TRANS

lighthouses

MORE THAN GREEN

Lighthouses
of transformative
nature-based solutions
for inclusive communities

Funded by
the European Union

Deliverable D5.1 – Formalization of the Living Knowledge Labs

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INTRODUCTION

Purpose of deliverable

This deliverable will present how each Living Knowledge Lab (LKL) has emerged and the particular governance constellations that will be the baseline for the pilot projects. It will include case-specific learnings (giving special attention to assessment cases learnings) and pragmatic solutions to local challenges.

This deliverable is developed as a roadmap, an essential step in building a common ground to "how you put things in motion" and to define what we would like to reach. It encompasses a roadmap for the initial stages of the pilot cases development. It demonstrates the activation and formalization of the living knowledge labs for the pilot cases. This deliverable portrays a process as well as a result.

It portrays a process, meaning that the partners follow the roadmap to develop their pilot case, concurrently implementing the frameworks and theories derived from other conceptual tasks within the TRANS-Lighthouses initiative. This deliverable demonstrates the development of the pilot case starting from the exploratory phase, where the physical and socio-economic characteristics of its territory, its actors and its social and ecological challenges are described that amount into an initial definition of the pilot's goals. Further progressing to the completion of the initiation phase, where the living knowledge labs have been compiled in coherence with the TRANS-lighthouses requirements and where they have been activated by means of learning/unlearning workshops. The process ends where based on the workshops and activities a common understanding of pilot case goals has been co-created and where the living knowledge labs have been formalized into a co-governance structure, going forward with the step by step co-diagnostic and implementation of the pilot case project which is the scope of task 5.2 and deliverable 5.2. The deliverable thus identifies at the same time how pilot projects will go forward in time, being involved in the other work packages. In this sense, it frames the baseline of each LKL pilot.

The deliverable roadmap is a general guideline, which the pilot cases' partners can adapt and make their own. It is important that this roadmap portrays the local processus of the pilot case, namely how it was launched and how the TRANS-Lighthouses philosophy and conceptual tasks have been integrated in each case.

The deliverable also portrays a result, where the partners activities are mapped and where their findings and reflections are registered. It describes the way a pilot case has matured in the initial stages of the pilot cases development, thereby providing valuable insights and data for the other conceptual tasks of the TRANS-Lighthouses initiative. The pilot's chapter can be used independently to communicate with the local partner and communities as a result of the first year of activity focused on the activation of the living knowledge lab.

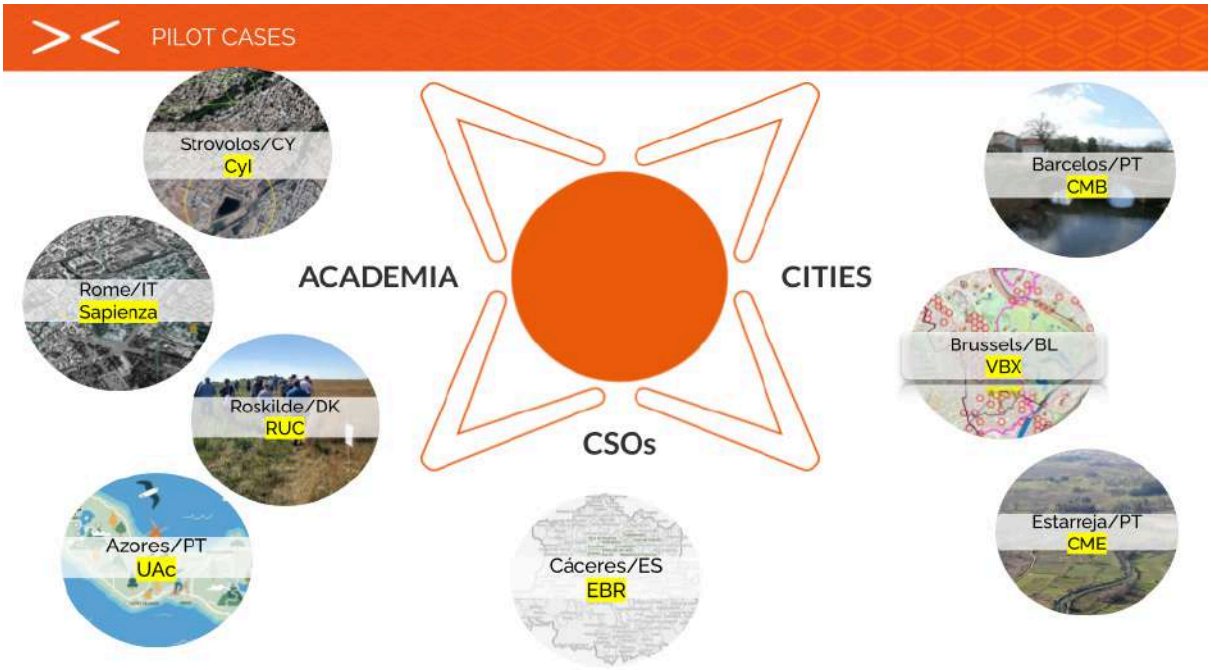


Figure A: Organisation of the pilots according to the nature of their leading partner - academia, cities (municipalities), Community Servise Organisation (CSO) (TRANS-Lighthouses, 2023)

Roles and objectives in relation to other work packages

This deliverable dialogues with the work put forward in several other work packages and deliverables. In this sense, for each step in the roadmap is written in detail with which work packages the specific step interacts with and how, with reference to the responsible work package leader.

In general, D5.1 builds upon the following work packages:

- Task 2.4. Co-production of living knowledge: learning and unlearning (M01 - M20).
  T2.4 designs the references framework for the LKL's through a series of workshops or webinars with local teams, where lived experiences and practices, sharing and learning among a diversity and plurality of actors and knowledge is central. These series of workshops or webinars in which the (un)learning of practices and experiences of and between stakeholders is shared, will help formalize the LKL. T2.4 proposes to organize 2 learning/unlearning interventions in the form of dialogue workshops for one pilot case. Based on the concerns of the survey, these dialogue workshops will (i) be organized around creating cooperation, understanding and dialogue and (ii) be organized around creating common ground, motivation and engagement for the pilot case.
- Task 4.2. Mapping public, private, associative and community-based models of governance (M5-M10).
  In T4.2 there will be a screening for different governance challenges in the local pilot cases: 1) the cultural, technical and political obstacles and opportunities for the co-creation of NBS, 2) the best ways to give more visibility and voice to the diversity of citizens, stakeholders and authorities engaged; 3) the best combination of norms, values

and communication codes. Based on what we learned about the existing participatory culture on the territory of the pilot cases, we are able to find opportunities and barriers for participatory governance and co-creation in their territories. The evaluation of the local participatory culture and local governance challenges will help guide the mobilization of the LKL.

- Task 4.3. Designing innovative governance systems (M7-24).
  T4.3 will establish systems of governance with engaged citizens, organized and non-organized, interested networks, public authorities and other identified stakeholders. The system will be structured according to the challenges for addressing social and ecological just transition and in methodologies and approaches to collaborative management, creating local networks. The LKL will discuss and agree upon a governance model, which will be facilitated and assisted by the local coordinator and local task forces of the pilot case.
- Task 6.2. Approaches and pathways to social mobilization and citizen engagement for NBS (M01-M12).
  T6.2 is intended to design a framework dedicated to citizen involvement based on existing and previous experiences of the communities regarding participatory activities. This framework will be provided to the local teams of the pilot cases, who will use it for T5.1 through a mapping process which mainly includes target knowledge, i.e. the more we know our target, the more we will be able to propose an appropriate communication strategy. This task also produces communication guidelines for NBS when interacting with different categories of stakeholders.
- Task 6.3. Fine tuning of participatory methods (M01- M36).
  Within T6.3, participants will propose methods which can be applied in participatory processes of the pilot cases in T5.1. Among these there are methodologies and participatory techniques relevant for the exploratory phase, networking activities of/for the pilot case and for the formalization of the LKL.

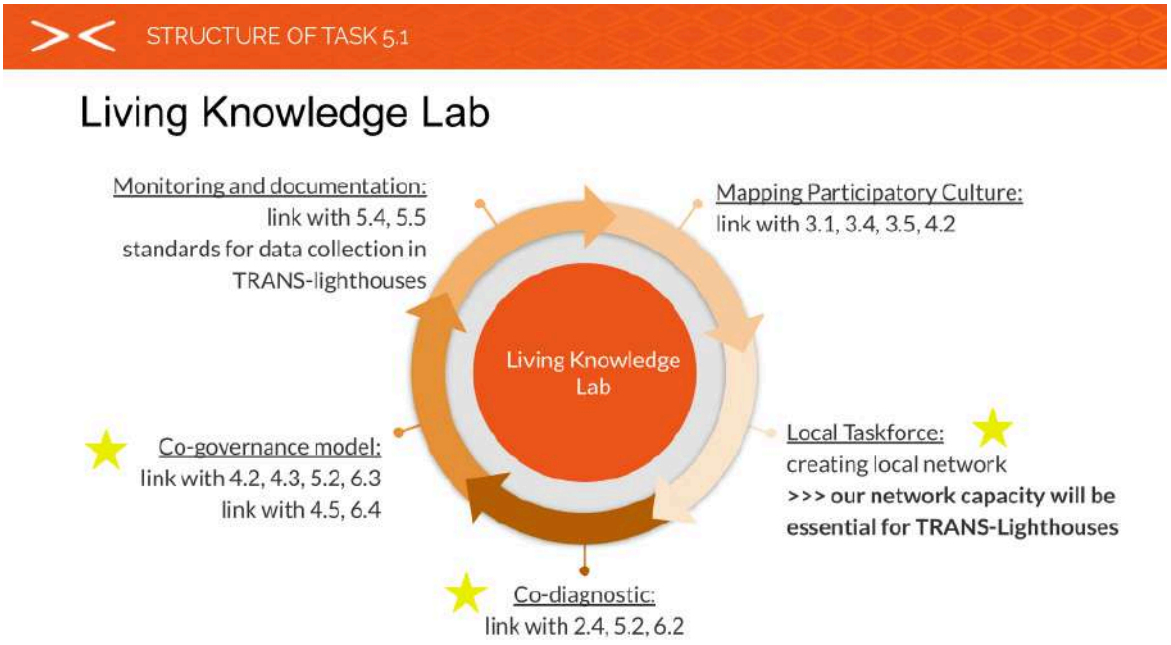


Figure B: Structure of Task 5.1 related to the formalisation of the Living Knowledge Lab (TRANS-Lighthouses, 2023)

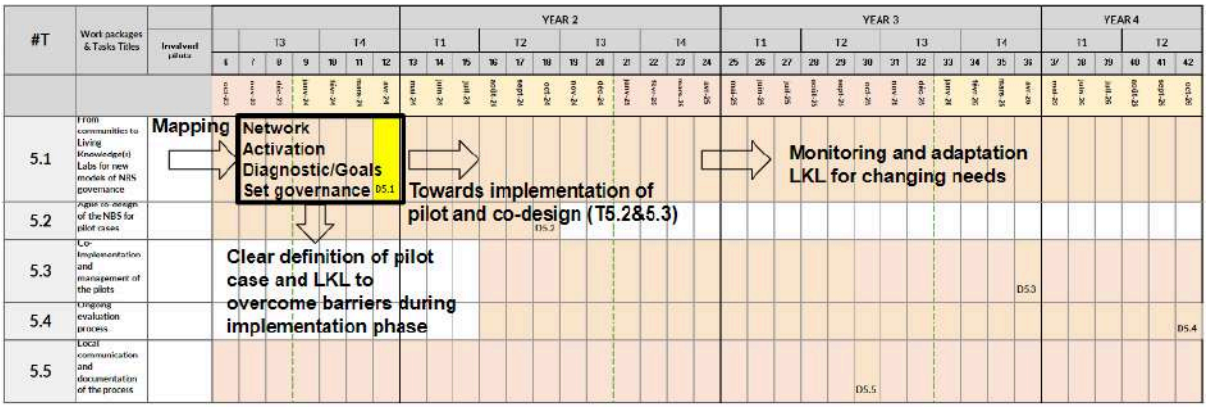


Figure C : Gantt Chart related to WP5 and objectives of Task 5.1 (TRANS-Lighthouses, 2023)

Constructing the deliverable

Based on the dynamic learning agenda and the learning outcome analyses of WP6, this deliverable has been constructed during the following significant events.

The following table provides a summary of the various actions and events that led to the construction of the roadmap and the deliverable 5.1. The pilot forums, which were initiated in December 2023 and held on a monthly basis, proved to be an excellent format for discussing and elaborating on the general roadmap. Additionally, the pilot forums served as a valuable opportunity for establishing connections between other tasks leaders and pilots, as well as for pilots to share their daily challenges. Furthermore, the forums served as a platform for discussing and updating each pilot on the entirety of WP5.

Date or period	Event	Explaination
October 2023	Meeting between the coordinators on the start of D5.1	The starting date of T5.1 was advanced to M7 instead of M12 in order to complement the pilots efforts to start reconnaissance of the terrain, their network activities and the defining of their pilot cases goals. We saw that the pilots had difficulties commencing their activities, setting the boundaries of their pilot case and felt lost in the structure and workload of the conceptual tasks of the TRANS-Lighthouses project
October - November 2023	Startup survey	The Startup survey established a level playing field between the pilot cases partners for the co-creation of D5.1. Different expectations on T5.1 and D5.1, as well as fears, barrières, and opportunities were mapped. The survey was further important to understand each pilot case partner their experience on LKL and to map the maturity of each pilot case with the start of T5.1.
November 2023	T5.1 and T5.2 startup meeting	A kickoff meeting was held, where we discussed the results and the way going forward with D5.1. Learning from the startup meeting it was decided to hold monthly pilot forums to share concerns, knowledges and the advancement of the pilot cases between the pilot case partners and the conceptual task leaders. A further requirement was the construction of a roadmap for pilot cases to follow over time, advancing the pilot case towards the formalization of the LKL and integrating the conceptual requirements of the TRANS-Lighthouses project.
December 2023	First pilot forum and draft D5.1	During the first pilot forum the draft D5.1 was presented. The deliverable contains a roadmap for the first stages of development of the pilot case, that integrates the conceptual tasks in certain steps, ensuring the TRANS-Lighthouses philosophy and methodologies are integrated in the pilot case and ensuring data collection for the conceptual task leaders.

January 2024	Pilot forum	In the second pilot forum, the pilots' case partners discussed the advancement of their pilot cases and exchanged knowledge. Common methodologies were discussed.
February 2024	Pilot forum	After the first pilot forum it was clear the draft D5.1 required collaboration with other conceptual work packages and pilot case partners to be well adapted to all pilot cases specificalities and other tasks. In the third pilot forum the final version of the roadmap was agreed upon, together with a timing. Conceptual tasks, like the (un)learning workshops were discussed, but found to be best executed in a later stage, outside of the scope of D5.1.
March 2024	Pilot forum replaced by bilaterals meetings	Following the previous discussion, bilateral meetings were held between the Task Leaders and each pilot to review the roadmap together, answer any questions and overcome any specific challenges.
April 2024	Pilot forum	During this forum, pilots detailed several issues and challenges met on the field with the formalization of the LKL. Deadlines for submission were adjusted taking into account the information shared by pilots.
May 2024	Pilot forum	Updates by each pilots were given on the state of advancement. Calendar for submission was presented and an introduction for the T5.2 was given.
October	Consortium meeting	Presentation and discussion of the closing section - conclusions and main findings and results

Table 1: Main events and meetings organised in the frame of task 5.1

Executive Summary

The formalisation of the living knowledge labs of each pilot case was achieved during the first year of the project, according to the guidelines co-created during the pilot forum meetings. A baseline for the activation of the co-creation process was established with a roadmap where pilots identify the territorial, socio-economic and ecological challenges and opportunities that frame the goals for the lighthouse.

The activation of the LKL is the result of the participatory and governance mapping where the strategy and action for the LKL was defined. In this sense, the pilots are creating cooperation, understanding and dialogue with the local community, through social mobilisation and engagement.

A structure for participatory governance was designed and will be implemented during the co-creation of nature-based solutions in each lighthouse, during the next steps of the project. The aim is to reconnect people with nature, taking in consideration the different context, the local knowledges and the specific goals of the pilot cases.

Structure of the deliverable

The deliverable is structured into three main sections.

(1) Firstly, there is a common section that describes the roadmap for the pilot cases in the early stages of development until the formalization of the LKL and the decision on a co-governance model. This roadmap serves as a general guideline or a template, which

each pilot case's partners have adapted to account for their specific characteristics (e.g., territorial, organizational, etc.), stage of advancement, and circumstances.

(2) Secondly, a pilot section where all pilot cases are described in line with the roadmap. This section details all relevant information regarding each pilot, their advancements and activities, their learnings and unlearnings, their challenges and opportunities and their strategy to formalize the LKLs. It is crucial that each pilot section accurately reflects the local processes of each pilot case.

(3) Thirdly, there is a closing section where the main findings, results and conclusions are presented regarding the formalization of the LKL that are common or peculiar for the pilot cases.

Concepts and Methodologies

TRANS-lighthouses pilot cases

At the application TRL pilot cases where defined as:

> "TRANS-lighthouses considers rural, urban, coastal and forestry geographical areas to be complex systems that are artificially contained by boundaries, features or scales, The project recognizes the particular characteristics of each geographical area as a principle to design and implement their solutions. Opportunities that emerge from the TRANS-lighthouses for the local context is the integration of 08 Local pilot cases to test new governance and co-creation models and to adapt the responses of NBS to different socio-political contexts. Each pilot case consists of a specific governance model, a specific target group, a social topic, a combination of NBS, and small-scale but big-picture projects that can be upscaled over time. Each pilot case has a local partner to enable implementation (NGO, university or municipality) and a scientific partner to lead data collection for assessment." (TRL, 2022, Part B, P.8)

The 08 pilot cases are located on the North (Denmark and Belgium), South (Rome), East (Cyprus) and West (Spain and Portugal) to represent the different European geographies, societies and cultures.

The pilot case has an experimental dimension that aims to implement nature-based solutions co-created with the local community, according to the principles and methodologies proposed by translighthouses. The solution can be replicated and up-scaled in the some territory or in similar contexts.

Living knowledge Lab

At the application LKL where defined as:

> "Each pilot case establishes a Living Knowledge(s) Lab gathering a diverse composition of local actors (formal and informal organizations, citizens, municipal actors, researchers) who will co- discuss, monitor, assess, design and plan the contribution of NBS to a just transition, including: (1) social benefits for that specific target group, (2) the social and ecological transformative capacity of specific NBS, according to the specificities of the geographical area, (3) capacity of introducing democratic innovations into the model of governance, including pathways towards co-decision and co-production of solutions for a just transition, sustainable wealth generation and job creation, (4) specific contribution of the NBS and the NBS co-creation process for the perception of the value of nature, (5) co-production in terms of designing material and immaterial NBS." (TRL, 2022, Part B, P.8)

Living Labs are spaces of experimentation activated by local communities with partners to co-create solutions for their challenges. The living lab is located in the territory with a material or immaterial presence and aims to take advantage of the local knowledge to address the needs of the community. It also empowers the citizens to be part of the transformation process from the first moment and offers the tools to an effective participation. The living Knowledge Lab, is based on tacit knowledge developed through the experience of the people that live, work and study in a territory and it dialogues with other actors to share and learn, other forms of knowledge namely academia, municipalities, companies. To establish this knowledge sharing, it is important to promote an unlearning process to set up an open learning environment.
According to the ENOLL, "Living Labs (LLs) are open innovation ecosystems in **real-life environments** using **iterative feedback processes** throughout a **lifecycle approach** of an innovation to create **sustainable impact.** They focus on **co-creation, rapid prototyping & testing** and **scaling-up** innovations & businesses, providing (different types of) **joint-value** to the involved stakeholders."[1]
In this context, living labs operate as **intermediaries/orchestrators** among citizens, research organizations, companies and government agencies/levels. Within a wide variety of living labs, they all have common characteristics, but multiple different implementations.

Outputs
Living Knowledge(s) Labs activated reinforcing local communities capabilities
Indicators - 08 LKL working community-led, guidance for citizen engagement jointly elaborated. Empowerment. Evaluation scale results. 01 NBS LKL Playbook. 08 NBS participatory budgeting processes organized to select local the NBS. Each pilot case: 30 participatory budgeting participants for ideation and 150 for voting, 01 Youth group engaged. Minimum of 100 students directly benefiting from NBS' co-creation in each lighthouse. Establishment of NBS in each pilot case.

Outcomes
Local communities engaged in co-creating NBS that directly benefit under-represented groups. Reinforcement of local communities capabilities. Co-production initiatives between local authorities and local communities. NBS participatory budgeting qualified through test and demonstration.

Impacts
Communities better prepared to actively face climate change and ecological transition. Youth, womens and vulnerable communities are politically conscients. Systematically use the lens of exclusion and integrate groups exposed to social and environmental justice. Environmentally-friendly food practices.

Long term effects
Expansion of each lighthouse communities that are NBS literate, environmentally conscious, just, equitable, and effects that live in a more balanced relationship with their territories. Interested persons continue LKL activities beyond project lifetime using its tools and guidelines. (TRL, 2022, Part B, P.14-15)

[1] European Network of Living Labs, "What are Living Labs", https://enoll.org/about-us/what-are-living-labs/

Territorial Mapping

In the context of the Trans Lighthouses project, "territorial mapping" refers to the systematic process of collecting, analyzing, and visually representing spatial data to define and understand the socio-economic, environmental, and cultural characteristics of specific regions. This methodological approach could use Geographic Information Systems (GIS), other spatial analysis and co-diagnostic tools to produce detailed maps that serve as critical instruments for regional/municipality planning, policy-making, and resource management (Goodchild, 2007; Crampton, 2010). Territorial mapping in this project is a key concept for identifying local disparities, opportunities, and needs, thereby facilitating evidence-based decision-making and strategic interventions to strengthen balanced regional development and social cohesion.

Participatory Culture

The concept of "participatory culture" refers to the collaborative engagement of local communities and stakeholders in the process of co-creation. This approach emphasizes the inclusion of diverse voices and perspectives, ensuring that the knowledge and experiences of community members are integral to the project's activities. Participatory culture in this context promotes active involvement and co-creation, moving beyond traditional top-down approaches to embrace a more democratic and inclusive methodology (Jenkins et al., 2009). By involving local stakeholders in data collection, analysis, and decision-making, the project not only enhances the accuracy and relevance of the maps produced but also strengthens the social cohesion and resilience of the communities involved (Foth & Hearn, 2007).

The participatory culture is related to the experience that local actors have in participatory projects and their common understanding on how the process should be conducted. The participatory culture is the environment to activate new projects taking advantage of methods and tools already tested. The acknowledgement and understanding of participatory culture of each given context enables the emergence of various strategies that relate to governance dynamics. Therefore as a means to set the scene for more collaborative modes of proceeding in regards to decision-making processes, the mapping of participatory culture allows for the social, cultural and political dimensions to be asserted, thus shedding a comprehensive lens over the actions that need to be undertaken in each contextual setting towards processes of engagement among and between different stakeholders and dynamics of collaboration throughout the co-creation process. The comprehensive approach that entails the mapping of the participatory culture provides important insights in regards to enabling bottom-up approaches to be implemented and played throughout the co-creation process as it highlights the local settings strengths, weaknesses, opportunities and barriers. Therefore the mapping of participatory culture enables the emergence of thoughts and actions concerning the governance structures as well as ways to which these structures can change towards a more transformative nature approach, in which social needs are met, nature's voice is heard and institutional apparatus is based on collaboration and cooperation between and among the different stakeholders of a given context.

COMMON SECTION: A ROADMAP FOR THE PILOT CASES

Introduction to the roadmap

This section is constituted by a common guideline or template to support the pilot cases, in order to achieve a similar process and related results. This roadmap is an open methodology that each pilot can adapt to their local planning culture to take advantage of their experiences.

TERRITORY	***KNOWLEDGE***	***LIVING KNOWLEDGE LAB***
Description Territorial Socio-economic Participatory culture	Relationships Networking Stakeholders Marginalized knowledges youth Human-nature	Cooperation Social mobilisation Participation
Pilot goals Ecological Socio-economic	Strategies of LKL	Governance
		Monitoring

Roadmap Template

[Name partner]

1. Exploration of the territory, its actors and challenges

As is the starting point for all or most projects in their management or coordination, it is essential for the pilot cases to have an exploratory phase. In order to refine the goals of the pilot cases and their territory, it is essential to gather additional information about the current state of the territory, its participatory culture, its actors and its challenges. This chapter bundles the existing knowledge of the partners on their territory and gives insight on how the pilot cases goals came to exist, which in turn is necessary to understand the assembly/creation of the LKL.]

Description of the territory

Territorial description

Macro: rural/forrest/urban/coastal lighthouse

Instructions for this paragraph	
Main description of the paragraph	Give a description of the physical characteristics of the municipality in which the pilot case is situated and orientate it in space. The physical characteristics concern for example its: geography, infrastructure, land use, density and urban form, landscape, facilities…
Must have data in this paragraph	It is important to highlight those factors that contribute to your municipality being a rural, forest, urban or coastal municipality and those macro factors that are of interest for the pilot case.
Length	200-400 words
Material for support	Maps, pictures, figures, tables, statistical data, GIS-data, policy documents, studies, urban development plans
Operationalisation of WP? Synergy with conceptual WP?	No
Contact in case of questions or aid	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators)
Comments from other WP leaders	

Micro: territory of pilot case

Instructions for this paragraph	
Main description of the paragraph	Give a description of the physical characteristics of the neighborhood in which the pilot case is situated and orientate it in space. The physical

	characteristics concern for example its: geography, infrastructure, land use, density and urban form, landscape, facilities…
Must have data in this paragraph	It is important to highlight those factors that contribute to the unique character of the neighborhood and those factors that are of interest for the pilot case.
Length	800-1000 words
Material for support	Maps, pictures, figures, tables, statistical data, GIS-data, policy documents, studies, urban development plans
Operationalisation of WP? Synergy with conceptual WP?	No
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators)
Comments from other WP leaders	

Socio-economic description

Macro: rural/forrest/urban/coastal lighthouse

Instructions for this paragraph	
Main description of the paragraph	Give a description of the social and economic characteristics of the municipality in which the pilot case is situated. The socio-economic characteristics concern for example its: population demographics, income and employment, education, health, cultural and recreational facilities, crime and safety
Must have data in this paragraph	It is important to highlight those factors that contribute to your municipality being a rural, forest, urban or coastal municipality and those macro factors that are of interest for the pilot case.
Length	200-400 words
Material for support	Maps, pictures, figures, tables, statistical data
Operationalisation of WP? Synergy with conceptual WP?	No
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinator)
Comments from other WP leaders	

Micro: territory of pilot case

Instructions for this paragraph

Main description of the paragraph	Give a description of the social and economic characteristics of the neighborhood in which the pilot case is situated. The socio-economic characteristics concern for example its: (diverse) population demographics, income and employment, education, health, cultural and recreational facilities, crime and safety and community engagement.
Must have data in this paragraph	It is important to highlight those factors that contribute to the unique character of the neighborhood and those factors that are of interest for the pilot case. For example, a mapping of associative and community-based actors working in the field of equality, population statistics or description concerning gender, cultural background, migration, socio-economic status and other vulnerabilities.
Length	800-1000 words
Material for support	Maps, pictures, figures, tables, statistical data
Operationalisation of WP? Synergy with conceptual WP?	No
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators)
Comments from other WP leaders	

Lessons from the participatory culture

[Together with the exploration of the physical and socio-economic characteristics of the territory, knowledge on the participatory culture and previous NBS projects with (or without) a participatory dimension within the territory will be essential for the organization of the LKL of the pilot cases. A mapping of participatory projects/trajectories, as well as an evaluation of their methodologies and results will generate a better understanding of the local participatory culture. This is framed in Task 4.2 and during the conceptual tasks surrounding the evaluation of the assessment case. For this deliverable, when knowing what works vs. what doesn't work, local pilot cases will have more tools for creating a successful LKL for new NBS and co-creation projects. An evaluation of the participatory culture (limits, opportunities) will lead to more hands-on participatory activities for co-diagnostic and co-governance that take into account the local social interaction and behavioral aspects].

Opportunities and barriers for participatory governance based on T4.2

Instructions for this paragraph	
Main description of the paragraph	This paragraph gives an overview on the accumulated experiences and conclusions of the pilot regarding T4.2. Based on what we learned about the existing project on the territory and their participatory structures, we are able to find opportunities and barriers for the participatory culture surrounding the implementation of NBS. This paragraph describes the main experiences and knowledge of the partners on the barriers and

	opportunities for participatory governance and co-creation in their territories. This paragraph serves as an evaluation of the local participatory culture and local governance challenges that will help guide the creation and mobilization of the LKL.
Must have data in this paragraph	The conclusions will be structured according to the different dimensions of existing co-governance structures. See analytical categories and indicators in the working document of the methodological development of Task 4.2: Work Document 2 - Mapping of Local Participatory Culture: Methods and Indicators (basecamp.com). For example, register socio-cultural, political and local obstacles and opportunities for participatory governance, barriers and obstacles based on NBS cases and co-creation processes, regulatory instruments over public, private, associative and community-based sectors that impact just transition and collaboration that is lacking or needs to be improved, as well as limits, controversies and opportunities to the co-creation approach relevant to take into account.
Length	1000-1500 words
Material for support	Websites, stakeholder spidergrams, images, charts, recordings, conclusions from interviews, also evaluations from participants or stakeholders, SWOT-analysis
Operationalisation of WP? Synergy with conceptual WP?	Task 4.1 - T4.1 creates a framework with governance archetypes that will sustain the process of situating the systems of governance from the assessment and pilot cases: D4.1 Governance archetypes framework for NBS (basecamp.com) Task 4.2 - In T4.2 there will be a screening for different governance challenges in the local pilot cases: 1) the cultural, technical and political obstacles and opportunities for the co-creation of NBS, 2) the best ways to give more visibility and voice to the diversity of citizens, stakeholders and authorities engaged; 3) the best combination of norms, values and communication codes. Task 6.2 - T6.2 is intended to design a framework dedicated to citizen involvement based on existing and previous experiences of the communities regarding participatory activities. This framework will be provided to the local teams of the pilot cases, who will use it for T5.1 through a mapping process which mainly includes target knowledge, i.e. the more we know our target, the more we will be able to propose an appropriate communication strategy. This task produced communication guidelines for NBS when interacting with different categories of stakeholders: TRL_D6.1.docx - Google Documenten
Contact in case of questions	Isabel Ferrera (T4.1 coordinator), Joana Santos (T4.2 coordinator) and Jules Sekedoua (T6.2 coordinator)
Comments from other WP leaders	

Opportunities and barriers for participatory governance based on the assessment case

[only for partners that are also responsible for an assessment case]

Instructions for this paragraph	
Main description of the paragraph	In this paragraph the partners will introduce the assessment case and the lessons it has learned from the assessment case in terms of participatory governance and culture. This paragraph serves as an evaluation of the local participatory culture and local governance challenges in the assessment case that will contribute to the emergence and mobilization of the LKL. Participatory exercises/activities for mapping and evaluation of the pilot case can also be included.
Must have data in this paragraph	The assessment case, its goals and actions need to be described as well as its participatory activities. Its co-governance structures and socio-cultural, political and local obstacles and opportunities for participatory governance need to be analyzed according to the frameworks of T4.1 and T4.2: see Work Document 2 - Mapping of Local Participatory Culture: Methods and Indicators (basecamp.com) and the above paragraphs for more information. In this paragraph then, the partners will ask themselves what stories and epistomologies from the assessment case can be useful and interesting for the further development of the pilot and the LKL.
Length	500-1500 words
Material for support	websites, stakeholder spidergrams, images, charts…
Operationalisation of WP? Synergy with conceptual WP?	Task 3.3 - T3.3 concerns deep research process over assessment and pilot cases that will be applied to reach a comprehensive evaluation on NBS design and implementation.
Contact in case of questions	Beatriz Caitana (T3.3 coordinator), Gerd Lupp (WP leader)
Comments from other WP leaders	

Definition of the pilot case goals

[Based on the territorial reconnaissance and the analysis of the participatory culture, we can identify some ecological and socio-economical challenges, around which the pilot case and the NBS can be constructed. How will the pilot case approach these ecological and socio-economical challenges? We need to explore this first in order to be able to gather the necessary knowledge and expertise for the LKL. This chapter thus defines the goals and the NBS-application of the pilot case. It is important to note that these elements may be adapted after the co-diagnostic activities in task 5.2. However, it is necessary to already have knowledge on the main goals and to have a preliminary idea of NBS-application in order to construct and assemble

the LKL and engage its actors. This way, by continuous (re)evaluation of the pilots goals during co-creation activities and the advancement of the pilot case,, the idea of reflective monitoring is introduced into the pilots development]

Instructions for this paragraph	
Main description of the paragraph	In this paragraph partners can shortly introduce their pilot case, in line with the posters made for the first consortium meeting: Pilot cases - July 2023 (basecamp.com).
Must have data in this paragraph	Only a very short introduction of the pilot case is needed. In the following paragraphs we expand on the ecological application of the NBS and the social dimension and the ecological and social goals of the pilot case. In a later chapter we expand on the stakeholders.
Length	100-200 words
Material for support	Maps, pictures, illustrations, figures
Operationalisation of WP? Synergy with conceptual WP?	D6.1 (part 2.2) also contains a short mapping and definition of the pilot cases and their goals: TRL_D6.1.docx - Google Documenten, as well as slide 6 on the methodology on co-design of T5.2: 5.2 Methodology for co-design (basecamp.com).
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinator)
Comments from other WP leaders	

Ecological challenges

Ecological goals and description of the NBS

Instructions for this paragraph	
Main description of the paragraph	This paragraph describes the ecological problem faced by the territory or neighborhood of the pilot case. It describes the risks in light of climate change and the resilience of the territory. The paragraph further describes the goals of the pilot case in light of addressing this problem and its choice of NBS in the pilot case in opposition to other solutions.
Must have data in this paragraph	The paragraph must contain a description of the ecological problem and its technical complexity and barriers in the territory (what, why, how) and how the pilot case addresses the ecological problem. The ecological side of the NBS of the pilot case (what, why, how it works) must be clearly explained and motivated why the specific NBS is the preferable solution. In contrast to D6.1 (part 2.2), where the ecological challenges are explained in a general way and connected to a lighthouse typology, we invite you here to write down your ecological problem and the NBS in detail.

Length	500-700 words
Material for support	Maps, pictures, illustrations, figures, tables, examples
Operationalisation of WP? Synergy with conceptual WP?	Task 2.1 and deliverable 2.2 - T2.1 and D2.2 provide an Internal Conceptual Framework on NBS and describe the different dimensions (nature, social, economic) of NBS: T2.1 (basecamp.com)
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinator) and Anna Umantseva (T2.1 coordinator)
Comments from other WP leaders	

Local values and attitudes towards the ecological challenges

Instructions for this paragraph	
Main description of the paragraph	This paragraph describes the relationship and the position of the community of the pilot case towards the ecological challenges that are being addressed in the pilot case.
Must have data in this paragraph	Local social interaction and behavioral aspects: attitudes, habits, behavior, resistances and core values from the community towards NBS and the ecological context or climate change. Are there any barriers or dispositions, lack of solidarity, etc. that render the implementation of NBS difficult? Put a focus on socio-cultural experience and knowledge, considering the LKL focus on diversity of knowledge mobilized within NBS implementation.
Length	400-500 words
Material for support	Pictures, illustrations, figures, tables,
Operationalisation of WP? Synergy with conceptual WP?	Task 3.4 - T3.4 generates a deeper knowledge about behavioral aspects from the co-creation process, and spawn understanding of attitudes, habits, behavior, resistances and core values from the community to the NBS involved. Task 3.5 - In T3.5 differences and similarities of perceptions, representations and practices between the different categories of stakeholders (inhabitants, government agents, members of associations, networks, citizens etc.) and the plurality of contexts (urban, rural, coastal, forestry) are registered.
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators), Jose Luis Fernandez (T3.4 coordinator) and Géraldine Molina (T3.5 coordinator)
Comments from other WP leaders	Beatriz Caitana (T3.3 coordinator) - NBS "solutions and attitudes", local values section, also socio-cultural experience and knowledge, considering the LKL focus on diversity of knowledge mobilized within NBS implementation.

Socio-economic challenges

[The following paragraphs describe the socio-economic challenges in the territory or neighborhood of the pilot case. The pilot cases' implementation needs to result in social inclusion and in long lasting social cohesion in the local community (no one left behind). Therefore marginalized knowledge and socio-economic needs of marginalized groups should be identified and addressed, as well as certain absences.]

Identification of marginalized knowledges and of needs of marginalized groups

Instructions for this paragraph	
Main description of the paragraph	This paragraph identifies marginalized groups and knowledge that are underrepresented in today's society. The information from this paragraph builds strongly on the socio-economic territorial description in the previous chapters. The socio-economic needs of marginalized groups need to be identified and described and there needs to be a motivation of why and how the pilot case goals and the NBS addresses these needs.
Must have data in this paragraph	Identification of socio-economic problems and social networks in the area. Identification of areas of exclusion, abandonment, vulnerabilities (e.g. poverty, racism, integration, happiness, etc.) for certain groups. The partners can register here what networking actions they undertook in their territory to understand their social challenges. The specificities of the social groups are to be registered (e.g. age, gender, race and ethnicity, functional diversity, socio-economic status, culture, religions, local history and existing relationships). From this analysis, priority target groups can be identified.
Length	500-800 words
Material for support	Pictures, illustrations, figures, tables, notes on meetings with associations, interviews, policy documents…
Operationalisation of WP? Synergy with conceptual WP?	Task 2.1 - T2.1 will focus on re-thinking NBS through the lens of action research, participatory processes and inclusive communities: T2.1 (basecamp.com). This task will focus on extending the understanding of what is NBS by relying on sociology of absences (Santos, 2001) and asking what is not there and who is not there? Task 3.1 - Following the principle that NBS are beneficial for all stakeholders and inclusiveness, task 3.1 lays a focus on strategies to successfully involve and engage especially vulnerable groups such as women, youth, indigenous populations and those hit the hardest by the COVID-19 pandemic in the co-creation of NBS as well as on under-researched groups.
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators), Anna Umantseva (T2.1 coordinator) and Gerd Lupp (coordinator of T3.3), Nathalie Nunes (general TRL)
Comments from other WP leaders	

Identification of presences and absences

Instructions for this paragraph	
Main description of the paragraph	This paragraph describes what is absent and who is absent in the territory of the pilot case, upon which an equality is sustained or introduced. This paragraph also describes what is present, upon which an equality is sustained or introduced. The paragraphs describe how the pilot case and the NBS addresses the absence or presence and sustained or introduced inequality and motivates why. These absences can be economical in nature or societal. This paragraph needs to specifically address the social and economic dimension of the NBS of the pilot case For example of the economic dimension: "how do the NBS make urban regeneration inclusive and how does it contribute to the solidarity economy?".
Must have data in this paragraph	
Length	500-700 words
Material for support	Pictures, illustrations, figures, tables,
Operationalisation of WP? Synergy with conceptual WP?	Task 2.1 - T2.1 will focus on re-thinking NBS through the lens of action research, participatory processes and inclusive communities: T2.1 (basecamp.com). This task will focus on extending the understanding of what is NBS by relying on sociology of absences (Santos, 2001) and asking what is not there and who is not there? Transformative Economies Task Force - Publications (basecamp.com)
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators) and Anna Umantseva (T2.1 coordinator), Beatriz Caitana and Pedro Gouveia (Transformative Economies Task Force)
Comments from other WP leaders	

2. Collecting the required knowledges for the Living Knowledge Lab

[There has been a reconnaissance of the territory, its actors and its participatory culture and the pilot cases' goals in light of its main ecological and socio-economic challenges and its (possibly preliminary) NBS-application have been defined. Furthermore, the case-specific learnings from the assessment case and the mapping of the participatory culture can provide ideas for pragmatic solutions to local challenges in the emergence of the LKL. Understanding the territory, the challenges and the participatory culture,it is possible to create relationships with potential partners for the emergence of the LKL.]

Creating relationships with partners

Networking and exploratory activities in territory

Instructions for this paragraph	
Main description of the paragraph	The partners have conducted for their reconnaissance of the territory and in order to network with potential partners conducted networking

	and exploratory activities in territory in line with the tasks of the TRANS-Lighthouses project. This paragraph allows the partners to register all their field activities necessary for the exploratory phase of the pilots development.
Must have data in this paragraph	Registration of meetings, terrain visits, events from local communities and organizations, etc. where partners were present in order to learn from different groups stakeholders about their challenges, in order to gain more connection with the territory of the pilot case and in order to explore opportunities for working together towards the co-creation of the pilot case in a LKL. Registrations of dates, locations, names and types of stakeholders, notes on what activity was performed, what was learned and the characteristics of the territory. Partners are invited to thoroughly make themselves familiar with the guidelines of WP concerning NBS communication and methodologies for involving and motivating stakeholders.
Length	300-500 words
Material for support	Lists of contacts, event brochures, pictures, recordings, interviews…
Operationalisation of WP? Synergy with conceptual WP?	Task 4.2 - In T4.2 there will be a mapping of participatory culture. In this mapping, different methods or tools for collecting data can be used, that can also be of use for networking with stakeholders: direct observation, exploratory interviews, walkthroughs, motivational interviewing, semi-directive interviews, cultural mapping and photovoice: Working Documents (basecamp.com) Task 6.2 - T6.2 is intended to design a framework dedicated to citizen involvement based on existing and previous experiences of the communities regarding participatory activities. This framework will be provided to the local teams of the pilot cases, who will use it for T5.1 through a mapping process which mainly includes target knowledge, i.e. the more we know our target, the more we will be able to propose an appropriate communication strategy. This task produced communication guidelines for NBS when interacting with different categories of stakeholders: TRL_D6.1.docx - Google Documenten. Task 6.3 - Within T6.3, participants will propose methods which can be applied in participatory processes of the pilot cases (T5.1). Among this there may be methodologies and participatory techniques relevant for the exploratory phase and networking activities of/for the pilot case: Preliminary set (basecamp.com). See also: Resources repository (basecamp.com).
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinator) and Jules Sekedoua (T6.2 coordinator).
Comments from other WP leaders	

Bringing members/stakeholders in the LKL

[After making connections with the local community and the relevant stakeholders of the territory, and with knowledge of the pilot goals, partners can select and assemble the relevant members of the LKL. These members have to be carefully chosen in order to successfully advance the pilot case with respect to the philosophy of the TRANS-Lighthouses project.

Instructions for this paragraph	
Main description of the paragraph	In this paragraph the stakeholders (=members of the LKL) will be defined. This paragraph includes a stakeholder mapping based on certain characteristics, in order to analyze the role they will play in relationship with each other and in relation to the advancement of the pilot case goals. It is important to choose stakeholders based on a thorough analysis of possible barriers and goals in the pilot case and to reflect on what knowledge will need to be brought together and represented. It is imperative to choose stakeholders that can overcome blockades in the process and to maintain close relationships with those that can introduce blockades.
Must have data in this paragraph	This paragraph includes basic information on the stakeholders (names, types, location of settlement, tasks, statutory goals…). In this paragraph it is important to understand the interests of the stakeholders and to define the opportunities for collaboration (what do they want). Furthermore it is important to ensure that in the choice of stakeholders a diverse kind of knowledge is represented and that the representation of the totality of (types) of stakeholders is fair and inclusive (no one left behind). Next it is important to understand the barriers towards the pilot case of each stakeholder and the individual power or importance of the stakeholders in the advancement of the pilot case. This knowledge may result in the partners choice of approach and relationship with certain stakeholders. Finally the partners must define what function the stakeholders will play or what role they will fulfill, representing their specific knowledge in the LKL and for the advancement of the pilot case (e.g. how will they help overcome barriers). Special attention needs to be put on how citizens are a part of the LKL, either directly or by representation through an intermediary actor. If by intermediary actor (e.g. associative and community-based actors, local champions), the goals and nature of the intermediary and its connection with the community has to be described.
Length	1500-2000 words
Material for support	Contact lists, pictures, illustrations, figures, tables, websites…
Operationalisation of WP? Synergy with conceptual WP?	No
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinator)
Comments from other WP leaders	

Inclusion of marginalized knowledges

Instructions for this paragraph	
Main description of the paragraph	Looking at the paragraphs which describe the social challenges in the territory and the importance of inclusion of marginalized groups for the TRANS-Lighthouses project, this paragraph describes how knowledge of marginalized communities or groups are represented and included in the LKL.
Must have data in this paragraph	The paragraph must describe who or what marginalized group is represented, what knowledge is represented and how it is represented (direct representation or representation by an intermediary stakeholders or actor). If the representation is by an intermediary (e.g. associative and community-based actors working with these groups), the goals and nature of the intermediary and its connection with the marginalized group or community has to be described. In this paragraph the experience and difficulties of the partner with contacting these groups can be registered. The paragraph can describe how relationships are maintained within the social network to generate understanding of social issues of vulnerable and underrepresented groups (e.g. go to meetings and local events of local associations or communities).
Length	300-400 words
Material for support	Contact lists, pictures, illustrations, figures, tables, websites…
Operationalisation of WP? Synergy with conceptual WP?	Possibly task 2.1 - T2.1 analyses the socio-political and institutional constraints which prevent marginalized NBS actors to emerge and/or sustain themselves in order to have a meaningful societal impact.
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators)
Comments from other WP leaders	

Inclusion of youth

Instructions for this paragraph	
Main description of the paragraph	Different tasks in the TRANS-Lighthouses project target adolescents and youth. Even though the GA does not compel the partners to involve youth in the co-creation of the pilot case and thus to include empowered youth in the LKL, some partners might form a relationship with the youth or adolescents they engaged for other work packages. Partners are invited in this paragraph to describe if and how the knowledge of engaged youth or adolescents are included in the LKL and what their level of engagement is.
Must have data in this paragraph	It is important to register the characteristics of youth actors (age, education, socio-economic status) and their institution by which you

	contacted them (e.g. school, sports, movement, organizations), contacting and networking activities with these youth actors and what projects/engagements you involved them in.
Length	300-400 words
Material for support	Contact lists, pictures, illustrations, figures, tables
Operationalisation of WP? Synergy with conceptual WP?	Task 6.4 - T6.4 seeks engagement of local communities anchored in the NBS approach and processes, by developing actions, communication products and social mobilization targeting adolescents and youth, based on their empowerment as agents of change who can reach and amplify the engagement of other target groups. Pilot teams will be supported with training and guidelines for community communication of NBS with youth, and a digital platform will be implemented, including dedicated subsites for each LKL of the pilot cases, linked to the development of social media and media campaigns: T6.4 - Community-driven process based on youth protagonism (basecamp.com). Task 4.5 - T4.5 includes participation by youth in formal educational contexts and non-formal contexts. It will research how the governance models in educational institutions (high school, vocational education and universities) sustain opportunities and initiatives for participation. It will formulate contributions for reinventing institutional governance models towards co-creation of NBS. Students will be trained for actively participating in: 1) re-inventing educational co-governance for just transition; 2) creating curricula content regarding co-creation of NBS; 3) contributing to adjust curricula for responding to NBS job creation. The local youth groups activated within the T6.4 will support this tasks implementation, through the action for youth to identify the singularities from their context and to communicate these themes for broader context.
Contact in case of questions	Daniele Savietto (T6.4 coordinator) and Marta Maciel (T4.5 coordinator)
Comments from other WP leaders	

Relationship with and view of nature (human-nature relationship)

Instructions for this paragraph	
Main description of the paragraph	This paragraph includes a registration of perceptions and practices (cultural, political) surrounding NBS and nature and describes the relationship of the (categories of) stakeholders (=members of LKL) listed above towards nature. How is nature understood and what is nature, and how do the perceptions and practices of the stakeholders relate to their understanding of the pilot cases NBS goal? In this paragraph we also ask you to provide a reflection on how, for your territory, through the representation of stakeholders or directly, nature can or should be seen as an actor in the LKL? Could nature be a direct stakeholder in your LKL?

Must have data in this paragraph	In order to structure this paragraph the following data can be provided: categories of stakeholders (inhabitants, government agents, members of associations, networks, citizens), perceptions and practices (cultural, political) surrounding NBS, characteristics of the context (GIS, policy documents, studies, urban development plans…) and the definition of ecological challenges, what knowledge is lacking. It is however advised to contact the conceptual task leaders for specification.
Length	500-600 words
Material for support	Possible (based on conceptual tasks description): PPGIS (public participation geographic information system), participatory map-it exercises.
Operationalisation of WP? Synergy with conceptual WP?	Task 2.2 - By collaborating with the pilot cases across the lighthouses, T2.2 will collect qualitative and quantitative data about different types of ecological interconnectedness of people with their environments, in order to create an overview of human-nature relationship in diverse contexts. Task 3.5 - In T3.5 differences and similarities of perceptions, representations and practices between the different categories of stakeholders (inhabitants, government agents, members of associations, networks, citizens etc.) and the plurality of contexts (urban, rural, coastal, forestry) are registered. The aim is to describe and map what counts as nature and what is valued in different territories and groups. Task 4.1 - T4.1 creates a framework with governance archetypes that will sustain the process of situating the systems of governance from the assessment and pilot cases.
Contact in case of questions	Anna Umantseva (T2.2 coordinator), Géraldine Molina (T3.5 coordinator) and Isabel Ferreira (T4.1 coordinator).
Comments from other WP leaders	

Strategy and actions for the LKL

[After having selected the diverse knowledge required for the advancement of the pilot case and their representation through stakeholders in the LKL, we can develop actions and strategies to solidify the LKL and to address essential questions and concerns for mobilizing and engaging its members/stakeholders. These questions need to be addressed through the formalization of the LKL.]

Addressing questions like XXX in the LKL through its formalization

Mistrust between population and municipality	Enabling new ideas and practices next to old ones	Overcoming power relationships
Ensuring representativity of stakeholders and inclusion of knowledges	Enabling local groups to take ownership	Definition of pilot case

Ensuring continuity in a changing political landscape	How to create social inclusion and long lasting social cohesion in the local community (no one left behind).	What is to be unlearned from present approaches of co-governance
What is to be unlearned and learned between the LKL members	How can members be approached and motivated, what do the stakeholders want and what can they gain?	What is to be learned in the new LKL regarding absences and unlearned regarding presences.

Instructions for this paragraph	
Main description of the paragraph	In this paragraph we ask the partners to reflect on their strategy and actions to mobilize and engage the members towards working together for (the duration of) the TRANS-Lighthouses project. The formalization (by means of learning and unlearning workshops, co-diagnostic activities and the forming of a co-governance structure) of the LKL will be registered in the next chapters. This paragraph concerns itself with the identification of what questions need to be addressed and what actions and strategies need to be implemented throughout the formalization of the LKL, in order to result in a successful mobilization of its members, a common understanding of the pilot cases goals and good relationships and agreements between each other. The case-specific learnings from the assessment case and the mapping of the participatory culture can provide ideas for pragmatic solutions to local challenges. Partners are invited to bring these solutions forward for implementation. Furthermore, partners are required to translate the case-specific learnings from the assessment case and the mapping of the participatory culture into ideas for pragmatic solutions to local challenges in the emergence of the LKL.
Must have data in this paragraph	
Length	800-1000 words
Material for support	None, concerns reflection
Operationalisation of WP? Synergy with conceptual WP?	No
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators)
Comments from other WP leaders	

3. Formalizing the LKL

[Now the LKL has emerged and has been organized, as well as strategies for its successful formalization have been reflected on, we can bring the formalization/mobilization/solidification of

the LKL into practice. Based on the concerns expressed in the survey, the formalization of the LKL will generally be structured in 3 stages, (i) activities or dialogue workshops for creating a multilevel understanding of pilot cases goals (i.e. looking to position them with regard to conventional assumptions in the field) and favoring habits for transformative learning and unlearning, (ii) activities for social mobilization and engagement for creating motivation, engagement towards the pilot case and a common understanding of pilot cases goals within the LKL and (iii) creating a formal and agreed-upon method for decision making through the adaptation of a co-governance model.]

Creating cooperation, understanding and dialogue

Registration of activities

Instructions for this paragraph	
Main description of the paragraph	Continuous negotiation within the group that promotes awareness of obstacles and the removal of bottlenecks are central for the formalization of the LKL. Negotiations also take place at the edge of the group, with actors who embody incumbency attributes with strong cultural, material, and financial ties to existing regimes. During the formation of the LKL, participatory activities, activities, dialogues or workshops can offer great advantages to encourage cooperation and a mutual understanding of the pilot cases goals, as well as to deal with conventional assumptions, incumbent actors and lock-ins.
Must have data in this paragraph	The paragraph must contain a registration of the activities, register who participated and how the workshops were organized. The paragraph also contains **the identification of the "internalized central assumptions",** i.e., the conventional views on the ways to operate in a certain field (e.g., bio-waste management, rainwater management, etc.)**, of the stakeholders within the LKL.**
Length	500-1000 words
Material for support	Any
Operationalisation of WP? Synergy with conceptual WP?	Task 2.4 - T2.4 designs the references framework for the LKL's through the experimentation of a methodology called "unlearning interventions" and based on a dialogue approach. The methodology is being experimented with the pilot of Cáceres and will be fully available to the other pilots by M16. Nevertheless, to some extent it is possible for the other (quite advanced) pilots to anticipate the first step and generate a certain degree of synchrony among pilots experimenting with unlearning interventions. Its specificity is to search (in a participative and transdisciplinar way) for dealing with conventional assumptions, incumbent actors and lock-ins. Task 6.2 - T6.2 is intended to design a framework dedicated to citizen involvement based on existing and previous experiences of the communities regarding participatory activities. This framework will be provided to the local teams of the pilot cases, who will use it for T5.1 through a mapping process which mainly includes target knowledge, i.e. the more we know our target, the more we will be able to propose an appropriate communication strategy. This task produced

	communication guidelines for NBS when interacting with different categories of stakeholders: TRL_D6.1.docx - Google Documenten. Task 6.3 - T6.3 customizes methods and actions for the pilot cases which are the most relevant, suitable and accessible for their community-driven processes. Depending on the field's configuration, different kinds of activities can be framed, such as to involve citizens in reflection on public policies about NBS, to stimulate the creation of projects and networking, and to jointly develop projects or prototypes based on users' (citizen, researcher, communities) expectations: see for methodologies Preliminary set (basecamp.com). See also: Resources repository (basecamp.com).
Contact in case of questions	Ela Callorda (T2.4 coordinator), Jules Sekedoua (T6.2 coordinator), Cédric Simons and Gonçalo Moniz (T5.1 coordinators)
Comments from other WP leaders	For the organization of the workshops we refer to the methodological framework of 2.4. Several document are already available : (1) 2.4 Meeting (6 October 2023) (2) The power point used at the Pilot Forum (14 February 2024) **(3) Report on unlearning and the pre-identification of internalized assumptions (table with pilots at the CM in Rome)** (4) Working document – operationalisation of unlearning interventions (workshop dialogues) with a "pilot of pilots" (Cáceres) (February / March 2024) The final deliverable of 2.4 is due for M16. Maybe 6.1 Can help to address these type of questions (assessing and adressing difficulties): (a)What is the level of difficulty for the pilot coordinating team when it comes to identifying who are the conventional actors (i.e., finding the name of the organisations and of people who share the conventional views on the ways to operate in the field) at different scales? It appears to be: 1/ very easy, 2/ easy, 3/ intermediate, 4/ difficult, 5/ very difficult Explain why and illustrate the difficulties envisioned. (b)What is the level of difficulty for the pilot coordinating team when it comes to entering into dialogue with conventional actors at different scales (i.e., knowing who is most likely to be receptive and knowing how to invite them to engage in dialogue)? It appears to be: 1/ very easy, 2/ easy, 3/ intermediate, 4/ difficult, 5/ very difficult Explain why and illustrate the difficulties envisioned.

Results of the activities and dialogue opportunities

Instructions for this paragraph	
Main description of the paragraph	In this paragraph the partners can register the outcomes of the unlearning interventions and activities and dialogues for creating cooperation and mutual understanding... Based on the concerns of the survey and on these activities, we can define central assumptions that are internalized by the actors within the LKL. This way we can have a (common) understanding of what we are doing in the pilot case and what is present in the LKL. At the same time, these activities/dialogue workshops can serve as an inspiration to infuse an unlearning mindset.
Must have data in this paragraph	This paragraph must contain a thorough analysis of the activities or dialogues . What barriers were addressed, what absences or presences are there in the LKL and what practices were shared? Did you go beyond your own reflection or strategies? Did the activities or dialogues bring more barriers or opportunities to the surface? This paragraph must contain a reflection on how activities contributed to the mobilization of the LKL. Partners can reach back to the questions, strategy and actions for the LKL they addressed above, for example: ● Enabling local groups to take ownership ● Creation local social cohesion and no one left behind ● Contributing to creating cooperation, understanding and dialogue ● Contributing to creating common ground on the territories' challenges, motivation and engagement for the pilot case. ● A reviewed definition and description of the goals of the pilot case?
Length	1000-2000 words
Material for support	Pictures, charts, materials used during the workshops, video or audio materials
Operationalisation of WP? Synergy with conceptual WP?	Task 2.4 - T2.4 designs the references framework for the LKL's through a the experimentation of a methodology called "unlearning interventions" and based on a dialogue approach. The methodology is being experimented with the pilot of Cáceres and will be fully available to the other pilots by M16. Nevertheless, to some extent it is possible for the other (quite advanced) pilots to anticipate the first step and generate a certain degree of synchrony among pilots experimenting with unlearning interventions. Its specificity is to search (in a participative and transdisciplinar way) for dealing with conventional assumptions, incumbent actors and lock-ins.
Contact in case of questions	Ela Callorda (T2.4 coordinator), Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators)
Comments from other WP leaders	For the organization and analysis of the workshops we refer to the methodological framework of 2.4. Several document are already available : (1) 2.4 Meeting (6 October 2023)

	(2) The power point used at the Pilot Forum (14 February 2024) **(3) Report on unlearning and the pre-identification of internalized assumptions (table with pilots at the CM in Rome)** (4) Working document – operationalisation of unlearning interventions (workshop dialogues) with a "pilot of pilots" (Cáceres) (February / March 2024) The final deliverable of 2.4 is due for M16.

Social mobilization and engagement

Registration of activities

Instructions for this paragraph	
Main description of the paragraph	Communication towards the neighborhood and activities that create social cohesion and engagement towards the pilot cases goals are central for the formalization of the LKL. During the formation of the LKL workshops for social mobilisation and engagement based on NBS community communication can offer great advantages to encourage engagement and acceptance towards the pilot case. D6.1 highlights communication practices and workshops for social mobilisation and citizens engagement. Based on the concerns of the survey, these workshops will be organized around creating common ground, motivation and engagement for the pilot case.
Must have data in this paragraph	The paragraph must contain a registration of the workshops, register who participated and how the workshops were organized. For the organization of the workshops we refer to the methodological framework in TRL_D6.1.docx - Google Documenten
Length	500-1000 words
Material for support	Any
Operationalisation of WP? Synergy with conceptual WP?	Task 6.2 - T6.2 is intended to design a framework dedicated to citizen involvement based on existing and previous experiences of the communities regarding participatory activities. This framework will be provided to the local teams of the pilot cases, who will use it for T5.1 through a mapping process which mainly includes target knowledge, i.e. the more we know our target, the more we will be able to propose an appropriate communication strategy. This task also produces communication guidelines for NBS when interacting with different categories of stakeholders. Task 6.3 - T6.3 customizes methods and actions for the pilot cases which are the most relevant, suitable and accessible for their community-driven processes. Depending on the field's configuration, different kinds of activities can be framed, such as to involve citizens in reflection on public policies about NBS, to stimulate the creation of projects and networking, and to jointly develop projects or prototypes based on users' (citizen, researcher, communities) expectations: see for methodologies

	Preliminary set (basecamp.com). See also: Resources repository (basecamp.com).
Contact in case of questions	Pedro Gouveia and Jules Sekedoua Kouadio (T6.2 coordinators)
Comments from other WP leaders	

Results of the activities for social mobilization and engagement

Instructions for this paragraph	
Main description of the paragraph	In this paragraph the partners can register the outcomes of the activities for social mobilization and engagement. .
Must have data in this paragraph	This paragraph must contain a thorough analysis of the activities. What barriers were addressed, what practices were shared? Did the activities go beyond your own reflection or strategies? Did the workshops bring more barriers or opportunities to the surface? What did you and the other stakeholders learn? For the required data to obtain we refer further to the methodological framework in TRL_D6.1.docx - Google Documenten. This paragraph must contain a reflection on how the activities contributed to the engagement and motivation towards the pilot case, from the LKL as from the surrounding neighborhood..
Length	1000-2000 words
Material for support	Pictures, charts, materials used during the workshops, video or audio materials
Operationalisation of WP? Synergy with conceptual WP?	Task 6.2 - T6.2 is intended to design a framework dedicated to citizen involvement based on existing and previous experiences of the communities regarding participatory activities. This framework will be provided to the local teams of the pilot cases, who will use it for T5.1 through a mapping process which mainly includes target knowledge, i.e. the more we know our target, the more we will be able to propose an appropriate communication strategy. This task also produces communication guidelines for NBS when interacting with different categories of stakeholders.
Contact in case of questions	Pedro Gouveia and Jules Sekedoua Kouadio (T6.2 coordinators)
Comments from other WP leaders	

Creating a structure for participatory governance

[After bringing together the members of the LKL in the learning and unlearning workshops, we decide on a particular governance structure and decision making model for the LKL, going

forward with the co-diagnostic activities and the implementation plan for co-creating the pilot case, that is the subject of task 5.2: [5.2 Methodology for co-design (basecamp.com)].

Description of the co-governance model

Instructions for this paragraph	
Main description of the paragraph	The specific co-governance structure will allow for innovative governance systems in which stakeholders are organized and non-organized in a more formal or informal way. This structure will be based on knowledge of the field, the terrain, the local participatory culture, the stakeholders, the political landscape, the socio-economic reality of the area, the vulnerable groups, priority groups etc. (gathered by the pilot partners during mapping and understood by local experience and networking) and allow it to rise to the defined social and ecological challenges for the local community. In the creation of the co-governance structure, partners need to be actors of Institutional change and rethink NBS in a way that participation and participatory activities can move towards true participatory governance. This reflection needs to be brought to the surface in this paragraph.
Must have data in this paragraph	The paragraph includes a description of the chosen co-governance model. The participants will discuss and agree upon a governance model, which will be facilitated and assisted by the local coordinator and local task forces of the pilot case. The governance model is further described based on the conceptual framework for dimensions of co-governance in D4.1 Governance archetypes framework for NBS (basecamp.com) and Resources repository (basecamp.com) and is elaborated with T4.3.
Length	1000-1500 words
Material for support	Any
Operationalisation of WP? Synergy with conceptual WP?	Task 4.1 - T4.1 creates a framework with governance archetypes that will sustain the process of situating the systems of governance from the assessment and pilot cases. Task 4.2 - Deliverable 4.2 in month 10 will document and systematise the different models of governance for the public, private, associative and community-based arrangements in the local pilot cases. Task 4.3 - T4.3 will establish systems of governance with engaged citizens, organized and non-organized, interested networks, public authorities and other identified stakeholders. The system will be structured according to the challenges for addressing social and ecological just transition, and in methodologies and approaches to collaborative management, creating local networks. It will include principles of collaborative governance, including criteria for democratic innovations in terms of opportunities for co-decision, co- production and co-monitoring and local participatory and governance culture:
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinators), Isabel Ferreira (T4.1 coordinator), Joana Santos (T4.2 coordinator) and Fabio Montagnino (T4.3 coordinator)

Comments from other WP leaders	

Establishing a modus operandi

Instructions for this paragraph	
Main description of the paragraph	This paragraph concerns itself with the operationalisation of the chosen co-governance model. In this paragraph, partners are invited to go in detail on the functioning of the governance structure. The partners can explain how, for their territory, the specific application is innovative in nature and includes a participatory governance dimension.
Must have data in this paragraph	Partners need to explain how the (individual) members are structured and formalized (e.g. task forces, work groups), how the decision making model functions, how categories of stakeholders are represented in a fair and inclusive way in the decision making model, how decision making power and weight in decision making is divided (e.g. majority, by consensus, unanimous voting, vetos), how interaction within the LKL and between its members will be practically organized (eg. periodicity of meetings, regular participatory meetings or activities, joint visits, etc.), how the voice of citizens, vulnerable groups and politicians are represented in the power-relations, how professional relationships are being addressed, what conflict-resolution mechanisms exist…
Length	1000-1500 words
Material for support	Stakeholder spidergrams on relationships, charts and models on decision making and power relationships
Operationalisation of WP? Synergy with conceptual WP?	No
Contact in case of questions	Cédric Simons and Gonçalo Canto Moniz (T5.1 coordinator).
Comments from other WP leaders	

Monitoring and constant reevaluation

Instructions for this paragraph	
Main description of the paragraph	In this paragraph partners will describe how reflective monitoring and continuous adaptation will be introduced in the participative governance structure… Partners can hereby reach to the model of the reflective monitoring framework and dynamic learning agenda: Reflexive-Monitoring Materials (basecamp.com).
Must have data in this paragraph	
Length	500-750 words

Material for support	Diagrams, reflective monitoring framework and dynamic learning agenda.
Operationalisation of WP? Synergy with conceptual WP?	Task 5.4 - T5.4 sets up a dialogue and mutual learning process between the LKL. Task 6.1 -T6.1 wil frame a reflexive monitoring process that gives practitioners insight into the progress of their project in real time. Not tied to pre-defined outcomes and pre-selected indicators, this reflexive approach is aimed at, from the start, envision a process where it is important to rethink goals, define roles, record important events, analyse critical turning points, identify learning outcomes, share findings, reflect on the methods and promote peer-to-peer sharing.
Contact in case of questions	Jules Sekedoua (T6.1 coordinator) and Jose Luis (T5.4 coordinator).
Comments from other WP leaders	

PILOTS SECTION

Brussels Pilot

Authors:
Cédric Simons (VBX); Antoine Warrant (VBX)

1. Exploration of the territory, its actors and challenges

Description of the territory

Territorial description

Macro: Brussels as an urban lighthouse

Brussels has been the capital of Belgium since 1830. The City of Brussels covers 32 km^2 of the 160 km^2 of the Brussels Capital Region and is one of 19 municipalities that compose the urban agglomeration. The City of Brussels is made up out of six separate entities:

- Le Pentagone (city centre);
- Laeken;
- Neder-over-Heembeek;
- Haren;
- Louise-Roosevelt southern axis;
- The European neighborhood (Léopold, Schuman and the squares).

The City of Brussels is the public institution responsible for the territory containing the assessment and the pilot case. However, it does not operate in isolation, and is in fact in direct interaction with the Brussels Capital Region and its various institutes with regards to particular areas of jurisdiction, not least of which are those regarding matters of environment, planning, mobility, and resource (waste) management. The Brussels Capital Region is responsible for drawing up overarching plans and regulations for the entire territory, in order to establish a coherence across the 19 municipalities composing it. Plans such as Good Move, Good Food, Good Soil, and Sustainable neighborhood Contracts (Contrats de Quartier Durable), that showcase the possibilities for joint municipal-regional action, are all essential tools for identifying joint priorities and fields of action.

Figure 1: Stylized map of the Brussels Capital Region with the City of Brussels filled in black.

Figure 2: Stylized map of the City of the Brussels, with its different neighborhoods

Brussels originated as a collection of agricultural hamlets in a marshy area along the Zenne River. The name Brussels itself comes from "Broeksele", meaning settlement on the marsh. Additionally, Brussels is situated in a hilly region with various plateaus and river valleys. The Ferraris maps, created between 1771 and 1778, illustrate how Brussels appeared before the population explosions and urban expansions of the 19th and 20th centuries. The map reveals a rich natural water system and various watercourses in the nearby surroundings.

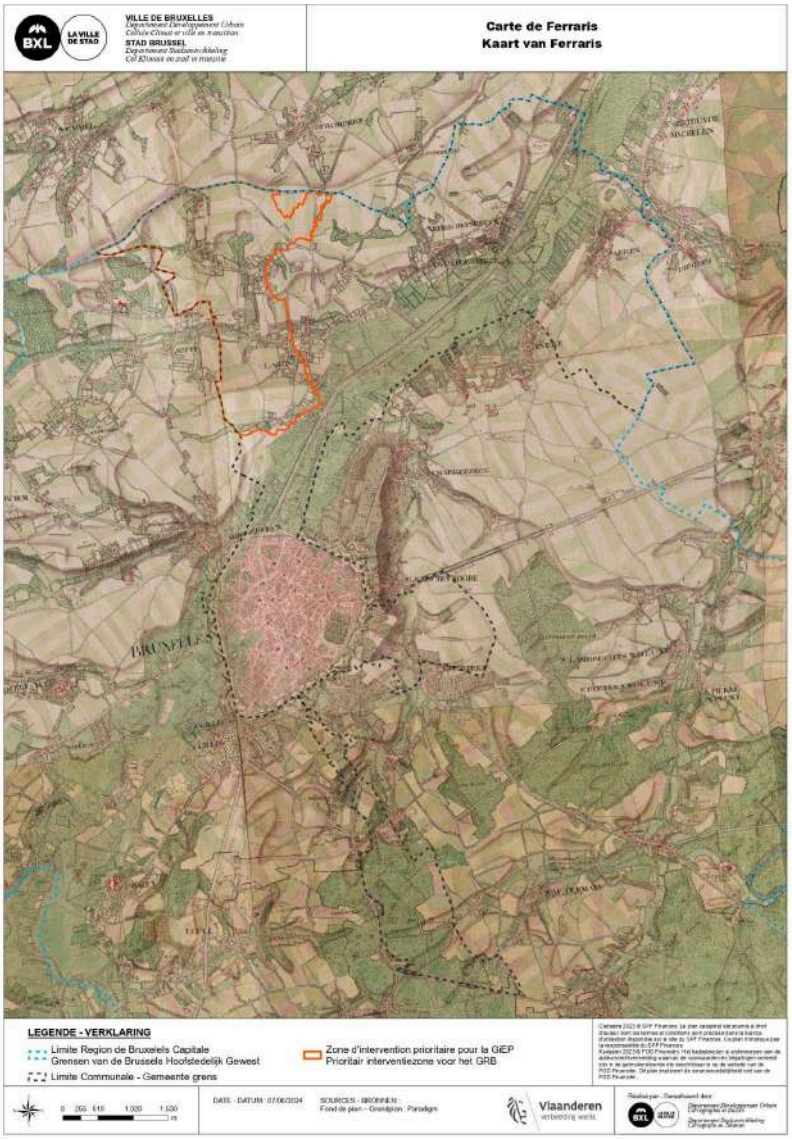


Figure 3: Ferraris map of Brussels

In the City of Brussels, four main watersheds can be identified, in which four rivers have carved the relief over the centuries. These watersheds and rivers are the Zenne (dark green), the Molenbeek (light brown), the Maelbeek (brown), and the Woluwe (dark blue).

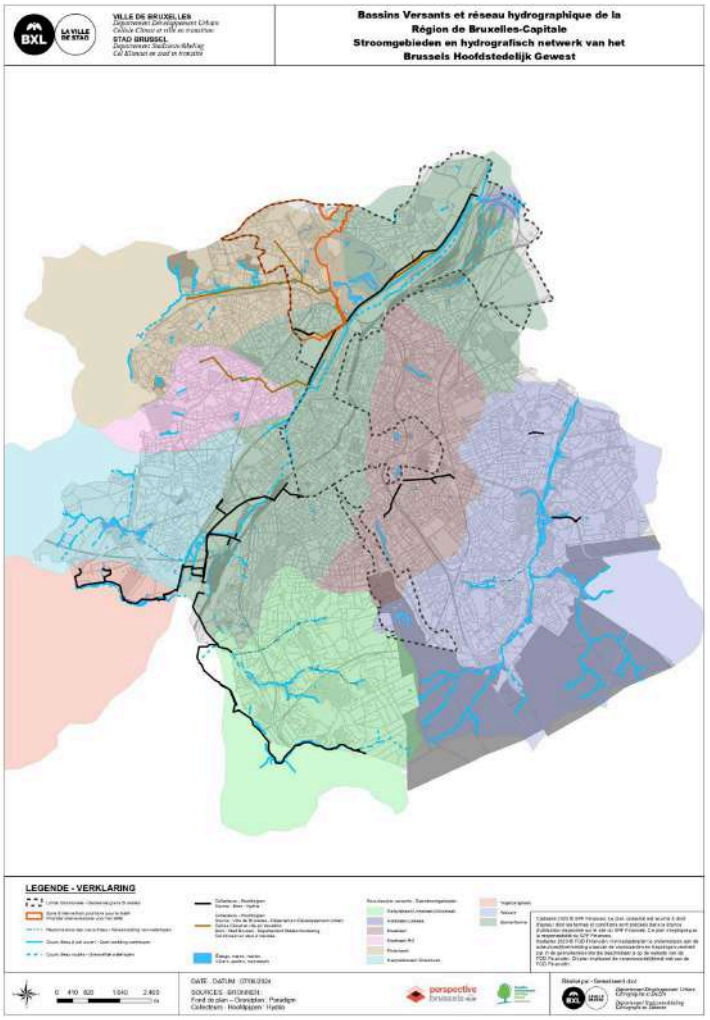


Figure 4: River basins and surface water the Brussels Capital Region

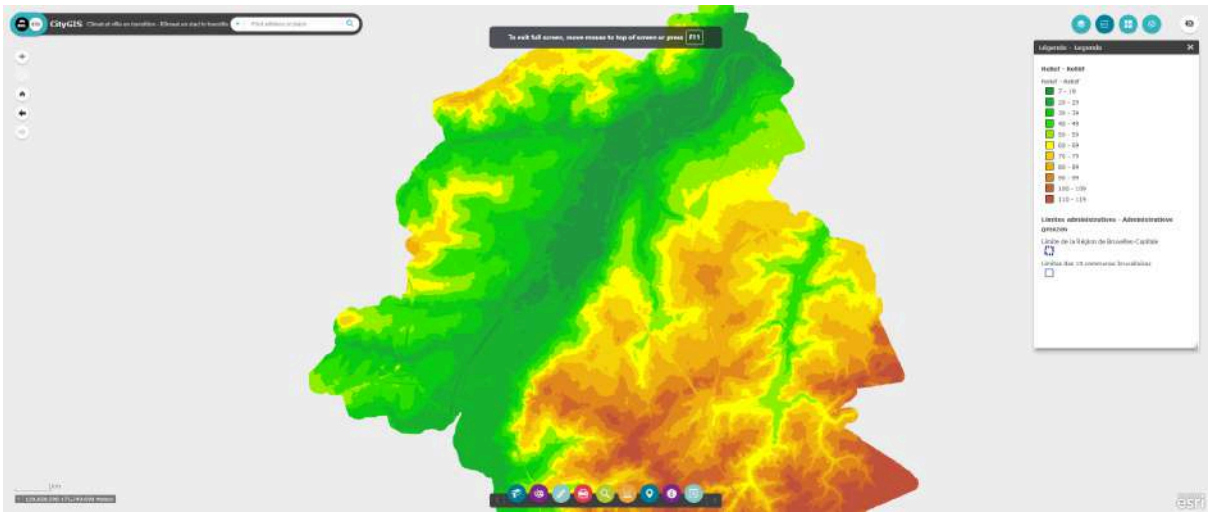


Figure 5: Topography in the Brussels Capital Region

The hydrographic network of Brussels has undergone significant changes and fragmentation over time. For example, the four rivers of the watersheds mentioned above were largely covered after the population explosion and urban expansion of the 19th century and are now officially part of the sewer system.

The sealing of surfaces (imperméabilisation des sols) is particularly concerning, as it is estimated that the rate has gone from 26% in 1955, to a current 44,8%, and has not slowed or reversed since. This prevents the soil from effectively fulfilling its role as a natural sponge in the water cycle (Vanhuysse et al. 2006). .

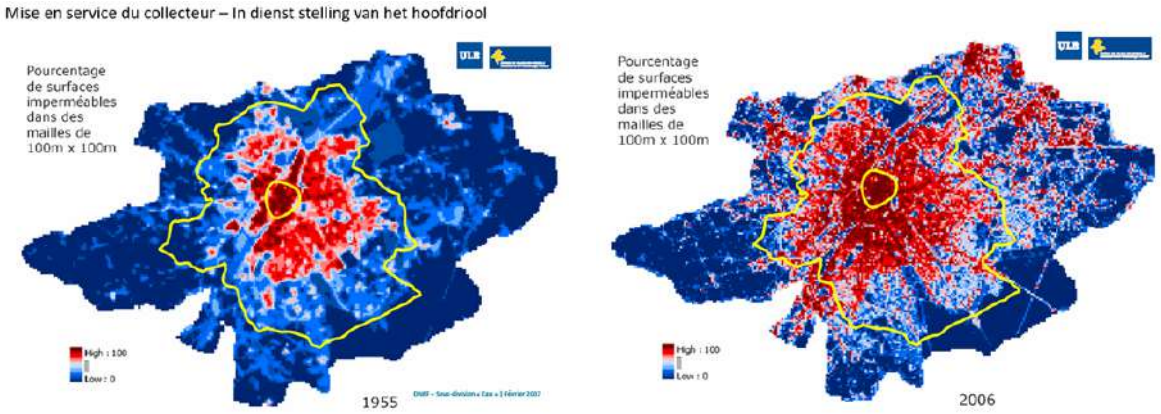


Figure 6: Built surfaces in 1955 and 2006 © ULB and Bruxelles.environment

Micro: Laeken

Laeken is an urban area characterized by diverse neighborhoods with a wide range of socio-demographic features. It boasts a rich heritage, international tourist appeal, and extensive green spaces. Despite its distance from the city center, Laeken has a vibrant core centered around Place Bockstael and Avenue Marie-Christine, easily accessible by public transport. The district is experiencing growth, with emerging areas like Tivoli and Tour et Taxis aiming to create a balanced link between dense residential zones and industrial areas. Significant investments are underway to transition Laeken into a mixed, inviting urban district, with a particular focus on enhancing existing parks. However, major thoroughfares such as the A12, Avenue Van Praet, and Boulevard Emile Bockstael present urban challenges including noise pollution and fragmentation of the urban fabric. Traffic and infrastructure also impact pedestrian and cycling connections, contributing to feelings of insecurity. Redevelopment initiatives, such as the revitalization of Place Bockstael, seek to improve the quality and visibility of multimodal transportation hubs. Laeken benefits from relatively good public transportation coverage, but housing divisions contribute to increased population density, particularly in small dwellings ill-suited for such urban developments.

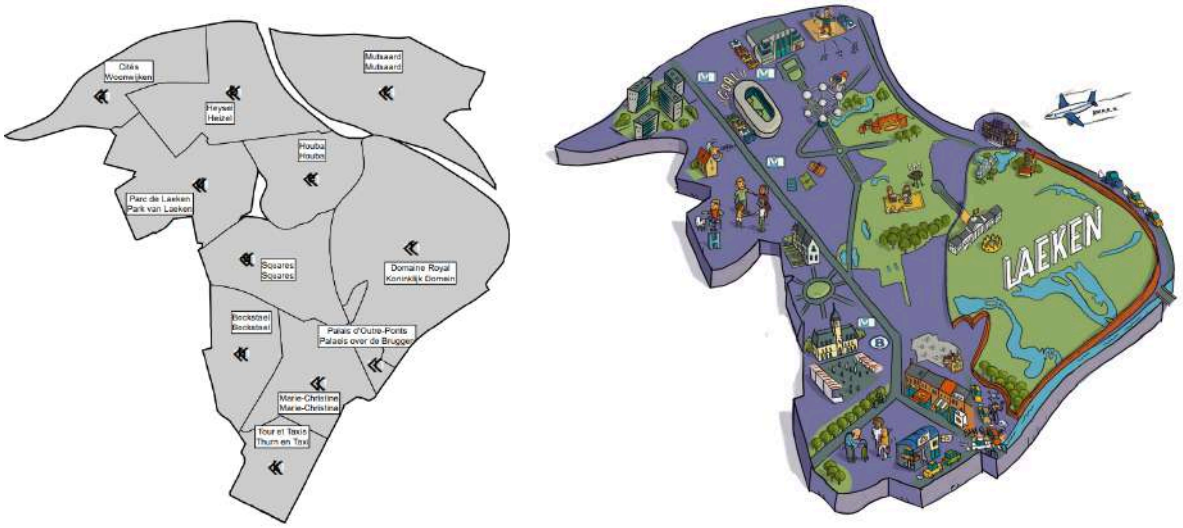
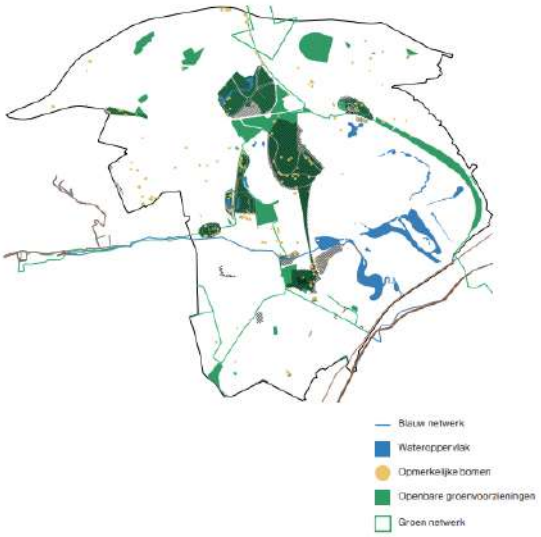


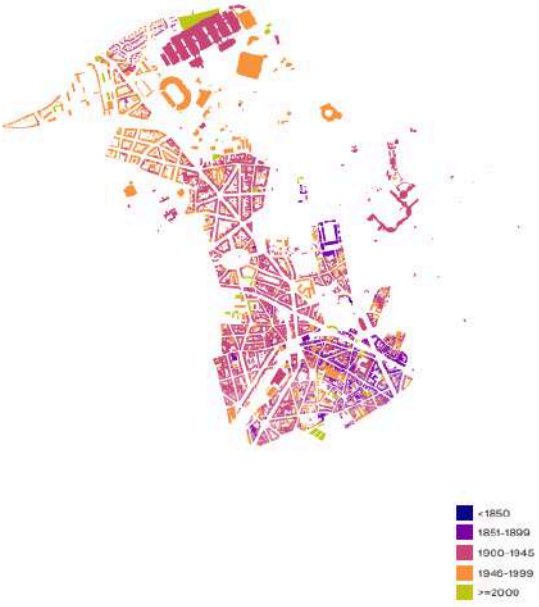
Figure 7: Laeken and its different neighborhoods

In the southern part of Laeken, there are more public plots within the building blocks compared to the north. Productive functions are mainly located in the south of Laeken, with exceptions in the area between Heysel and UVC Brugmann. Commercial hotspots are found in Maria-Christinastraat, Emile Bockstaellaan, Fransmanstraat, and Houba de Strooperlaan. Public amenities (public buildings and education) are concentrated in the south and the area between Heysel and UVC Brugmann. The economic fabric of Laeken is found in neighborhoods with high functional diversity, especially in the south. Exceptional mixed-use building blocks with large footprints are located in certain areas. The urban heat island effect is most pronounced in the building blocks south of Kroonveldstraat, where the blocks are most densely built and have the least vegetated and permeable surfaces.

There is a network of public green spaces in Laeken, but it is concentrated, with limited access to public greenery in the immediate vicinity, especially in the south. Some schools have much more paved than unpaved space.

In the east we find a huge conglomeration of green areas, public (diverse parcs) and private (royal demain) and in the north of Laeken we find larger built structures for commerce (Trade Mart), expos (Brussels Expo Centre), tourism (Atomium), and habitation (Cité Modèle and other living quarters).





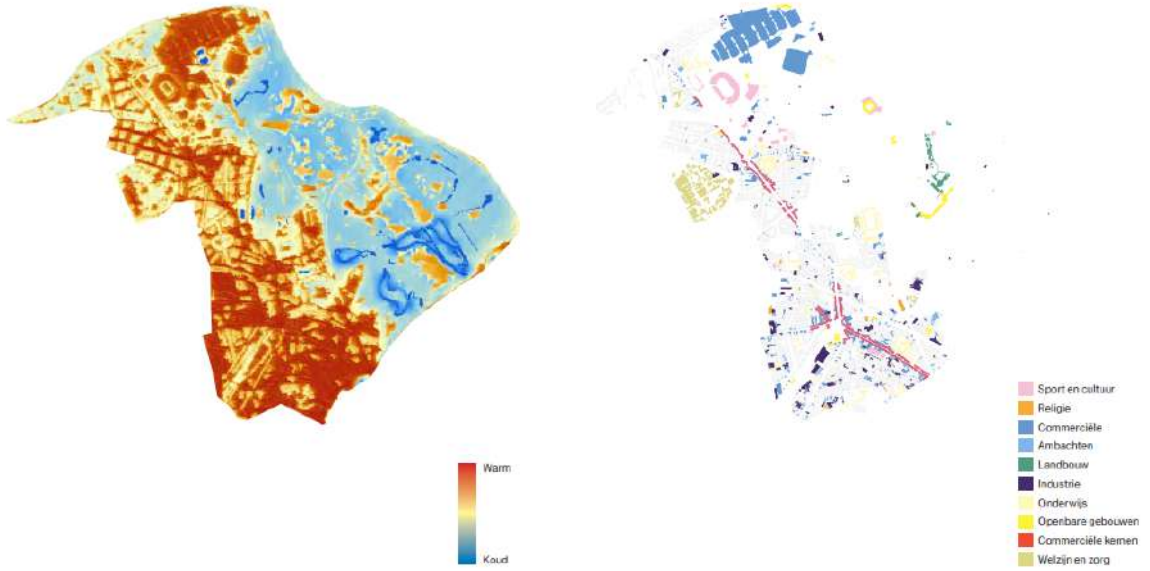


Figure 8: Maps on Laeken, showing green and blue spaces (left top), build infrastructure and age (right top), the urban heat island effect (left bottom) and functions (right bottom).

The figure below shows the Molenbeek watershed passing through different regions (Flanders and Brussels and municipalities (Laeken-Brussels City, Jette, Berchem and Ganshoren), the hydrographic network and the main sewer collector in the neighborhood. The river Molenbeek is collected by the Molenbeek sewer after the King Baudouin Park in Jette.

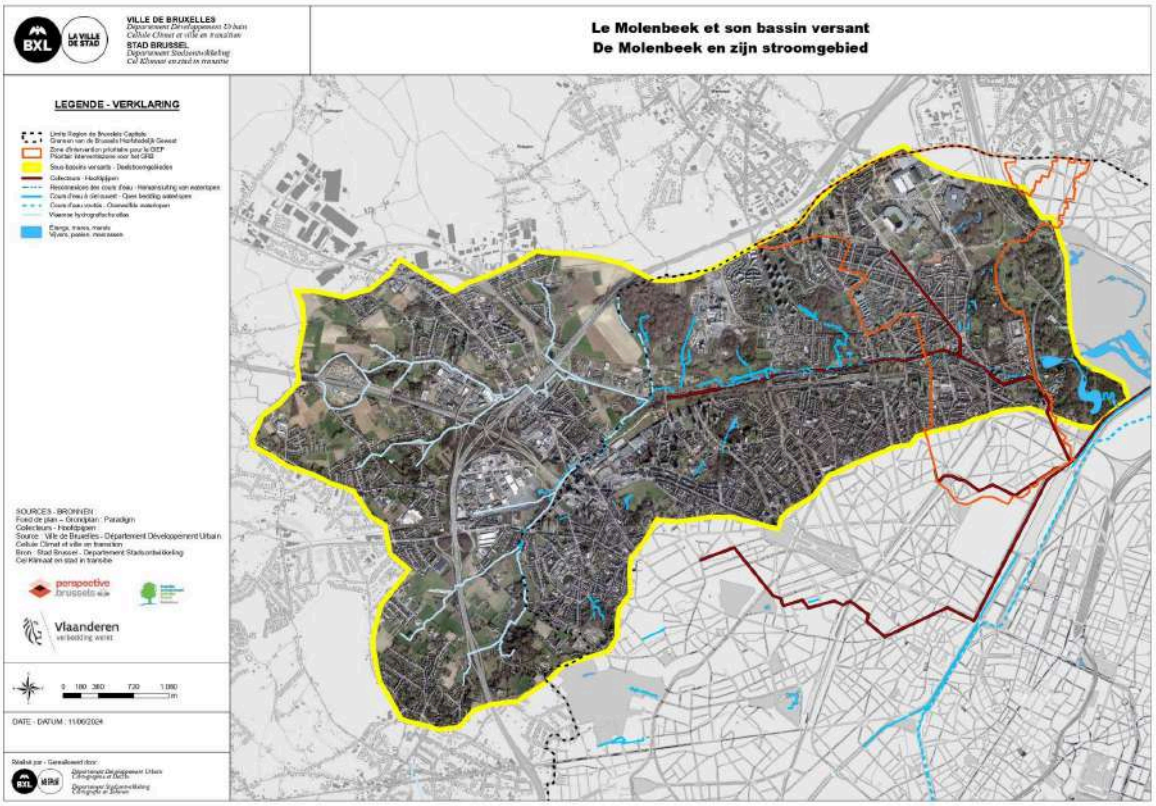


Figure 9 : Molenbeek watershed with hydrographic network and main sewer collectors

Socio-economic description

Macro: Brussels as an urban lighthouse

The "Zoom sur les communes" publication from the Brussels Institute of Statistics and Analysis (IBSA) of the Brussels Capital Region gathers and analyses demographic, socio-economic, well-being and health and health indicators for each of the 19 communes of Brussels. This publication is a tool to help local decision-makers with a better understanding of the characteristics of the population and territory in which they work. Very recently they have published their report on the city of Brussels. For any more detailed information we refer to this document (IBSA, 2024). In this paragraph we will give an overview of the most relevant information.

As a capital city and European, the Brussels Capital Region and its 19 municipalities compile a wide variety of people and diverse functions. This generates its richness, but also is the source of some issues, linked to socio-spatial fractures, economic inequalities, issues of social cohesion and tolerance, amongst others.

As in 2023, the municipality counts 194.291 inhabitants, of which 67.201 Belgians and 127.090 other nationalities during birth. A third of the population resides in the historic Pentagon. Approximately half of the population lives in the northern expansion, including the districts of Laken, Neder-over-Heembeek, and Haren. The remainder is distributed in the neighborhoods around the Louizalaan, Ter Kamerenbos (together forming the southern expansion), and in the eastern expansion, the European Quarter, of which the majority is also part of the city.

The high density of the municipality (5,321 inhabitants per square kilometer) hides a great disparity between the different districts: some are very populated while others are much less like the industrial zones in the north. There are 51 parks and gardens (3, 2 km2) within the City of Brussels (managed by the city itself or the Region). There is on average 25m2 of green space per inhabitant. They are relatively well distributed on the territory, but they are of smaller sizes within the city centre. Economic activities are particularly present in the City of Brussels, particularly in the Pentagon, which accounts for 50% of the Region's offices.

The distribution of the precarious districts follows mainly the axis of the canal west of the city centre as well as the suburbs of the 19th century. These neighborhoods, with very low-quality housing and rents, were reinvested, following the industrial decline of the City in the 1960s mainly by populations of immigrant and / or low-skilled origin. The precarious populations fall back on the markets that remain accessible to them, which have prevented depopulation and a massive abandonment of these districts. These densely populated districts form an area of poverty, like a "halfmoon" or a "croissant" sometimes called, in the immediate vicinity of downtown.

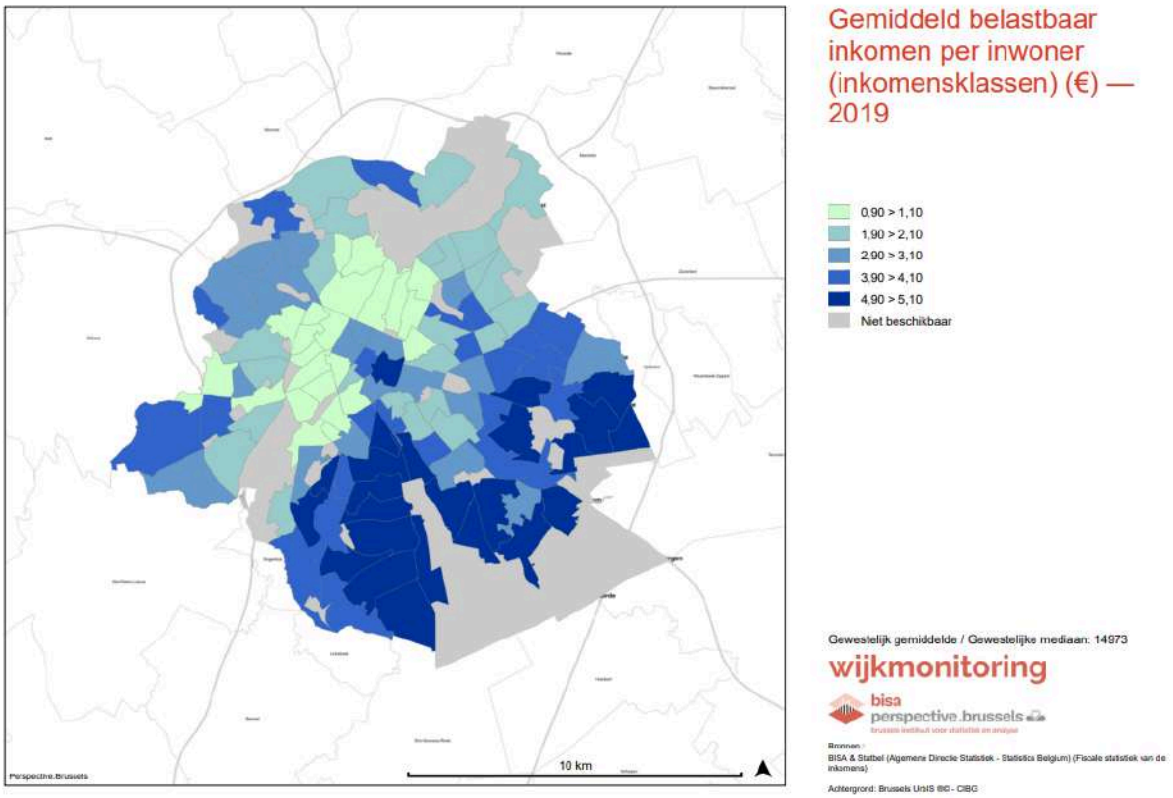


Figure 10: Average taxable income per citizen, 2019

In a study by Van Hamme et al (2016), an analysis of migratory patterns in the Brussels Capital Region indicates that the poorest statistical sectors in the Region experience the highest demographic pressure, and the most demographic influx from poor or intermediate countries. These zones are concentrated in the centre and west of the Region, with a concentration alongside the canal zone. However, they do not operate merely as transit zones for incoming migrants, as large parts of the populations do remain within these neighborhoods for longer periods of time. Housing policies encouraging social mixity in these neighborhoods (including Sustainable neighborhood Contracts, which we will discuss in 4.1.5) increase the pressure on these zones and can occasionally encourage gentrification dynamics which are exclusionary to the original populations.

Brussels is reputed to be an international city, with over 180 nationalities, ranking it amongst the top multicultural agglomerations in the world (alongside cities such as Amsterdam or New York). As the capital of the country, it is also a city that has a long history of immigration: from its peripheries, from the countryside, and from the EU and Global South. The different waves of migration are the result of various labour and migratory policies over the decades, responding to the economic and political context at those times. At the regional level, an estimated 160,000 people (17% of the population) are of Muslim original; at the City level, this number is estimated at a lower 8.2% of the population coming from a country where Islam is the dominant religion (Torrekens, 2007).

Micro: Laeken

Laeken, a district of Brussels, is characterized by its diverse population and varied demographics.

- Population and Age Distribution: Laeken has a significant population density, with distinct differences between its various districts. While some areas, like Vieux Laeken East and

Houba, have higher population densities, others, like Domaine Royal Laeken and Heysel, have lower densities. The population is relatively young, with a sizable percentage under the age of 17, indicating a vibrant and growing community. However, there is also a notable presence of older adults, contributing to the district's demographic diversity. Laeken Centre is characterized by its heterogeneity, with the imminent arrival of new populations from the Tivoli and Tour et Taxis projects, and the emergence of "gated communities" on Briqueterie Street.

- Household Composition: The average household size in Laeken is moderate, with a mix of couples with and without children, single-parent families, and individuals living alone. This suggests a range of family structures and lifestyles within the community.
- Population Mobility: Laeken has a significant proportion of residents who have moved to the area within the last five years, indicating a degree of population turnover and potential for social integration. Additionally, a notable percentage of residents are expatriates from various European countries, highlighting the district's multicultural character.
- Employment and Social Level: While Laeken has a moderate employment rate, there is a high proportion of long-term unemployed individuals among job seekers, indicating potential challenges in the local job market. The median taxable income is relatively modest, and there is a significant presence of social housing, suggesting socio-economic diversity within the community. The southern part of Laeken was the most densely populated in 2001 and remains among the poorest parts of the Brussels Region, often experiencing housing overcrowding.

Overall, Laeken emerges as a dynamic and diverse district with a young and growing population, diverse household compositions, and a mix of long-time residents and newcomers. While it faces challenges related to employment and socio-economic disparities, its multiculturalism and community vibrancy contribute to its unique identity within Brussels.

The social coordination of Laeken, PICOL, has drafted a Comprehensive Revitalization Plan for Laeken 2019 - 2025, which compiles information on the major social challenges in Laeken: a presence of general poverty and precarity, educational challenges, the lacking state of (public) housing and need for renovations, the regression of culture and disappearance of cultural and convivial spaces for different groups to meet and exchange, and a feeling of insecurity. We refer to this document for more detailed information (PICOL, 2019).

Furthermore it is interesting to highlight the diagnosis of the neighborhood council of Laeken (fairebruxellessamen.be).
The neighborhood council of Laken consists of 17 citizens and 8 representatives of associations who collectively contribute to the development of the neighborhood. A neighborhood council is a group of citizens (randomly selected volunteers) and representatives of associations who identify what is important for the neighborhood.

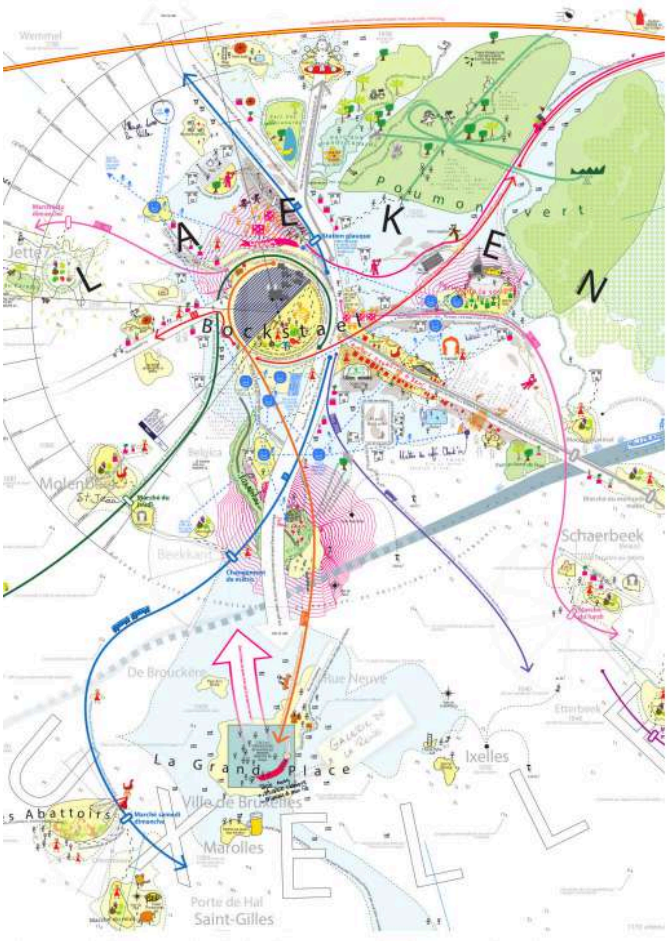


Figure 11: Laeken as seen by its residents (map created as part of the Subjective Geography project initiated by CIFAS, in collaboration with CCBN-Maison de la création). © Catherine Jourdan and Pierre Cahurel

The neighborhood council is "mandated" in its mission by the City Council. It may be asked by the City to provide advice or submit proposals to it depending on its work. The neighborhood council supports the different phases of participatory budgeting and will be deployed between now and 2024 in the 7 large zones that regroup the neighborhoods of the City of Brussels. In June 2022 this council drafted a diagnosis of the neighborhood that functions as a base for their action plan and participatory budgeting. The result of this diagnose is as follows:

- **Cleanliness:** There is a pressing need for more trash bins in the streets of Laken as the amount of litter, particularly stray waste, remains a significant issue. In particular, the cleanliness within the Houba-Sobieski-Heysel triangle leaves much to be desired, with litter often attracting pests such as rats. Additionally, there is a noticeable shortage of urinals and public toilets in the area, contributing to the cleanliness concerns. However, the installation of underground glass bins is a positive step towards addressing waste management.
- **Commerce:** The commercial landscape in Laken suffers from a lack of diversity, with many shops offering similar products and concepts. This homogeneity makes shopping experiences monotonous and drives customers to seek alternatives outside of the area. Moreover, the extensive use of sidewalks by businesses hampers pedestrian and Persons with Reduced Mobility (PBM) access.

- **Heritage:** While efforts are being made to highlight Laken's heritage, the maintenance of historical buildings leaves much to be desired. Neglecting monuments like the Chambon passage, the royal station/the Halte, and the Sobieski bridge detracts from the potential enhancement of public spaces.
- **Green Spaces:** Although Laken boasts numerous green areas, the lack of maintenance in parks is a concern. Furthermore, there is a noticeable absence of a dedicated sports field for organizing football matches and a lack of landscape architecture around the canal. The community also lacks communal vegetable gardens.
- **Mobility & Safety:** The extension of tram 9 is a positive development for mobility in the area. However, there is a noticeable absence of street signage or concrete barriers/flower pots to delineate lanes, leading to safety concerns. Additionally, insufficient pedestrian crossings and distant crossings exacerbate safety issues, while limited resident parking and narrow bike paths compound mobility challenges.
- **Quality of Life:** While Laken features attractive meeting spots such as parks and guinguettes, there are drawbacks to residents' quality of life. The deserted police station and perceived lack of security, particularly during events, raise safety concerns. Events often bring noise, litter, disorder, and even vandalism to public spaces, especially around the stadium. Poor air quality is another significant issue, and residents feel disconnected from the City and its projects, impacting community cohesion.

Definition of the pilot case goals

Ecological challenges

Ecological goals and description of the NBS

The main consequences of climate change under which the city of Brussels will suffer are heat stress and flooding. Water issues will mainly translate into severe flooding in flood-prone locations. In total, 27% of the total area of the City of Brussels is at risk of flooding. The high impermeability of the soil in Brussels leads to a significant loss of infiltration potential. This means that rainwater can no longer be drained by natural infiltration, but enters the sewers, which consequently become saturated and overflow the Senne river and the canal Brussels-Charleroi, affecting surface water quality.

In the city of Brussels, these floods are mainly located in the central part of Laeken, the Northern Quarter, and the western part of the Pentagon. The valley areas are particularly affected, such as the central and southern parts of Laeken, which are downstream of the Molenbeek catchment area and directly below the Heizel Plateau. Here, two main sewer collectors converge: (i) the Molenbeek, which follows the old course of the Molenbeek and thus transports the rainfall from the Molenbeek catchment area, and (ii) the Clementine, which transports the rainfall from the Heizel Plateau. The flood reports of inhabitants of the City of Brussels that have been registered since 1990 follow more or less these two collectors. Both collectors converge near the Prins Leopoldsquare, where the landscape is also very prone to flooding, and where flood reports are clustered. Some of the most severe floods in the Brussels Region in recent decades were located in Laeken. These were the floods of 2005, 2007, 2011, 2016, 2021, and 2023, around Alfred Stevens Street, Vrière Street, Chrysanten Street, and Groenvink Street.

Vrièrestraat, Laken, 2007

Alfred Stevensstraat, Laken, 2011

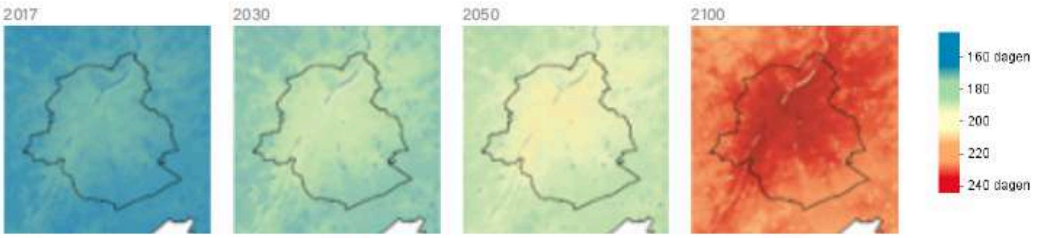
Chrysantenstraat, Laken, 2016

Chrysantenstraat, Laken, 2021

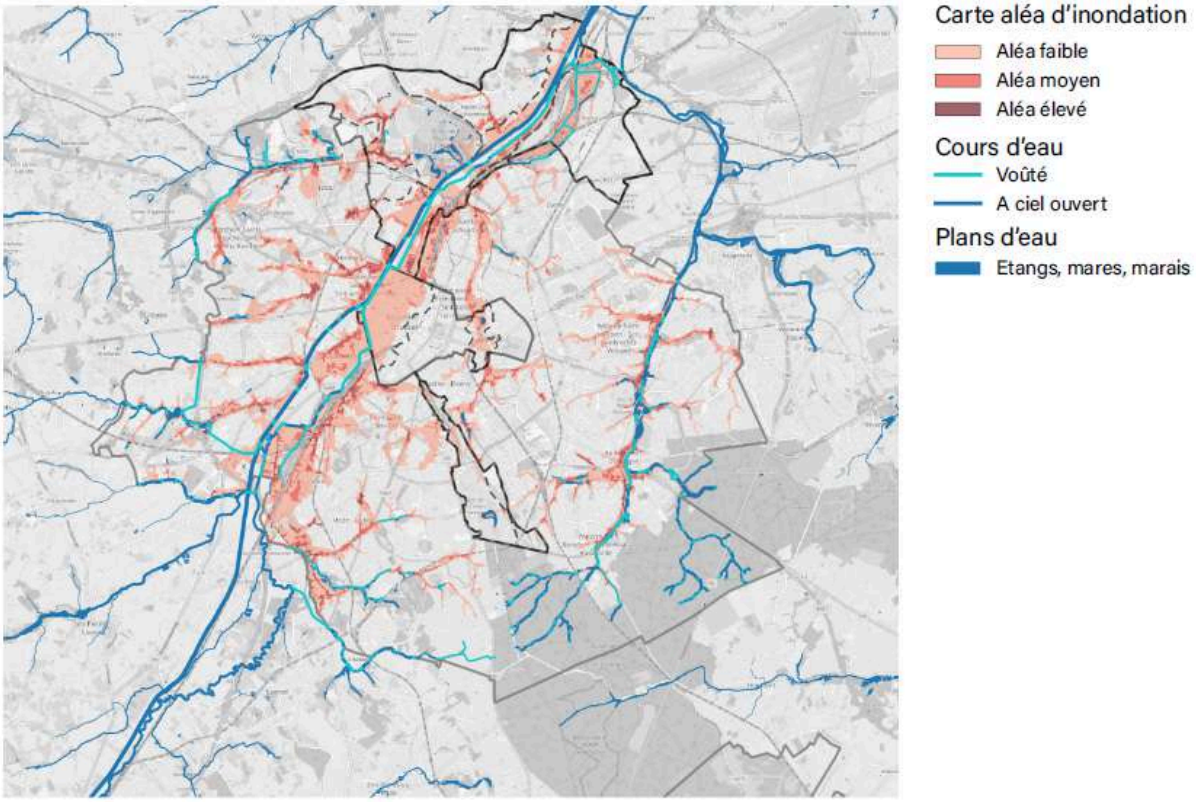
Figure 12: Pictures of floods in Laeken © City of Brussel

Compared to the early 1950s, the average annual number of days with heavy rainfall in Belgium has almost doubled: in six decades, it has increased from 3 to 6 (Climat.be). Global warming will make the area further vulnerable with more intense rainstorms in winter and more frequent and intense stormweather in summer.

Besides the risks of flooding, there is the problem of drought and hot weather, which is becoming more frequent and intense. Although every summer sets new temperature records, temperatures are higher in the city than in the countryside. Heat stress will mainly be felt in places with the most pavement in the City in the form of urban heat islands. This phenomenon occurs in Brussels, especially in the densely built-up and urbanized center. With the canopying of rivers and the concreting of spaces, the city has gradually lost its capacity for evapotranspiration and natural cooling of neighborhoods. Dark pavements such as bitumen absorb more heat than light-coloured or vegetated surfaces; the many vertical buildings increase the area that collects solar radiation and can create a "canyon" effect by preventing air circulation.



Évolution du stress hydrique dû à la sécheresse (source : Klimaatportaal)



Carte des aléas d'inondation (source : Bruxelles-Environnement)

Figure 13: Evolution of water stress due to drought (source: Klimaatportaal) and below the Flood hazard map of Brussels (source : Brussels Environment)

In the context of rainwater management, more focus should be given to source measures such as the creation of upstream storage and infiltration areas. Efforts should be maximized to infiltrate rainwater in the upstream parts of catchment areas, wherever the subsoil allows. This requires greater integration and coordination between spatial planning and comprehensive rainwater management, even in urban environments. According to the Brussels Region, comprehensive rainwater management includes a set of construction and operational techniques that help restore the natural water cycle by managing rainwater as close as possible to where it falls and preventing it from flowing into the sewer system (Leefmilieu Brussel, 2022). This approach helps recharge groundwater levels, increases absorption by Brussels flora, and enhances evapotranspiration during summer, which provides cooling. The primary strategy of the City of Brussels to address flooding issues, as outlined in its Municipal Water Plan, is to implement comprehensive rainwater management.

Local values and attitudes towards the ecological challenges

Our observations and interactions with different stakeholders in our pilot area reveal a divergence in local values and attitudes towards water-related challenges among various groups. Public authorities and governmental institutions, tasked with addressing rainwater management in both public and private spheres, primarily focus on safety (flood prevention) and ecological concerns (surface water pollution and groundwater shortages), as well as adaptation, biodiversity, and overall water management challenges.

Local associations contribute to sustainable action to varying degrees, largely focusing on raising awareness and communication about the issue. Citizen engagement in sustainable actions often depends on factors such as socio-economic status, knowledge, and their relationship with nature.

Most citizens think about water in economic terms, primarily concerned with reducing their monthly water bills. Other citizens value the benefits nature provides, such as recreational spaces and cooling effects, without fully considering the actions needed to preserve these benefits. Only a few citizens, typically those who are already aware or have been personally affected by floods, are actively concerned with comprehensive rainwater management. Due to its technical nature, the majority of the population only understands comprehensive rainwater management when it is connected to local, concrete, and personal needs, such as reusing rainwater for a vegetable garden, greening a street, or creating a pond in a garden.

Socio-economic challenges

Identification of marginalized knowledges and of needs of marginalized groups

Several social groups stand out as marginalized and often overlooked, especially in participatory processes, in the pilot area and in Laeken generally. These groups include low-income families, minorities, immigrants, disabled people, older people, children and young people. Because their needs and voices are not always readily apparent or commonly acknowledged, recognizing and identifying these marginalized groups can be challenging. The under-representation of these groups in urban planning processes often leads to a lack of tailor-made solutions that take their specific needs into account.

The pilot project aims to engage these underrepresented groups through a comprehensive participatory process, using a variety of activities and methods to ensure their involvement (social cohesion activities, variety of tools and methods, etc.). However, the integration of these marginalized groups is a challenge recognized by Brussels Participation, and finding solutions for their inclusion will be a central focus during the Local Democracy Lab (LDL). The main question to be addressed in the LDL is: “How can Brussels effectively engage a culturally and socio-economically diverse population in sustainable participatory projects (such as rainwater management and climate plans), and secure political support for the necessary resources to ensure inclusivity and participation of the 'unusual suspects'?”

The findings on the local participatory culture and the lessons learned from the assessment case will be taken into account by developing participatory activities that have concrete, local results and goals based on local needs.

Identification of presences and absences

In Laken, there is a strong sense of neglect and disconnection from the city of Brussels and its projects. Residents feel their neighborhood is merely a transit area for tourists and visitors to events like those at the Heizel Plateau, without genuine attention to Laken's center. This

perception makes inhabitants of Laken feel they are invisible on the political agenda. The area faces challenges such as high turnover of residents and businesses, poor renovation of social housing, and a lack of diverse commercial services. However and unexpectedly, in comparison to Laken-South, the quality of life in Laken-Noord is generally lower. This significant imbalance is often analyzed by citizens as a lack of investment from the City. Despite the relatively young and active population of Laken-Noord, with some residents belonging to the affluent middle class, impoverished areas persist, and isolated households are almost in the majority. The community also experiences a general decline in service quality and the loss of historical elements, exacerbated by gentrification projects. These factors contribute to the erosion of Laken's social identity.

This feeling of neglect is further fueled by the apparent lack of political involvement and inadequate follow-up on city projects. Residents point to examples like the sustainable neighborhood contract in Bockstael, where there was neglect in maintenance and follow-up after project completion. Issues such as poorly maintained parks, non-functioning drinking fountains, and neglected green spaces contribute to the community's distrust towards the city administration. Additionally, there is frustration over the lack of communication and perceived disregard for local knowledge and input in urban planning, further diminishing confidence in the city's commitment to the well-being of Laken's residents. Inhabitants also feel that their concerns and local knowledge are ignored by the city administration. There is a weak exchange of information between citizens, associations, and the city, leading to urban planning that seems ill-conceived. Examples include misplaced traffic signs and the removal of frequently used benches without consulting residents. This distrust is compounded by fears that green initiatives might lead to higher costs for citizens, such as increased cadastral income or additional water meters. Overall, the political decisions appear arbitrary, and the community feels overlooked, weakening the social fabric and trust in the political system.

In Laeken and more broadly across the City of Brussels, there is a notable lack of knowledge and engagement concerning Integrated Water Management and NBS solutions, including the different types of techniques, its potentialities and benefits, etc. Representations of these systems are largely absent from the collective memory because such projects are recent, few in numbers, and receive little publicity. To generate interest in the project, a key step is to quickly showcase and implement concrete rainwater management projects or to showcase existing projects already finalized such as the nearby Verregat Park. These interactions will not only promote immediate engagement but also serve to educate the community on the practical applications and benefits of NBS solutions. Another important aspect is understanding the dynamics between upstream and downstream areas in terms of rainwater management and flooding, and fostering awareness and solidarity between these communities. For example, in the Verregat district, discussions about flooding are relatively rare. This is because the neighborhood is located upstream in the catchment area, whereas flooding predominantly affects areas further downstream in Laeken. Unlike the downstream areas of Laeken-South, which are densely urbanized and lack opportunities for rainwater management, Verregat (Laeken North) has many green and permeable spaces. These areas present numerous opportunities for implementing Nature-Based Solutions (NBS) and rainwater management systems.

Lessons from the participatory culture

Participation in Brussels

In Brussels, the landscape of civic engagement and participation is multifaceted, comprising various actors, initiatives, and approaches. While there might not be many overt activist

movements except during significant events like those related to global issues or racism, the city thrives with softer forms of activism represented by numerous institutionalized associations. These organizations champion common interests or causes and serve as essential conduits for community engagement. Brussels boasts a vibrant event culture, with citizens, neighborhood committees, and associations organizing diverse activities addressing cultural, environmental, and social issues. These events, often held in public spaces or neighborhood centers, strengthen community bonds and promote inclusivity.

At the local level, there are a series of associations and networks operating on the ground. Ranging from neighborhood committees, to cultural centers, to umbrella organizations regrouping all local organizations, these local actors all have a primordial role to play in the everyday life of the neighborhood. Local organizations, particularly sports and cultural associations, play a pivotal role in fostering community cohesion. From football clubs to dance groups and cultural centers like CG Nekkersdal and Maison de la Creation, these entities serve as focal points for social interaction and collaboration.

Administration agents interact with the community primarily through neighborhood committees, albeit with limited ad hoc interventions. Typically, the administration operates through intermediaries such as social coordinators and local organizations to facilitate community engagement. Within the community, champions emerge as influential figures who motivate others to participate actively. These champions can be residents, association leaders, or community advocates who embody the spirit of grassroots involvement.
In general communication among various stakeholders in Brussels is robust, albeit sometimes hindered by bureaucratic processes. Associations benefit from a strong mutual base, fostering smooth communication and collaboration, particularly at the grassroots level.
For more detailed information we can refer to de deliverable 4.2 of the TRANS-Lighthouses project.

In order to enhance citizens collective empowerment, attention must be paid to both the breadth and depth of participation. This is the degree to which multiple individuals and groups are included and the extent to which residents experience participation as empowering (Lewis et al., 2019). It is important to take into account local needs at different scales and to ensure meaningful participatory processes (Calderón-Argelich, 2023). While participatory processes cannot involve everyone for logistical reasons, finding a balance between participation breadth (variety of representation) and depth (extensive meaningful conversations, sufficiently long time frame) is fundamental for the inclusion of diverse views, opinions and interests (Kotsila et al., 2023).

The depth of participation in Brussels

Awareness should be directed to limiting instrumentalism. When public agencies focus on perfecting the techniques of participation or when participation seems like a managerial exercise based on `toolboxes' of procedures and techniques, it distances practitioners and participants from the truly transformative potential of participatory processes (Aylett, 2010).
In the city of Brussels, citizens actively participate in decision-making processes through democratic channels and legal avenues such as public consultations and municipal-led initiatives. Mechanisms for participation vary, with the administration employing institutional approaches like conferences and public information sessions, while associations adopt more hands-on approaches, engaging directly with citizens in local contexts and public spaces. The current administration places a strong emphasis on participation, dedicating resources to facilitate citizen engagement and collaboration.

However, we have much left to learn. A general barrier in Brussels is the lack of proximity in participatory processes. Some participatory activities in the territory are abandoned after completion, due to a lack of investment in the monitoring phase or in participatory activities that allows for appropriation. Other cases show a lack of frequent and continuous communication between the project coordinators and the actors on the terrain. This happens for example when a project subsidy or an important stakeholder within the administrative network is not involved). While the "contrats de quartier/renovation" (Rénovation urbaine | Ville de Bruxelles) and the neighborhood councils are clear exceptions to this, in general the ad hoc participation is more tokenistic and lacks continuous and frequent communication. These cases have difficulties showing the participants the results of participation that are being implemented in the decision-making processes.

The breadth of participation in Brussels

The largest barriers for the participatory culture is within the inclusion aspect of participation. Participants in participatory processes in Brussels often reflect a demographic skew towards older, white, Belgian-origin individuals with median to higher socio-economic backgrounds and higher education levels.

Even throughout the co-creation practices, we see that very persistently the same type of audience is present and that the engaged groups are generally small and don't grow much, even with the involvement of local associations. This is a continuation of Brussels as a very multicultural city and an absence of mixed cultures. Different cultures that arrived from immigration dynamics are generally connected to a lower socio-economic class. Past experiences from the immigrant community as well as gentrification effects create a certain distrust towards the administration, that are generally white and more rich. Breaking these barriers are very difficult, but also necessary in the multi-cultural and slightly more poor area of the "croissant pauvre", of which Laeken is a part.

TRANS-Lighthouses can, in the territory of the pilot case (Laeken but in the first time, Verregat), bring opportunities for creating more engagement in a participatory co-creation process, by focusing in parallel on social activities that bind cultures (like food, sports and art). We hope that by working in a social housing district and by working with the social coordination of the cooperative social housing company (Comensia), we can create over time a wider, more inclusive co-creation engagement that represents the community more in its diversity.

Co-creation in integral rainwater management

Co-creation approaches are thought to be valuable ways of working with communities not only because they provide more transparent, inclusive and effective processes for developing sustainable communities, but also because they have been found to lead to better outcomes (Haase et al., 2017; Frantzeskaki, 2019). Co-creation refers to the notion that a plurality of public and private ideas, resources and knowledge is merged in a joining creation of public solutions (Torfing et al. 2016). The common objective of all the co-creation phases (co-design, co-production, co-…) is to ensure citizen involvement in the activities carried out.

The assessment case

The Municipal Water Plan

The assessment case in Brussels focuses on the deployment and monitoring of the Municipal Water Plan (PCE), driven by the urgent need to address environmental challenges such as floods, droughts, and urban heat islands. Recognizing water as a crucial resource, the plan aims to advance Brussels towards its goal of becoming a globally renowned water city by 2050. This

underscores the necessity for integrated water management within urban spaces, signaling a departure from reliance only on technological solutions to confront climate-related issues. To operationalize that, the municipal council of the City of Brussels adopted the Municipal Water Plan (GWP) on March 25, 2024.

As stated in the plan, transitioning to a Water City by 2050, requires a variety of projects at different scales. The project sheets are divided into 5 scales, from XS to XL, and require collaboration between many stakeholders.

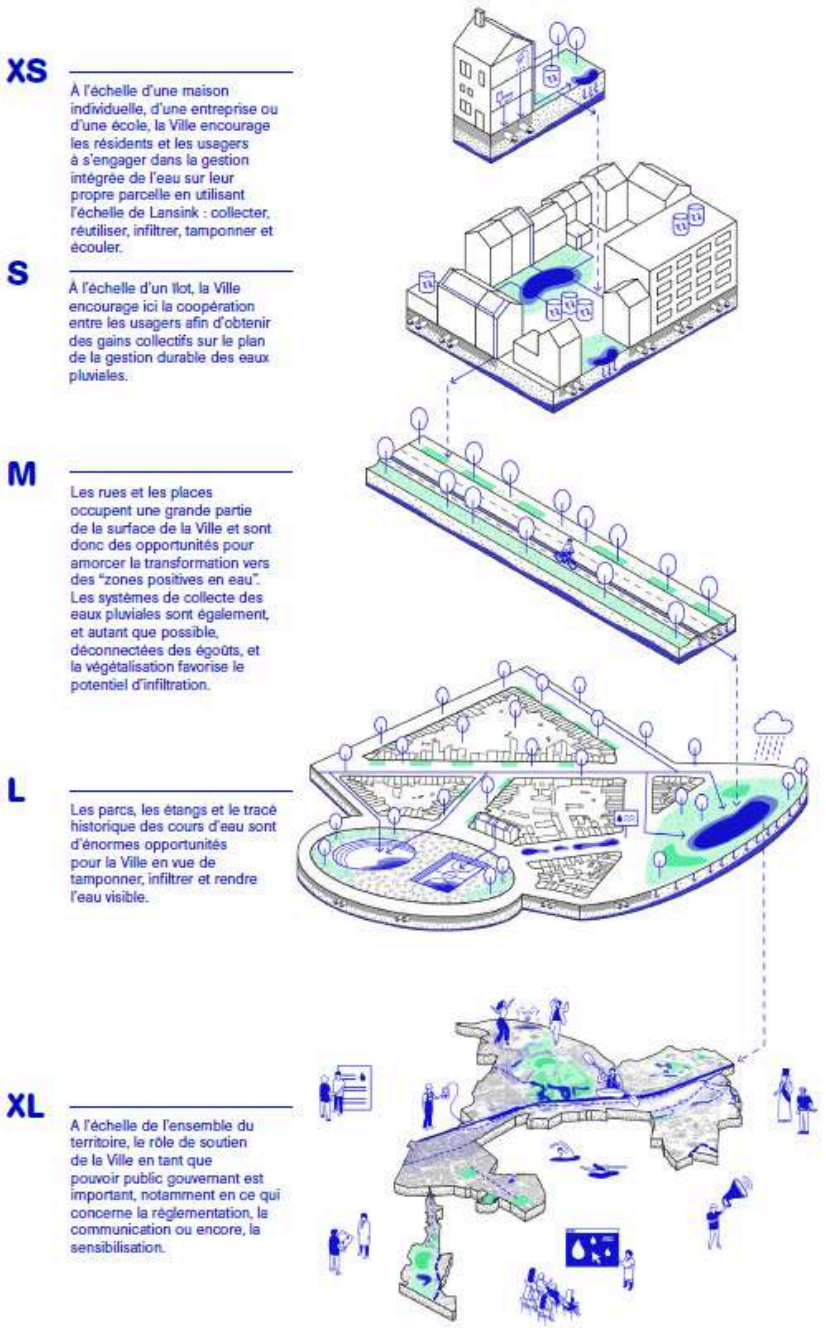


Figure 14: Presentations of project sheet scales (PCE, 2024)

The smaller scales (XS, S) focus on private plots, where, depending on the ownership, the City of Brussels has a directing role, in case the plot belongs to the City, or a supporting role (via subsidy

or premium), in case its plot belongs to private owners. Defined and already started projects include the installation of rainwater tanks at schools or depots, the dewatering of playgrounds, the disconnection of roofs and paved surfaces (from the sewage system) of major economic players such as the King Baudouin Stadium, TradeMart and Brussels Expo on the Heysel Plateau. , disconnecting roofs and paved surfaces of public real estate companies such as the Model neighborhood. The larger scales (M, L) relate to public space and require an executive role from the City. Defined and already started projects include the reconstruction of the Jan Sobieski avenue and the streets around the Prince Leopold Square, including the Duysburgh and Ledeganck streets, the construction of a sports park in Laeken, as well as various hydrological studies for the revaluation of the Brussels ponds. The largest scale (XL) comprises mainly non-spatial actions in which the City assumes a policy-making role. Defined and already initiated projects include, for example, the revision of premium regulations, the launch of awareness programmes and the drafting of a specific municipal urban development regulation (for rainwater).

In the PCE a priority map proposes a zoning, ranging from yellow (low priority) to red (high priority), for each sub-watershed. The purpose of this map is to highlight the areas where priority intervention is required in view of the risk of flooding. A gradation of the degree of priority has been calculated on the basis of the number of people potentially exposed to the risk of flooding within a sub-catchment area (Brussels-Environment flood risk maps and emergency services flood response statistics). This exercise makes it possible to prioritize projects in watersheds where the impact will be greatest, bearing in mind that Integrated Stormwater Management (ISWM) measures will always be more appropriate upstream than downstream

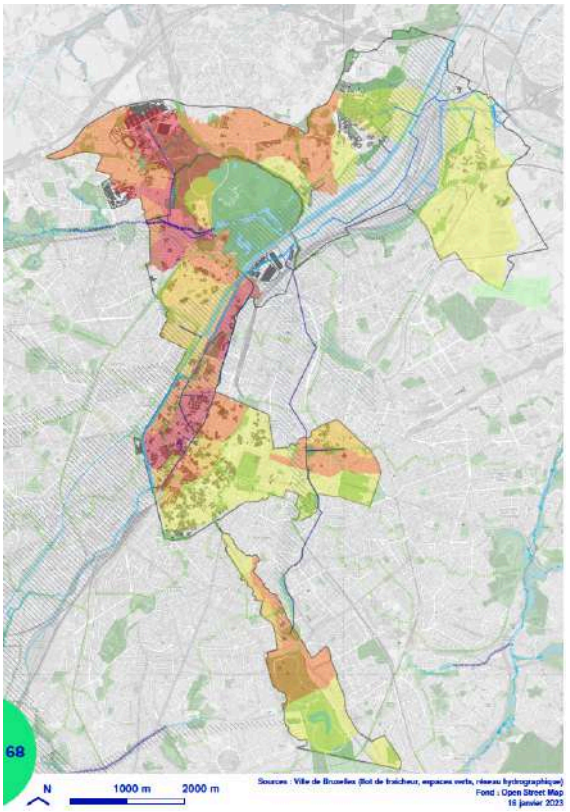


Figure 15: Mapping of priorities areas (PCE, 2024.

The technocrat discourse and the democratic discourse

During the preparation of the PCE, stakeholders collaborated during various work sessions (Figure below). The stakeholders were public authorities, such as the City, Vivaqua, Hydria, Perspective and Brussels Environment, and citizen associations, such as SGWB, Pool is Cool and Coordinatie Zenne (City of Brussels, 2023). Residents were only informed through a public information session in the City Hall on May 31, 2024. The PCE was therefore written by the pens of experts. This is understandable, given that the implementation of the policy on integrated rainwater management in the urban environment requires thorough knowledge of the local hydrological systems and local urban development policy. As a strategic policy plan, the PCE therefore deals with a very technical matter, making the plan difficult to make tangible for residents in order to involve them in the process.

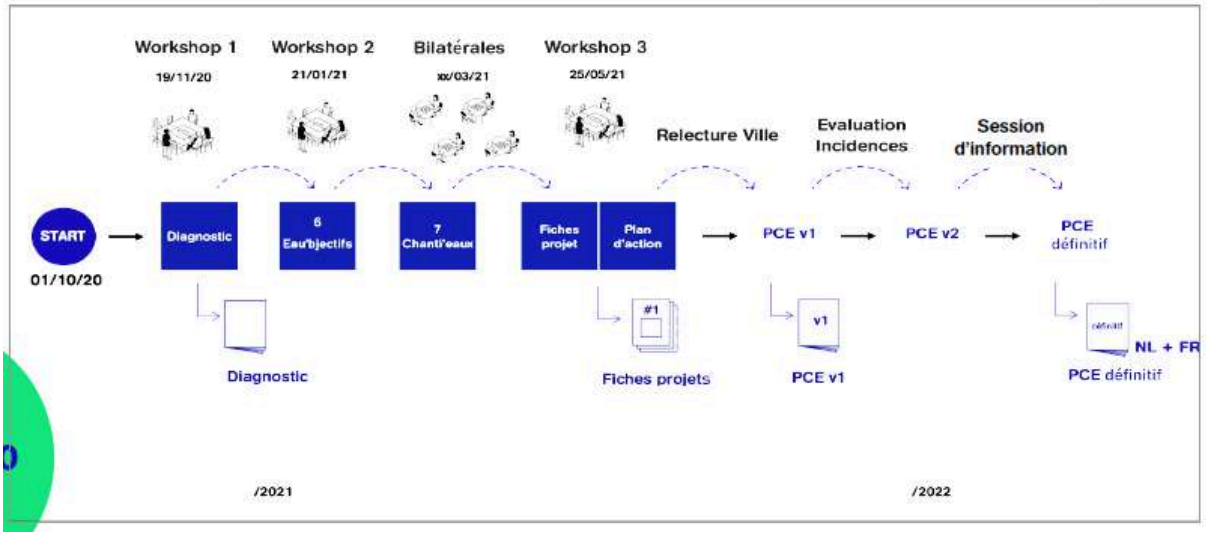


Figure 16: Development of the Municipal Water Plan of the City of Brussels, extract from City of Brussels (PCE, 2024)

The choice to exclude higher levels of engagement than merely informing residents from certain projects or processes is a conscious organizational choice. Maintaining an open network relationship in which roles and positions of authority are subject to negotiation may be less desirable in urban planning projects that require a fair amount of technical expertise. Building on Arnstein's (1969) ladder of participation, low citizen involvement is often associated with activities that require technical expertise and that cannot be carried out by citizens. This discourse is called the technocratic discourse, in which the importance of citizen participation in the process is reduced due to the project-related need for specialized and professional expertise. From an opposite perspective, regarding representativeness, democratic discourse idealizes citizen expertise over specialized or political expertise. High levels of citizen involvement are associated with activities that are tailor made for citizens (Stauffacher et al., 2008).

However, it is important even in technocratic discourse to recognize the arenas in which different actors can interact. These two discourses reveal the complexity of integrating different perspectives to find the perfect balance between trust in a project or program and the representativeness of local groups and needs (Dobre, 2019). In the context of the PCE, at different project scales, in addition to the M and L scales that mainly intervene in public spaces and are most definitely of interest to citizen participation, the question arises which projects have an impact on residents facing flooding. Floodings are heavily influenced by macroscopic causes, such as the degree of urbanization of the river basin. Initiatives on individual parcels, such as removing pavement of playgrounds or creating rain gardens in private gardens, will not be able to reduce the impact of future heavy rainfall on flood-prone areas. Rather, large-scale infiltration projects, or an aggregation of many smaller initiatives on plateaus and upstream, will significantly impact these food prone but also socio-economically vulnerable neighborhoods. It is characteristic of hydrologic systems in river basins that rainfall upstream and on its plateaus tends to cause few flooding problems locally (where it falls), but rather elsewhere, particularly downstream and in its natural depressions. A resident in southern Laeken may be interested in local infiltration initiatives, especially near major economic hubs like the TradeMart or Brussels Expo on the Heizel plateau, and broader integrated stormwater management policies. In fact, all inhabitants in a river basin could benefit from integral rainwater measures due to the various ecosystem services they provide. This means possible all projects could or should possess a participatory element.

The Brusseau(Bis) project

The Brusseau(Bis) project sought to develop a participatory approach to integrated rainwater management and formalize it for the different project scales and types from individual private plots to public spaces and even to entire river basins. In this way, the expertise and knowledge of inhabitants and users could be channeled in a formal way into policy on integrated rainwater management. The project goal was to develop co-creation methodologies for all types of rainwater projects.

Within the river basin of the Molenbeek, of which Laeken is a part, there are not many co-creation experiences, except initiatives that stemmed from the Brusseau(Bis) project (Brusseau – Brussel sensible à l'eau). Three of these initiatives were brought in a further stage of development, all three concerning a very local scale of water management (scale of an individual gardens, a building group and a square) (= XS, S and M scale of the PCE):

- **Personne ressource:** inhabitants co-implementing NBS works for creating rain gardens in each other's private gardens and bringing each other in contact, so there is possibility for peer-2-peer learning (inhabitants informing and helping each other). This was facilitated by official communication channels and financial incentives by the municipality of Jette.
- **Ilot Strauwens:** this is a social housing block, where 3 co-production activities were implemented (diagnostic, design and implementation), during which rainwater solutions were intertwined with local needs like biodiversity in the common garden and vegetable crates. A local association worked to bring more engagement within the social housing block and a social local committee of the housing block was very active.
- **Participatory walk, diagnostic and design of square prince leopold:** multiple participatory activities that functioned to give back ownership of public space to the inhabitants, engaging inhabitants in the process of diagnostic and design, in order to give a signal to the administration that certain works or certain objectives needed to be implemented in this location, coming from a local need. The sessions focused on empowerment and education of the inhabitants surrounding rainwater management.

Analysis of the above mentioned projects through interviews of the participants, organizers and local grass-root associations teaches us that integrated stormwater management is complex for co-creation on larger project scales. Residents need concrete, tangible, and personal projects, while stormwater management installations, especially on private properties during heavy rain, can be very technical due to space constraints. Projects involving citizen participation should align with personal interests. We observe that participatory processes are smoother when they address local needs, such as solving a common problem. However, flood issues affect only a small portion of the population, making it a low priority for most residents. Thus, it's crucial to link integrated stormwater management measures to personal interests and local needs, like using rainwater for a vegetable garden or planting more trees in a street.

The interviews also conclude that co-creation can foster stronger community dynamics and engagement, particularly on small-scale projects (XS and S), which often involve private gardens. This reduces concerns about representation in the process. Projects on private property can only start voluntarily without a mandatory legal framework. For public domain projects (M scale), organizing co-creation around stormwater management is harder compared to issues like traffic safety, parking, noise, or greening. This is because integrated stormwater management is not a priority for most residents and is too complex in the public domain. As a result, achieving a truly representative participant group is difficult, undermining an inclusive process. Co-creation in public projects should consider stormwater management as a design parameter rather than the

main focus. Other participation forms, like surveys and consultations, might generate more community engagement.

The interviews indicate that awareness of integrated stormwater management spreads slowly due to its technical nature. Residents can only discuss it when they have tangible projects and examples. Engagement is challenging unless residents have no other pressing priorities. This makes engagement in medium-scale projects (M) difficult. For small-scale projects (S), it depends on the local conditions of the participants and often requires collaboration with local associations acting as ambassadors. Among the studied projects, activities at the smallest scale (XS), involving resource persons, show the greatest potential for creating engagement beyond the original target group. Co-creation played a crucial role, fostering project ownership within the community. Even more crucial was enabling residents to become ambassadors, to feel comfortable with the topic and to take part in the organization of the project. This informal and direct knowledge dissemination builds trust in ambassadors' expertise and spreads engagement quickly. Over time, the social aspect, like getting to know your neighbors, remains more important than the ecological one. If there are no local ambassadors willing to participate, the social aspects of participation should be maintained by another actor that has close relationships with the neighborhood, like grass-root organizations.

For residents affected by flooding, the situation is more complex. They know that a rain garden won't stop their basement from flooding; they seek quick structural measures, like underground or above-ground storm basins, which are primarily about buffering, not integrated stormwater management.

On the improvement of social aspects, namely social cohesion through participation we further learned that organizers cannot force a broad local community dynamic within the context of specific project development. Social activities can be arranged to introduce more people to a topic, but individuals must make a necessary personal shift towards the project on their own. Project development within a specific context lacks the flexibility to focus on local and shared structural needs, such as loneliness, poverty, moisture problems in social housing, or critical social cohesion. These local and shared structural needs drive true broad community dynamics. However, this requires funding different structures and sectors (like non profit grass-root associations or social workers) or developing specific projects within these contexts. In the context of integrated stormwater management, especially within subsidized projects, there are limits and boundaries to what the organizer can do and is authorized to do.

The pilot case

Priority Intervention Zone for Integrated Rainwater Management in Laeken

The pilot project in Brussels is the Priority Intervention Zone for Integrated Rainwater Management in Laeken (referred to as "PRIOR Laeken"). This zone, identified by the College of Mayor and Aldermen of the City of Brussels on November 25, 2021, has defined several objectives to address the flooding issues in Laeken. These objectives were also published in the City of Brussels' Climate Plan 2.0, approved by the City Council on December 12, 2022. Urban development and renovation projects, as well as the (re)design of public spaces within this zone, must prioritize infiltration and the reuse of rainwater to enhance the city's natural sponge effect. Additionally, 250,000 m^2 of roofs or paved surfaces in this zone must be disconnected from the sewer system (City of Brussels, 2022).

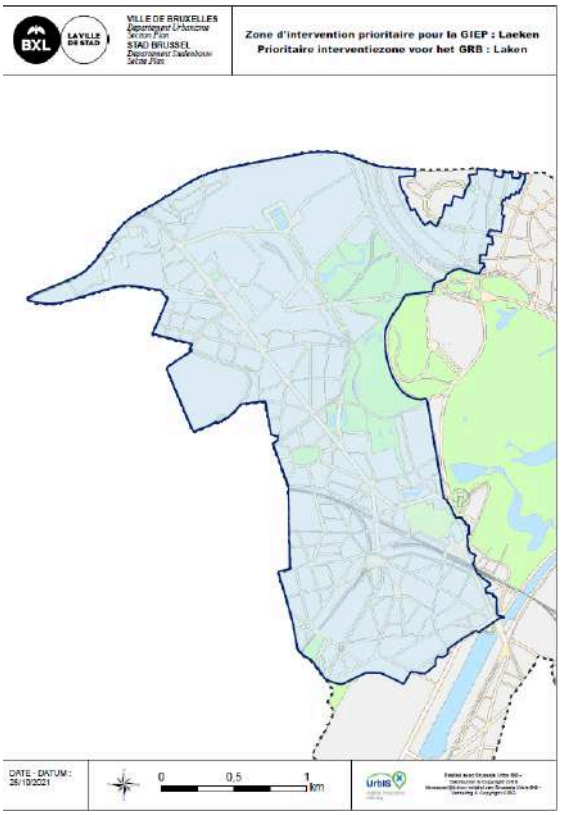


Image 17: the PRIOR Laeken © City of Brussels

The Verregat neighborhood

Within PRIOR Laeken, numerous rainwater management initiatives are being implemented across various scales (see MWP: XS, S, M, L, XL) and types (private/public). The local pilot project within the TRANS-Lighthouses initiative must be a co-creation process driven by local socio-economic and ecological needs.

For this reason, the pilot case will primarily focus on the Verregat neighborhood, located in the North of Laeken on the Heysel Plateau, at the edge of the Brussels-Capital Region and adjacent to the recently renovated Verregat Park. Verregat is a very green area, one of the 20 "cité-jardins" in Brussels, originally designed to provide comfortable housing for disadvantaged people. Today, it consists of apartment blocks owned by the Comensia cooperative social housing association, surrounded by green areas and private houses with gardens. In later phases, other areas within PRIOR Laeken with potential for improved stormwater management based on local needs may be added to the project, with additional Local Knowledge Labs (LKL) to be created.

The Verregat neighborhood has been selected because it meets two essential conditions for successful participatory processes in Integrated Stormwater Management (ISWM):

Social Conditions:

- The active presence of neighborhood representatives and local associations is crucial for the project's success.

- There is a willingness to work on ISWM and Nature-Based Solutions (NBS). While ISWM may not be an immediate priority for citizens, it could address socio-ecological issues often raised by the community.

Ecological Conditions:

- It is preferable to work upstream in the watershed where infiltration and ISWM solutions are feasible.
- In flood-prone areas, NBS actions have limited impact due to high urbanization and low infiltration rates.
- Implementing a series of small upstream actions can yield significant results and improve flooding dynamics downstream.

The aim of this pilot case is to mobilize local inhabitants and the Comensia social housing cooperative, integrating practical ecological solutions to enhance stormwater management while addressing local needs. Through community involvement and the use of NBS, the project seeks to mitigate environmental challenges and improve socio-economic conditions in Laeken, particularly in the Verregat neighborhood, and downstream flood-prone areas by reducing rainwater discharge into sewers. Given the environmental issues facing Brussels, such as flooding and heat islands, the pilot project will focus on sustainable management techniques that offer multiple environmental benefits (less flooding, cooling effects, increased biodiversity).

The pilot project will employ a variety of NBS, both technological and participatory. During the co-diagnosis phase, participatory NBS (e.g., walkthroughs) will identify local opportunities in water management, environmental improvement, and social cohesion with citizens and local associations. To address socio-economic inequalities and enhance social cohesion at the neighborhood level, the pilot case proposes a parallel social trajectory with initial social cohesion activities, followed by social activities based on the findings of the local diagnostic phase. These activities aim to connect local associations and citizens, inform them, and raise awareness about NBS solutions and integral water management (swales, infiltration ponds, planted ditches, etc.) through various channels and tools (presentations, museum or field visits, serious games, etc.). This will enable citizens and associations to understand, adopt, and co-design these solutions, appreciating their advantages and disadvantages.

Figure 17: Verregat neighborhood with private houses and Comensia buildings, pathways and green spaces between them (source : City of Brussels)

2. Collecting the required knowledges for the Living Knowledge Lab

Creating relationships with partners

Networking and exploratory activities in territory

To explore the territory and gain knowledge from grass-roots associations, stakeholders and citizens, the VBX pilot team has adopted the methodology of light ethnography, which aims to explore and comprehend individuals' experiences and perspectives within their social milieu. Light ethnography relies on adaptable data collection techniques, including informal interviews, observations, and spontaneous interactions with members of a community or specific groups. This methodology enables us to gain insights into how individuals inhabit and interact with their environment.

By prioritizing informal exchanges, we have created a conducive environment where participants are freely expressing themselves, fostering open and spontaneous communication. This approach entails actively listening to individuals and incorporating their life stories into the co-creation process. By empowering residents with a voice and involving them in decision-making processes, we ensure that resultant decisions align more closely with their needs and aspirations.

Empathy and active listening to participants constitute key components of light ethnography. By empathizing with participants' perspectives and striving to understand their realities, This methodology promotes a deeper understanding and greater empathy towards citizens' expectations and needs.

Various initiatives were aimed at fostering connections with potential partners, gaining insights into the challenges faced by local communities and associations by the VBX pilot team. These activities were divided into two main types of exploratory visits: field work visits and semi-structured interviews.

Field work visits were conducted with tailored methodologies suited to the characteristics of the target groups and participants, employing direct observation, exploratory interviews, and

walkthroughs.. *For more detailed information, please refer to Task 4.2 where all data and results collected during this mapping of participatory culture are detailed.*

Following the field work visits, semi-structured interviews were also conducted with key stakeholders in the territory in order to gather specific data and insightful knowledge about the territory, its actors and stakeholders. Subsequently, comprehensive data were collected from all social and youth organizations operating in Laeken (see T4.2).

Intervieweds	**Type**	**Organisation**	**Date interview**
Cédric Simons & Lionel Francou	Administration	Ville de Bruxelles - UO Climat	Through form
Nderagakura Astride	Administration	Ville de Bruxelles - BXL participation	13-févr 204
Aude Hendrickx	Non-profit Organisation	Musé d'égouts	14-mars 2024
Pieter Elsen	Non-profit Organisation	Canal it up	13-mars 2024
Jan Lippens	Non-profit Organisation	Coordination Zenne	05-mars 2024
Lional Galand	Non-profit Organisation	Bravvo	12-mars 2024

The main insights and preliminary conclusions from the field work detailed above could be summarized as follows :

The participatory culture faces several significant barriers, one on the **inclusion aspect of the participation**. Even throughout the co-creation practices, we see that very persistently the **same type of audience** is present and that the engaged groups are generally small and don't grow much, even with the involvement of local associations. This is a continuation of Brussels as a very multicultural city and an absence of mixed cultures. Different cultures that arrived from immigration dynamics are generally connected to a lower socio-economic class. Past experiences from the immigrant community as well as gentrification effects create a certain distrust towards the administration, that are generally white and more rich. Overcoming these barriers is challenging yet imperative, especially in areas like the "croissant pauvre," including Laeken, characterized by multiculturalism and modest means.

Another barrier is the **perceived lack of tangible outcomes and proximity.** Many participatory initiatives fail to demonstrate to participants that their input translates into tangible decisions. This is exacerbated by **symbolic participation**, a **lack of communication and follow-up** between project coordinators and the community (eg: when a project subsidy ends) and often **abandoned projects post-completion (No monitoring phase or investment in participatory trajectory post project-completion)**.

TRANS-Lighthouses can, in the territory of the pilot case (Verregat), bring opportunities for creating **more engagement in a participatory co-creation process**, by focusing in parallel on social activities that bind cultures (like food, sports and art). Our aim is that by working in a social housing district and by working with the social coordination of the cooperative social housing company (Comensia), the creation over time of a wider, more inclusive co-creation engagement process that represents the community in its diversity can be achievable.

Bringing members/stakeholders in the LKL

Taking into consideration the Verregat district's dual composition of private owners and tenants in Comensia buildings, and following extensive consultations with Comensia, as well as discussions with residents/owners' representatives, the Living Knowledge Lab (LKL) was formalized as follows:

- **Comensia**: Representing the tenants of the Verregat district due to their comprehensive understanding of the area, its context, challenges, and longstanding presence.
- **Tenant representatives and neighboring associations:** Ensuring the voices and concerns of tenants are effectively represented within the LKL.
- **Representatives of private owners :** Providing input and perspectives from private property owners and local neighborhood associations.

The table below provides detailed information on the roles and responsibilities of each LKL representative and member.

Name	Organization	Function	Tasks in the LKL
Cédric Simons	Brucity – administration	Water referent - Brucity	Project organization, Project coordinator, Support and budgetary issues,
Antoine Warrant	Brucity – administration	TRANS-Lighthouses Coordinator	Project organization, Project coordinator, Support and budgetary issues,
Dimitri Coppens	Comensia – social housing cooperative	social cohesion coordinator	Project co-coordinator, Internal Comensia commitment and coordination, Legitimation on Comensia side
Stéphanie Rosa	Comensia – social housing cooperative	Animator - Verregat neighborhood	Commitment and communication Verregat district,
Alain Huysmans	Comensia – SISP cooperative	Technical coordinator	Technical feasibility and monitoring,
Dominique Pesch / Aurélia	Comité social des voisins (locataire)	Participant	Involvement and communication with residents and tenants,

Name	Organization	Function	Tasks in the LKL
Cédric Simons	Brucity – administration	Water referent - Brucity	Project organization, Project coordinator, Support and budgetary issues,
Antoine Warrant	Brucity – administration	TRANS-Lighthouses Coordinator	Project organization, Project coordinator, Support and budgetary issues,
Dimitri Coppens	Comensia – social housing cooperative	social cohesion coordinator	Project co-coordinator, Internal Comensia commitment and coordination, Legitimation on Comensia side
Charlotte	Propriétaire quartier	Participants	Involvement and communication with residents and tenants,

The Living Knowledge Lab (LKL) representatives share at least two common objectives:

- **Improving environment and quality of life**: Enhancing integrated stormwater management in the Verregat neighborhood to create a healthier environment, minimize floods in the surroundings and further down in Laeken and elevate residents' quality of life.
- **Promoting social cohesion**: Cultivating stronger social ties within the neighborhood by facilitating interactions among residents, tenants, and Comensia through diverse social cohesion activities, which may encompass environmental themes but extend beyond them.

Comensia's involvement as a key participant in the LKL enables them to contribute their expertise as a social housing cooperative, drawing upon their deep understanding of project dynamics, local context, and the challenges faced by tenants. Comensia will prioritize initiatives aimed at enhancing the environment and quality of life within their apartment buildings, potentially through incentives such as premiums or subsidies for improved stormwater management. While their objectives may align with those of tenant representatives, differences in perspective or preferred approaches for project implementation may arise and will have to be taken into consideration.

Private owners' representatives will advocate for neighborhood enhancements that reflect the interests and aspirations of the broader community. It's essential that their proposals resonate with the majority of residents and property owners within the neighborhood to ensure inclusivity and effectiveness in neighborhood development initiatives. These representatives will have to be the voice of all private owners.

Inclusion of marginalized knowledges

The inclusion of marginalized communities is based on a few fundamental principles in our pilot project:

- **Varied participatory activities**: Alternating between **social cohesion activities**, such as barbecues, sewer museum tours, and neighborhood parties, and **participatory activities,** such as walkthroughs, photovoice and design labs, helps attract and include a multicultural audience with varied sensibilities.

- **Open and inclusive communication**: Transparent, accessible, multilingual and multi-channel communication is adopted, using visual aids, translations and simplified formats to ensure that every individual can understand and participate fully in the project.
- **Collaboration with neighborhood and grass-root associations**: Working closely with local associations, such as Comensia and the citizen committee, who are familiar with the challenges faced by marginalized communities, helps to mobilize their participation. These associations can act as advocates and/or facilitate the participation of marginalized community members.
- **Community needs approach:** Adopting an approach centered on the real needs of the community and neighborhood, rather than on political will, ensures that initiatives effectively meet the expectations and priorities of local residents.

The Local Democracy Lab, involving our elected representatives and several researchers focused on the inclusion of marginalized communities, will allow us to thoroughly explore the question: "How can Brussels effectively engage a culturally and socio-economically diverse population in sustainable participatory projects (such as rainwater management and climate plans), and secure political support for the necessary resources to ensure inclusivity and participation of the 'unusual suspects'?"

The project team expects this discussion to be highly enriching, providing a platform for in-depth reflection on short, medium and long term solutions for the inclusion of marginalized communities in participatory projects across Brussels including the present pilot project. By encouraging a collaborative environment, we aim to develop actionable strategies that promote inclusivity and ensure that all community voices are heard and valued in the urban planning process.

Inclusion of youth

Various activities will be planned for the youth to ensure their involvement and participation in the project. However, since they are not the decision-makers in their households, the objective with the youth is to raise their awareness about NBS and Integrated Rainwater Management. With this awareness, we believe it will be easier to engage and convince families and parents to take action to implement NBS at their level. The youth's perspectives are also crucial for the development of their neighborhood according to their concerns, especially regarding public spaces and the presence of nature in the city.

The involvement of young people in the project will be facilitated through awareness-raising activities in schools (such as École des Magnolias and Athénée BXL2) and through local scout groups in Laeken (including radio activities, participatory workshops, etc.). Initially, schools already involved in environmental projects, such as Athénée BXL2, will be involved in the project to build on the existing interests of students and teachers. This school, located in the south of Laeken at the bottom of the valley, is particularly active in the field of the environment. For several years, a teacher and students have managed a vegetable garden, participated in the "Récréation de Bruxelles Environnement" project - a co-creation initiative to depave and rethink their playground - and will install additional rainwater harvesting systems with the help of the City of Brussels.

Two students and one teacher from the school will attend an Educommunication training in Trento. The aim is for them to share their experiences within their school and the TRANS-Lighthouses project through workshops, blog posts and other activities, and to extend the

collaboration to nearby schools such as the École des Magnolias, which borders the Verregat neighborhood.

Relationship with and view of nature (human-nature relationship)

The relationship with nature among stakeholders in the LKL (Living Knowledge Lab) is diverse, shaped by cultural and political contexts. Stakeholders include inhabitants/general citizens, government agents, social housing cooperative members, each with distinct perceptions and practices regarding nature and Nature-Based Solutions (NBS).

Inhabitants: Local residents view nature pragmatically, valuing its immediate benefits such as recreational spaces, gardening opportunities and cooler green areas. These interactions enhance their quality of life and well-being. For a large majority of them, the relationship between integrated rainwater management, nature and green spaces is not direct. The planned Photovoice activity will encourage citizens to reflect more deeply on the role of nature and water in their daily lives and the significance they wish to attribute to it in the future.

Social Housing Cooperative: As a social housing cooperative, Comensia not only provides housing for its cooperator-tenants, but also aims to offer a healthy, pleasant and sustainable living environment to all users of the sites it oversees and manages on a daily basis. Comensia aims to be exemplary in terms of sustainable management of its real estate and green spaces, aiming to inspire both its tenants and other players in the sector to generalize these practices.

Comensia set up an Energy-Environment and Sustainable Development unit in 2017 and drew up a Sustainable Development Plan that includes the following sustainable-related actions: company travel plan, use of eco-friendly cleaning products, waste reductions and improved selective sorting, renewable energy production, improved energy performance of buildings, Sustainable management of green spaces and rainwater.

Comensia's activities already support NBS initiatives aimed at restoring natural habitats and promoting environmental stewardship. For example, Comensia, in collaboration with Bruxelles Environnement, supports its tenants in creating neighborhood composts. The social housing cooperative has also started differentiated management of its green spaces in the Verregat neighborhood. This change has required a great deal of communication with tenants, and was the subject of numerous complaints from them. After more than a year of implementation, tenants seem to have finally embraced the idea and understood the benefits both for them and the biodiversity.

Comensia's previous experiences in implementing these projects, along with the associated challenges and lessons learned, will be crucial for the success of our pilot project.

Government Agents: Policymakers and urban planners see nature as a strategic urban asset, focusing on ecosystem services like integrated rainwater management, cool-island effect and air quality improvement. Policy documents focus and give guidelines for sustainable development and climate resilience. For the city of Brussels, numerous strategic plans have been adopted the past years related to that matters including the most recent plans : Climate Plan, Climate Water Plan, Municipal Sustainable Development Plan

In the city of Brussels, water has become an increasingly important theme due to several flooding events in recent years. Currently, several people are working on water-related topics, including integrated stormwater management, and have acquired knowledge on what can be envisaged in specific neighborhoods or areas, taking into account regional and municipal guidelines.

This knowledge around integrated stormwater management will need to be shared and disseminated to the inhabitants and Comensia's representatives during the planned activities (walkthrough, Photovoice), while adopting a role of proposal and suggestion rather than decision-making, to enable the participatory process to function fully.

Strategy and actions for the LKL

The LKL will probably need to overcome some of the barriers and challenges identified below. Strategic actions and targeted solutions related to each challenges have been listed to ensure successful mobilization, common understanding of pilot case goals, and strong relationships among all stakeholders :

1. Mistrust between some inhabitants and the municipality following previous experiences in co-creation or participatory processes.

   Proposed actions :

   - Decision-making transparency: open and regular communication through participatory website creation, organization of co-diagnostic activities (walkthrough, photovoice) ;
   - Representativity and Inclusivity of All Opinions Within the LKL.

2. Differences in Vision and Objectives Among Stakeholders. *This challenge could be from stakeholders in the LKL itself as previously stated but could also arise from stakeholders engaged in the pilot project itself.*

   Proposed actions :

   - Organize initial visioning sessions for stakeholders to articulate their aspirations for the LKL.
   - Conduct polls to identify and prioritize key objectives from the community's perspective.
   - Build a common knowledge and global understanding on water and climate issues, participatory processes, Nature-Based Solutions, Integrated Rainwater Managements techniques and Verregat/Laeken own challenges

3. Lack of expertise, knowledge, Skills, in Nature-Based Solutions and Integrated Rainwater Management

   Proposed actions :

   - Training, Education and sensitization Programs through participatory activities, open communication and learning/dissemination activities (sewer museum visit, informal discussions, booklets and flyers distribution).

- Conduct hands-on workshops where participants learn techniques like rain garden installation (via the help of the resource person).
- Arrange tours to neighborhoods with successful nature-based solutions and integrated rainwater solutions to showcase.

4. Fluctuation in terms of engagement and participation

   Proposed actions :

- Work closely with grass-root associations (Comensia, neighbors' social committee) to ensure close connection with residents
- Diversify the types, timings, and target groups of activities to appeal to a broader audience. Organize activities that provide immediate benefits while also considering initiatives that could lead to long-term improvements.
- Host regular neighborhood gatherings to build community bonds and with a various range of events' types.

3. Formalizing the LKL

Creating cooperation, understanding and dialogue

Registration of activities

In the process of formalizing the Living Knowledge Lab (LKL), several meetings have been conducted to understand stakeholders' visions and operational strategies. Initially, these meetings were held individually to grasp each partner's specific needs and methods. Here's a breakdown of the key meetings:

- December 21, 2023: Presentation on LKL, the co-diagnosis process, and the pilot project for the Verregat neighborhood social committee with Comensia, exploring potential cooperation.
- April 5, 2024: Meeting with Comensia's technical department in the Verregat district for the pilot project, followed by a technical site visit to assess rainwater harvesting tanks and new cisterns.
- April 11, 2024: Inaugural meeting of LKL citizens.
- April 24, 2024: 1st social cohesion activities with citizens via a BBQ and informal exchanges about.
- April 30, 2024: Strategic session with Comensia and the head of the social department.

These initial meetings facilitated stakeholder introductions, presented pilot project objectives and planned activities, and fostered discussions on future strategies and implementation ideas. Following these discussions, a roadmap document and gantt chart were created to outline the LKL's organizational structure and distribute roles and tasks between the Support Committee and the Steering Committee, ensuring clarity and effective project monitoring. The following phases detailed below have also been identified.

The following phases are intended for our pilot project :

1. **Activation phase:** This phase involves initiating engagement and motivating stakeholders to participate actively in the process.
2. **Co-diagnostic phase:** During this phase, stakeholders collaboratively identify and analyze needs, challenges, and opportunities. Also during this phase, pilot and priority activities could already be launched to inspire the community and respond to well identified urgent needs (e.g.: .
3. **Co-design phase:** In this phase, stakeholders work together to create and develop solutions that address the identified needs and challenges.
4. **Co-implementation phase:** This phase involves the joint execution of the developed solutions, ensuring active participation and collaboration from all stakeholders.
5. **Co-monitoring phase:** During this phase, stakeholders collectively oversee, evaluate, and assess the progress and effectiveness of the implemented solutions.

Social mobilization and engagement

Registration of activities

An initial project presentation and social cohesion activity has already been carried out in the form of a barbecue on April 24, 2024 following the distribution of our flyer (see figure below). This barbecue was a good opportunity to meet around forty local residents and tenants, to introduce the project, to discuss the neighborhood's problems and to briefly show them what they could do in terms of Integrated Stormwater Management.

The co-diagnosis phase will begin mid-June, with the following activities planned:

- Walkthrough in the neighborhood to identify on-going problems linked to the environment, rainwater management but not only,

- Two photovoice workshops, using photography as an entry point for thinking about water management in a neighborhood, and then extending this to the environment.

- Semi-structured interviews with a number of local residents to gain a better understanding of the issues at hand

- A visit to the sewer museum is planned to raise awareness about rainwater management.

Thus, except the barbecue, other activities have not yet taken place.

BXL LA VILLE DE STAD

TRANS
lighthouses

Réfléchissons ensemble à l'amélioration de votre quartier, tout en luttant contre les inondations qui touchent la vallée de Molenbeek.

La **Ville de Bruxelles**, avec le nouveau projet **TRANS-Lighthouses**, souhaite prendre des mesures dans votre quartier pour gérer les inondations à Laeken. Nous vous invitons à prendre part aux activités participatives au coeur du quartier Verregat. En collaboration avec **Comensia**, la société de logements sociaux, nous examinerons ensemble l'environnement et **la gestion des eaux pluviales** dans le quartier. Pourquoi ? Le quartier Verregat, avec ses nombreux jardins et espaces verts, est un endroit idéal pour développer une meilleure gestion de l'eau de pluie. De cette manière, **la vallée du Molenbeek** sera rendue plus résiliente en prévenant **les inondations**. Grâce à un subside européen, nous allons réaliser un **diagnostic** et des **activités conviviales** pour améliorer ensemble **l'environnement** de votre quartier. Votre participation et vos idées sont cruciales pour mener cette initiative à bien. Ensemble, travaillons pour un avenir plus durable !

01 BBQ pour découvrir le projet
24 avril 2024 à 13h00
Rue du Romarin 16, Bruxelles
Venez discuter du projet avec nous et vos voisin·e·s de manière informelle.

02 Visite Musée des Égouts
11 mai 2024 à 14h00
Porte d'Anderlecht, Bruxelles
Une visite guidée au Musée des Égouts vous permettra de découvrir le parcours de notre eau de pluie. Inscrivez-vous avant 18 avril.

03 Balade au quartier Verregat
15 juin 2024 à 14h00
Rue du Romarin 16, Bruxelles
Participez à la balade et partagez votre vision du quartier ainsi que de la gestion des eaux de pluie.

04 Photo Voice
20 juin 2024 et 10 juillet 2024 à 14h00
Rue du Romarin 16, Bruxelles
Participez à deux ateliers de photographie pour capturer en images les aspects liés à l'environnement et à la vie du quartier.

Les évènements sont **gratuits**. Attention, les **inscriptions** sont **obligatoires** pour le Musée des Égouts et le Photo Voice. Contactez Antoine Warrant pour vous inscrire en précisant votre nom ainsi que le nombre de participant·e·s.

Antoine Warrant
e-mail :
antoine.warrant@brucity.be
tel : +32 2 279 30 83

Comensia · MAISON · Cofinancé par l'Union européenne · Ville de Bruxelles Stad Brussel City of Brussels

Figure 18: Flyer distributed to all residents in the Verregat neighboorhod prior to the activation phase (source : City of Brussels)

The following pictures were taken during the barbecue event and the slides shown are examples of the feasible Integrated Stormwater Management (ISWM) techniques presented to the residents as part of the project.

Figure 19A: Photos taken during the barbecue event - Verregat neighborhood, May 2024

Figure 19B: Slides about ISWM shown during the barbecue event - Verregat neighborhood, May 2024

During this first activity, several elements have already been identified:

- Comensia is a very dynamic partner, full of resources and motivation.
- A willingness on the part of the local people to learn and take ownership of the problems and solutions. Sometimes a desire/need to be guided by someone who knows.
- Local people are more interested in action than in reflection. Their involvement must take the form of concrete action, otherwise motivation will be lost in the long-term.

- Difficulty of inclusion: Those present at the barbecue were the 'usual suspects'. Few people from minority groups were present, so despite our efforts on inclusion, this needs to be improved for future activities.

These initial reflections and feedback from our first activity will feed into the organization of future activities to improve their inclusivity and impact align with the reflective monitoring principles. .

Creating a structure for participatory governance

Description of the co-governance model

The activities related to the Brussels pilot have not yet reached the stage where a co-governance model has been chosen. This will be a point of discussion during the next meeting of the LKL. It is worth mentioning that the design of the model begins as part of T4.3, both for this pilot and the subsequent ones.

Establishing a modus operandi

Since no co-governance model was already discussed and defined, the modus operandi has not been established either.

Monitoring and constant reevaluation

A continuous monitoring and re-evaluation process will be in place to reevaluate constantly the activities done on the field, their impacts, what can be done better, in direct link with the TRANS lighthouse partners, namely from WP5 and WP6, and according to the reflective monitoring framework.

Cáceres Pilot

Authors:
Mónica Cuende (EBR); Franco Llobera (EBR)

1. Exploration of the territory, its actors and challenges

Description of the territory

Territorial description

Rural/urban lighthouse: Cáceres province & municipality (Extremadura region)

Extremadura is a Spanish region with a rich history in which several important periods stand out, from Prehistoric times with numerous archaeological sites from the Palaeolithic to the Metal Age such as the cave paintings in the cave of Maltravieso in Cáceres, through the Roman Empire when the region was part of the province of Lusitania and Mérida (Emérita Augusta) one of the prominent cities, to the 15th-16th centuries where it played a crucial role in the expansion of the Spanish Empire in America.

Figure 20: Dolmen of the Great Holm Oak in the Dehesa Boyal of Montehermoso, 3rd century B.C.E. (A.M. Felicísimo, CC-BY-SA)

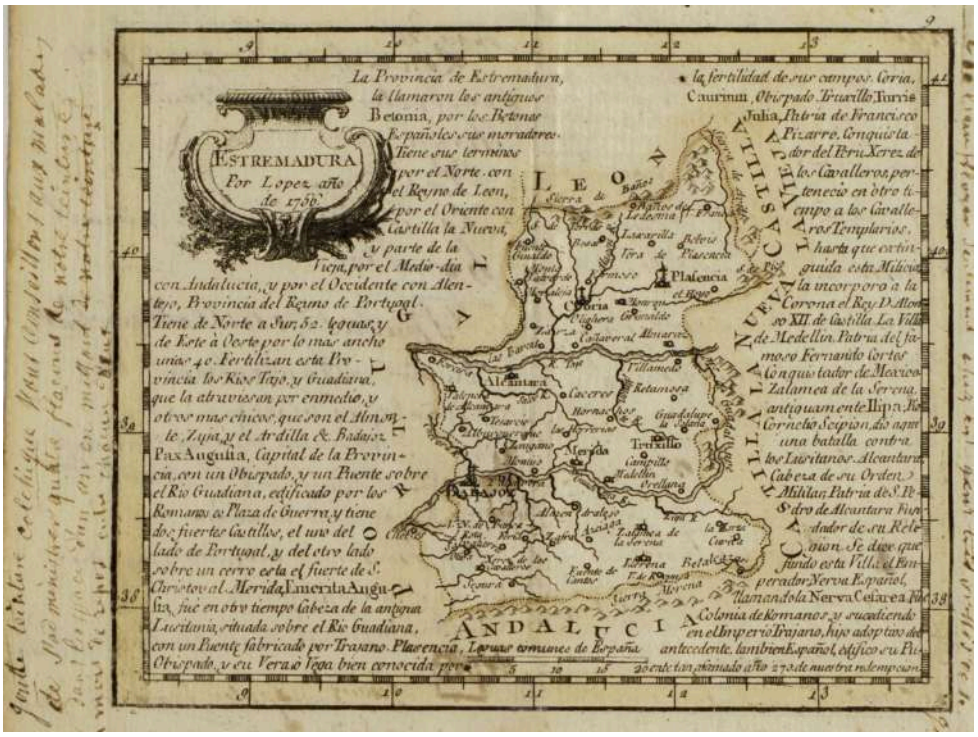


Figure 21: Geometrical plan of Cáceres, Talledo, J. Antonio & Baier, J. M., 1822 (Army cartographic archive, CC0 1.0)

Extremadura is one of the most biodiverse regions in Europe, with large expanses of 'dehesas' -unique ecosystems that combine farming and nature conservation- and are home to a rich flora and fauna, including protected species such as the Iberian imperial eagle and the Iberian lynx; a network of rivers and reservoirs that support valuable aquatic habitats and wetlands; and protected areas, such as the Monfragüe National Park which is important for the conservation of the vulture.

Figure 22: Vulture in the Monfragüe National Park (Tanja Freibott, CC BY-SA 4.0).

The Spanish region of Extremadura is located in the southwest of the Iberian Peninsula, bordering Portugal. With an area of approximately 41,635 km2, equivalent in size to Belgium, it is one of the largest regions in Europe, The Extremadura region is divided into two of Spain's largest provinces: Cáceres in the north and Badajoz in the south. Mérida is the regional capital.

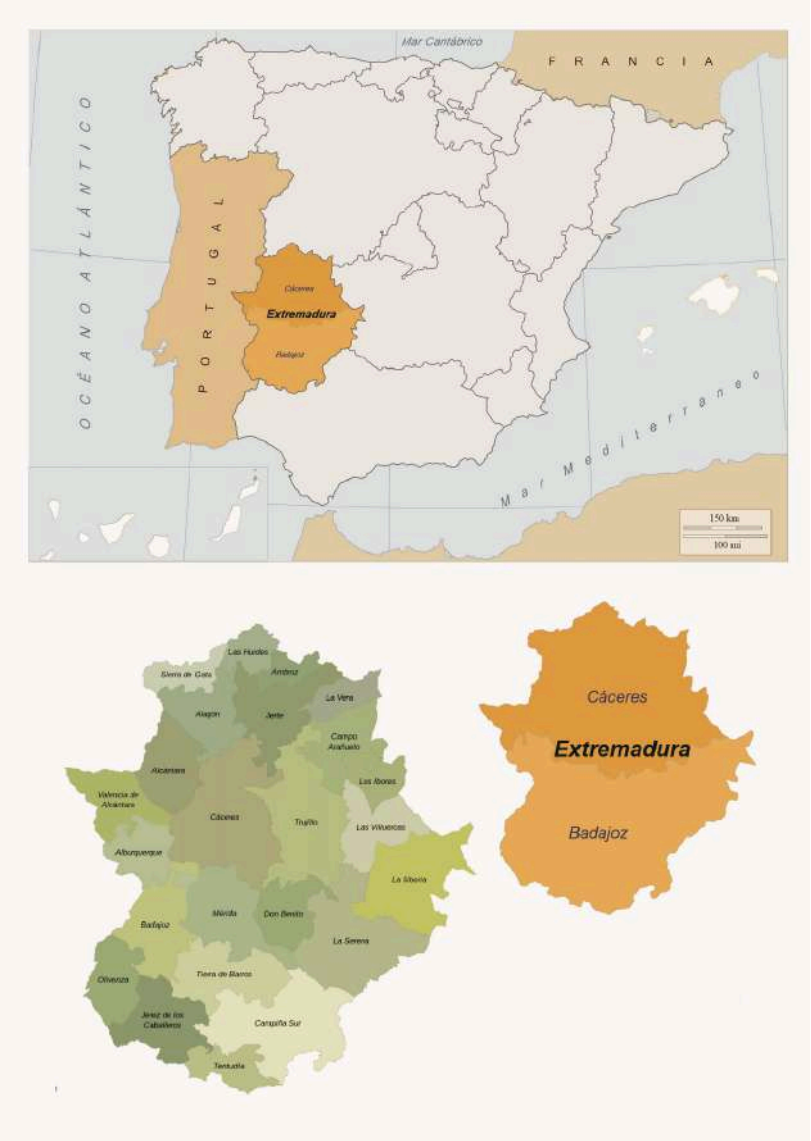


Figure 23: Map of Extremadura with indication of the Cáceres and Badajoz provinces (Joan M. Borras, CC BY-SA 3.0)

Cáceres is the name of the province with 387,434 inhabitants (in 2023) out of the total 1.06 million inhabitants of the region of Extremadura, and also the name of the provincial capital with 96,215 inhabitants.

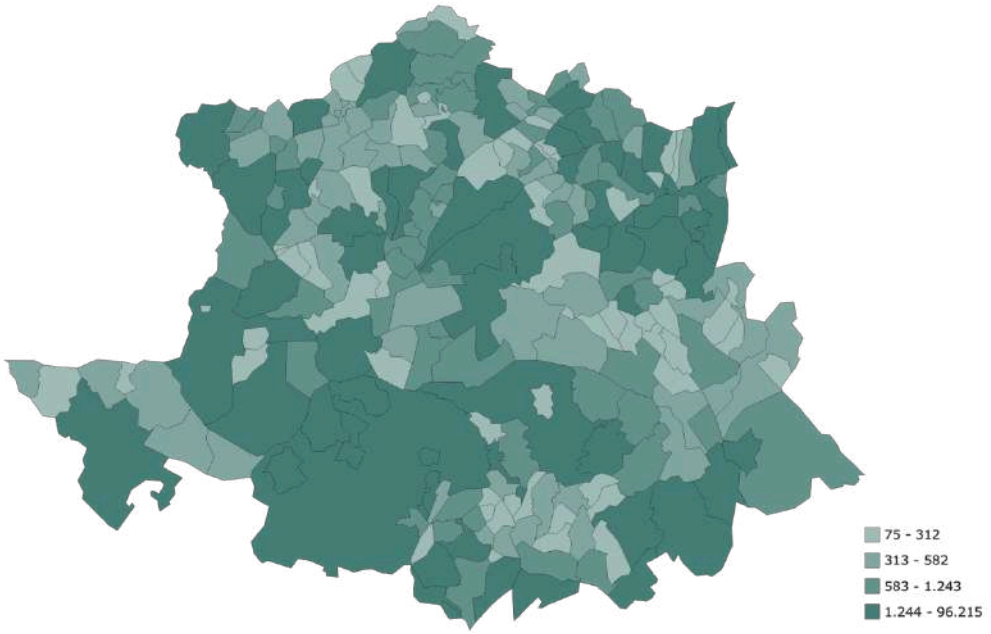


Figure 24: Map of the total population density of province of Cáceres (Instituto Nacional de Estadística, CC BY-SA 4.0)

Thus, this pilot project addresses both urban Cáceres (municipality) and rural Cáceres (province), in particular the challenge for bio-waste to be treated in a delocalized and decentralized way on a medium and/or small scale in a participatory and inclusive manner through composting, understood as the most environmentally, socially and economically efficient nature-based solution.

Physical geography of Cáceres province and municipality

From the geological point of view, the Province of Cáceres is located on the Hercynian shield, silicon materials of Precambrian and Paleozoic age: especially slate, quartzite and igneous rocks. The province of Cáceres has an important geological heritage of these ancient materials, embodied in the Villuercas Ibores Geopark with an active public, private and social presence and dynamization (school, association) that allows the geological heritage to be interrelated with economic, ecological and social of the province, with an internal educational focus, and as a tourist resource for visitors. The slates of Precambrian age stand out, coinciding with the Ediacaran flora and fauna, of which however there are few fossils.

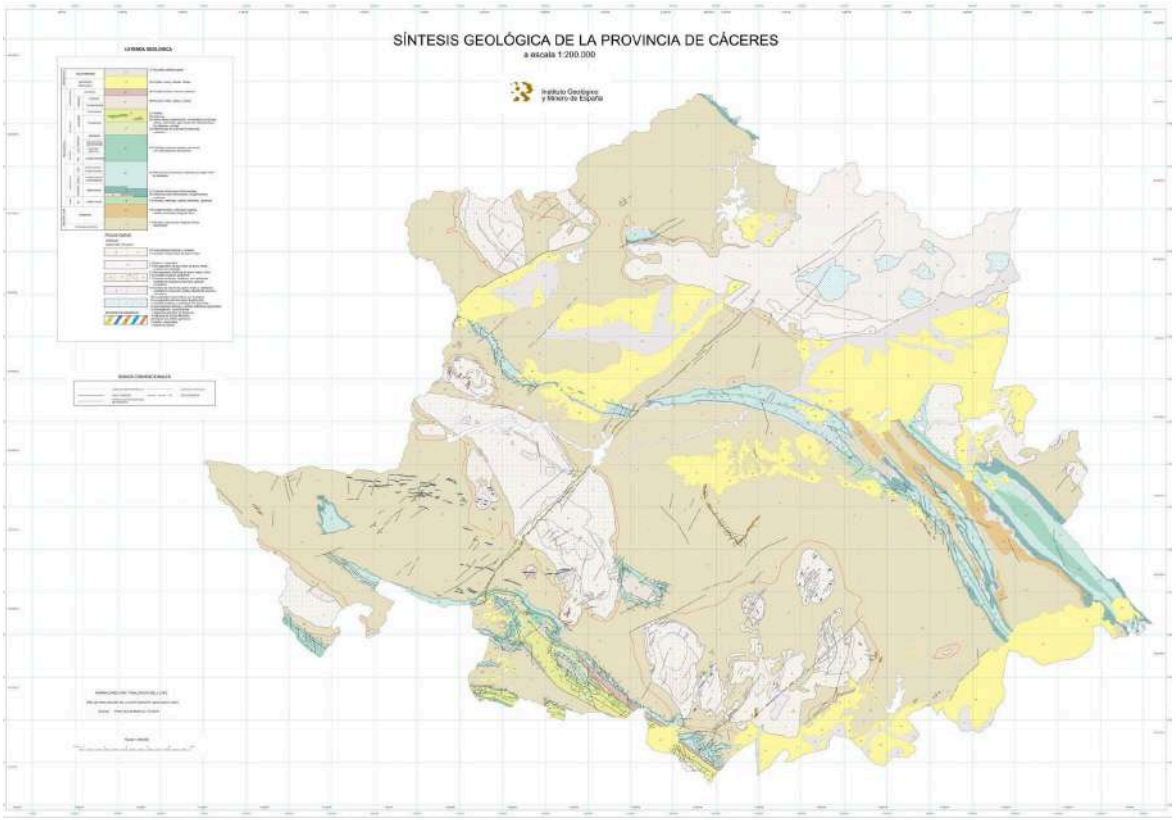


Figure 25: Geological Map of Cáceres, scale 1:200.000 (Pablo Gumiel Martínez from Spanish Geological and Mining Institute Registry INSPIRE - no limitations to public access)

The city of Cáceres is located in a rich area of geological and biological diversity. In the geological sense, the western part of the city of Cáceres corresponds to granitic materials, which pressed on the Precambrian sediments that were folded. The city is located in a synclinorium (a raised syncline fold) with materials of Cambrian, Ordovician, Silurian and Permian age, that is, with the presence of almost the entire Paleozoic series.

From a bioclimatic point of view, the province of Cáceres is located in the Luso Extremaduran bioregion, within the Mediterranean region, with rainfall between 500 and 1500 li/m2/year, rainfall is greater in the elevated areas of the north of the province, Sierra de Gata, Hurdes, Béjar y Jerte and La Vera (Sierra de Gredos), and in the Sierra de Villuercas in the east of the province, and to a lesser extent the mountain ranges that border the province to the south in the Sierras de San Pedro. and Montanchez.

Figure 26: Sierra de Montánchez (CC BY-SA 3.0)

On this lithology, mostly made of granites, slates and quartzites, acidic soils develop, with a rich coverage of silicon vegetation, and mostly dominated by oak forests and pastures (Q. rotundifolia), to a lesser extent cork oak forests and pastures (Q. suber) in warmer and rainier areas, and forests and pastures of Pyrenean oaks woods (Q. Pyrenaica) especially in the colder and humid northern elevations of the province.

From the agrochemical point of view, acidic soils determine low fertility of the land, and the livestock vocation, although the thermal conditions with mild winters allow, with adequate drainage and fertilisation actions, crops among which the vineyard stands out, with the designation of origin of Cañamero wines, the olive grove that is one of the main crops in extension, and industrial tomato crops in the Guadiana plains (south of Cáceres), peppers (Tietar valleys), cherry trees (Tietar valley), stone fruit trees in Guadiana, and formerly tobacco that has been relegated to the north of the sandier soils of the province. And in recent decades in the north of the province (Alagon and Tietar valleys) nut plantations: almond trees, pistachios and walnut trees.

The proto Living Labs (pLL) of the project are being developed in all these geological and bioclimatic areas, with composting communities started in all the mentioned mountain ranges.

Cáceres Pilot case: rural + urban

Cáceres' pilot is formulated as a rural and urban case. Both the rural province and the city of Cáceres are considered and studied in the aspects of citizen participation and participatory culture, facing a transition towards a more decentralized and local bio-waste management through composting as a synergic solution based on nature: more transformative, inclusive and efficient environmentally, socially and economically.

From EBR association we are advising, collaborating and accompanying the Cáceres City Council since 2021 in the field of decentralized composting. and to the MásMedio provincial consortium of waste management from 2021.

Throughout this report we will distinguish urban and rural, under the same name Cáceres, and for each of them we will subdivide two priority areas that will be explored for the decision of the concret territorial Pilot Case according to the best governance and participatory precondition for a more oriented results:

1. Cáceres urban (around 96,000 inhabitants in the municipality of Cáceres), focusing on the mapping of competencies in two Departments:

    1.1. Department of Waste and Environment, without a participatory process, and with a culture that we can consider "information and communication" about changes and regulatory demands.

    1.2. Department of citizen participation, where there is a wide range of citizen participation and participatory budgets that we will later break down.

Figure 27: Old town of Cáceres City (Alonso de Mendoza, CC BY-SA 4.0)

2. Cáceres rural (rural areas of the province of Cáceres)

2.1. The MásMedio Provincial Waste Consortium is a technical management body and there is no culture of citizen participation, but only the provision of waste collection service for treatment in specialized centres.

2.2. With different people-professionals interested in promoting solutions based on nature, with whom we have established the Composting Knowledge Community. And selected 10 protoLivingLabs in April, and 20 in September in order to analyze the responses of local entities and the population to the decentralized composting proposal (as a central example of a Nature-Based Solution of this pilot project in Cáceres).

Figure 28: Sierra de Montánchez (CC BY-SA 3.0)

Socio-economic description

Rural lighthouse: Cáceres province

The province of Cáceres has 19,868 km^2, and 394.000 inhabitants in 223 municipalities. If we subtract the capital, and the three cities with more than 10,000 inhabitants, we have a population of 228.500 inhabitants in 219 municipalities with an average of 1050 inhabitants per municipality,

Therefore small villages on rural Cáceres province imply that:

1) It is important in local administration to structure the 17 *Mancomunidades integrales* (Integral Commonwealths) that join these small municipalities to be able to provide public services with higher quality conditions. These Mancomunidades have several competencies, particularly in social services, water supply and sewage treatment, tourism, and economic development and employment
   In the topic of the new obligation of a separate biowaste collection and treatment, those Mancomunidades are the main actors, on a) the possible decision of decentralizations, and b) in management responsibility, and new employment opportunities. Thus, these are critical actors in the focus of the Pilot Case Cáceres in rural areas for a more NbS approach to organic waste management.
2) The global tendency in such small villages is a decrease in population and job opportunities, on average a decrease of 10-30% in the decade 2008-2018 (see figure above)

In rural areas the unemployment rate oscillates between 9% and 25% in 2024, with an average in 2021 of 16%. From 2008 to 2018 most part of the municipalities has loosed population in the province,

The economy in small rural municipalities is related to services and agriculture, livestock, and food industry, really diversified in Cáceres. A total of 1268 agroalimentary sectors, including 16 factories of artisanal cheese, 58 sausage factories, particularly relevant the tourism sector with 3.902 businesses and 7.745 self employments (including urban areas of the province).

In 2023, the Urban Solid Waste Recovery and Disposal Plant received a total of 52 000 tons of waste, packaging and paper fractions per year, with a reception of more than 20 tons per day, and 35 employees.
According to the official sources of greenhouse gas emissions from the landfill and treatment plant of the Cáceres ecopark, a strong increase in the three main gases is confirmed between 2017 and 2022. Thus, in the case of CO2, it has exceeded 292 t per year. at 473 t year, for N2O it has gone from 0.7 t year to 1.2 t year, and for methane from 4800 t year to 7800 t year. In addition, the Cáceres ecopark facility is located 22 km from the town.
The option initially proposed to the Cáceres city council for the Pilot Case is to try to prevent collection and transport to the ecopark facilities by 10%.

Conclusions focused on the pilot case on more decentralized biowaste management.

The hypothesis focused on NbS is that organic urban waste decentralized systems will contribute to create job opportunities, or complement incomes for small farmers, and contribute to regenerate agriculture soils, and human settlements.

The province of Cáceres lost more than 30% of its population between the 1960s and the 1980s. From the 1990s the population had already decreased to the current 394.000 inhabitants (300.000 if we consider the capital of the province). Cáceres province is among the ten most depopulated Spanish provinces, with a particularly high rate of depopulation in the north, west and east of the province, territories with the highest rates of degrowth. Depopulation is one of the main challenges that provincial authorities are trying to reverse.

From 2008 to 2018, most of the municipalities (in brown) in the province have lost population, and decentralized organic waste systems will help create job opportunities.

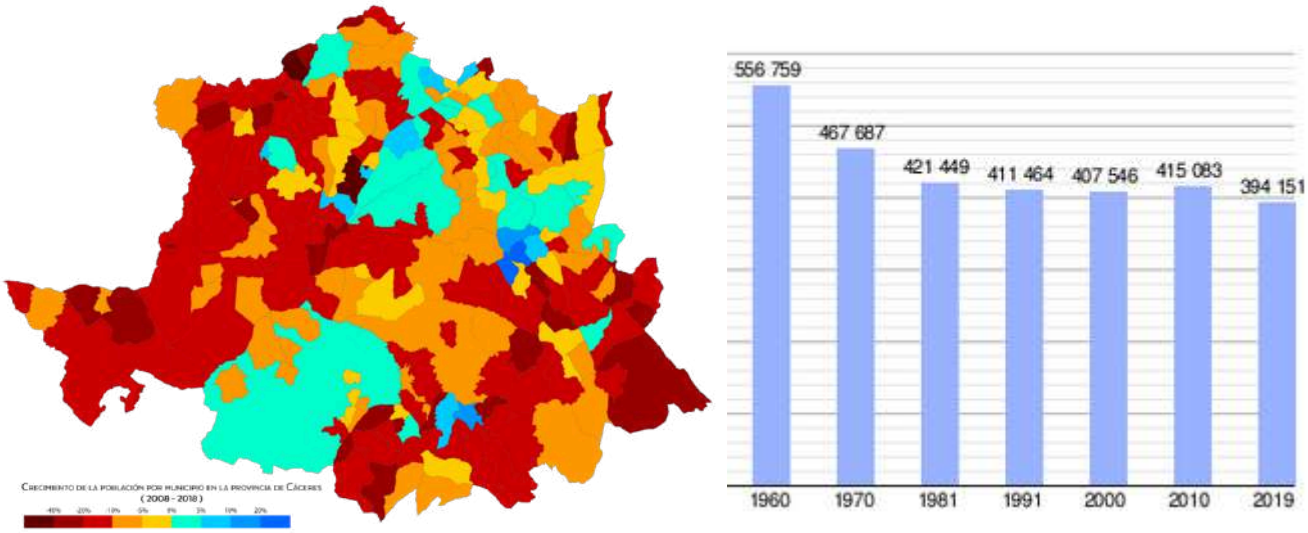


Figure 29 : (left) Population Growth - Province and municipality of Cáceres (right) Number of inhabitants - Cáceres Province

Another notable feature is the low population density, with fewer than 10 inhabitants per square kilometer. This contributes to higher costs, fuel consumption, and carbon emissions associated with organic waste collection. These factors clearly justify the need for more community and nature-based solutions, such as decentralized composting.

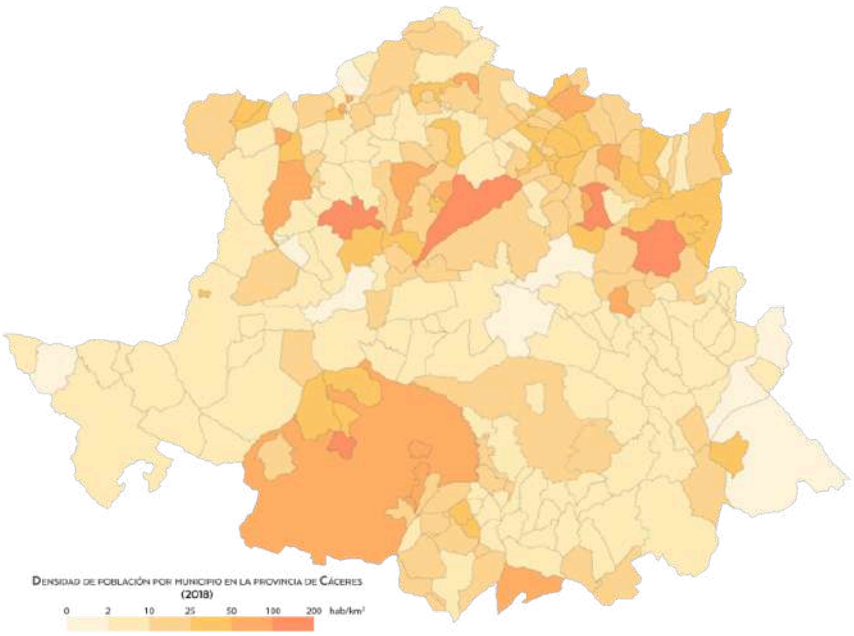


Figure 30 : Population Density - Province and municipality of Cáceres

Urban Lighthouse: Cáceres municipality

In the last 20 years Cáceres Municipality has maintained its population of around 95.000 inhabitants without significant variations. This implies that it can be considered as an urban capital with non-growth, which implies a relative decrease in sociodemographic dynamic.
The immigrant population is lower than other cities in Spain, with 3%, mostly from Latin America, morocco, china and romania.
Cáceres Municipality Districts population: North 18.710, Center- all town 39.966, West 15.999, South 21.060, Small towns 949. TOTAL 96.684

The city is the main commercial, administrative and economic center of the province of Cáceres. Its economy is mainly based on the service sector, tourism and construction, with a limited contribution from the industrial sector, focused on food industries, textiles, ceramics and rubber products.

On the outskirts of the city there are five industrial estates where a large number of companies are located: Las Capellanías, Charca Musia, Mejostilla Business Park, Aldea Moret and the Polígono Ganadero. Although in the past it had several mines in operation (such as the Valdeflores Mine127 and the five in Aldea Moret, currently all of them are closed; and three quarries located on the outskirts of the city operate.

The construction of a new technology park called Ciudad de la Salud is planned, which will have an area of 200 hectares in which it is estimated that between 100 and 200 companies dedicated to health sciences, engineering, biotechnology, pharmaceuticals, nanotechnology could be established. , chemistry and astrophysics, with the generation of between 5,000 to 9,000 direct jobs.

The commercial influence area of Cáceres is in second place in the region with 250,382 inhabitants (Economic Yearbook of Spain 2007, published by the La Caixa Research Service). This figure is the result of adding the population of the capital (90,218), that of the closest municipalities (58,142) and that of others that are further away but that have the city as a reference from a commercial point of view (102 222).

The total potential market of the city is 358 million euros, and the total potential market, including its area of commercial influence, is 459 million euros, in both cases it is the second largest in the autonomous Region, after the other provincial capital: Badajoz.

Unemployment rate in 2024 in Cáceres municipality is 15 '36% of the population. However, at the end of 2023 registered unemployment in the municipality of Cáceres has reached a minimum in the last 15 years, with 6,442 people registered, 404 less than in December 2022, 5% reductions. During the decade 2008 to 2018 the unemployment rate rose 20%. This reduction is mainly related to the tourist sector.

In the particular mapping on Pilot Cases in TRL project, through Caritas collaboration NGO, homeless will be one of the collectives to focus job opportunities on the decentralized composting sector in the five districts.

Conclusions focused on the pilot case on more decentralized biowaste management.

Cáceres is a median side town provincial capital (96.000 inhabitants), mainly services economy, and with a high unemployment rate of 15%, and youth emigration, even the population has been stable for the last ten years,

Organic waste has started to be separated in 2022, according with the European Directive 98 2018, and the national Law 7 2022, but has started only in part of the central district, and it is provided to enlarge to the other four districts in the next two years

Decentralized organic waste management in neighborhoods is an effective strategy to create more jobs and reduce the need for transportation to treatment plants. By implementing a system where 10% of municipal organic waste is treated through communal and small farmer composting, significant local employment opportunities will be generated. This approach not only supports the local economy but also contributes to environmental sustainability by minimizing waste transportation emissions.

Over the past 30 years, the population of Cáceres has shown notable changes. There was a significant increase from the 1990s to the 2010s, followed by stabilization over the past decade. This trend can be interpreted as a symptom of a slow, de facto socio demographic decline. One of the critical factors contributing to this situation is the migration of youth from the region. Addressing this issue is crucial for the long-term vitality of Cáceres.

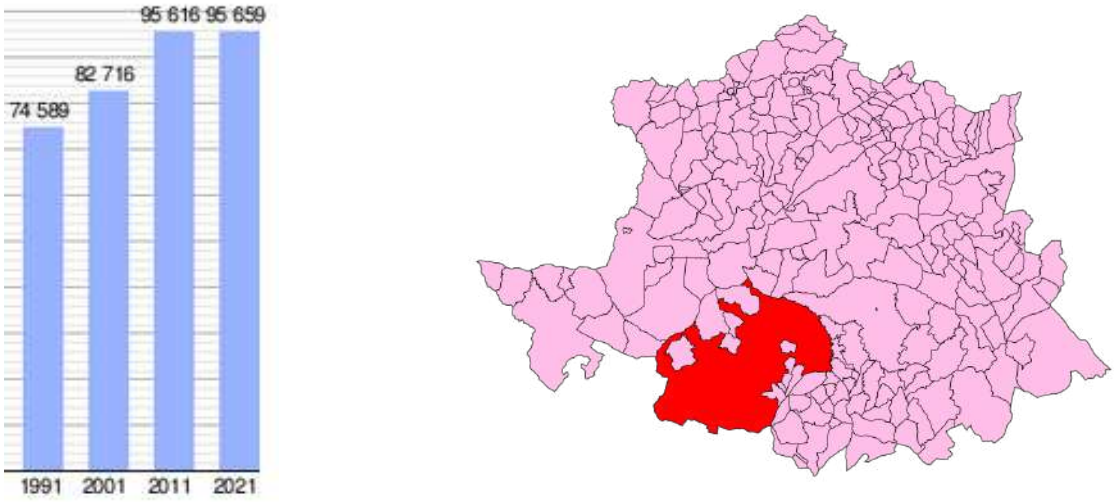


Figure 31: Population growth in Cáceres municipality

Cáceres municipality (red) with 1750,23 km^2 is the biggest municipal territory in the province of Cáceres, and the capital of the province.

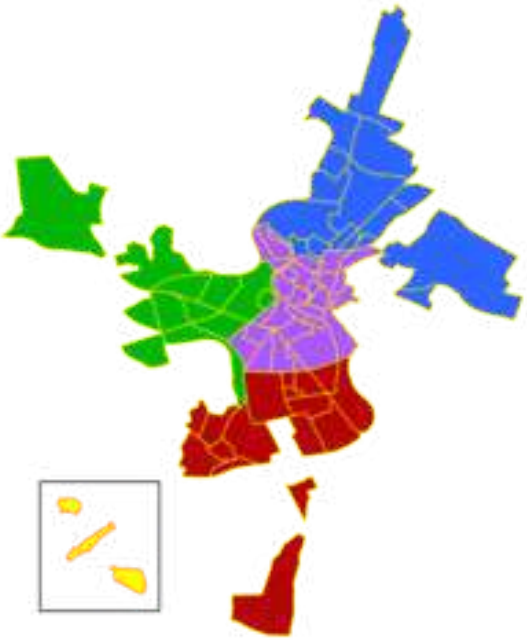


Figure 32: District areas in Cáceres Municipality

The urban area of Cáceres municipality is divided into the following five districts: North 18,710 inhabitants (blue), Center-all town 39,966 inhabitants (purple), West 15,999 inhabitants (green), South 21,060 inhabitants (brown), Small towns 949 in hab (yellow).
These districts are particularly relevant because they organize the participatory process in the municipality. A neighbor is elected from the neighborhood associations to represent in the participatory council, with an elected counselor from the political parties for each district.

Lessons from the participatory culture

Opportunities and barriers for participatory governance based on T4.2

The figure below represents the Municipal Structures (Mancomunidades) responsible of the collection of the wastes, and so the responsibility of the definition of the new organic management we are focused on.

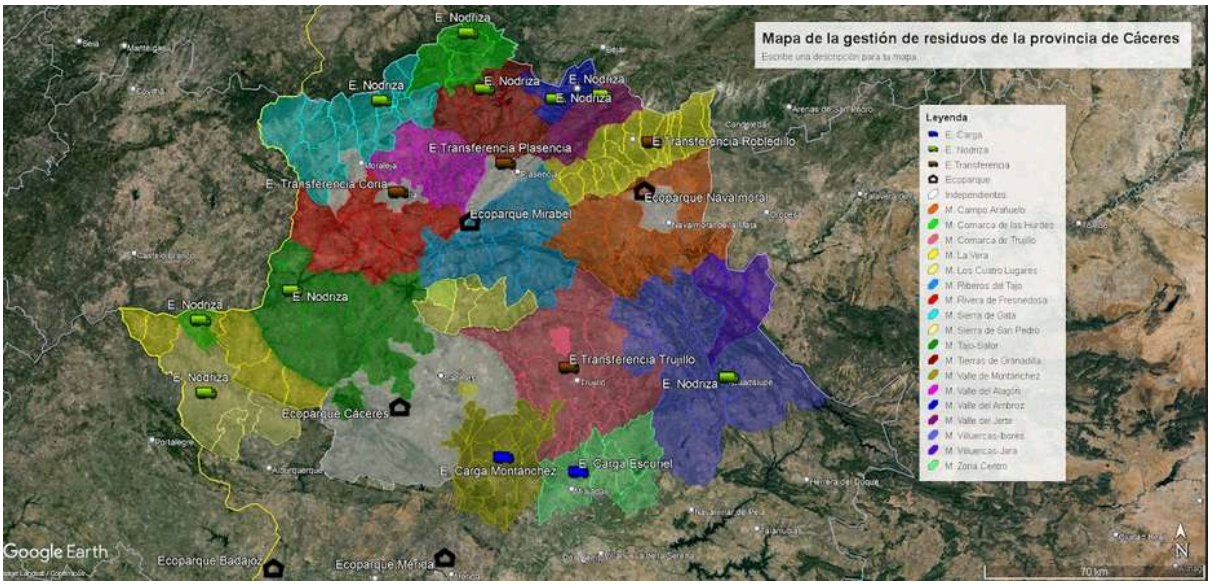


Figure 33: The current constituted Mancomunidades in color, in pale grey the municipalities (mainly urban) not included in any Mancomunidad.

Our research has identified the most natural-based solution as animal feed for food waste, which we have proposed to call "traditional uses." This figure was created through interviews and extrapolation, based on the dimensions of the municipalities and characterizations. Characterization is a study of the percentage of different materials in a sample. In this case, the biowaste present in the waste fraction containers. From EBR, two characterizations were conducted in April 2024 in collaboration with the MASMEDIO Provincial Waste Consortium in the rural region of La Jara (east of Cáceres). These were used as an extrapolation for populations of similar size in the province.

The figure 34 below illustrates the estimated percentage of traditional uses, which reflect the rurality and tradition associated with organic waste management. In accordance with European Directive 98/2018 and national law 7/2022, these solutions are considered “waste prevention” in legal framework.

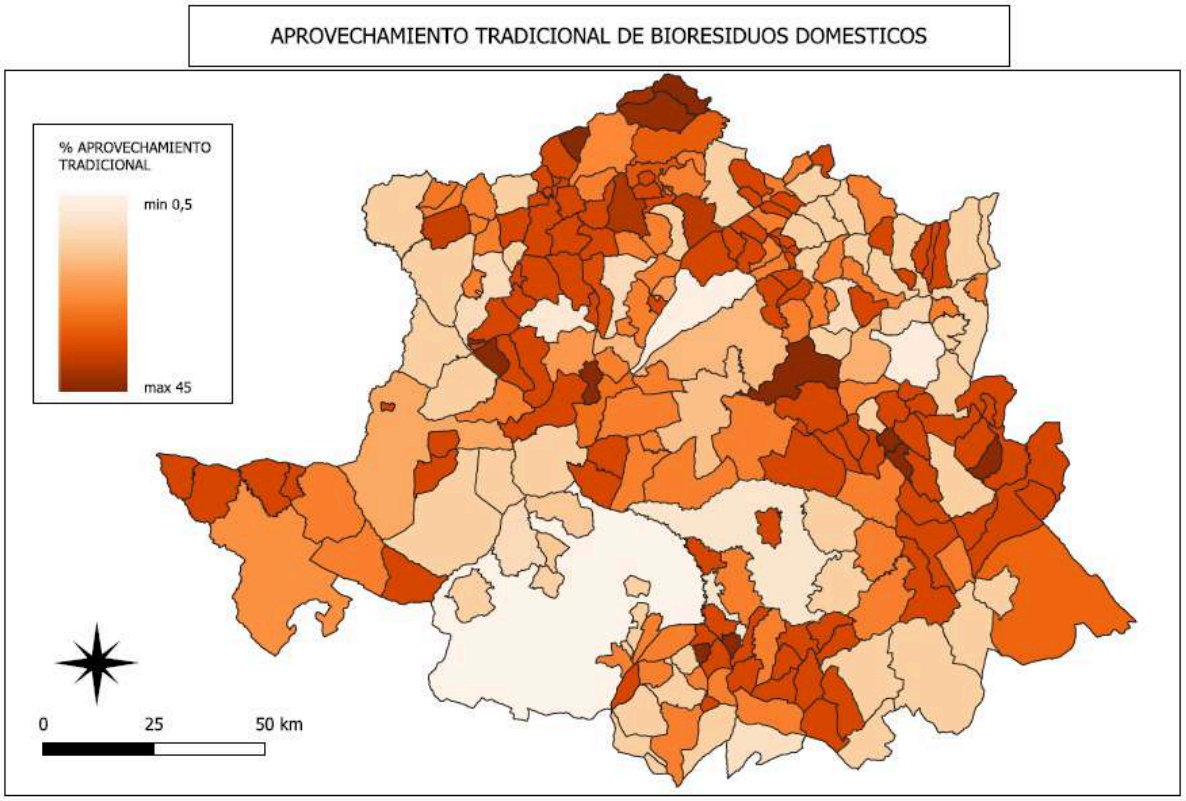


Figure 34: Traditional utilization of domestic biowaste

The following figure 35 illustrates the quantities generated by the municipality based on the bio waste generation rates recognized by the Government of Extremadura, which stands at 70 kg per inhabitant per year.

There is a negative correlation between the size of the population and the total bio waste generated by municipality (Figure 35) and the percentage of waste prevented through traditional uses (Figure 34).

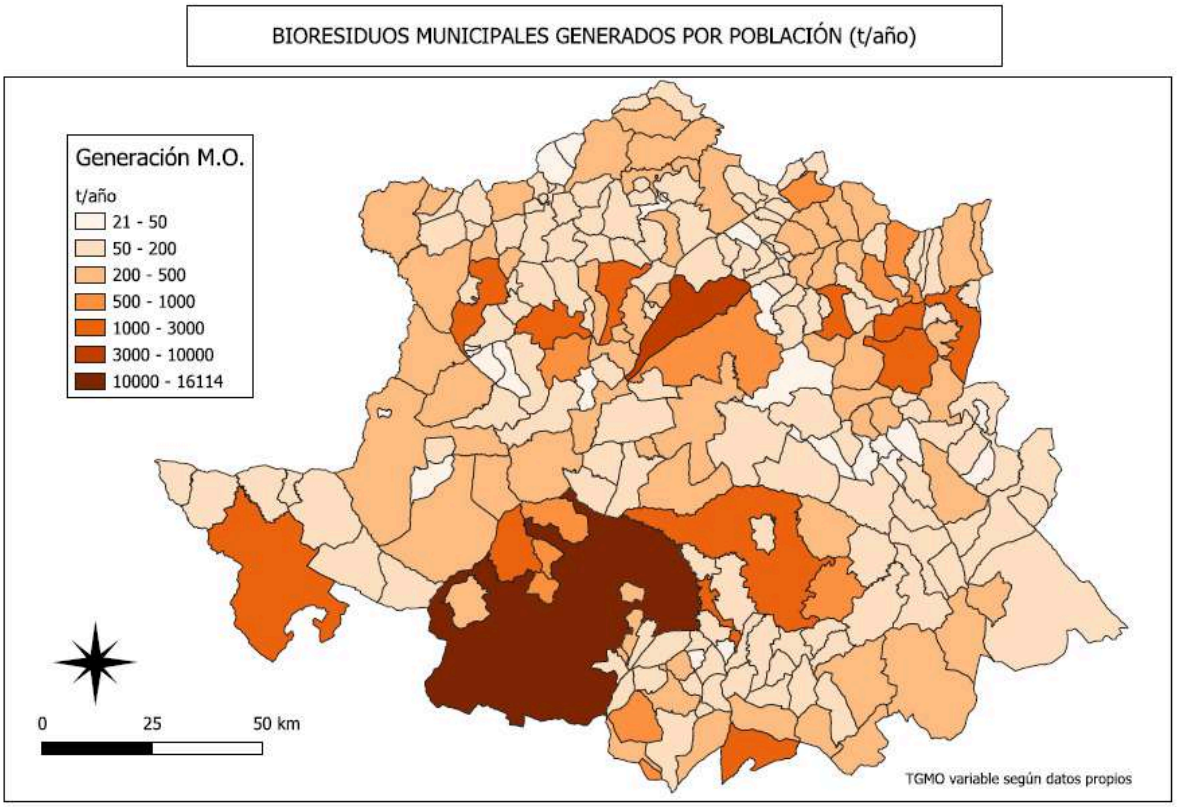


Figure 35: Total bio waste generated by municipality

Currently (2024) there are very few existing projects on composting in the Extremadura Region. Since the Pilot Case focuses on the creation of decentralized composting. The Pilot Case focuses on decentralized composting. Currently (2024), there are only a few existing projects on composting in the Extremadura Region. In June 2023, the partners of TRL in Cáceres decided to design and implement an initial composting process through a regional training offered by the National Minister of Ecological Transition (MITECO). In 2023, the Ministry of Ecological Transition (MITECO) issued a Ministerial Orden (13/02/2023) to promote decentralized composting with municipal enhanced competencies. The theoretical training for this type of composting facilitators will take place from October to December 2023. In December, the 30 participants will become practitioners with composting boxes and will receive support and follow-up from the EBR team. The practical component of the training program will be concluded in June 2024 with the initiation of 20 composting processes as proto Living Labs.

During these period september 2023 to june 2024 the association EBR has been advising the provincial consortium MásMedio of Cáceres province through a Ministry project in order to plan decentralized composting solution in Cáceres province and confirm the reduction in terms of cost, taxes, carbon emission and increase in local employment all around this province in serious depopulation.

The following is a summary of the SWOT analysis of the potential for decentralized and participatory composting processes over the next six months:

Strengths	**Weaknesses**
Existence of a Law 7 2022 that obligates Municipalities 1 january 2024 to begin separate collection of organic matter from municipal waste Existence of the Ministerial Orden 13/02/2023 that create condition to Municipalities in Order to implement more natured and community based solution through domestic, communitary and small agrarian composting process and facilities	Management habits from technicians of the public administration, Public decision makers are in general very few engaged with a more efficient process, the priority is to keep it easy, which means: “do as usual” with a separate collection of organic waste . the interests of the collection and treatment companies in maintaining the service by transferring the biowaste to the pre-established large scale plants (3 in Cáceres province)
Opportunities	**Threats**
The Cáceres provincial consortium MASMEDIO agrees that these decentralized processes will be more efficient than the expected centralized model in order to reduce economical and carbon cost, and increase local rural employment. Regional government recognise that local composting will be the cheaper solution and has a call for aid to municipalities in 2022, 2023, and expected in 2024, to purchase local composting equipment and selective collection containers	The short time for implementing the separate collection of organic matter from municipal waste in 2024 pressed MASMEDIA provincial Consortium and Cáceres municipality to start with conventional solutions. The small community solutions need cultural changes and time to be implemented. Participation the decision on waste management clashes with the interests of the conventional actors (see unlearning report)

The three models of participatory governance are as follows:

- Informative and corporate
- Advisory and consultative
- Cooperative and co-productive

The waste management culture in the municipality of Cáceres, as well as in the province and region of Extremadura, is mostly **informative and corporate**. It is focused on the challenge of implementing a separate collection of organic matter by 2024. This will not be done in a decentralized manner, but rather in a more conventional way through new treatment plants.

- A dialogue process and composting pilot project commenced in June 2023 and will continue until June 2024. These will serve as “proto Living Labs” as an exploration for defining the best conditions for going to Living Local pilot in October-December 2024th.
- The TRL process, the training, and the proto Living Labs network enabled us to establish a relationship and dialogue with provincial and municipal decision makers.

The co-diagnosis and participatory methodology Menu MATER COMPOSTA is focused on training decision makers and the population in a cooperative and co-productive biowaste management system.

In November 2024 th the negotiation with three Joint Municipal Authorities (pool of municipalities):

- Mancomunidad Sierra de Montánchez (Cáceres province)
- La Vera with MásMedio provincial Consortium (Cáceres province)
- Mancomunidad Tentudia (Badajoz province) was open as the territories with the best conditions to develop the pilot project and guide the pilot case agreements and move to 5.2. and open participatory processes.

Opportunities and barriers for participatory governance based on the assessment case

The **assessment cases in Madrid region** started in 2015 coming from social mobilization in different local :

- Madrid Agrocomposta started in September 2015 as a proposal from the civil platform Madrid Agroecologico . The general direction of environmental education is accepted as a pilot project that runs in different phases from 2016 to 2019 with a collection from social enterprise and the treatment in 4 different small gardening initiatives in a 25 km maximum distance between the organic waste producers (cantines, restaurants, retailers, markets and homesteads).
  It concluded in September 2019 because the Waste DG of the Madrid City Council prioritized taking it to large scale municipal facilities.

- Hortaleza neighborhood (Madrid municipality) started in 2015 with an scholar composting community, in 2016 jump thanks to Madrid Agrovomposta as a node of organic collections to be agro composted, and for enhancing these a group of four associations implement a social complementary currency MOLA as reward for homes and cantines for composting with the discount of 10% in 40 local trades in Hortaleza neighborhood. This local social currency It was developed between September 2017 and February 2019. It was dismantled because the Madrid city council did not agree to participate by accepting the currency as a discount in the payment of municipal taxes and services.
  When Madrid Agrocomposta finishes in September of 2019, the neighborhood association will follow their social based composting process, and an insertion association “El Olivar” became a partner of Madrid Agro Composta, and include composting as a part of their services.
  In may 2024 the Madrid City Council sent a letter to Hortaleza neighborhood association for denying permission to continue doing community composting, and warning of the possibility of continuing to pay a fee for the use of public space.

  Nevertheless the department of environmental education and urbanism of the Madrid Municipality has demand and received assessment from IMIDRA in order to implement decentralized composting: community composting in nature classrooms from DG of

environmental education, and agrarian composting in urban gardening from DG Urbanism on the project food production neighborhoods

- IMIDRA is a research on rural and agriculture in Madrid Region, took on the interest of composting with small farmers and in 2017 started the Agro Composting Communities of Madrid project: CAM agrocomposta, that assume the training and transferring of small scale agriculture composting plants to 6 pilot cases in Madrid Region. IMIDRA has recognize the interest for agricultural sector and environmental balances and prolonged the goals as project REALIMENTA from 2022 to 2023. But the municipal and regional electoral processes in 2023 stop the agricultural composting processes while waiting for a new political framework and the entry into force of the new Law 7 2022 and the adjustments in the Madrid region. In 2024 IMIDRA decided to prolongs the project REALIMENTA from 2024 to 2024, bringing support to farmers, food industry and local council, especially in rural areas, to implement small and local scale for composting urban organic and improving the treatment of the organic agrifood wastes.

- Community Supported Agriculture "Vega de Jarama" (Jarama river valley) Association started in 2015, and in 2016 collected organic waste with a bicycle and small trailer with 20 homes. In 2016 started a community composting in a public garden and invited the waste management Mancomunidad Sierra Norte to participate in training their employees with 3 community composting boxes. The CSA organized monthly workshops and open sessions that permit to enlarge to a near 30% of the 1000 inhabitants in 2017 the participation in the composting community. IMIDRA and CAM Agrocomposta included as a pilot case, and the Mancomunidad Sierra Norte waste local manager, accepted to participate and the garden of the CSA association became one of the 5 pilot agro composting cases in Madrid Region between 2019 and 2022.

As a conclusion of the assessment case Madrid Region in nine years (2015-2024) of composting process can be considered.

- The Municipality of Madrid has refused to continue with decentralization of organic waste treatment, especially from the department DG waste management, and DG parks and gardens ad conventional actors
- IMIDRA as regional rural and agrarian research center in Madrid Region has recognize the interest for agricultural sector and environmental balances of decentralized composting and prolongs the project REALIMENTA from 2024 to 2026 in order to assess and implement cases of decentralized composting in the Regions through training and assessment to agrarian sector and municipalities.
- Nevertheless the two main cases of decentralized composting (community and agrarias) selected to participate in the proposed TRL Madrid Case in 2022 have had to close in 2023 and 2024 because different municipal and regional regulatory reasons, which consider the same requirements for a large composting facility as for small community or agricultural facilities.
    - CSA Vega de JArama has stopped composting because of a regulation in the Use and management plan of the NATURA 2000 space "riberas del jarama y Lozoya" which does not allow waste management in this protected space. The OM 02/13/2023 has come to the rescue and proposes that community composting facilities (less than 20 t per year) and agricultural composting (less than 200 t per

year) will be exempt from authorization and consideration of waste management. The application process will reopen in the coming months

- The Hortaleza neighborhood association in Madrid has received In may 2024 a letter from Madrid City Council for denying permission to continue doing community composting, and warning of the possibility of continuing to pay a fee for the use of public space. No future for those composting neighborhood project, in Madrid Municipality only the community composting in urban gardens (5 cases) and in Municipal nature classrooms (2 cases)

Taking into account these conclusions of the assessment case Madrid, are convergent with the development of the mapping process, governance analysis and the implementation of the 20 proto LLs in the Pilot Case Cáceres.

Definition of the pilot case goals

Following the mapping (t 4.2) and unlearning (t 2.4) tasks, and in light of the delay in the affirmative response of different administrations to the conditions of a participatory process and decentralized organic waste management as more natural based solutions, we consider in June 2024th the possibility of creating an unique Cáceres province pilot Case, shared in between different Joins Local Authorities, including and integrated some of the more developed "proto living labs", from the rural and urban.

Some are the conditions and advantages for this pilot provincial case approach are:

- It is important to note that implementing NbS will require a longer implementation period due to the necessity of unlearning as a process of deep cultural change (social, administrative, and enterprise-wide). One possibility for achieving this unlearning could be through the establishment of unlearning labs.
- It is anticipated that greater impact will be achieved through more ambitious territorial and administrative partnerships than those at the local scale. Nevertheless, decentralized proposals must be implemented at the local level.
- In the absence of responses from local administrations, the pilot will continue to be strategically focused on training individuals to expand the solution and supporting various local unlearning processes through the TRL project from 2024 to 2026.

In this figure are summarized the 20 main proto-living labs explored between January and June 2024 in order to identify possibilities and difficulties.

	pLL	Mancomunid	name facilitator		Nov	D2023	J2024	Fe	Mr	apr	May	June
1	Villasbuenas	Sierra Gata	Pepa Miranda	0	IC	IC	IC	close				
2	Pinofranqueа	Las Hurdes	Carlos Socastro	2	IC	IC	IC	Scomposting	Composting			
3	La Jara	Villuercas	Maria Jose MASMEDIO	0	IC	IC	IC	stand by	stand by			stand by
4	Miajadas	Centro	Alejandro	0	IC	IC	IC	stand by	stand by			stand by
5	Arroyo de la	Tajo Salor	Chemo Araujo	2	IC	IC	IC	Scomposting	Composting			
6	San Pedro	Sierra San Pe	Nuria MANCOMUNI SIERRA SA	0	Compostin	Composting	Composting	Composting	Composting			stand by
7	Carcaboso	Valle del Alag	Alberto Cañedo EDUCATIERRA	1				IC	IC			
8	Plasenzuela	Montanchez	Toño y Jorge	2	IC	IC	Scomposting	Composting	Composting			stand by
9	Mancomunidad	Montanchez	Sandra	0								stand by
10	Sierra de Fue	Montanchez	Jose Luis Fernandez Pacheco	1			IC	IC	IC			stand by
11	Madrigal	La Vera	David	2	IC	IC	IC	Scomposting	Composting			stand by
12	Villanueva	La Vera	Ana	2	IC	IC	IC	IC				stand by
13	Sierra Gata	Sierra Gata	Maria Jose MASMEDIO	0	IC	IC	IC	IC	IC			stand by
14	Caceres	Caceres	Centro de Acogida CARITAS	2				IC	IC			
15	Caritas Cace	Caceres	Asoc discapacidad intelectual	2	IC	IC	IC	Scomposting	Composting			
16	Farmer Cace	Caceres	Agricultor Carlos Fresnedoso	2	Scomposti	Composting	stand by					stand by
17	Caceres Municipality											
18	Caceres UEX	Caceres	UEX	2								stand by
19	Torremayor	Centro	Regino	2	IC	IC	IC	Scomposting	Composting			
20	Tentudia	Manco tentud	Marisa	0								stand by

In November '2024 the decision is undertaken to focus the negotiation for going to t5.2. and t5.3 in three main territories:
Mancomunidad de Sierra de Montanchez y (joint proto living Labs 8 and 9 in the above figure)
Mancomunidad de Tentudia (proto living lab 20 in the figure)

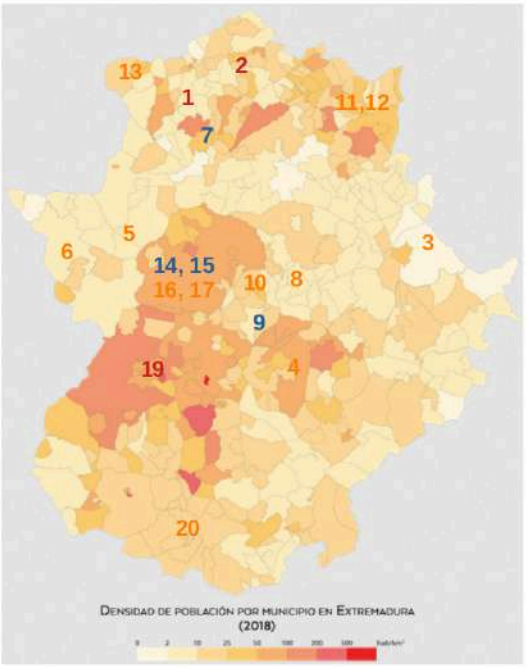
Summary report June 2024

Facing the future (2024-2026) we proposed a **Pilot Caceres Provincial Case** from following and enhancing of some of the 20 proto Living Lab and local cases. It is necessary more than six month (January to June 2024) for guarantee the transition conditions in Local Municipalities

In red the closed *proto* Living Labs (3)

In yellow expecting anwser from Municipalities to create Living Labs (11)

In blue the not stopping or starting *proto* Living Labs (3) in June



A brief glossary of the Pilot Case process:

The conceptual framework of TRL facilitates the development of more fluid concepts. A vocabulary and timeline aligned with the challenges identified are employed, akin to the neurons in a complex mammalian brain. The connection of living labs comprises distinct subtypes.

Proto Living Lab – pLL - a first step of experiences of composting communities, mostly from ecosocial citizen motivation, trying to engage local administration on decentralized composting and participatory process. ***Germinating seeds***

From January to June 2024

Regional Living Knowledge Lab - rLKL– a regional group of different profiles (administration technicians, entrepreneurs, youth in training, interested people on ecological and permacultural transition ....) that share the goals of a more decentralized and natural and community based solution for organic waste management. We propose this regional scale because concept. ***Regional fructification and spreading***

From january to december 2024, and further on

Local Living Labs – LLLs – those pLL that have conditions from public, local municipality, social and traders implication for starting composting communities with in a participatory culture.
This LLLs participate on the exchanging and learning in the rLKL . ***Growing up***

from July to December 2024.

Living unlearning Lab –LuL - refer to those pLL that have no condition of municipal agreement for going further to a Local Living Labs, but the municipality accept to have

assessment and interest on Nature and Community based Solutions, and train and receive support from TRL to change the way in which they understand and resolve the waste challenges. ***Stationary seeds.***

from July to December 2024, and further on.

So that the Pilot Cáceres Provincial Case – PCPC - is a regional / provincial connection of pLL, LLLs, LuL and LKL

After the experience of pLL and LKL from January to June 2024, the goal of this Provincial Cáceres Pilot Case PCPC (rural + urban) are:

1. Accompany local and provincial entities, in the unlearning process to advance in a more decentralized, natural and community based organic waste management solutions
2. Train, advise and pre-design different decentralized organic matter natured based and community solutions, through participatory approaches.
3. Implement participatory budget in some of the more advanced local living labs
4. Evaluate, communicate and research about the best solutions and Local Living Labs inside de Pilote Case, tanking especial care and communicate to Cáceres and Extremadura society the more participatory and decentralized and NbS organic waste treatment

Ecological goals and description of the NbS in the Extremadura Region and in Cáceres

Organic waste management presents several environmental challenges that need to be addressed to minimize its impact and improve sustainability. Here are some of the main challenges:

Greenhouse Gas Emissions and Methane Production:

- Organic waste, particularly food waste, generates methane (CH_4) when it decomposes anaerobically in landfills. Methane is a potent greenhouse gas, with a global warming potential much higher than carbon dioxide (CO_2). The waste management sector generates 5% of total emissions (Catalan waste agency)

Odour and Air Quality

- Decomposing organic waste produces unpleasant odors, which can affect the quality of life for nearby communities.
- Volatile organic compounds (VOCs) released from organic waste can contribute to air pollution.

Leachate Production and Water Pollution:

- As organic waste decomposes, it produces leachate, a liquid that can contaminate groundwater and surface water if not properly managed.
- Leachate often contains high levels of organic matter, nutrients, and potentially harmful substances that can harm aquatic ecosystems.

Resource Wastage and Loss of Valuable Nutrients:

- Organic waste often contains valuable nutrients that could be recovered and reused through composting or anaerobic digestion.
- When organic waste is sent to landfills, these nutrients are lost, contributing to the depletion of soil fertility and increasing the need for synthetic fertilizers.

Land Use and Soil Degradation and Landfill Space:

- Landfills require significant land area, which can lead to habitat destruction and loss of biodiversity.
- The accumulation of organic waste in landfills can degrade soil quality and limit its use for other purposes.

Energy Use and Carbon Footprint, Transportation and Processing:

- Collecting, transporting, and processing organic waste requires energy, often derived from fossil fuels, contributing to the overall carbon footprint.
- Efficient waste management systems need to be designed to minimise these emissions.

Health and Safety and Pest Attraction:

- Organic waste can attract pests such as rodents, flies, and other insects, which can spread disease.
- Proper waste management practices are essential to reduce these health risks.

Inefficient Composting and Recycling, and Process Management:

- Inadequate composting practices can lead to incomplete decomposition and the presence of pathogens in the compost.
- Ensuring proper conditions (aeration, moisture, temperature) is crucial for efficient composting.

Public Awareness and Participation, and Behavioral Challenges:

- Effective organic waste management requires public participation in separating and properly disposing of organic waste.
- Lack of awareness and improper sorting can reduce the efficiency of waste management systems.

Economic and Regulatory Barriers: Cost and Policy:

- The cost of implementing and maintaining efficient organic waste management systems can be high.
- Inconsistent regulations and lack of enforcement can hinder the development and adoption of sustainable waste management practices.

To address these challenges, into mitigation several strategies can be employed:

- Promoting Waste Reduction: Encouraging practices that reduce food waste and organic waste generation. Those that we call in Menu MATER COMPOSTA as “traditional uses” as animal feed
- Enhancing Composting: Developing efficient composting facilities and promoting backyard composting and other decentralized composting processes. In accordance with de OM 13/02/2023 the Spanish Minister of Ecological Transition recommended to municipalities to consider: domestic composting, community composting (in public gardens), and agro composting (into small farms facilities).
- Anaerobic Digestion: Implementing anaerobic digestion systems to convert organic waste into biogas and compost. But these anaerobic processes need more initial investments, and for this reason it is normally used in large facilities and for large urban agglomerations. For instance, these is one of the reasons because Madrid Municipality in the considered assessment case, rejects decentralized solutions, to centralize all organic treatment in a large anaerobic digestion facility
- Policy and Regulation: Developing and enforcing regulations that promote sustainable waste management practices.
- Public Education: Increasing public awareness and participation in proper organic waste management.

In addressing these challenges, the Pilot Case and the focus in the EBR association have been to:

- On a small scale and decentralisation according with domestic, community and agrarian composting within the generating rural municipalities themselves.
- Decided through a **participatory** process and co design the solution in between inhabitant and the local council using the Menu MATER participatory tool, that permite to create a sustainable and efficient participatory organic waste management system.

Local values and attitudes towards the ecological challenges in the Extremadura Region and in Cáceres province and municipality

The subject of the Pilot Case is how to manage organic urban waste that every citizen and household produces throughout the year in a more nature-based solution (NbS) manner. This is not only a domestic "in-family" challenge, because the separate and local treatment of urban organic matter is related to Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018, which amends Directive 2008/98/EC on waste. This directive was transposed into Spanish Law 7/2022 on “waste and contaminated soils for the circular economy.” According to this law, municipalities are obliged from January 1, 2024, to carry out selective collection of the organic fraction and differentiated treatment, with the costs of the system to be transferred via fees to citizens.

The rural population in the province of Cáceres maintains the habit of using domestic biowaste for animal feed, in what is known as "traditional uses." In some of the locations where Proto Living Labs has been proposed to identify the conditions for the implementation of the Pilot Case, 80% of households resort to this type of use. In other cases where we have carried out waste characterizations, the contributions from gardening and horticultural pruning provide higher amounts per inhabitant per year than the Spanish average of biowaste, which is 143 kg per capita per year.

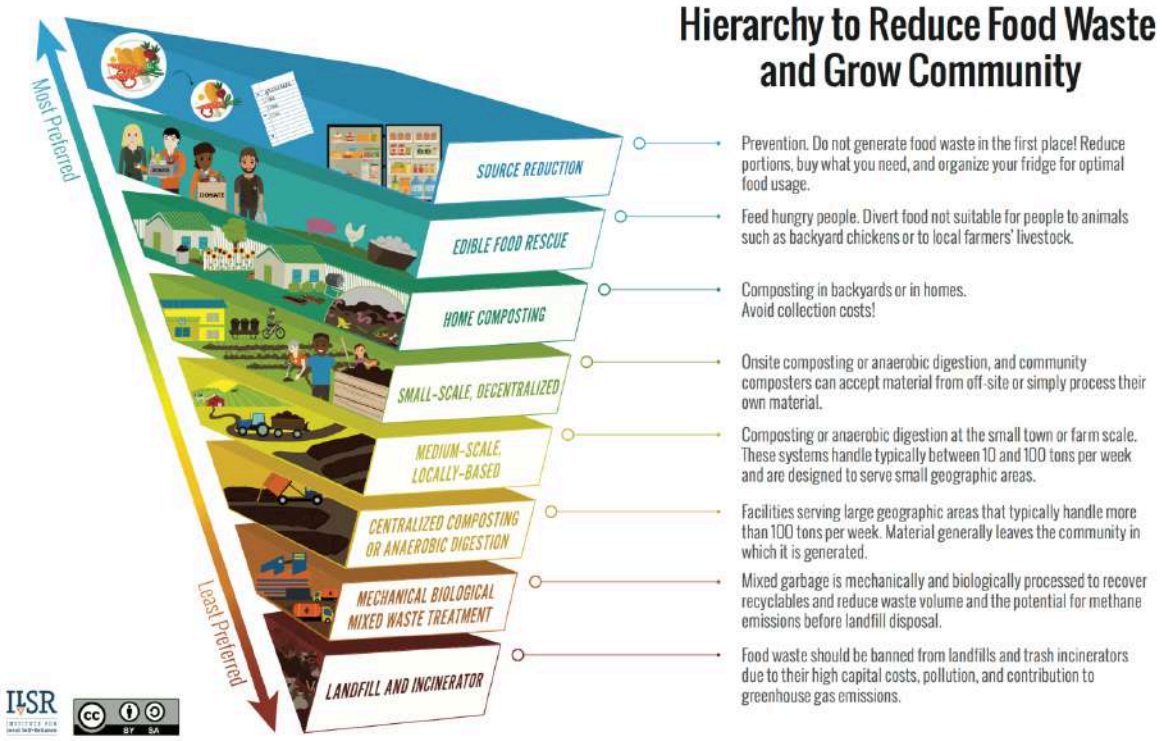


Figure 36: Hierarchy to reduce food waste and grow community

In the proto Living Labs, a participatory training-research-action method has been considered to advance in a workshop of 2-3 hours, allowing people participating to learn the main possibilities of organic waste management in accordance with the current legal framework. Participants think about how the current biowaste situation is in the village, and think further about how that challenge could be better resolved in the next four years, in line with the more nature-based solutions and lower fees.

Of the 20 proto Living Labs, only the MATER Menu of participatory design has been possible with enough social participation in ProtoLL number 5 (Arroyo de la Luz) and 20 (Tentudia). To proceed through Pilot Case and proper Living Labs, this workshop is critical to transition from just a community exploration to a common view and minimum co-design.

The regional Living Knowledge Lab (LKL) that started in January 2023 aims to create a focus on participation and co-design among professionals to resolve the challenge of organic municipal waste in a more natural manner.

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Socio-economic goals

Identification of marginalized knowledges and of needs of marginalized groups in the Extremadura Region and in Cáceres province and municipality

The management of waste has been traditionally related to marginalized people. In the workshops and training with the homeless in CARITAS Cáceres, the participants explained that they had been collecting and recovering different waste throughout their lives, especially paper and cardboard, different metals, and bulky electrical and electronic waste.

In recent years, waste management has been centralized and professionalized in large companies, in what could be considered a “bureaucratic centralization” of these residual resources, which were previously used in a more organic way by groups with few resources and job possibilities. "We not only collected, but separated and marketed different wastes in a more efficient way than current centralized systems."

This group of homeless people was very interested in participating in these new biowaste management activities through composting (5 out of 5 in the process of quantifying future interest). However, of 15 people starting the process on the first two days of training in April, only 3 completed the process in July 2024 and obtained the training certificate for 30 hours.

In the rural meetings and workshops, people said: "Before, nothing was thrown away, everything was recycled or reused," and "however now it will be difficult to separate and reuse it again, we are accustomed to convenient and centralizing management."

After interviews with several people in charge of rural CARITAS and rural pastoral care in the province of Cáceres, we have identified marginalized groups in rural areas as only migrants without residence and work permits. We have identified this as the focus group of the EDUCATIERRA association of Carcaboso.

After interviewing the steering committee of the association Educatierra in February 2023, we agreed to carry out a 30-hour training in composting mastery within the framework of a course with 15 undocumented migrants training as assistants to agroecological farms. The training in composting mastery was carried out between March and June 2024. Contacts were made to get them to develop practices with the Municipality of Montehermoso.

Another of the groups we have interacted with in this first year of TRL is the intellectual disability association of Cáceres. Through their gardening technician, Mercedes Molina, a student of the aforementioned course, organized a Proto LL with two composters in the Huerto Social de San Jorge.

In April 2024, an undergraduate student from UEX began her final degree project on disability and composting, interviewing Mercedes Molina.

Identification of presences and absences in the Extremadura Region and in Cáceres

In relation to "what is absent, and who is absent" in the pilot case area, is the result of the different meetings, encounters, workshops with more than forty public entities (associations, City council, waste consortiums of Cáceres and Badajoz) and social entities. (migrant NGOs, disabilities, charities, etc.).

The great absentee in the research process and the most difficult of the actors involved are the private actors of the food service sector such as hostels and hotels, restaurants and cafes (HORECA channel). Further analysis and reflection will be conducted throughout the project in order to gain a more precise understanding of the specificity of presences and absences in the Extramadura Region and in Cáceres. .

2. Collecting the required knowledges for the Living Knowledge Lab

Creating relationships with partners

Networking and exploratory activities in territory (both for proto Living Labs and for Cáceres)

The appendix lists the various territories where we are studying participatory conditions in rural + urban in Cáceres province.

Since November 2023, we have been engaged in the promotion, advice, and development of 20 composting experiences at varying levels of practicality and focus, from codesigned to diagnosis-oriented, and from public to social leadership. Our approach has been to employ a **quality participatory proxy indicator** of the process at four levels, with the aim of identifying optimal pilot case conditions:

- Level 1 high integration public social co-participation,
- Level 2 medium, sufficient for starting up a Living Lab
- Level 3 low but minimum for starting up, on observation and assessment
- Level 4 unfeasible participation. dismissed

In June 2024 after six months of boosting, facilitating, supporting and enhancing composting communities as 20 exploratory or protoLiving Labs we could summarize the following:

a) In March 2024, we expected to consolidate Cáceres Urban Agreement and agenda, and at least one rural community to implement a rural pilot case.
b) In June 2024 the municipalities involved refused (3) or are still considering (17) if they support those natural and community based solutions such as local and decentralized compost.

The criteria proposed to become a Pilot Case territorial area are:

1. **neighborhood community agreements conditions between public administration, social neighborhood implication , and private small enterprises implication**.
2. Disposition of the municipal administration for promote a **community biowaste participatory management experience, and participatory budgets 2024-2026**
3. Agree of the local municipality to walk together for a **municipal waste ordinance** that consolidates citizen participation mechanisms 2025-2026

Bringing members/stakeholders in the proto-LKL and the Cáceres LKL

The LKL was taught at a regional level and commenced in October 2023, in conjunction with a composting training offer initially launched between EBR and UEX. However, due to administrative and academic deadlines, UEX was unable to participate in the programme. The initiative was made possible through the support of the Ministry of Ecological Transition (MITECO), with the objective of disseminating the opportunities presented in Ministerial Order 02/13/2023 on decentralized composting. Furthermore, we have collaborated with the Cáceres Provincial Waste Consortium MásMedio, which we consider to be the most significant stakeholders in the province with regard to biowaste management.

Figure 37 : Flyer for the composting training offer (EBR, 2023)

The LKL started in December 2023 with at a monthly online meeting through zoom session, with the next agenda:

Monthly online meetings of the Composting knowledge community (LKL)			
#	Sesion and programme	Date	Territories
1	**Foro theatGestión de proyectos y consorcios.** Coordinación general del plan de trabajo y del consorcio / Dimensión Género+	CES-UC Portugal	
2	**Coproducción de conocimiento vivo e investigación basada en el lugar** Ampliar los enfoques convencionales de las SbN mediante el desarrollo de marcos reflexivos y críticos.	RUC Dinamarca	

3	**Investigación en acción y evaluación** Investigación, valoración y profundización del análisis de contextos sociales, políticos y culturales.	tum Alemania
4	**Gobernanza innovadora para la cocreación de SbN** Reunir socios con experiencia en investigación e intervención sobre modelos participativos de gobernanza.	CES-UC Portugal
5	**Implementación de casos piloto a través de la cocreación.** Interconecta las actividades de investigación con casos del mundo real.	Cyl Chipre
6	**Comunicación comunitaria y ciencia ciudadana** Comunicación e interacción con los ciudadanos en el despliegue de SBN	uni. Eiffel-CNR S Francia
7	**Requisitos de ética** Establece los 'requisitos éticos' que el proyecto debe cumplir	CES-UC Portugal

The LKL started in December 2023 as a forum of practices and the following sessions of the trainees. The profile of the participants in the LKL during the six first month are:

- Person from de EBR and UEX teams, (5 persons)
- Facilitators and contacts of the proto LLs (see the list of pLL in the table below)

	Territory with a 'Proto-Living Lab' approach community composting starting	**Regional living lab participation** From 0 no participation to 3 high participation
1	Villasbuenas de Gata	1. Participation in the starting point when the municipality refused to collaborate the two participants (Pepa y Justo) stopped.
2	Pinofranqueado	3. High participation in mostly every monthly meeting. In june will stopped the pLL and probably stopped the participation
3	Comarca de la Jara	0. they are not participating yet
4	Miajadas	0. they are not participating yet
5	Arroyo de la Luz	3. High participation in mostly every monthly meeting. In june will stopped the pLL and probably stopped the participation
6	Mancomunidad Sierra de San Pedro	1. Participation in the starting point when the municipalities refuse to collaborate the participant (Nuria) stopped.

7	Carcaboso/ Mancomunidad del Alagón	2. Participation in regional LKL from april to june
8	Plasenzuela, Mancomunidad de Montánchez	3. Participation in regional LKL from january to june
9	Mancomunidad de Montánchez	0. they are not participating yet
10	Sierra de Fuentes	0. they are not participating yet
11	Madrigal, Comarca de La Vera	3. High participation in mostly every monthly meeting. In june will stopped the pLL and probably stopped the participation
12	Villanueva, Comarca de La Vera	3. High participation in mostly every monthly meeting. In june will stopped the pLL and probably stopped the participation
13	Mancomunidad de Sierra de Gata	0. they are not participating yet
14	CARITAS in Cáceres	0. they are not participating yet
15	Asociación disability Cáceres	3. High participation in mostly every monthly meeting. In june will stopped the pLL and probably stopped the participation
16	Farmer, Carlos Fresnedosa Cáceres	2. Participation in regional LKL from December to april. When the municipality did not answer stopped to participate
17	Cáceres Municipality	0. they are not participating yet
18	UEX in Cáceres	3. High participation in mostly every monthly meeting. In june will stopped the pLL and probably stopped the participation
19	Torremayor, BADAJOZ	3. High participation in mostly every monthly meeting. In june will stopped the pLL and probably stopped the participation
20	Tentudia Mancomunidad BADAZOZ	0. they are not participating yet

The LKL had organized different visits to composting plants. The figure below shows a visit to the plant of Suelo fertil, a company that has joined the regional LKL in some sessions.

FIgure 38: Visit to the company Suelo Fertil that recently joined the regional LKL

Capacity building of Master Composters and Organic Change Agents

In the months of November and December 2024 a group of 20 students arriving from different composting practices and expectations has started a 30h course as Master Composters. During the first half of 2025 they will continue with a 170h course as Organic Change Agents. This year they will learn the legal, biogeochemical and practical basics to start and run a domestic or community composting installation. Next year they are expected to negotiate, launch, coordinate and manage a municipal scale composting installation where compost-related community-based NbS will be deployed.

Formación en gestión de sistemas de compostaje descentralizado

Fecha y horario	Formato, lugar y duración	Contenido
M5 nov 18-20 h	**Sesión online** 2 h	**Presentación del programa de formación y acción.** ¿Qué es compostar? Herramientas y recetas para cocinar de modo aerobio los residuos orgánicos y producir alimento orgánico para nutrir la tierra que nos alimenta.
J7 nov 18-20 h	**Sesión online** 2 h	**Dinámica grupal de introducción:** metodología Menú Mater I y II.
M12 nov 16-20 h	**Sesión presencial de inicio** 4 h **Universidad de Extremadura** Facultad de Formación del Profesorado en Cáceres	**Introducción al marco legal.** Ley 7/2022 residuos y suelos contaminados para una economía circular, Orden Ministerial de compostajes descentralizado 13/02/2023 y RD 1051/2022 de nutrición sostenible de suelos agrarios. **Los retos de la gestión de biorresiduos** agrarios, alimentarios y de lodos de competencia municipal. **Introducción al metabolismo orgánico territorial.** El ciclo del carbono y de los nutrientes. **Visita a composteras y taller de caracterización.**
J14 nov 18-20 h	**Sesión online** 2 h	**Ventajas ambientales. Gestión descentralizada de residuos y** nutrición sostenible de suelos agrario.
M19 nov 18-20 h	**Sesión online** 2 h	**Introducción a la química y a la microbiología** del compostaje. Regeneración del suelo y el territorio.
J21 nov 18-20 h	**Sesión on line** 2 h	**Codiseño de proyectos I.** Programas y planes para la gestión de biorresiduos enfocada para entidades locales.
M26 nov 18-20 h	**Sesión on line** 2 h	**La ordenanza de residuos y la fracción orgánica** enfocada para entidades locales.
J28 nov 18-20 h	**Sesión online** 2 h	**Seguimiento de composteras.** Gestión de residuos de jardinería y podas agrícolas. .
M3 dic 18-20 h	**Sesión online** 2 h	**Diseño de instalaciones** de compostaje comunitario y pequeñas plantas de tratamiento.

J5 dic 18-20 h	**Sesión online** 2 h	**Comunicación, compostaje y comunidad:** Menú Mater III.
M10 dic 18-20 h	**Sesión on line** 2 h	**Prevención de riesgos laborales (PRL) en compostaje comunitario y en planta agraria.**
J12 dic 16-20 h	**Sesión presencial** de cierre 4 h **Universidad de Extremadura** Facultad de Formación del Profesorado en Cáceres	**Presentación de la metodología de TRANS-Lighthouses:** faros, comunidades de conocimiento y los laboratorios vivo.
M17 dic 18-20 h	**Sesión on line** 2 h	**Presentación de trabajos online y evaluación.**
M18-M31 dic mañana/tarde	**Tutorías a demanda**	**Acompañamiento para decidir el faro de compostaje.**

FIgure 39: Learning programme of the Master Composter course

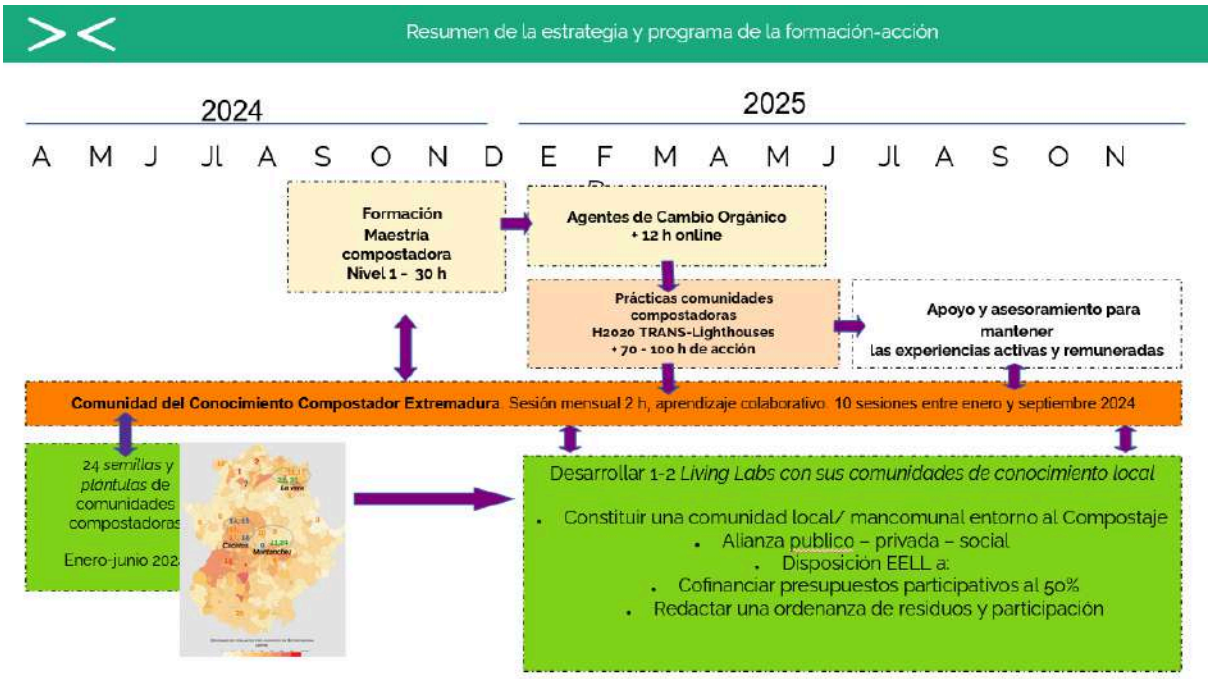

FIgure 40: Full programme of the Master Composter and Organic Change Agent courses

Inclusion of marginalized knowledges

Two collectives and two principal social actors have been identified and engaged in Cáceres province with the objective of collaborating with marginalized individuals.

- CARITAS is the largest non-governmental organization (NGO) affiliated with the Catholic Church, providing the most significant social assistance in the province of Cáceres, including in rural areas and the provincial capital. Meetings have been held with the board on numerous occasions since October 2023. Finally, in February 2024, CARITAS agreed to commence work on composting as a potential employment opportunity at its shelter for homeless individuals in Cáceres city.

The training commenced in March with 15 participants and will result in the certification of three individuals in July (Martin, Christian, and Gabriel).

Figure 39: Visit at Caritas - October 2023

The training process for the group in pLL 14, which took place in the shelter for homeless people of CARITAS in Cáceres, was followed by the inauguration of the first composting box in April 2024. In June, a team of three individuals was responsible for maintaining two compost boxes and obtaining certification at the 30-hour level of the Master Composter certification program.

- In rural areas and with a social engagement for the creation of opportunities for migrant collectives, we select and contact the association EDUCATIERRA.

3. Formalizing the LKL

Results of the activities for social mobilization and engagement

Here are pictures of our main active pLLs from January to June. This is what we'll face in the second half of 2024.

Figure 40: pLL Pinofranquedado - compostin worshop

Pinofranquedado (Sierra de Hurdes, Cáceres) is one of the municipalities where the proto Living Lab has been most successful. The photo shows a composting workshop. Carlos Castro, the pLL facilitator, is a student of the composting master's course with the UEX and MITECO. He is also an active member of the LKL Regional.
The pLL commenced with the support of Pinofranqueado and a meeting in February 2024 at the town hall, where 15 homes and 2 restaurants signed up. However, the city council ceased its support for the pLL in May 2024, citing the initiative's focus on the neighborhood as too demanding.

Figure 41: pLL Arroyo de la Luz - composting master course, visits

The following images were captured at the inaugural Living Lab in Arroyo de la Luz.
In the first photo, we see pLL facilitator Chemo Araujo, CEO of Huerta Mangurria, a student of the composting master's course with the UEX and MITECO in October-December 2023, and active

member of the LKL Regional in 2024. He is instructing the staff of the cantine of the elderly residence in Arroyo on the proper separation of bio waste and participation. The second photo depicts a workshop with local schools and an adult employment workshop around the composting boxes where Chemo Araujo developed the pLL.
The pLL project commenced with the support of Arroyo de la Luz and a series of meetings held in February 2024 with the local elderly population. The city council has opted to install a fifth brown container, with collection and transportation services provided by a conventional company. The objective is to comply with the Waste Law 7 of 2022, which only conventional systems are permitted to do.
Following the conclusion of the pLL project in Arroyo de la Luz, Chemo Araujo continued its implementation in the surrounding area of Mancomunidad Tajo Salor with the assistance of EBR.

Figure 42: pLL Madrigal de la Vera - agroecological poultry farm visit

David Acuña is the CEO of an agroecological poultry farm and the primary driver of the Madrigal de la Vera pLL initiative, which ran from February to June 2024. He was also assisted by two other members of LKL, Ana Maria Tebar in Villanueva de la Vera and Javier Lamanie in Jaraiz de La Vera. All three have been engaged in developing meetings with various local administrations within the Mancomunidad de La Vera, with the support of Alfredo Morilla, an expert on composting and trainer from EBR. In this photograph, David Acuña is seen in a workshop with the local school in Madrigal de la Vera.

Figure 43: pLL Torremayor - composting workshop

Torremayor pLL started in february 2024 with a workshop on composting where Regino Pinilla engineer in GESPESA public consortium in Extremadura Region, that has run as main facilitator this pLL in Torremayor. With 10 homes participating and two cantines from the local school and the elderly residence whose waste was collected and transported to the compost bins twice a week..

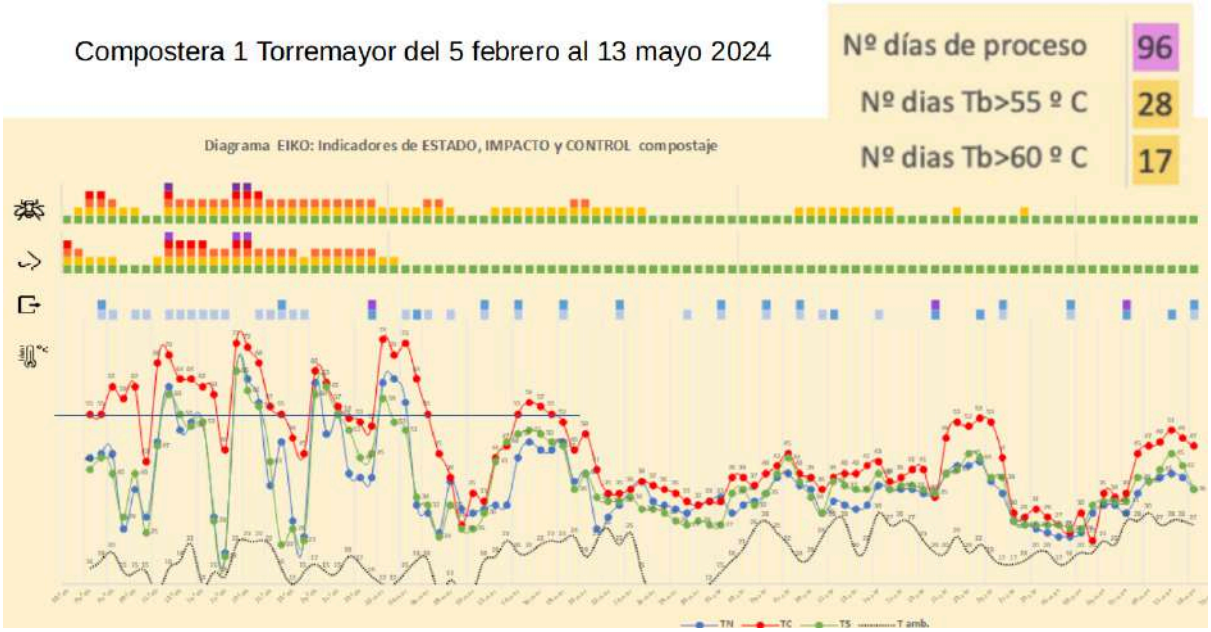

Figure 44: pLL Torremayor - evolution of temperature and other variables

In this chart the pLL Torremayor and Regino Pinilla as facilitator has collected temperature data and other variables of the composting process that are required according to Ministerial Order 02/13/2023 to guarantee hygienic conditions in decentralized composting (more than 55ºC over 14 days). These data are very suitable for carrying out citizen science workshops and processes.

After those five months the Municipality of Torremayor has concluded that it needs to implement a large-scale solution in the very short term.
The continuity of the biowaste management from the local school and the elderly residence will continue through a “fifth brown container” and the management from URBASER, the large scale waste company in the area.

Creating a structure for participatory governance in the proto-LL of Extremadura and the LKL of Cáceres

Description of the co-governance model

After six months of collaboration between local facilitators and fighters on natural and community-based solutions for decentralized composting, and in light of the hypothesis of continuity of the LKL developed during this period as a community of knowledge and practices, we have reached the following conclusions:

- Given the pressure on municipalities and public entities to resolve the mandatory collection of the "fifth brown container" through conventional companies, it is important to consider alternative solutions.
- To ensure the continued growth of our teams, we plan to hold another composting master's course between October and December 2024. This course will be held in collaboration with the UEX and will provide an opportunity for new professionals to join our team. It will also allow us to maintain the internship system with local pLL leaders and facilitators.
- The Regional LKL will be a strategic asset in maintaining the networking of those leaders and fighters on decentralizations and natural and community-based solutions in the medium term (TRL 2024-2026).
- We propose the creation of a professional association in the region of Extremadura in favor of an ecosocial economy for bio waste.
  The initial capital of fifteen thousand euros will be provided by the TRL.
  We propose that this capital be used, with a match fund, to request local action groups or associations for 50% of the financing of the decentralized community composting projects that the partners design and present.

Roskilde Pilot

Authors:
Anya Umantseva (RUC); Jonas Egmose (RUC)

1. Exploration of the territory, its actors and challenges

Description of the territory

Territorial description

Macro: rural

To establish the Living Knowledge Lab, the RUC team collaborates with the Regenerative Farming Association (further RFA) - an organization that aims to create networks and knowledge sharing among regenerative farmers in Denmark. The association's office is located in the Danish region Sjælland, However, the organization is working nation-wide with regenerative farmers in all regions of Denmark in rural and semi-rural areas. Therefore, at this stage of the pilot development the focus is on the overall macro territorial context of Danish agriculture. In the later stages of pilot development a more specific region or territory to work with might be co-identified.

Denmark consists of the peninsula Jutland, and islands Zealand, Funen, Lolland, Falster and Bornholm, and more than 400 smaller islands. The land area of the country consists of 43.100 km2 which equals 4,31 million ha with about 7,500 km coastline. Denmark has a relatively flat and low-lying terrain, with the highest elevation reaching no more than 173 meters above sea level. The country is in the North Temperate Zone with an average temperature in January of 1.5 °C and in August of 17.2 °C.

Most of Denmark's surface area is used as agricultural land which, including permanent grass, amounts to 2.54 million ha, corresponding to 59 % of the total Danish area. Forest and nature area amount to 1.09 million ha, constituting 25 % of the total area. In total, the areas in the open country amount to 3.65 million ha, corresponding to 84% of the country's land area. From this area 48% is used for fodder production, 16% is forest, 14% is light open nature, 11% is used for food production, 5% is permanent grass and 6% is other crops (Danmarks Naturfredningsforening et al., 2023).

Danish agriculture is highly modernized with a focus on efficiency and export. Being one of the most intensively cultivated countries in Europe, over half of Denmark's land is plowed and fertilized every year. Agricultural production and food consumption strain the climate, nature and environment like no other sector in Denmark. Intensive livestock production is the main cause of disproportionate fodder production and high CO2 emissions in the sector while it also has major negative consequences for the welfare of farm animals. The agricultural sector is responsible for about 23% of the country's greenhouse gas emissions, with production of cattle and pigs being the dominant source. Food for human consumption is cultivated on 16% of the agricultural area, while food for animals is grown on 76%. (Danmarks Naturfredningsforening et al., 2023).

There are about 7500 farmers in Denmark cultivating 33.000 farms, from which two out of three farms are located in Jutland, the western part of the country. In Denmark the farms are large, with an average size of 83 ha, and more than 20% of the farms exceed 100 ha of land. More than half of the farms cultivate cereals and other arable crops (wheat, barley, fodder plants, rye, oat, sugar beet, carrot, potato, cabbage, etc.). One fourth of the farms are specialized in cattle and pigs (Bolding Pedersen et al., 2022; Danish Agriculture and Food Council, 2023; Danmarks Naturfredningsforening et al., 2023).

Most of the agricultural land is managed conventionally with the use of monoculture crop production, intense plowing, and tilling, using chemicals as herbicides, pesticides, artificial fertilizers, leaving the soil bare and uncovered between growing seasons, intensive grazing and keeping livestock, use of antibiotics, etc. In Denmark approximately 12% of the total agricultural land is cultivated according to the principles of organic agriculture while 1.6% of agricultural land is managed by conservation agriculture principles (Danish Agriculture and Food Council, 2023).

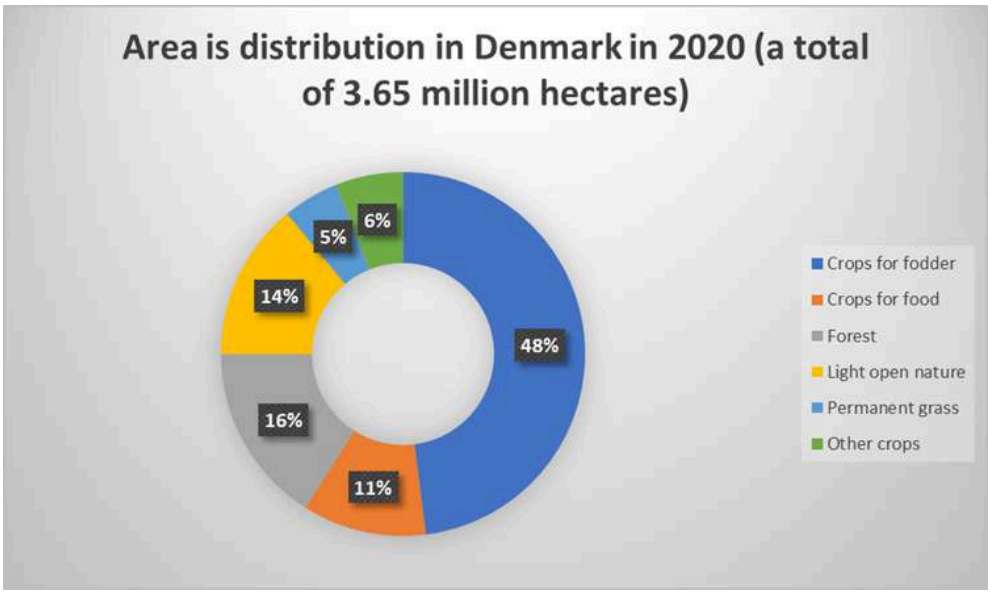

Figure 45 : Fra Foder til Føde 2 (Danmarks Naturfredningsforening et al., 2023)

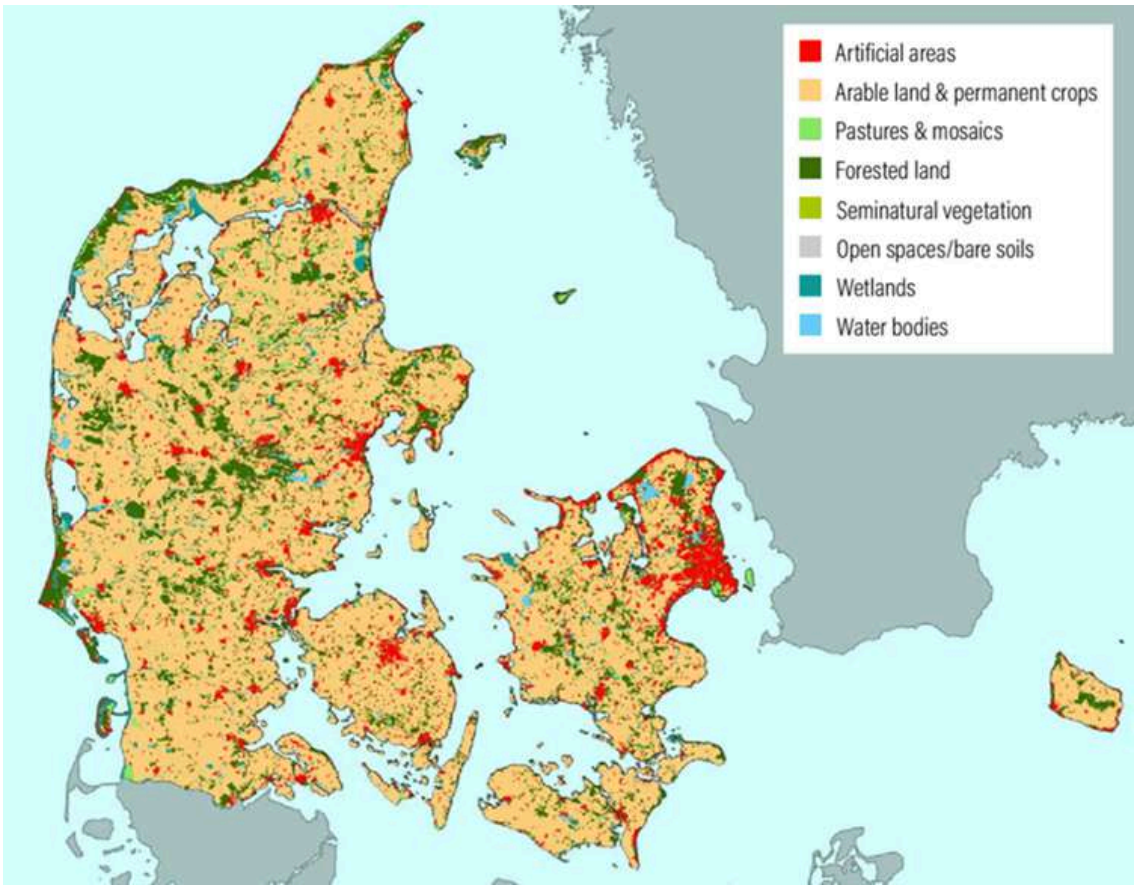

Figure 46 : Land use cover in Denmark (A Pathway to Carbon Neutral Agriculture in Denmark 2021 (Searchinger et al. 2021)

Micro: territory of pilot case - n/a, see previous section

Socio-economic description

Macro: rural

Based on a survey conducted in 2022 by Danmarks Statistiks (Bolding Pedersen et al., 2022) almost all Danish farmers are men (94%) and half of them are older than 55 years. Most of the farmers' highest education is erhvervsfaglig uddannelse (vocational education). Farmers grow feed on 76% of all agricultural area, while on only 16% they grow food crops and they mostly cultivate with conventional farming practices (Danmarks Naturfredningsforening et al., 2023). Based on the report from the Danish Agriculture & Food Council (2023), the farms are large, with an average size of 83 ha, however, more than 20% of the farms exceed 100 ha of land. The most produced animals are pigs, cattle, and chicken. Most of the agriculture products are handled through cooperatives. Around 12% of Danish farmland is cultivated organically (Danish Agriculture and Food Council, 2023)

Micro: territory of pilot case - n/a, see in the section above

Lessons from the participatory culture

Opportunities and barriers for participatory governance based on T4.2

Description of decision making and governance structure of the Regenerative Farming Association: It is a grassroot, citizen led initiative. Inspiration for the association came from the Green Youth movement in Denmark. Hence the ambition is to have a completely flat structure, a democratic structure, where you don't have one person, or one structure that makes decisions. Everybody has an opportunity to set up activities and to decide what the organization should be about. The rule is that anybody in the association, who is a member, and who can gather a group of a minimum two people, has a right to initiate activities. That's a standard for everything the organization does.

Economy group is the closest to what can be called a board. They are responsible for the yearly general assembly invitations, they have to make sure that the bookkeeping is correct, finances are correct and they also make sure the rules of the association are followed and implemented. But there is no chairman or someone who could be called a head of the association or the spokesperson, it is a flat structure.

Working groups: There are several working groups – Knowledge and research; communication; group that founded the regenerative farming school. People shift in and out in the groups, some people are more active, some are less active. Working groups also depend on activities. If there is a project (suggested by a member or an external collaborator) , a working group can be created around this project.

Degree of participation of members in the association. The degree of participation is very similar to many other volunteer groups in Denmark. There is a core group that changes because people leave and come back. But they are mostly driving the activities, organizing seminars, etc. And you have 80-90 percent who are just members, are supportive of the organization, but who are more passive.

Characteristics of citizens who usually participate

The Danish regenerative farmer is somewhat younger than the conventional farmer (85 % is under 55 years) and half have an academic background. 52 % are self-taught farmers. 62 % of the farmers are small scale – below 10 hectares..
The members of the association at large are more diverse in age and gender, most are white, and most are also active in other environmental networks and initiatives. Approximately half of the members are practitioners, the rest are a mix of students, researchers, academics and people who want to support the movement.
The majority are participating passively and then a smaller group are also contributing to the planning and execution of activities.

Participatory initiatives led by the association

- The School of Regenerative Farming – a one year master teaching concept for young aspirational farmers. Was founded in 2022, with approx. 15 students per year
- Fall seminar – an annual meeting for members of the association discussing and sharing the latest learnings, research results and regenerative methods. Founded in 2020, approx. 100-150 participants per year.
- A communication campaign funded by the KR Foundation – sharing information about the possibilities of regenerative farming in Denmark. Is currently underway, will conclude in June 2024
- Co-writing the report 'From fodder to food II' (Fall 2023) in collaboration with a number of Danish environmental organizations in order to give policy makers a substantial foundation for decision and policy making
- Part of the political coalition "Who owns the soil" that aims to create awareness about the commercialization and foreign acquisition of Danish farmland
- Mapping of the Danish regenerative farmers (Spring 2023) and their means of selling, their finances and types of production

Solidarity economy initiatives

- "Andelsgaarde" – an association that purchases farmland/farms and sublet them to young farmers. Financed by private people. (they do not, however, mention "regenerative" in their mission statement – nor organic – but most of their farmers are members of the association)
- There are a number of CSA – community-supported agriculture models among farmers who are members of the association. Within the association farmers have had some success in engaging their local communities with CSA. They tweak the model to fit their local communities – some organize field dinners, field trips, maybe helping out at the farm, many different models.
- Some members of the association work with Fællesgro – a company that connects farmers and consumers in a CSA model.
- There is, however, no centralized CSA network in Denmark. There is an initiative within the association where a group of members are working on a CSA network-related project. CSA is always one of the points on the agenda of the association. Possible reasons why a more formalized network has not been created so far are lack of funding; as well as the food culture in Denmark, where most families are two income households, and don't have time to participate in the CSA schemes, instead choosing to get their food quickly in the supermarket. Also centralized solutions always introduce a middleman, which might reduce the individual farmer's profit.

Challenges and opportunities:

Engagement of practitioners: One of the challenges that the association identified is more active participation of practitioners-farmers. Challenges to involve more farmers: are farmers' resources (time, money), lots of them are working mostly voluntarily. Also there is a lack of resources in the association to produce more tangible, practical things tools for the farmers.

Municipal actors*:* The association identifies the need to collaborate with municipal actors in order to advance regenerative agriculture. There is a need to engage people, institutions involved in the procurement aspect of food production – e.g. public kitchens, schools, procurement in municipalities. Also people working with climate adaptation – in municipalities, in companies or working with carbon footprint of food production.

The association already has some small collaborations, including, firstly, collaboration with Ringsted Municipality about the Regenerative School and the local planning.

Secondly, potential collaboration with other municipalities about supporting local farmers' dialogue with procurement in public kitchens - how to support the local farmers in their transition towards more regenerative practices.

Scaling challenge*:* The issue is that a lot of the farming legislation comes from the state level. So whatever local initiatives are doing doesn't reflect the national level. Because on a national level, there is a very large farming lobby and Denmark has a government that doesn't necessarily consider local regenerative farming as the solution to Danish agriculture. Also if we create the knowledge with a municipality, how can others take this up? How do we make a model that can be scaled?

Opportunities and barriers for participatory governance based on the assessment case - n/a, see the section above

Definition of the pilot case goals

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.

Ecological challenges

Ecological goals and description of the NBS

The agricultural sector was responsible for 33% of total CO2 emission from Denmark in 2022, making it the sector with the largest share of emissions in Denmark. If the agricultural sector continues to operate as it is today and emissions stay flat, this share is estimated to increase to 45% by 2030. Nature is also under pressure. As for the biodiversity crisis, agriculture is among the largest drivers of Danish biodiversity loss. Conventional farming practices undermine biodiversity above and below ground. In 2022, the share of Danish farmland was 61%, of which a significant share was farmed using conventional practices, continuing to put pressure on Danish biodiversity. Concerning the oxygen depletion in Danish coastal areas, the agricultural sector is also a major driver. The oxygen depletion is caused by large amounts of nutrients (phosphor and nitrogen) in the water. A significant share of those nutrients stems from fertilizer use in the agricultural sector. Pesticides are leaching from farmland into rivers and further down into the oceans, causing oxygen depletion and damaging the underwater ecosystem. In this context, it's essential to recognize that farmers are also under pressure to maintain high yields and minimize costs while grappling with the challenges posed by sustainability (Jameson et al, 2024).

Local values and attitudes towards the ecological challenges

Regenerative farming aims to provide alternative ways to produce food that has lower or even positive environmental and social impacts. Regenerative agriculture has no commonly accepted and agreed definitions, yet all the existing definitions highlight the improvement and maintenance of soil health and the symbiotic connections between soil health, biodiversity and land productivity. (Newton et al., 2020; Rhodes, 2017)

The Regenerative Agriculture Association in Denmark offers five principles of regenerative agriculture that must be considered and implemented through a wide range of farming methods: (1) using of ground cover and diverse greenery; (2) not disturbing the soil (no till, no dig practices); (3) supporting soil life; (4) integrating livestock to farming; (5) farming must be based on circular processes (source: https://regenerativ.dk).

1. **Ground cover and diverse greenery** - Farming must provide ground cover with continuous and diverse greenery to support photosynthesis that bring energy to the soil. Photosynthesis uses CO2 from the atmosphere and absorbs it together with water to create oxygen and sugar that supports the plant and the micro-life around the root system, building up the topsoil. This process helps to avoid leaving the soil bare that contributes to erosion, loss of micro-life and fertile topsoil. The use of catch crops, perennial crops, underseeding and woody plants supports the photosynthesis, living root systems and increased soil life as well as binding carbon into the soil.

2. **No disturbance of the soil (no till, no dig) -** Tilling and especially plowing disrupts the structure and destroys microbial life in the soil. The robust structure is essential for preventing

erosion and water holding while micro-life supports soil health by breaking down the organic matter providing nutrients for the plants. With tilling, the organic matter of the soil is exposed by decomposing it releases carbon back into the atmosphere.

3. **Supporting soil life -** Fungi, bacteria and other organisms are part of a complex living system in the soil. The more life and diversity there is in the soil, the healthier and more resilient it will be, which is crucial for growing healthy crops as well as for biodiversity above ground. A diverse micro-life reduces the crop's vulnerability to fungal and insect attacks. The use of pesticides, herbicides and tillage disrupt the diversity and micro life. However, ground cover, living roots all year round, grazing animals, compost or seed inoculation can help support the micro-life in the soil.

4. **Livestock integration to farming -** Animals are a natural part of ecosystems and they create dynamism and diversity in the landscape. Grazing animals increase the soil's microbial life when there are no more animals that the ecosystem can support. Methods such as rotational grazing can regenerate grass and soil, converting the plant biomass into nutrients for the soil while the manure will feed the soil life. It's important to reduce the numbers of animals as it will create a reduction in greenhouse gases, phosphorus, and nitrogen from animal production.

5. **Farming must be based on circular processes** - In regenerative agriculture there is a focus on recirculating resources and supporting the ability of ecosystems to offset imbalances. By ensuring a diverse micro-life, undisturbed soil, and balance in nutrients, the soil's recirculation processes are active. In exchange for the plant's sugars, the micro-life releases nutrients bound in the soil. The use of chemical fertilizers leads to environmentally harmful nutrient leaching and disrupts the natural processes of ecosystems.(source: https://regenerativ.dk).

Transformative potential of regenerative farming

At the same time, regenerative agriculture is rapidly becoming an ambiguous discourse and practice used by actors who seemingly belong to opposing sides of the farming debates (Tittonell et al., 2022; Gordon et al., 2023). Food corporations are increasingly incorporating RA into their strategies as an add-on farming practice without otherwise changing the productivist and industrialized basis of farming (Gordon et al., 2023). Gordon et al. (2023) details a variety of regenerative agriculture discourses and their levels of departure from the status quo, ranging from merely a new technique of on-farm management to "regenerative cultures" including more equitable value chains and farm labour, and to more radical socio-political transformations (food sovereignty and agroecology). Hence, in order for regenerative farming to have a transformative potential, it should be approached not only as an agronomic practice, but as a change in mindsets towards regenerative thinking, and as a change in human-nature relations (Umantseva and Egmose 2024; Gordon et al., 2022). From the perspective of political ecology, regenerative trends in farming are seen as instances of departing from or challenging the paradigm of industrial and productivist agriculture (Gordon, Davila, and Riedy 2021). This departure is reflected in the direction of regenerative trends towards ecological embeddedness of farming ecosystems and questioning the hegemony of techno-scientific progress in agricultural development that allowed the creation of farming systems where crop production is not (or less) dependent on ecological conditions and processes (Arbuckle Jr 2020). Agroecology in this respect implies rethinking food production and value-chains towards food sovereignty (Gliessman, Friedmann, and Howard 2019) which can sustain but also regenerate social and ecological living conditions.

Based on the workshop results, organized by RUC for regenerative association members, besides agro-ecological principles, they see the need in strengthening the local food systems, attention to nature in food production, changes in land ownership practices, and strengthening community-based economic organizing, such as community-supported agriculture.

Socio-economic challenges

Identification of marginalized knowledges and of needs of marginalized groups

The question of inclusion of marginalized knowledge in the pilot case is approached as a dilemma. There are different choices that could be made in regards to how to approach inclusion, and what is the most meaningful strategy for this particular pilot case. The inclusion of marginalized knowledge can be approached in this case in two different ways.

Firstly, regenerative farming is approached in Denmark as marginalized knowledges and practices, and state the main objective of the pilot as working with these knowledges, learning from them and strengthening the regenerative practices. Within the Danish context of industrialized agriculture regenerative farming is perceived as a framework for societally marginalized knowledges and practices, and the reemergence of these as potentials for transforming human-nature relations. In the pilot the focus will be on the re-emergence of marginalized knowledges 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.

On the other hand,work can be done with inclusion of marginalized groups *internally within* the regenerative movement, identifying who is not there and why, for instance, regarding ethnicity, gender, age, education level, etc.

Identification of presences and absences

The pilot case is working with the absence of caring and reciprocal human-nature relations in the general context of Danish agriculture, and asks questions about how these relations and practices can be supported and reinforced through participatory approaches. The work of the Regenerative Farming Association and its members is considered as emerging practices of reciprocal human-nature relations. There is a need to work with understanding how these practices can be organized in terms of social and economic models in order to strengthen these practices at the broader societal scale.

In terms of who and what is absent and present within the regenerative association and the regenerative movement in general in Denmark, there are several aspects which are significant:

Gender aspect: Although In European countries, the number of women in agriculture is slightly increasing, in Denmark in 2020 only 5 per cent of the land belonged to farms owned by female farmers (European Commission, 2021)., and women-owned farms are significantly smaller in size than male-owned ones (Danmark Statistik, n.d). However, within regenerative farming the gender distribution is notably different from conventional agriculture with women constituting around 50 percent of members.

Age: In general in Denmark farmers are above 55 years old (Bolding Pedersen et al., 2022). However, in regenerative farming members are mostly younger people.

Education: Many regenerative farmers are highly educated. This trend can be related to the fact that many regenerative farmers are people who are new to farming - they are what can be called citizens who turned practitioners, people who are interested in environmental and sustainability issues, and have recently turned to practicing farming.

Farmers-practitioners: Approximately half of the members of the association are practitioners, the rest are a mix of students, researchers, academics and people who want to support the movement (source: interview conducted with the association representative) The association identifies that they wish that more active members of the association were farmers-practitioners, However, it is a challenge to involve more farmers, because most of them are in a precarious financial situation, and they lack time and other resources to be active in the association (source: interview with the association-member).

Civil society: Although the regenerative farming association is a grassroots civil society-led organization mostly supported by the efforts of volunteering members, the association identifies that more support and engagement of civil society is needed to strengthen the transitions to regenerative practices in farming.

Municipalities and other public authorities: The association identifies that there is a lack of engagement and collaboration with municipal actors, who are working with local food provision as well as climate action. More active collaboration could potentially be beneficial for strengthening transitions to regenerative practices. One of the objectives of the pilot case is building collaborations with municipal actors.

2. Collecting the required knowledges for the Living Knowledge Lab

Creating relationships with partners

Networking and exploratory activities in territory

1. **Meetings of the Pilot Coordination Group**

The Pilot 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. **Future Creation Workshop - Date: 30 January, 2024. Location Roskilde University**

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.

3. **Regenerative agriculture seminar 2023. Date: 18 November 2023. Location. Himmelbjerggaarden, Ry**

The RUC team took part in the event organized by the association - Regenerative agriculture seminar 2023. This is one of the regular knowledge-exchange and networking events organized by the association every six months. The seminar consists of presentations by practitioners, researchers and other people interested in sharing experiences, knowledge and advancing regenerative farming.

Bringing members/stakeholders in the LKL

Working group collaboration

In collaboration with the Regenerative Farming Association, we are working on anchoring the pilot activities into the diverse working group formed within the association.

Activities in the pilot will to a large extent consist of planned activities within the association (and the planning and carrying out is made by the working groups themselves), in particular in relation to the working groups, which are in the process of formalizing:

1) **Biodiversity Working Group (Arbejdsgruppen for biodiversitet).** This group in particular works with developing a set of principles for working with nature and biodiversity in regenerative farming.

2) **Community-supported agriculture.** This group in particular works with community supported agriculture (CSA).

Working group activities are run independently by the working groups as agreed by the association. The pilot can further provide resources (meetings, venues, conduction of research) as agreed in the coordination of the pilot.

Municipal collaborations

As part of the LKL, in addition to the activities described above, there are plans to identify, set up, and establish collaboration with municipal actors.

Inclusion of marginalized knowledges - n/a, see above the section *"Identification of marginalized knowledges and of needs of marginalized groups"*

Inclusion of youth

The regenerative farming association mostly consists of young members (25-44 years) old, hence in the pilot case we will be working with the youth group.

Also, in the pilot plan we consider a collaboration with the Regenerative Agriculture School, which was founded by the association.

The Regenerative Agriculture School started in 2022. The School offers an alternative for those students who want to learn about the regenerative movement and practice. The School is closely linked to practitioners in the association Regenerativt Jordbrug, and through the School students are involved in the network and introduced to the association's activities and opportunities. Teaching at the Regenerative Agriculture School is provided by farmers who share their knowledge and experience directly from the field. The basic course consists of seven weekly seminars. The topics covered include Farendløse examples and solutions for farm and land ownership, joint organization, producer community, housing community, plantation systems, rotational grazing, egg production in a mobile chicken house, vegetable production, processing facilities, carpentry etc. The farms are actively used in teaching to connect practical examples directly with theory (source: https://regenerativ.dk).

Relationship with and view of nature (human-nature relationship)

A fieldwork is being designed to conduct interviews and field demonstrations with regenerative farmers to better understand how human-nature relations are established, negotiated and transformed in regenerative farming practices.

3. Formalizing the LKL

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.

Key aims for the pilot

The LKL will have the following three key aims for the pilot phase:

1) To establish a Living Knowledge Lab between Roskilde University and the Danish Regenerative Farming Association as a platform for continuous collaboration on regenerative practices and knowledge. This includes anchoring and further maturing the development of

regenerative knowledges and practices in the Regenerative Farming School, including the establishing of 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.

2) To strengthen and mature the regenerative knowledge base, by conducting action research and practice development on:

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.

This implies co-disseminating results of the pilot within and beyond the association targeted transformation towards regenerative practices in Denmark.

3) 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.

Pilot activities

Phase 1: Mapping phase identification of challenges, visions and action points for pilot plan co-creation. Activities include participatory culture mapping; revision of existing literature.
Phase 2: Organizational setup and anchoring with the association and working groups, and setup of working-group for municipal governance. Activities: Establishment of the Pilot Coordination group including RUC researchers, and members of the association; establishing collaborations with working groups.
Phase 3: Action research and knowledge co-creation on human-nature relations and socio-economic organization of small-scale regenerative farming and lifestyles. Fieldwork activities with regenerative farmers and community-supported agriculture; recurring workshops with the working groups.
Phase 4: Establishing **farmer to farmer knowledge exchange** networks.

Phase 5: Co-creating and maturing models for **cross-municipal collaborative governance** on regenerative farming. Organizing a working group with relevant municipal actors
Phase 6: Co-dissemination of results for scaling- out, and ensuring **organizational anchoring** and beyond project lifetime.

Creating a structure for participatory governance

Description of the co-governance model

Based on the discussions with the association representative as well as the Future Creation Workshop organized by RUC for the association members, we identified interest and need of regenerative farmers to work towards creation of locally-embedded collaborative governance that supports and strengthens regenerative farming practices. Hence, one dimension of the pilot plan includes the goal to set up, 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.

The work on developing such a model will be organized through the collaboration of RUC and regenerative farming association, including the working groups. At a certain stage, municipal actors will be engaged for further co-creation and testing.

Lagoa Pilot

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1. Exploration of the territory, its actors and challenges

Territorial description (Macro: rural/forrest/urban/coastal lighthouse)

The pilot we aim to develop is situated in the archipelago of the Azores. The azorean archipelago is composed of a set of 9 islands: Santa Maria, **São Miguel**, Terceira, Graciosa, São Jorge, Pico, Faial, Flores and Corvo. The pilot is located on the island of São Miguel, as well as the University of the Azores and Coop. Kairós.

Figure 46: Political Map - Portugal

Figure 47: Azores archipelago

São Miguel Island has a population of 137,220. It consists of six municipalities: Ponta Delgada, Ribeira Grande, Lagoa, Vila Franca do Campo, Povoação, and Nordeste. The municipality of Lagoa has a population of 14,189 people, with 16.5% being children aged 0 to 14 and 70% being 15 to 64 years old (according to the 2021 Census) , and is distributed over 5 parish councils.

In Lagoa, you can find both public and private facilities that support life in the community, such as a hospital, a museum and representation centers, an old monastery that now serves as a library, two business hubs, and churches (both Catholic and non-Catholic).

The municipality offers, in terms of participatory culture, mechanisms for citizen engagement such as participatory budgeting, youth participatory budgeting, municipality general assembly, public consultation, public auctions, local voluntary bank, citizens' voice line, water readings, and complaints channels.

The parish councils also offer similar opportunities to foster participation in the governance process and decision making, although without a specific methodology regarding participation. Generally, participation happens by bringing people together on special dates of celebrations or festivities in the parish, as well as sport and cultural events where the parish council invites and welcomes the participation of the citizens. They also provide support to events organized by different organizations and entities that reside in the municipality.

The citizens tend to organize themselves in organizing events traditionally related to religious festivities, where, as volunteers, they prepare all the program for the festivities, gather all the resources for it, and determine who will be the leader in charge of the next year's organization. Generally, it is assigned to a single family (with one spokesperson) which will be responsible for the engagement of the rest of the community.

The municipality hosts a large number of civil entities, from sports clubs (in different sports), young people's clubs, scouting groups, music and arts associations, to parents' associations in local schools. This demonstrates a strong motivation to be active participants in community life and highlights their capacity for mobilization and participation.

Figure 48: Azores archipelago - Island of Sao Miguel related municipalities and Lagoa's parishes

The municipality of Lagoa covers geographic areas that are urban, rural, forestry and coastal. Our Pilot - The Water Trail covers just rural and forestry and we defend it also as coastal because we live on an island where the sea is always present. For us the right to seascape is very important and we want to integrate the experience of sea contemplation into the Trail that is only possible in a particular area.

Micro: territory of pilot case

The "Water Trail" is located between two council parishes named "Santa Cruz" and "Água de Pau". Both council parishes are rural with low population density and the main activities are agriculture, cattle breeding, some fishing activities and tourism. The specific place where the trail is located includes a small village called Lugar dos Remédios, but somehow is a dormitory community not deeply engaged with the trail. It is a natural surrounding that was constructed by man at the beginning of the 20th century, to capture water for an alcohol industry and to pump water for human consumption. Nowadays there is a rich industrial heritage and still supplies water for the communities.

At the beginning of the Trail, there is the information center called "Water House" that was once a milk warehouse for cattle breeders and was repurposed and renovated using participatory budgeting. At the area nearby there are a public garden/picnic area with wc facilities

Socio-economic description

Macro: rural/forrest/urban/coastal lighthouse

The 2021 census registrations indicate that the municipality of Lagoa had a population of approximately 14,189 individuals, of whom 6,976 were male and 7,213 were female. The population was distributed as follows: 2,345 individuals were between the ages of zero and fourteen, 10,024 between the ages of fifteen and sixty-four, and 1,820 individuals were sixty-five and over.

The municipality of Lagoa is home to 1,380 companies, representing the business fabric of the area. A total of 1,320 companies have less than ten employees, 36 have between ten and nineteen

employees, 17 have between twenty and forty-nine employees, and seven have fifty or more employees. The data demonstrate that small companies employ a greater number of individuals. The economic activities most prevalent in Lagoa are agriculture, hunting, forestry, and fishing (11.9%), housing, restaurants, and similar (10.3%), wholesale and retail trade (17.7%), construction (15.7%), and transformative industries (11.6%).

The most recent data on the average income in the municipality, as of 2019, was 941.90 euros.
It is noteworthy that of the 14,189 residents of the commune in 2021, only 3,403 were employed in the area in 2022.

Our pilot initiative is predominantly rural, forestry, and coastal in nature, given that our island nation is situated in the outermost region. Our objective is to integrate the experience of the trail as a component of local sustainable development. It is anticipated that the local community will also benefit from the economic value that could potentially accrue from the economic activities based on the trail. These could include, for example, free tour guidance, a food and beverage station, and the commercialization of indigenous species of plants to restore biodiversity in the trail area.

Micro: territory of pilot case
The social and economic characteristics of the neighborhood in which the pilot case is situated are mainly a dormitory area, from Lagoa and Ponta Delgada Municipalities with some economic activities mostly agriculture and cattle breeding. As a rural area there are a lack of choices concerning the offer of public or private services. The most important offer is related to the parish council, religious organization and a cafe/bar.

Lessons from the participatory culture

The mapping of participatory culture thus far has indicated that the municipality is the primary entity engaged in fostering community engagement. This engagement is manifested in the form of participatory budgeting, which is available to both the municipality's youth population and the general public. In this methodology, the public is invited and encouraged to submit proposals that address a specific problem or challenge identified within the community. Subsequently, the proposal will be subject to a public vote, with the successful implementation of the plan proposed by the mayor contingent upon the outcome of this vote.

Additionally, the municipality facilitates the general assembly, which includes members of the community, parish councils, youth organizations, sports and cultural associations. The current situation is presented, and the measures to be implemented in order to solve the problems are discussed. It should be noted that not all members of the municipality are eligible to participate in this assembly.

Furthermore, local citizens organize activities related to religious festivities with the support of the parish council. These activities are entirely organized by the local citizens each year with the objective of maintaining and promoting traditional customs. In contrast to other periods when the municipality encounters greater difficulty in encouraging participation, the level of engagement among the local population is particularly high.

Opportunities and barriers for participatory governance based on T4.2

These are some of the **barriers** in promoting participatory governance that have been identified, based on the T4.2, so far:

- **The top-down approach:** although the municipality leaders acknowledge the importance of the participation of the locals in the decision making, this is still not effective. The majority of the decisions are made by those in power (mayor, parish council presidents, general assembly participants…) representing the locals as they were elected to occupy their positions.
- **A lack of participation in matters that are not directly related to religion (majority of the Catholic religion)**: the Church traditionally represents the center of the values upheld in the community, which motivates the locals to engage with greater enthusiasm in related activities. However, this is less evident in other types of events.
- **Participation of the elders**: elderly people do not engage in many activities, besides the religious one. Although there has been a shift in this trend—with some variation across the different parishes—primarily manifested in the form of annual group summer trips.
- **Participation of the youth**: many youngsters are eager to participate, especially in activities related to sports, and some with culture such as concerts (as an example). It is observed that their participation in activities related to nature preservation is also very welcome. However, the consistency of this participation is not as strong as it could be, and there is room for improvement in the initiatives taken by young people to engage, propose activities, or participate in decision-making processes within the community.

The following are some of the **opportunities** for promoting participatory governance that have been identified based on the T4.2.:

- **Willingness to be part of the decision-making process:** although it can be a challenging process, when given the opportunity, the locals tend to show up and contribute in the decision making. As evidence of this, we cite the success of participatory budgetting (Lagoa has two of such programs: one for the general public and one for the youth).
- **Co-design of programs with the elders**: Given the considerable time and energy they devote to religious activities, there is an opportunity to enhance their participation in other activities by aligning the co-design process with their elders' conditions (related to time and health) and desires.
- **A broader general assembly format**: this can be co-designed with the locals to make the general assembly more inclusive and closer to the needs of the population.
- **Nature conservation awareness:** The increased awareness of global warming and the urgent need for a more sustainable approach to nature preservation has resulted in a greater sensitivity to these issues within the community. This can be seen in the recycling habits that more and m0re people are aware of. Furthermore, there is a growing engagement in activities related to land, river and ecosystem restoration.

Opportunities and barriers for participatory governance based on the assessment case

Both the assessment case and the pilot case are situated within the Lagoa Municipality in the Azores. We have not yet had the opportunity to reflect on the assessment case, as there has been some overlap with the pilot case. This indicates that our attention has been primarily directed towards the pilot case. As a result, we have not yet had the opportunity to apply the insights gained from the assessment case regarding participatory governance and cultural considerations.

Definition of the pilot case goals

"Trilho Janela do Inferno (Rota da Água)" is a natural asset located in Lagoa Municipality territory (Santa Cruz & Água de Pau). This trail belongs to a Network of Walks Classified by the Regional Government of the Azores and is an important dimension of the economic strategy to promote Azores as a sustainable tourism destination based on nature.
This trail is located in Lagoa Municipality, which is developing a new holistic strategy to engage communities in natural spaces with the goal of promoting environmental education, social inclusion, health and well-being, science, and local development. The objective of the Pilot is to study strategies to link in a respectful way citizens and nature to understand the best way to integrate Nature Based Solutions into local government and to develop a participatory culture to combat the disconnection between people and policies, institutions and nature. To ensure the continued use and protection of these natural spaces, it is essential to conduct research and studies to promote their biodiversity, historical significance, and valuable assets such as water.

TRAIL INFORMATION: Category - Circular; Difficulty - Easy; Extension - 7.6 km; Time average - 2h30

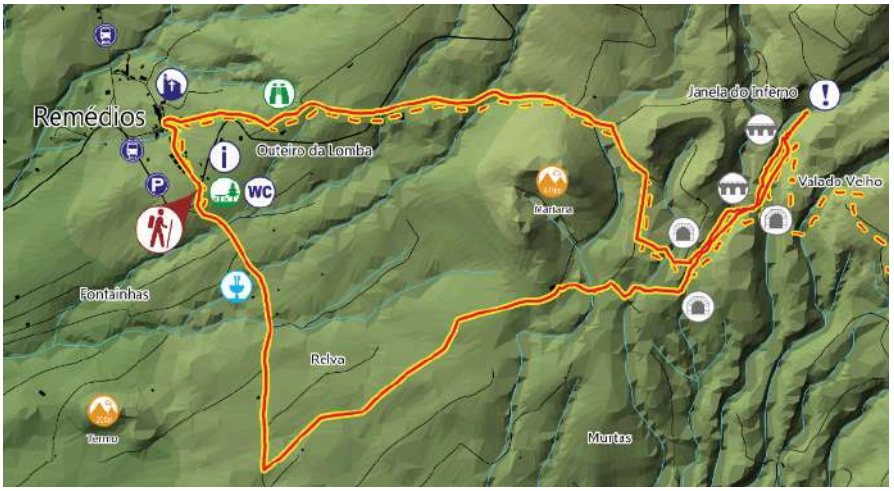

Figure 49: Trilho Janela do Inferno (Rota da Água) - Trail map with related information

Figure 50: Hikers on the Water Trail

Ecological challenges

Ecological goals and description of the NBS

The main ecological problem faced in our Pilot is to conciliate the rights of nature, with the right of use of natural assets by man. It is essential to evaluate the cargo capacity of these trails in order to determine the optimal number of individuals who can utilize these natural spaces without causing damage or undue stress to plants, birds, etc. We are seeking solutions that enable us to utilize the trail in a sustainable manner, which necessitates an understanding of the optimal balance between exploitation and conservation. Other ecological issues are related to natural hazards, such as landslides, as well as the introduction of non-native species that pose a risk to biodiversity and the ability of soils to retain water.
Regarding biodiversity, our objective is to restore certain sections of the trail with endemic plants in order to address the environmental stress caused by invasive plants, which reduce the resilience of the territory.

Some activities are planned to be organized in a participatory way to deal with conservation and restore biodiversity in a cooperative effort between public organizations and citizens. These activities include the cutting of invasive plants, the creation of a community forest nursery as a local-based community project to promote entrepreneurship, and the creation of capacity building/training for a social enterprise to provide maintenance of the trails in a good manner. This is necessary since gardening enterprises don't have the necessary expertise to carry out such works in complex area. This approach enables our Lighthouse to address nature, social, and economic issues and become a NBS itself.

Local values and attitudes towards the ecological challenges

Nowadays the neighborhood community around the trail is disconnected from it. The trail is just part of the geography of the landscape. The water trail is seen as a "portion of land with trees and water" where cows can graze and where tourists like to go. There are identified needs to develop strategies to reconnect the community with our pilot case. It will be a challenge to engage the local community as part of an NBS and raise awareness about climate change and the impact on water resources in our daily life. There is still a significant effort required to mobilize the

community around the importance of the water trail as an NBS, with the aim of improving well-being and creating a sustainable economy. There is a lack of participatory culture and still a vision of a fragmented approach to territories. Because of that there is a need to reinforce partnerships with stakeholders to create a common agenda.

Socio-economic challenges

Due to the lack of democracy and low levels of participation (for example, in the last electoral act, the European Parliament elections in 2024, the Azores had an abstention rate of over 80%), we are aware that we face different challenges in promoting an inclusive and sustainable socio-economic development. It is our objective to implement our pilot case in a way that will result in social inclusion and long-lasting social cohesion in the local community. In light of this, we are developing an entrepreneurship agenda and identifying NGOs that work with marginalized groups to involve them in the process. This is a new initiative, and there is a significant amount of work to be done. The lack of financial resources and the institutional culture of social organizations that are still very distant from environmental issues make it more challenging to address these issues.

Figure 51: Meeting for stakeholder's engagement

Identification of marginalized knowledges and of needs of marginalized groups

In a changing society there is a need to include all voices and knowledge in the process of sustainable development and wellbeing. The European Union has pledged to reduce the number of people at risk of poverty or social exclusion by 15 million by 2030 (including 5 million children). However, this goal is far from being achievable and also leaves over 80 million people behind. The Azores as a peripheral region face the problem of poverty and social exclusion in a more severe way and with a lack of public policies that can deal with the problems in an effective way. Lagoa region faces different socio-economic problems that our Pilot wants to help addressing and it is concerned with educational problems (school dropout), lack of economic opportunities, drug abuse, homelessness, ageism, etc. The social inclusion dimension is a key consideration in our pilot project. Because of that, we are promoting the water trail as an inclusive initiative. In addition to offering a physically accessible route, we are developing a virtual solution (trilho do mundo.org) to enable those who are excluded from the experience of nature/water trail due to socio-economic and cultural handicaps to participate.

Local knowledge, histories, traditions, narratives will be integrated to give value to cultural assets that can be translated in the concept of Free Tours: https://www.freetour.com/concept/about-free-tours
The integration of storytellers, the narratives of the elders who have been involved /worked in the construction of the trail will be registered to make a "Guide" to be used in the training of local people who want to work as mediator guides. The aim is to add value to the experience of doing the water trail, offering stories about the place, biodiversity, and richness. We want to give the opportunity to youngsters /adults in a disadvantaged situation to be mediators, to create their own job/activity.

Identification of presences and absences

In our pilot case, the "Water Trail," is primarily utilized by tourist operators/free movers who visit the Azores in search of nature tourism.. As a result, the economic view remains largely traditional and disconnected from a biocentric perspective. Our objective is to change the paradigm and view nature as an NBS that should be inclusive and accessible to all, with economic benefits available to all. We plan to engage with stakeholders from the solidarity economy to explore potential collaboration in job creation. This could include opportunities such as nature mediation, local shops specializing in sustainable artcraft/biocraft, trail gardening and maintenance, local food, and free tours. We aim to enhance the value of the "Water Trail" as a health asset. By promoting health and wellbeing, we can transform the current absence of marginalized groups into a regular presence at the trail, offering social inclusion experiences through nature.

2. Collecting the required knowledges for the Living Knowledge Lab

Networking and exploratory activities in territory

In Lagoa the Pilot and assessment case cover the same geographical scope, despite the Pilot being more integrated in a rural/forestry area. The mapping of the participatory culture is still ongoing, but we believe that it will provide ideas for pragmatic solutions to local challenges in the emergence of the LKL. From several activities and meetings with stakeholders it becomes clear that other governance strategies are possible and this can be the trigger for different organizations to look at the territory based on a participatory culture, and the dialogues conducted so far enlighten possibilities for cooperation, sharing responsibilities, developing new ideas, recycling and leaving others.
There are several important dimensions that become clear for future cooperation and are linked with Training, Citizen Science, Research, Developing sharing activities as Cinema by Night at "Water trail", Workshops, etc. During the exploratory phase (April/May) more than 100 youngsters were involved in activities during the experience of the trail, got inspired and reflected about their experience using dialogues and art as methodology and around 15 organizations have met and cooperated. Networking is still going on and still a lot of meetings are planned to strengthen this cooperation. These meetings were used to promote TRL project but also to share results as the website trilhosdomundo.org and its potential in terms of citizen science, youth participation, training possibilities for tourist mediators, social inclusion, etc
Concerning the relation with tasks we can identify 4.2; 6.2; as relevant in a way that we are collecting and producing information in traditional approaches (observation, exploratory interviews, motivational interviewing, semi-directive interviews) but also in innovative ways, as ICT, art as a tool, walkthroughs, etc.

Bringing members/stakeholders in the LKL

To create a diverse and operational LKL we have identified and connected different organizations/stakeholders that can contribute to the success of our operation within the pilot, but can also help us to the creation and development of activities included in our LKL and are aligned with the philosophy of the TRANS-Lighthouses project.

In the following table we listed our various stakeholders (members of the LKL):

Uac
Kairós
Câmara Municipal de Lagoa
Expolab
Direção Regional dos Recursos Florestais
Direção Regional de Turismo
Sustainable Azores - DMO
OVGA
SPEA
Associação Ecológica Amigos do Calhau
SMAS PDL
Junta de Freguesia do Rosário
Junta de Freguesia de Santa Cruz
Junta de Freguesia do Cabouco
Junta de Freguesia de Água de Pau
Junta de Freguesia da Ribeira Chã
Escoteiros Grupo 97 - Água de Pau
Escuteiros Agrupamento 798 - Cabouco
Escuteiros Agrupamento 1290 - Santa Cruz
Escuteiros Agrupamento 1333 Ribeira Chã
CEFAL - Centro de Educação e Formação Ambiental de Lagoa

Note: this is an ongoing process and at the moment we are elaborating the list of organizations from the solidarity economy that will be involved in the LKL to promote social inclusion. As far as we can understand, the stakeholders are interested in the project but they can't go as far as they wanted, because they don't have the budget for it nor the human resources which could easily affect their involvement in the project.

Inclusion of marginalized knowledges

The area where the "Water Trail" is located is a territory that needs a deep community diagnosis to evaluate the social challenges in the territory and the best strategy to include marginalized groups in a comprehensive way, avoiding social alarm, that has a potential to create misunderstanding and conflict with the local population. We need to avoid the idea that the project is caring or facilitating the process of driving people with social problems such as drug users, homeless, mentally ill persons and others to a quiet and rural place that is not used to facing or interacting with these kinds of citizens.

Departing from a decolonial knowledge perspective we will integrate the knowledge of marginalized communities, as rural workers, manual workers, maintenance workers, and of elderly people, as living libraries of oral knowledge and local stories. Different strategies are being reflected to find the ones that represent everybody and can facilitate the understanding of social issues of vulnerable and underrepresented groups in the Pilot.

Inclusion of youth

For the Pilot, youth is a central point to ensure the sustainability of the project after it ends. This means that the knowledge of engaged youth or adolescents are included in the LKL and the level of engagement depends on their motivations, life objectives, environmental education actions and entrepreneurship activities. We aim to work with students from different educational levels, organizations, sport clubs, etc, without looking at their socio-economic status.
Students from Azores university are also part of our concerns related with youth, because we want to develop a peer education to promote social mobilization and empowerment of youth groups as changing agentes. University students can act as tutors of other youth to promote knowledge sharing based on a model of learning community and citizenship.

Figure 52. Groups of students involved in on-site activities.

Relationship with and view of nature (human-nature relationship)

A connection with nature allows us to see the roots that sustain and explain everything around us. At UAc, we have prepared two questionnaires to be used this summer to capture the perception of the human-nature relationship of the users of the "Water Trail". We have two questionnaires to be applied: before the trail and after the trail. In this way, we expect to collect data to understand this relationship between man and nature. At the moment we don't have any data that would allow us to make valid statements/conclusions about this. How is nature understood and what is nature, and how do stakeholders' perceptions and practices relate to their understanding of the pilot case NBS goals is what we want to explore and understand. This is an ongoing process and our perception is that stakeholders have a limited view of the pilot and this was dependent on the way they use it, mostly in a traditional way based on human egocentric perspective.

Strategy and actions for the LKL

The Lagoa pilot case is currently in the phase of co-design and co-diagnostic activities and the formation of a co-governance structure of the LKL. The cooperation between the 3 main actors (UAc; Kairós and Lagoa Municipality) is based on an informal partnership and mutual support, which makes the communication efficient, facilitates the planning of activities and the sharing of the workload. As far as we can see, there is a good relationship between the municipality and citizenship as well as local organizations, such as schools and social organizations and stakeholders. This organizational climate makes our work easier and more effective because it is based on a participatory culture. For us, it is clear that there is a need for improvements and a

clear strategy on how to approach the municipality in order to establish direct links with citizenship. There is a need for a common framework for entering the neighborhood and negotiating entry. For us, community engagement is essential and can be understood as the nature and quality of relationships between community groups, neighborhoods and public services. To promote participation, we will use Arnstein's "Ladder of Citizen Participation," which is presented as a metaphorical "ladder" with each ascending rung representing increasing levels of citizen agency, control, and power. In addition to the eight "rungs" of participation, Arnstein includes a descriptive continuum of participatory power that moves from nonparticipation (no power) to degrees of tokenism (counterfeit power) to degrees of citizen participation (actual power).

3. Formalizing the LKL

Creating cooperation, understanding and dialogue

Registration of activities

The operationalization of LKL was based on an initial training/workshop provided in the context of the project, meetings between partners and meetings with stakeholders. Based on that we have been able to reflect about practices and habits for learning and unlearning, and promote activities for social mobilization and engagement for creating motivation, engagement towards the pilot case. For that we developed a program of activities with a focus in the celebration of World Water Day (22 march) and Environment World day (5 of June) that involved more than 100 youngsters and 15 organizations that goes from environmental education, to schools, social organizations and stakeholders. It is also important to mention the LivingLab on “Body-Art-nature & Trash - Micro Artistic Residency for Ecosocial Work Students” that involved 50 UAc students and intended to explore the connection of youth with nature by art work. A Youth Forum and two meetings with stakeholders was done, and from that new ideas arose and the planification of new activities started to be built.

Social mobilization and engagement

Registration of activities

Social mobilization and citizen engagement will happen in the future as part of a local community development process. Till now we have done some mobilization to test and to understand how far we are implementing good strategies to connect youth with nature through the activity planning explained before. Concerning stakeholders' involvement, there are still a lot of things to be done. Some virtual engagement on NBS, Pilot and TLH was made by virtual environments using trilhosdomundo.org.

Results of the activities for social mobilization and engagement

There are not yet results to share from the social mobilization and engagement activities.

Creating a structure for participatory governance

We don't have a deep reflection or results to share yet regarding the governance structure and decision-making model for the LKL.

Description of the co-governance model

At this stage of the pilot, the specific co-governance structure is not ready yet, but the intention is to develop a participatory governance system in which stakeholders are organized according to their expertise and in a more formal or informal way, depending on the organizational culture of each organization.

Establishing a modus operandi

At this phase of the Pilot we have not yet chosen the functioning of the governance structure.

Monitoring and constant reevaluation

The Reflexive Monitoring process will be employed to track the working process, results, and challenges. The reality of the situation is more complex than any plan. This ongoing process becomes increasingly complex with each step. The involvement of stakeholders introduces new ideas, activities, and dimensions that were not foreseen at the outset. However, with the involvement of stakeholders and the commitment of all partners to the Water Trail initiative, new approaches were implemented based on active collaboration, sharing of staff, knowledge, materials, and strategies. This strategy, based on the Bootstrap methodology, facilitates more efficient management of trail activities. We recognize the importance of learning by doing and how collaborative governance helps us to achieve results. The reflexive monitoring process provides practitioners with an insight into the progress of the project in real time.
From the outset, our strategy was based on the PDCA (Plan Do Check Act) cycle. Thus, the PDCA cycle is applied to achieve results within a management system in order to guarantee the success of the project in the company/institution's area of activity. The cycle begins with planning, then the planned action or set of actions are executed, it is checked whether what was done was in accordance with the plan, and an action is taken to eliminate or at least mitigate defects in the product or execution.

The steps are as follows:

• Plan (planning): establish a goal or identify the problem (a problem has the meaning of what prevents the achievement of the expected results, that is, the achievement of the goal); analyze the phenomenon (analyze data related to the problem); analyze the process (discover the fundamental causes of problems) and develop an action plan.
• Do (execution): carry out, execute the activities according to the action plan.
• Check: periodically monitor and evaluate results, evaluate processes and results, comparing them with the plan, objectives, specifications and desired state, consolidating the information, possibly preparing reports. Update or deploy management on sight.
• Action: Act in accordance with what was evaluated and in accordance with the reports, eventually determining and creating new action plans, in order to improve quality, efficiency and effectiveness, improving execution and correcting any flaws. This mean that we mix a more traditional strategy of monitoring as the PDCA cycle with reflexive -monitoring framework that is not tied to pre-defined outcomes and pre-selected indicators, this reflexive approach was aimed from the start, envisioned a process where was important to rethink goals, define roles, record

important events, analyze critical turning points, identify learning outcomes, share findings, reflect on the methods and promote peer-to-peer sharing.

Strovolos Pilot

Authors:
Georgios Artopoulos (Cyl); Constantinos Kritiotis (Cyl); Charalampos Spanos (Cyl)

1. Exploration of the territory, its actors and challenges

Description of the territory

Territorial description

Macro: rural/forrest/urban/coastal lighthouse

Strovolos Municipality was established in 1986 and is now the second largest municipality in Cyprus, after Limassol, with a population of over 70.000, in an area of 25 km^2 (Strovolos Municipality, n.d.-b). Located at the capital of Cyprus, Nicosia, Strovolos is also in close distance with the buffer zone that separates the occupied North Cyprus (Turkish-Cypriots) with the South (Greek Cypriots).

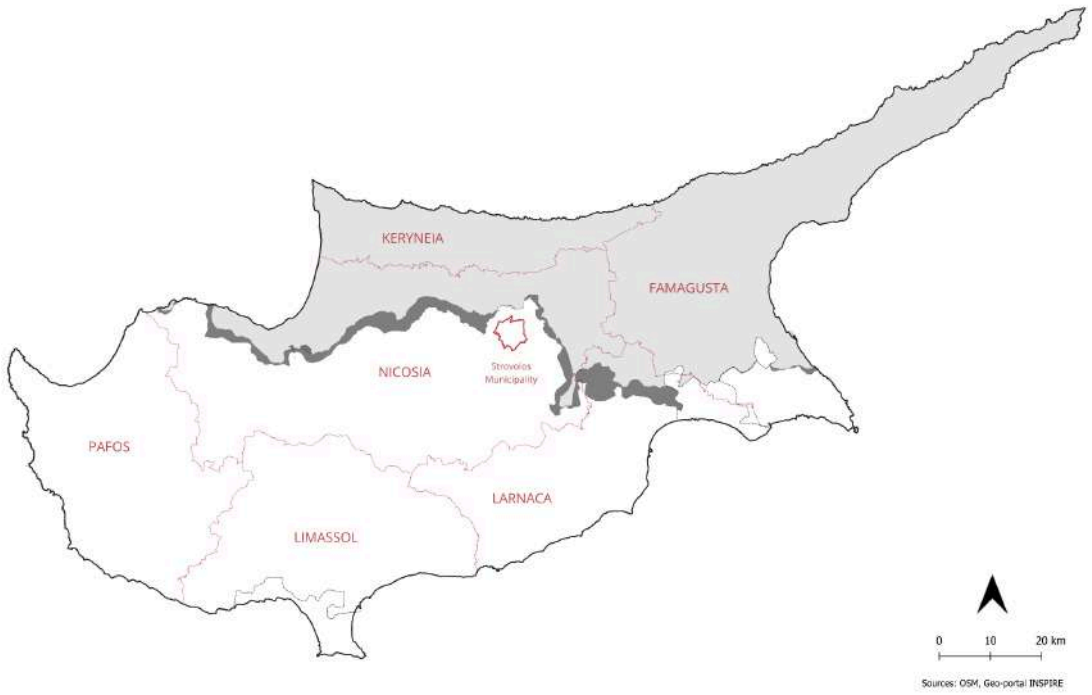

Figure 53: Map of Cyprus with indication of Strovolos Municipality (OpenStreetMap contributors, 2015; Republic of Cyprus, n.d.-a)

After the war of 1974, Strovolos saw the settlement of many refugees, resulting in the development of refugee neighborhoods. Later, a big industrial area was implemented, creating opportunities for services and manufacturing to establish and grow in the area (Strovolos Municipality, n.d.-b). Despite its current state and the expansion of the municipality, the historical core is characterized by low density built environment, mainly consisting of old vernacular single or double storey houses.

In the Strovolos region, there are 46 organized green spaces with seating areas and 65 playgrounds. The main green infrastructure, though, is Pedieos River Linear Park. The Pedieos River runs across different municipalities, including Lakatamia, Strovolos and Nicosia, being the most urbanized. Although the Pedieos river is dry most of the year, it has contributed to some of the 38 floods recorded in Nicosia from 1960 to 2012. Along the urban segment of the river, a linear park was created in 1990's and is still upgraded and further expanding its path across the divide into the north.

Figure 54: Photos of the historical center of Strovolos Municipality, May 2023 ©The Cyprus Institute

As a constantly growing municipality in terms of population and infrastructure, Strovolos faces a challenge to provide accessible and restorative public space. With Pedieos River as an ecological and environmental infrastructure passing through the urban fabric, there is an opportunity to facilitate the development of biodiversity, including human and non-human, through NBS implemented along the linear park.

The on-going project of Strovolos Municipality, Slow City, brings to the forefront of the area the need to prioritize pedestrians and slow mobility, especially by emphasizing the connection of the historical center to the linear park, "creating a city with a more anthropocentric and sustainable character" (Strovolos Municipality, 2024). The TRANS-lighthouses project (TRL), in correlation with the municipality's aspirations for the area, can contribute in integrating participatory processes for such projects, and introduce to the discussion biodiversity and ecological services of NBS and green infrastructure in urban environments.

Figure 55: "Slow City", Urban regeneration project for the historic center of Strovolos (Strovolos Municipality, n.d.-b)

Micro: territory of pilot case

The selected area to implement the NBS was discussed with the Municipality of Strovolos to be located in the segment of Pedieos River Linear Park which is most connected to the historic center of the city, encouraging the accessibility to the NBS from the most densely populated areas of Strovolos along the river. The specific area is characterized by the landmarks surrounding it, including the Strovolos Town Hall which is already being used for various activities, and the churches that are tightly connected to Cypriot culture.

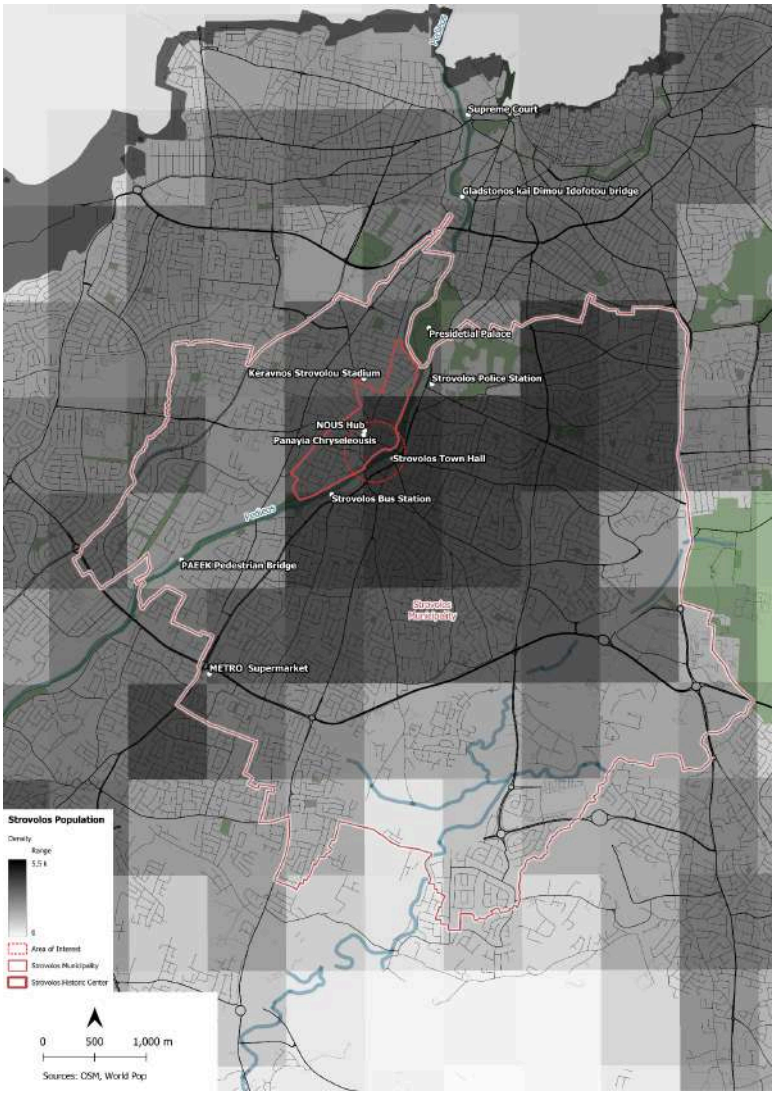

Figure 56: Strovolos population density (OpenStreetMap contributors, 2015; WorldPop and Center for International Earth Science Information Network (CIESIN), Columbia University, 2018)

This segment of Pedieos river linear park, faces a challenge to accommodate a nature-based public space that can be attractive to diverse social groups in proximity, to achieve the improvement of human-nature relationship, while raising awareness on biodiversity challenges of the river's biotope.

Therefore, it is crucial to Strovolos Pilot that the implemented NBS is in close distance to places that accommodate diverse social groups. In the area, there are several community places found, including the Town Hall, the Adults' Center particularly for elderly, the primary school of Ayia Marina and the 76 Scouts System. Given that some of those groups already make use of the linear park, engaging them in the project would create a feeling of responsibility, but also encourage them to actively participate in preserving and protecting nature in urban environments.

Another important aspect is to encourage residents from further locations to visit the NBS. In fact, as a linear park that is mostly used for exercising, various visitors live in distant neighborhoods, and visit the park for running or cycling. But for those that are interested in spending time in nature, the potential pilot locations are very effective. Given the local car culture and the

dependance of transportation to private cars, the availability of existing parking lots, creates the opportunity and potential for residents who live in distance to visit and interact with the implemented NBS. The existing infrastructure of the park provides several entrance points from parking lots to the river and therefore, one can conveniently park and walk in the park. Aim of the Strovolos Pilot is to test a solution that can be scaled up and replicated elsewhere along the linear park to change residents' attitude towards its use and to see it as a circulation avenue as well, for active mobility (e.g., cycling or walking to the city centre for work, etc.).

Attracting humans to Pedieos river comes with its risks. The biodiversity of the area, though very rich, is threatened and needs to be embraced and flourish. In the river's proximity, there are records of the river turtle (Mauremys rivulata), a species only found in the south coast of Croatia and Eastern Mediterranean countries. The river turtle is one of the endangered animals and protected by law, though it is threatened in many ways, mainly by the drying of its biotopes, and their pollution from trash and chemicals (Broadcast - Environment for all, n.d.). In the Integrated Spatial Development Strategy, a great attention is also given to the vegetation, with healing gardens being proposed to ensure the improvement of local ecology and the enrichment of biodiversity (Republic of Cyprus, n.d.-b).

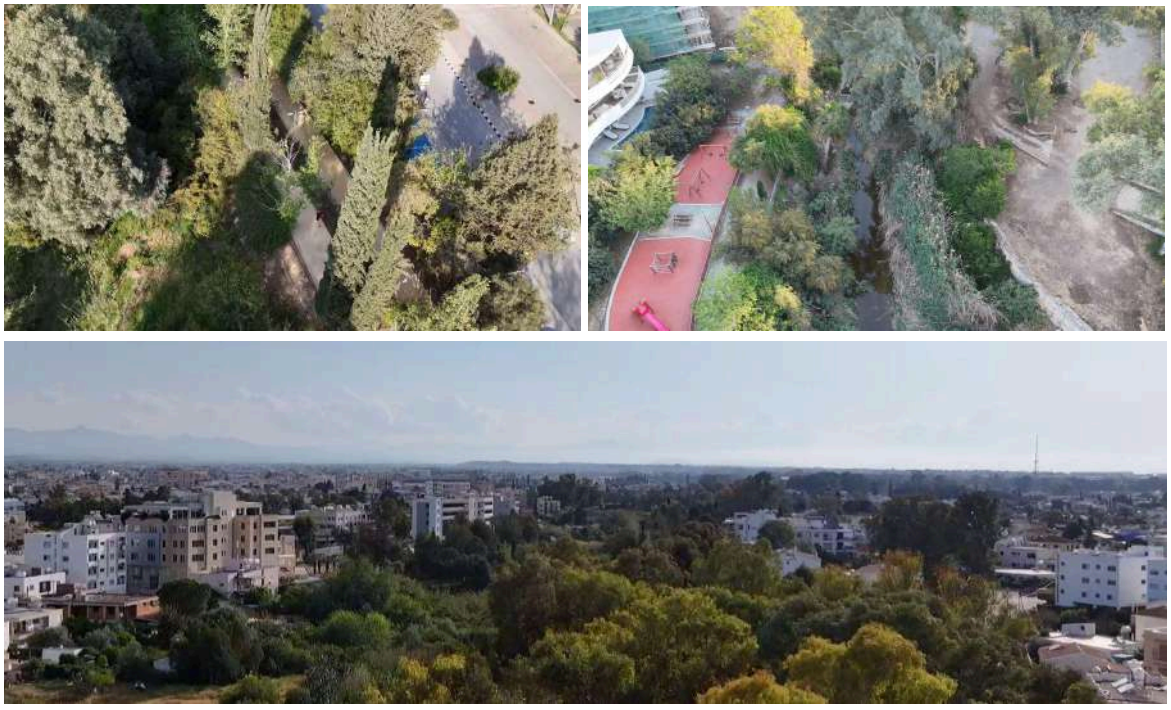

Figure 57: Drone footage of Pedieos river linear park in Strovolos Municipality ©The Cyprus Institute

Socio-economic description

Macro: rural/forrest/urban/coastal lighthouse

According to the latest demographic survey of the Statistical Service of the Republic, the municipality of Strovolos increased by almost 3.000 residents, since 2011, reaching in 2021 a population of 71.123 residents. In 2011, Strovolos residents' ages vary, with the largest number being young adults between 20-45 years old (Republic of Cyprus, 2023). The age diversity of the municipality is also visible through the diverse facilities in the area, including primary, middle, and high schools, various businesses, and elderly housing (Strovolos Municipality, 2024).

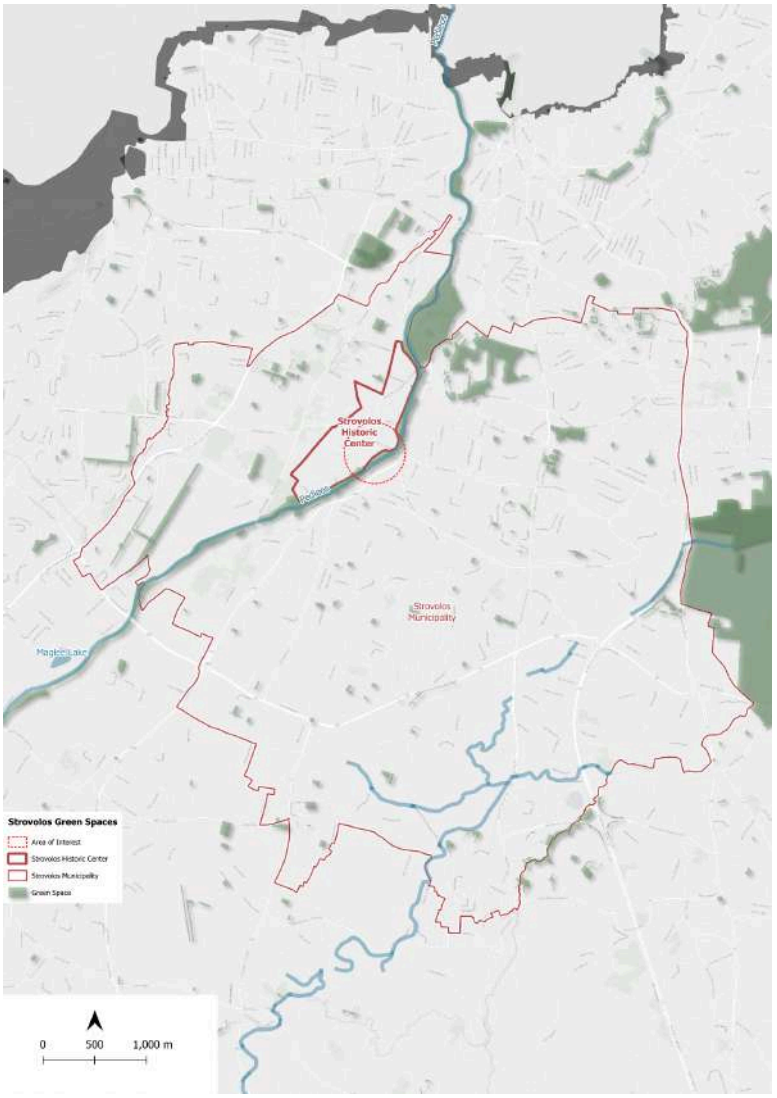

Figure 58: Green spaces of Strovolos region (OpenStreetMap contributors, 2015)

The education at Strovolos Municipality dates back to 1810 with the first primary school. However due to the Greek revolution in 1821, education was impacted resulting in unofficial teaching in houses or churches, continuing until the end of Ottoman occupation. With the arrival of the British on the island, education was reconstructed and in 1900 an English School was founded in Strovolos. Today, the buildings of the first schools after this period -first built in 1915 and second in 1929- are still preserved in the historic center (Peri Strovolou, 2018b). Currently, the Municipality encourages education in all levels, integrating in its actions the operation of the Open School and the Adults' Center for outside curriculum education and activities.

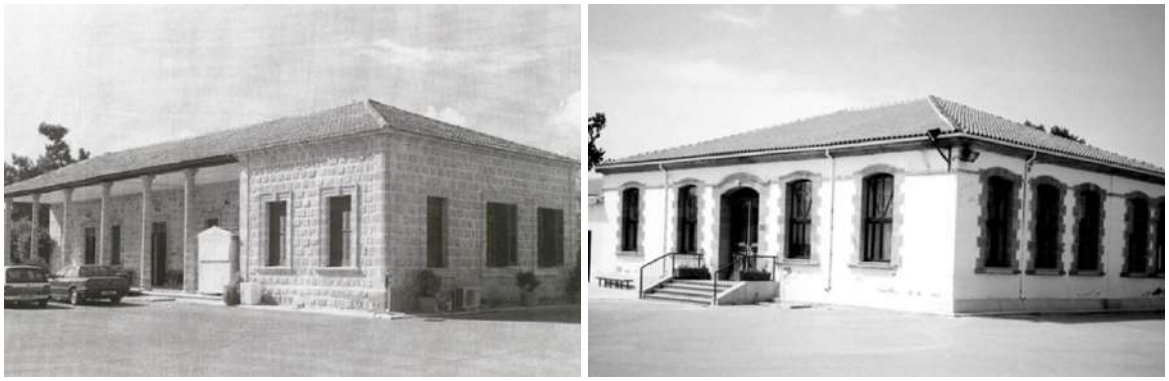

Figure 59: (left) School for boys - 1915, (right) School for girls - 1929 (Peri Strovolou, 2018b)

Furthermore, the Municipality takes actions toward social equality, through the Strovolos Multipurpose Foundation. Specifically, they offer social services to low income families, with afternoon child care and food provision. The Strovolos Counseling Center provides "psychological support and promotion of social inclusion and reintegration of the most vulnerable group of the population". Also they established the "Neighborhood Observer' to reduce illegal activities and encourage active citizen participation (Aftodioikisi, 2021).

With the rapid urbanization and expansion of the city, Strovolos Municipality counts today 65 organized parks and 32 organized green areas with amphitheaters, lakes, fountains ranging in scale and recreational facilities (Strovolos Municipality, n.d.-a). Strovolos Municipality has always been concerned with green and sustainable development. The actions taken throughout the years have awarded the municipality with various recognition awards, including the "Green City" awards in 2017-19, the Golden Mouflon distinction in 2018 and the award for Ecological Management Body of Green Spaces in 2019 (CSR Cyprus, n.d.).

Micro: territory of pilot case

Strovolos center is a fascinating multi-use neighborhood defined by its contrasting characteristics across the Pedieos River, which runs through the heart of the area. On the north-west side, the historical center of Strovolos embodies a highly traditional ambiance, boasting a long legacy of old-school professionals and artisans. Here, visitors can find carpenters shaping wooden creations, tailors meticulously crafting clothing, and bakers providing the daily essentials. The historical core is also a hub for artistic talent, attracting painters, potters, and other creative individuals who find inspiration in the area's rich cultural heritage and traditional charm.

Figure 60: Traditional professions of Strovolos (Peri Strovolou, 2018a)

On the south-east side of the river, however, the character of Strovolos is entirely different. Strovolos Avenue, which runs parallel to the river, is a bustling artery of commerce lined with businesses, shops, and offices. Towering residential buildings flank the avenue, housing an increasingly dense population that contributes to the neighborhood's vibrancy and economic activity. This area represents the modern commercial face of Strovolos, providing a sharp contrast to the traditional artisanal spirit found on the other side of the river.

The Pedieos river itself is integral to the history and resilience of the community. Its waters have been a source of sustenance and development of Strovolos, enabling the settlement to thrive over the centuries. The original inhabitants recognized the value of the river's resources, developing a system of underground water channels and lagoons that harnessed the natural resources. Over time the system gradually fell into disuse, abandoned amidst the march of technological progress and the spatial and demographic expansion of the area. (Τσελίκα & Πασιά, 2023)

Yet, the water resources and the fertile ground of Strovolos provided the ideal conditions for the development of agricultural and livestock activities. Traditional craftsmen, builders, and woodworkers, as well as the establishment of cheese factories, olive presses, and soap manufacturers further enriched the local economy, creating opportunities for employment, especially for post-1974 refugees. (Peri Strovolou, 2018a)

The river, as a critical part of the center, plays a pivotal role for the future environmental, social, and economical development of Strovolos. Implementing a NBS connected to the historical center of Strovolos can revive the human - nature relationship and bridge the divide between the cultural and traditional urban fabric with the contemporary, newly established populated city of Strovolos.

Figure 61: Kitchener map of Strovolos (Τσελίκα & Πασιά, 2023)

Lessons from the participatory culture

Opportunities and barriers for participatory governance based on T4.2

Introduction: Understanding the Landscape

In Cyprus, the CyI team employed a multifaceted approach to gather information, utilizing various methods and strategies to ensure comprehensive data collection:

1) **Exploratory Interviews:** We conducted six exploratory interviews with representatives from NGOs and civil society organizations. These interviews provided valuable insights into the perspectives and concerns of key stakeholders in the community.
2) **Semi-Directive Interviews:** Additionally, we conducted ten semi-directive interviews, engaging with two elected representatives and eight public officers. These interviews allowed for in-depth discussions on governance challenges and opportunities within the municipality and pilot area.
3) **Public Fairs Engagement:** A public fair organized by Strovolos Municipality served as another avenue for information gathering. The fairs targeted children, young families, parents, and residents of the municipality. Our booth at the fair attracted approximately 15 visitors, among whom 7-8 actively participated in brief, semi-structured interviews and completed a survey. These interactions provided valuable insights related to the pilot area and project. Further to this, we have also participated in the sCYence Fair organized by the Cyprus Institute; the fair's audience was primarily school children and researchers. A similar approach to the public fair was adopted to gather information and raise awareness about the project and its activities.
4) **Collaboration with Community Organizations:** To effectively engage with our target audience, including families, young people, the elderly, youth, and representatives from creative industries, we collaborated closely with community organizations. We established connections with entities such as the Strovolos Center for the Elderly and the Strovolos Scouts, conducting initial meetings with their representatives. Follow-up

meetings involving a broader membership base are scheduled to gather both qualitative and quantitative insights. Through these collaborative efforts, we successfully reached a significant number of elderly individuals and young people, thereby achieving our goal of engaging with our identified target audience and with under-represented groups of people.

By employing a diverse range of methods and approaches, we ensured a comprehensive understanding of the local participatory culture and governance challenges, laying a strong foundation for the creation and mobilization of the LKL.

In Cyprus, particularly within Strovolos Municipality, participatory initiatives are not prevalent, as indicated by the findings from exploratory interviews and public engagement events. The CyI team has actively engaged with diverse stakeholders to address this gap and assess the local participatory culture.

Reflections and Actions

In Cyprus, the CyI team undertook a comprehensive, multifaceted approach to gather data and understand local participatory culture and governance challenges within Strovolos Municipality. In general, participatory initiatives are rare and citizen engagement is limited within Strovolos.

This comprehensive strategy and approach showed that several barriers hinder participatory governance in Cyprus, including a widespread sense of indifference, difficulty engaging governmental departments, and low citizen involvement in environmental discussions. Further, political obstacles, such as the lack of collaboration among public authorities, further negatively influence the attitude of citizens towards cooperation and participation. However, despite these challenges, it seems that there is a growing interest in sustainability, offering an opportunity for collective action. To address and alleviate some of these barriers as well as take advantage of promising opportunities, the CyI team focused on stakeholder mapping and engagement, inclusive communication strategies, and targeted sustainability related outreach events as mentioned in the previous section of this roadmap. These efforts enhanced the visibility and voice of the community, stakeholders, and authorities.

Importantly, results showed that building partnerships with community organizations and embedding principles of inclusivity and equity into decision-making processes promotes transformative collective action. Further, prioritizing diversity and inclusion in project planning ensures that marginalized groups' needs and perspectives are represented.

Further, effective communication strategies should prioritize transparency, active listening, and the empowerment of marginalized voices. Building trust through participation is vital, as these initiatives have the power to positively influence attitudes and expectations. Inclusivity, continuous engagement, transparency, and accountability are essential for sustaining participatory initiatives and driving positive change.

Finally, our research showed that various initiatives (i.e. EU funded projects and local initiatives) are fostering a symbiotic relationship between people and nature, with academic institutions and grassroots movements playing key roles in raising awareness and disseminating knowledge. Role-playing activities and educational initiatives enhance awareness of the interconnectedness

between people and nature, fostering a deeper appreciation for biodiversity and environmental sustainability.

In conclusion, addressing the barriers to participatory governance in Cyprus requires a multifaceted approach and a solid understanding of the ecosystem. By leveraging stakeholder mapping and engagement, inclusive communication strategies, targeted outreach events, and fostering partnerships, the CyI team aims to overcome challenges and promote transformative collective action for environmental sustainability and social justice.

SWOT Analysis

The information, insights and knowledge gained from the CyI TRL team's activities - stakeholder mapping and engagement, inclusive communication strategies, participation in targeted outreach events, and partnership creation - enabled us to compile the following SWOT analysis:

Strengths	Weaknesses
- Diverse range of methods utilized for data collection, ensuring comprehensive understanding of local participatory culture and governance challenges.	- Limited prevalence of participatory initiatives within the local community, as indicated by findings from exploratory interviews and public engagement events.
- Successful engagement with diverse stakeholders, including public authorities, civil society organizations, and community groups, demonstrating adaptability and inclusivity.	- Political obstacles hinder effective decision-making and problem-solving, including a lack of collaboration among public authorities and departments.
- Proactive approach to address gaps in participatory governance, evidenced by efforts to assess and overcome barriers to citizen engagement.	- Difficulty engaging governmental departments and fostering interest from citizens in environmental discussions.
- Appetite for sustainability and collective action within the community, providing opportunities for transformative initiatives and co-creation efforts.	- Lack of a strong participatory culture and limited interest from citizens in engaging with governance processes.

Opportunities	Threats
- Political will and interest in sustainability present opportunities for collaborative initiatives and policy reforms.	- Resistance to change and entrenched bureaucratic structures may impede progress towards participatory governance goals.
- Potential for fostering partnerships with community organizations and grassroots movements to amplify voices of marginalized groups.	- Socio-political instability and economic challenges may divert attention and resources away from participatory governance efforts.
- Growing awareness of environmental issues and biodiversity conservation, creating momentum for citizen-led initiatives and collective action.	- Lack of funding and resources for sustained engagement and capacity-building initiatives within the community.
- Increasing availability of digital platforms and communication tools for enhancing public participation and engagement in governance processes.	- Potential backlash from entrenched interests and stakeholders resistant to inclusive decision-making processes.

Having this initial SWOT analysis in place and further building on it will allow us to make informed decisions, ensuring that strategic choices are grounded in a thorough understanding of the local ecosystem as well as the project's context. Further, a comprehensive risk management plan can be developed in order to address potential threats identified in the SWOT analysis. Finally and as the SWOT analysis becomes more robust, opportunities for forming new partnerships or collaborations that could enhance the project's reach and effectiveness could be identified and exploited.

Conclusion: Towards Collaborative Governance

Collaborative efforts between various stakeholders, including academic institutions, public authorities, and civil society, are essential for fostering inclusive governance and addressing local challenges. Continuous engagement, transparency, and accountability are vital for sustaining participatory initiatives and driving positive change.

Opportunities and barriers for participatory governance based on the assessment case

The assessment case in Cyprus focused on the communal maintenance of mountain terraces, using local expert knowledge to maintain and transfer the traditional knowledge of dry stone construction. The communal terrace construction activities contributed to the reduction of soil erosion, conserved productive agricultural land and maintained the cultural landscape.

Reflections and Opportunities

- **Understanding Complexity:** Embracing the dynamic and multi-scale nature of socio-economic and environmental systems presents an opportunity for participatory governance. However, it also poses a significant challenge, as navigating complexity requires robust communication channels and shared understanding among stakeholders.

- **Building Trust and Collaboration:** Creating conditions that foster mutual trust among key actors is essential for effective participatory governance. Shared organization tasks can enhance collaboration and ownership of initiatives. However, building trust may be challenging, particularly in contexts where historical tensions or power imbalances exist.

- **Leveraging Local Knowledge:** Utilizing local and traditional technical know-how as the basis for community empowerment offers a valuable opportunity for participatory governance. However, integrating traditional knowledge with modern practices may require bridging cultural divides and addressing potential resistance to change.

- **Fostering Social Capital and Innovation:** Focusing on activities that build social capital, creativity, innovation, resilience, and local leadership on a voluntary basis can enhance community engagement and ownership. However, relying solely on voluntary participation without monetary incentives may limit the involvement of certain stakeholders, particularly those facing economic constraints.

- **Central Role of Local Communities:** The participation of local communities, including land users and owners, is crucial for successful participatory governance. Hands-on workshops co-organized with local authorities can facilitate meaningful engagement and co-creation of solutions. However, ensuring meaningful representation and participation

from all segments of the community may require proactive outreach and inclusive processes.

- **Effective Stakeholder Engagement:** Employing strategies such as the snowball process and stakeholder analysis can facilitate effective engagement with diverse stakeholders. Categorizing stakeholders into local and external groups based on their knowledge and expertise can aid in tailoring engagement approaches. However, ensuring meaningful participation from all stakeholder categories and bridging potential knowledge gaps between them remains a challenge.

- **Collaborative Action for Land Degradation:** Addressing land degradation and desertification necessitates simultaneous cooperation and collective action from all stakeholders. Participatory approaches and community-based conservation initiatives can serve as effective mechanisms for initiating collective actions and motivating land users. However, shifting mindsets from production-centric to conservation-oriented practices requires sustained education, awareness-raising efforts, and targeted policies.

- **Balancing Indigenous Knowledge with Sustainability:** Balancing the preservation of indigenous knowledge with the development of sustainable conservation practices poses a dual challenge and opportunity for participatory governance. Institutionalizing conservation initiatives and integrating targeted policies and farm education programs can enhance their impact. However, ensuring that conservation practices are both economically viable and environmentally sustainable requires careful planning and ongoing adaptation.

Summarizing, while participatory governance offers numerous opportunities for leveraging local knowledge, fostering collaboration, and addressing complex socio-environmental challenges, it also entails overcoming barriers such as building trust, ensuring inclusive engagement, and balancing traditional practices with sustainability goals. By acknowledging and addressing these opportunities and challenges, participatory governance can become a powerful tool for promoting sustainable development and community resilience.

In conclusion, the insights gained from the assessment case have significantly shaped the implementation strategy for the pilot case and continue to do so. Specifically, the snowball process has been adopted to engage a diverse set of stakeholders effectively. Additionally, involving local communities and leveraging local knowledge have been crucial in identifying the most relevant and pressing issues affecting the pilot area. Finally, fostering innovation has enabled the CyI pilot team to identify and exploit new and effective solutions to various challenges, while also attracting the interest and participation of citizens and other stakeholders.

Definition of the pilot case goals

The linear park of Pedieos river in Strovolos, is one of the main green infrastructure in Nicosia region and is constantly upgraded and extended. The fact that the river is mostly dry throughout the year, created the opportunity to enhance its ecological services by establishing a pedestrian and cyclist path along the river, encouraging the public to reconnect with nature.

However, the current condition presents various challenges, especially with the urban expansion that threatens its viability and the protection of the biodiversity associated with the river. Another issue is the lack of available social spaces along the river bed. It was expressed by stakeholders that Pedieos could facilitate the implementation of NBS with primarily social impact, improving social cohesion through social interaction among local residents. Located in a dense urban environment, the preservation of the river and its natural territory is conflicted with the construction sector, one of the main industries and source of employment. Especially with the land ownership situation in Cyprus - most of the land is privately owned and the government has no power over it - Pedieos boundaries in the urban fabric are extremely narrow, leaving no room for the river and its ecosystem to expand.

Therefore, the main goal of the proposed NBS is to enhance biodiversity, while keeping in mind the water challenges during extreme weather conditions. By improving accessibility and introducing natural processes, we can encourage the activation of the park from the public, create opportunities for social interaction and improve community awareness for local biodiversity.

Ecological challenges

Ecological goals and description of the NBS

In the densely populated Strovolos municipality, the river segment faces a host of ecological challenges stemming from limited space for expansion and a general lack of public awareness. Consultations with the biodiversity experts, conducted as part of the participatory culture mapping initiatives and the co-diagnostic phase of the pilot, underscored a significant threat: stray cats. These felines, often fed by residents, exhibit predatory behavior toward indigenous species such as lizards and snakes, posing a clear danger to local biodiversity. Urgent action is imperative to raise public awareness and mobilize authorities to safeguard the ecosystem. One proposed intervention involves engaging citizens in hands-on activities to create installations supporting species like beehives and bird nests.

Moreover, the Pedieos river has a history of causing floods in the area. In 2002, a dam was constructed against the flooding of downstream areas. The growing populations and urbanization of the area, though, increased the storm water runoff with consequent flooding hazards still being present (Giannakis et al., 2016). Experts caution against implementing flood mitigation measures in densely populated urban settings, instead recommending alternative locations for greater effectiveness. However, NBS for water management remain viable options, endorsed by NGOs for their suitability in urban areas. These solutions include rain gardens, permeable pavement, and water detention infrastructure, which, while not addressing large-scale flooding, can serve as educational tools for the public to catalyze community action and delay runoff stormwater.

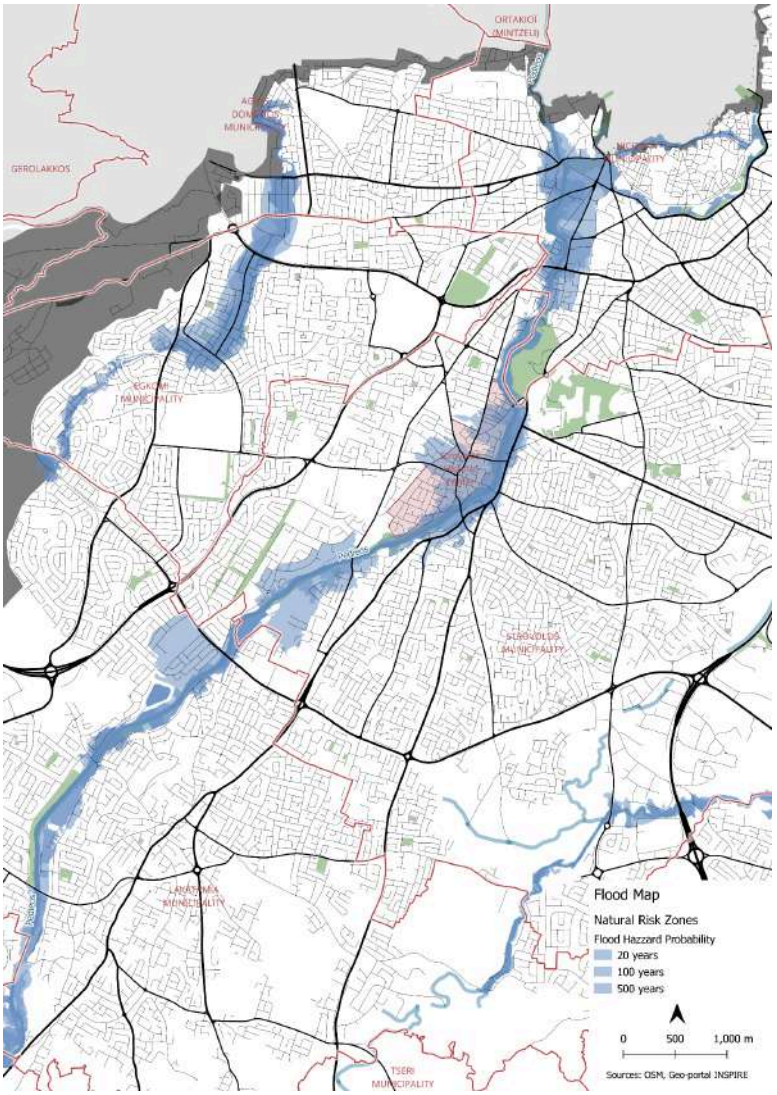

Figure 62: Flood risk map of Pedieos river in urban fabric (Lakatamia, Strovolos, Nicosia) (OpenStreetMap contributors, 2015; Republic of Cyprus, n.d.-a)

To foster a deeper connection between humans and nature, it is crucial to encourage public engagement with natural processes. Proposed NBS could serve as a Nature Hub, hosting a range of ecological activities such as composting, and natural water infiltration. This dual ecological-educational role could attract public interest and facilitate meaningful interactions with nature.

While specific NBS for Strovolos pilot have yet to be finalized, a range of options has been identified through expert consultations and community discussions. These options are documented as cards, featuring descriptions, examples, and characteristics, and will be utilized in field activities and as part of a board game/scenario-building exercise. This approach aims to introduce participatory budgeting concepts and challenge participants to evaluate diverse NBS scenarios. Subsequently, a more informed choice of NBS will be available for implementation.

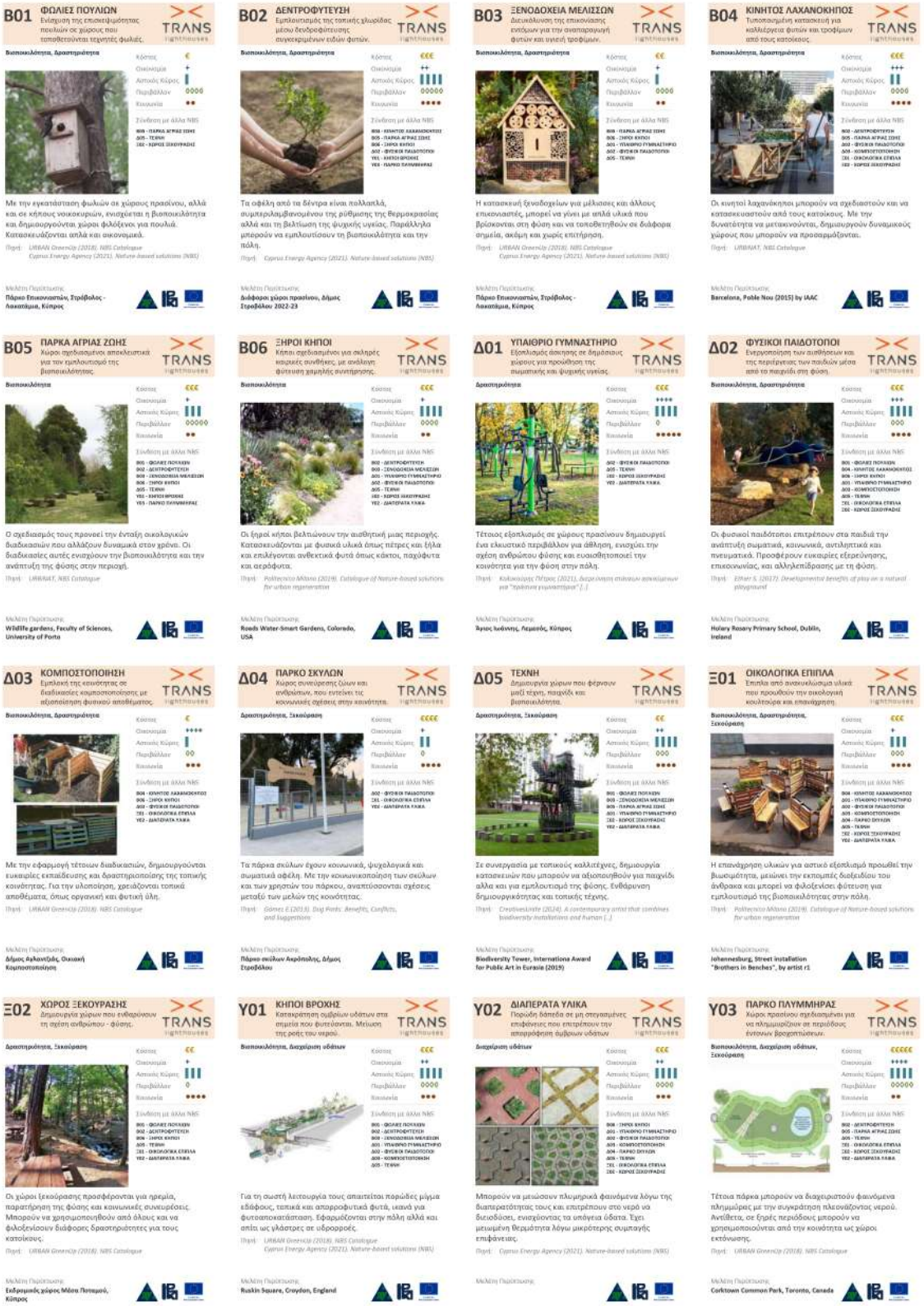

Figure 63: NBS cards collection for participatory activities

Local values and attitudes towards the ecological challenges

Based on our observations and interactions with various stakeholders, it's evident that there exists a divergence in local values and attitudes towards ecological challenges among different groups. Public authorities and governmental institutions are established with a clear mandate to address ecological issues and promote sustainable development. These entities primarily focus on tackling biodiversity and water management challenges, leveraging their resources and expertise to drive initiatives in these areas.

In addition to governmental efforts, there are practitioners and sustainability experts who play dual roles as activists, striving to raise awareness and mobilize citizens towards sustainable action. However, despite these concerted efforts, there remains a gap in engagement from citizen collectives and individual citizens. Often, their interaction with the pilot area is predominantly recreational, lacking informed and purposeful engagement towards addressing ecological challenges.

Figure 64: Images of the linear park in Strovolos area ©The Cyprus Institute

This disparity highlights a notable lack of communication, unity, and collaboration among stakeholders towards a common ecological mission. While governmental institutions and professionals are actively involved, there is a need to bridge the gap and encourage greater participation and responsibility from citizen groups. Enhancing communication channels, fostering partnerships, and promoting education and awareness initiatives could facilitate a more cohesive and effective approach to addressing ecological challenges in the pilot area.

Socio-economic challenges

Identification of marginalized knowledges and of needs of marginalized groups

In the Strovolos region, as in Cyprus in general, several social groups stand out as marginalized and often overlooked particularly in participatory processes. These groups encompass a diverse spectrum, including children and youth, the elderly, minorities, migrants, individuals with disabilities, and low-income families. It's important to acknowledge that identifying these marginalized groups can sometimes be challenging as their needs and voices may not always be readily apparent or commonly acknowledged. The Strovolos pilot team has identified those groups and proceed in getting in touch with organizations encompassing those, in an effort to

engage with them, in familiar environments, aiming to build trust, understand the needs and perspectives of these communities.

Kids and youth have been approached through the local Scouts System. By first meeting their leader and later being invited to their event, we were able to engage with locals, including kids and families. During our meeting the Scouts presented genuine interest in the TRL project, even being willing to run some of the co-diagnostic activities using the tools developed by our team. The event has been very successful, with the visitors being eager to share their experience at the linear park, complete the survey and the mapping exercise. However, due to the full schedule of the Scouts with their own activities, there wasn't time to implement diagnostic activities with the kids, which will probably be scheduled in June after deliberating with the Scouts Leader. The activities will aim to educate youth as the "voice of nature" through in field exploration. Primarily the goal is to raise awareness on the ecological biodiversity of Pedieos river and later engage them as nature representatives in co-design workshops.

To get in contact with the **elderly**, we communicated with the Strovolos Multifunctional Foundation which runs an Adults' Center in a location not far from Pedieos river. This center, which operates as a day-long public facility, gives the opportunity to the elderly to engage in various activities and socialize. During our visit, we happily interviewed several elderly, who were familiar with the linear park. The interviews brought to the discussion the specificities of older citizens and their needs. Especially regarding safety and availability of various amenities along the linear park. More specifically they expressed the need for more sitting areas, that are separated and protected from the bicycle route, which stresses them, but also the improvement of the path to make it easier for them to walk on - mainly cleaning and smoothing. Another necessity was the availability of toilets and the access to drinkable water. Currently there are some drinkable water fountains, but they are not protected from stray animals and they are not considered healthy and safe by the public. The overall outcome of the discussion showcased a sensitivity around nature by the elderly, especially as a space for relaxation and socialization.

Figure 65: Photos of activities with the community ©The Cyprus Institute

Other marginalized groups, such as migrants and low-income families, are to be approached through the local church. After the scheduled meeting with the local priest and the Sunday school teacher, it is expected to acquire knowledge not only for the charitable work of the church,

but also the challenges that migrants and low-income families face. Hopefully, we will be able to build a bridge of contact with those marginalized groups and include their voice in the pilot.

People with disabilities are an important part of the community and lately have been very active in the commons of Cyprus. While Strovolos has not a particular representative within this social group, the CyI team is trying to approach organizations related to people with disabilities and open a dialogue on their challenges in public spaces and especially their accessibility in nature within the urban environment.

Identification of presences and absences

Absences:
In the current governance model, the opportunities for the community to express their opinion on decision-making and being heard are limited. The approach is for the authorities to plan and execute work, usually only by reporting their plans in public deliberations, allowing citizens to publicly criticize their plans, but not necessarily be involved in the planning process. Especially for marginalized and underrepresented social groups, having a voice in such processes is becoming more difficult. Specifically due to their daily lives struggles and the lack of awareness on local initiatives and relevant projects.

Furthermore, the trust for the authorities is absent in the Cypriot culture. Throughout the exploration phase of the project, we came across several stakeholders, including community members and NGOs, who expressed their disappointment about the government, especially when it comes to will for actions, inclusion, and consideration of others opinions. Because of the small-scale communities in Cyprus, there is also an issue with nepotism. Experiences of community members showcase examples that disregard procedures and regulations for specific persons, resulting in further distrust towards the authorities.

This brings us to a challenge of building trust among the community and the local authorities, but also developing an innovative and inclusive co-governance model that addresses the current difficulties and introduces transparency to decision-making processes.

Another absence in Strovolos pilot is the voice of nature. Beside the NGOs related to environmental and ecological aspects, the community appears to be unfamiliar with the importance of the Pedieos river biotope. The lack of awareness was evident during our discussions, with the community expressing mainly their personal need, keeping aside how they might affect the environment and the associated biodiversity.

Presences:
On the other hand we identified some beneficial characteristics that could facilitate a participatory NBS implementation, namely the interest of community towards nature in cities, their openness to share knowledge and communicate their ideas, and their potential in actively interacting and engaging with the project.

Approaching the local community groups in organized settings was very accommodating for effectively engaging with them. Specifically we targeted already formed groups, such as the Adults' Center, the Scouts, the church and the NGOs. This way we had the opportunity to discuss in familiar places for them, where they felt safe to freely express their opinion, showing their willingness and need to be heard,

The results of the activities undertaken throughout the project so far brought to the surface the appreciation of the community for having accessible nature in proximity, and their aspiration to further develop and maintain such spaces to be more inclusive and accommodating for their needs.

The different NGOs approached were happily sharing their experiences and knowledge, being open to further build collaboration and engage with the project. Despite their tight schedules, most of the organizations committed to participate and explore their level of engagement in different stages of the project.

Social and economical dimensions of NBS:
Having described those aspects, the proposed NBS can have a meaningful impact on the community of Strovolos in various ways. Especially by following participatory processes, where the community would have the opportunity not only to be heard but also be informed on the different aspects of implementing a NBS at the Pedieos river linear park. Focusing on the process of implementing an inclusive NBS, the goal is to build trust between community, experts, local authorities, and the government, but also enhance social cohesion by integrating diverse social groups in activities. Through collaboration among diverse stakeholders, there is an opportunity to overcome barriers and challenges, resolve conflicts and work towards a desired solution for the benefit of the community and the biodiversity of the river.

2. Collecting the required knowledges for the Living Knowledge Lab

Creating relationships with partners

Networking and exploratory activities in territory

The Strovolos pilot CyI team participated in a number of activities aiming to connect with potential partners for engagement, as well as inform and raise awareness of the community regarding the TRL project. These activities included primarily meetings with stakeholders and setting up information booths in events organized within the municipality.

Since the beginning of the project, our team focused on bringing the Municipality of Strovolos on board, achieving the registration of the Municipality as an observer partner of the Strovolos pilot. The engagement of the Municipality to the project facilitated the communication with organized social groups in the community and governmental agencies involved with Pedieos river. Along with the municipality's representatives we met with the Water Development Department and the Department of Forest. They also connected us with Strovolos Multi-function Foundation, which runs the Strovolos' Adult Center, giving us the opportunity to visit and inform the elderly of the TRANS-Lighthouse project.

Parallely, we organized meetings with NGOs operating in Cyprus that are experts on biodiversity, climate change, environment and water management. During these meetings we presented the project and explained how their input could benefit our goal. We discussed the participatory culture in Cyprus and their potential engagement in future TRL activities. Overall, the NGOs were happy to share their knowledge and expertise, and we find their input very valuable for the progress of the pilot. However, most of the NGOs, due to their busy schedules, were hesitant to be

actively involved in the project but agreed to participate in organized TRL events when early communicated to them.

Targeting organized social groups within the municipality appeared to be very effective for engaging the community. Our meeting with the local Scouts System, opened opportunities for collaborating during the course of the pilot, and they were excited to share their knowledge and experience as well as taking authority of specific activities of the projects. Specifically, they were open to organize and operate co-diagnostic, crowd-sourcing, field analysis, using tools that we will discuss among the CyI team and the Scouts Representatives. The Scouts is a great opportunity to engage younger groups in a familiar setting with their parents' trust.

Finally, our attendance in different events, such the sCyence Fair of The Cyprus Institute, the Happiness Fair of the Strovolos Municipality, and The Scouts Brunch Sunday, appeared to be very enlightening. Having a banner of the project and giving brochures attracted the public to our booth. There, we had the chance to talk about the project and get a grasp on their aspirations and opinions on Pedieos river. At the same time, we introduced our online survey, where we aimed to get an idea of their reactions towards the current situation of the pilot area, and we asked them to draw on a map their travel path to reach the pilot area. Having on the spot activities (map and survey) was very engaging for the public and an opportunity for us to open a dialogue with them.

Figure 66: Photos of outreach events ©The Cyprus Institute

Bringing members/stakeholders in the LKL

The CyI team has approached a diverse set of stakeholders, namely:

- **Municipality of Strovolos (Policy Makers/Public Officers):** responsible for urban planning and development; infrastructure maintenance; waste management; public transportation; providing support for vulnerable populations, such as the elderly, people with disabilities, and low-income families; organizing cultural and recreational activities; issuing various licenses and permits, such as business licenses, marriage licenses; and implementing environmental policies and initiatives aimed at preserving natural resources and reducing pollution.

- **Water Development Department (Policy Makers/Public Officers):** responsible for the protection and sustainable development as well as the rational management of the water resources of Cyprus, in accordance with European and National legislation and within the framework of the Government water policy in force from time to time.

- **Department of Forests (Policy Makers/Public Officers):** responsible for promoting the sustainable forest management, as well as improving urban green areas in the whole of the Republic of Cyprus.

- **Volt Cyprus (Elected Representatives):** a political party in Cyprus and the Cyprus branch of Volt Europa, a Eurofederalist pan-European political party and movement, which advocates for greater European cooperation across Europe.

- **Birdlife Cyprus (Practitioners and Professionals):** non-governmental, non-profit nature conservation organization based in Cyprus

- **Cyprus Energy Agency (Practitioners and Professionals):** enhances the role of local authorities in sustainable energy planning, providing technical support for developing and implementing actions to mitigate and adapt to climate change. It supports the Covenant of Mayors for Climate & Energy initiative, and it has a vision of a just, inclusive, and climate resilient Cyprus, governed by the principles of sustainability.

- **AKTI & ISOTECH Ltd (Practitioners and Professionals):** non-governmental, non-profit organization based in Nicosia, Cyprus focused on raising environmental awareness and promoting sustainable development.

- **76 Scouts System (Citizen Collectives):** voluntary, non-political youth movement aiming to contribute to the shaping of tomorrow's citizens as an additional means in the upbringing offered by the family and the school. It is supported solely by its members through their own efforts and with minimal resources.

- **Strovolos Center for the Elderly (Citizen Collectives):** provides an opportunity for the elderly to spend their time in a pleasant and creative way, participating in a series of activities, to use their skills, socialize and actively participate in society. Individuals can register as members of the Strovolos Centre for the Elderly if they are over 60 years of age, they are residents of the Strovolos Municipality and are physically independent.

- **Athienou Municipality (Policy Makers/Public Officers):** responsible for the provision of a range of services (Administration, Financial, Technical, Cleaning, Health, Cultural, Green and Park) to Athienou Municipality's citizens.

- **The Cyprus Planetarium (Practitioners and Professionals):** the largest planetarium in the Eastern Mediterranean and the 1st Planetarium in Cyprus! A unique space that combines education and entertainment.

- **Church:** the Cyprus Orthodox Church holds a central position in Cypriot society, exerting influence in religious, cultural, social, political, and economic spheres. Its role is deeply ingrained in the fabric of Cypriot life, reflecting centuries of tradition and faith.

From the diverse list of stakeholders provided above, it is evident that each possesses unique interests, knowledge, and varying degrees of influence, particularly concerning the pilot area. Despite the discrepancies in motivations and impacts, all stakeholders, with the exception of Athienou Municipality, share a vested interest in the Strovolos pilot area.

However, the primary challenge lies in uniting these diverse actors within a participatory and co-creative framework. This endeavor has proven exceedingly arduous and, in some cases, seemingly insurmountable. Such fragmentation poses a significant barrier, hindering the inclusive development of the pilot area that takes into account the desires and necessities of all involved parties.

To address this challenge within the TRL Project, a thorough stakeholder mapping exercise has been undertaken. This mapping effort delineates the roles and responsibilities of each stakeholder within the pilot area, enabling the CyI team to orchestrate meetings and workshops in a manner that fosters robust participation and engagement from all stakeholders involved.

Finally, the CyI team is still working on arranging meetings with the following key stakeholders ('owners of Pedieos River') who have been identified as key players and power holders when it comes to the pilot area:

- Department of Environment (Policy Makers/Public Officers)
- Department of Lands and Surveys (Policy Makers/Public Officers)
- Department of Town Planning and Housing (Policy Makers/Public Officers)
- Department of Public Works (Policy Makers/Public Officers)

When it comes to citizen participation and involvement in co-creation efforts and activities, again there is a diverse range of interest and engagement. Some citizens are extremely vocal and involved in multiple different initiatives whereas others are completely unbothered and uninterested. Some others might be afraid to express their views and opinions or might be overshadowed by those who are more extroverted and opinionated.

There are also citizen collectives that are formed and guided by a common interest and passion. Members of these citizen collectives are usually people who are more outgoing, who seek to be part of a group, and who enjoy the company of like-minded people. These groups typically exhibit a high level of approachability and are inclined to lend support to projects and initiatives that closely align with their own motivations and objectives.

Understanding Stakeholder Dynamics in the Strovolos Pilot Area

In the pursuit of sustainable development initiatives within the Strovolos pilot area, the CyI team has embarked on a comprehensive stakeholder engagement process. This endeavor seeks to harness the diverse interests, knowledge, and influence of various stakeholders to foster inclusive decision-making and co-creation efforts.

The stakeholder landscape within the Strovolos pilot area is characterized by its diversity, encompassing public authorities, political representatives, non-governmental organizations (NGOs), citizen collectives, and professional organizations. Each stakeholder group brings unique perspectives, motivations, and capabilities to the table, shaping the collective dynamics of the project.

Despite the myriad differences among stakeholders, a common thread binds them together: a vested interest in the sustainable development of the Strovolos pilot area. Public authorities, including the Municipality of Strovolos, the Water Development Department, and the Department of Forests, are tasked with various responsibilities related to urban planning, environmental conservation, and infrastructure management. Likewise, NGOs and professional organizations such as Birdlife Cyprus, the Cyprus Energy Agency, and AKTI & ISOTECH Ltd. are committed to advancing environmental awareness and promoting sustainable practices.

However, the fragmentation among stakeholders poses a significant challenge to the project's objectives. While some stakeholders exhibit strong alignment with project goals, others may have divergent interests or limited engagement. Athienou Municipality, for instance, appears less involved in project initiatives, highlighting disparities in stakeholder commitment and involvement.

To address the complexities of stakeholder dynamics, the CyI team has undertaken a meticulous stakeholder mapping exercise. This effort aims to extract the roles, responsibilities, and interests of each stakeholder group, providing a foundation for targeted engagement and collaboration. By understanding the unique perspectives and motivations of stakeholders, the CyI team can tailor engagement strategies to maximize participation and support.

Moreover, efforts are underway to arrange meetings with key stakeholders identified as pivotal players in the pilot area's development. These include government departments such as the Department of Environment, the Department of Lands and Surveys, the Department of Town Planning and Housing, and the Department of Public Works. By facilitating dialogue and cooperation among these stakeholders, the CyI team seeks to foster inclusive decision-making and collective action.

In addition to institutional stakeholders, citizen engagement plays a crucial role in shaping project outcomes. However, citizen participation varies widely, with some individuals actively involved in multiple initiatives, while others remain disinterested or hesitant to engage. Citizen collectives, characterized by shared interests and passions, offer a promising avenue for broader community engagement and support for project initiatives.

Moving forward, addressing disparities in citizen participation will require targeted outreach and engagement efforts. By leveraging the support of citizen collectives and fostering inclusive dialogue, the CyI team can ensure that diverse voices are heard and represented in project decision-making processes.

In conclusion, the success of sustainable development initiatives within the Strovolos pilot area hinges on effective stakeholder engagement and collaboration. By recognizing the diversity of stakeholder interests and navigating complex stakeholder dynamics, the CyI team can pave the way for inclusive governance and collective action. Through ongoing dialogue, partnership-building, and targeted outreach, the project can harness the collective wisdom and resources of stakeholders to drive positive change and achieve sustainable development goals.

Inclusion of marginalized knowledges

Engaging marginalized groups and individuals has been a pivotal aspect of our project's outreach efforts. We have discovered that collaborating with citizen collectives and community-based organizations yields significant benefits, particularly in terms of efficiency and effectiveness.

For instance, our partnership with the Strovolos Center for the Elderly has provided us with invaluable access to a sizable elderly population. Rather than attempting to reach out to elderly individuals one by one, which would have been both challenging and time-consuming, working through the center has streamlined our efforts. By tapping into this established community hub, we have been able to engage with elderly residents more comprehensively and meaningfully. This approach not only saves time but also ensures that our interactions are more targeted and impactful.

Similarly, engaging with young people posed its own set of challenges. However, our collaboration with the Strovolos 76 Scouts System has proven instrumental in overcoming these obstacles. This organization, which offers nature-focused extracurricular activities for individuals aged 12 and above, provided us with access to a diverse group of environmentally-conscious youth. By aligning our project with their interests and activities, we have been able to engage with over 100 young people who are already passionate about nature and the environment. This partnership has not only expanded our reach but has also allowed us to tap into a demographic that is often overlooked in traditional outreach efforts.

Figure 67: (left) Scouts Event, (right) Strovolos Adults' Center ©The Cyprus Institute

Recognizing the influential role of the Church in Cyprus, we have strategically planned to present the TRL Project to the Strovolos Municipality's main church on May 18, 2024. The Church holds significant power in mobilizing and supporting marginalized groups within the community. By engaging with the Church, we aim to leverage its extensive network and resources to reach immigrants, foreigners, and other underserved populations. This collaborative approach not only

enhances our project's visibility but also ensures that we are inclusive and accessible to all members of the community.

In conclusion, our strategy of collaborating with citizen collectives, community-based organizations, and influential institutions like the Church has been instrumental in our efforts to engage marginalized groups and individuals. By leveraging existing networks and resources, we have been able to maximize our outreach and ensure that our project is inclusive and impactful.

Inclusion of youth

The Strovolos pilot team approached kids and youth through the local Scouts System. Our meeting with the Scouts' Leader was very informing and productive. We realized that the projects' goals are aligned with the framework of the Scouts and that their involvement can be quite important for the implementation of an inclusive NBS,

The Scouts are organized in three groups based on their ages. The Wolf Pack consists of children aged 8 to 11 years old, engaged in activities related to scouting and environment through play, aiming to encourage kids caring about and respecting nature, while developing skills of responsibility and teamworking. The Scouts Team includes adolescents (11-15 years old) and are more focused on developing collaboration and surviving skills, as well as being more independent and proactive. While the Scouts Community is formed by older adolescents of 16 to 18 years old who are working towards completing achievement and getting degrees within the Scouts Framework (76 Scouts System, 2013) .

Attending their open event gave us the opportunity to discuss with the wider community of the Scouts, including their families and older Scouts members who are still active. Our discussions with this community have been promising on their potential engagement to the project, including youth workshops, field diagnostic activities, co-creation with other stakeholders, and hand-0n involvement on the implementation of the NBS.

Relationship with and view of nature (human-nature relationship)

Nature has been identified to be strongly connected to stakeholders, including community, NGOs, and governmental agencies. Our meetings with the Water Development Department and the Department of Forest highlighted the need to preserve nature/biotopes/biodiversity by taking actions on different scales. For the government nature is understood through its importance for the environment and their contribution to the dialogue was mainly based on the protection of nature, with limited consideration on nature's impact on social life and urban environment. Furthermore, the Pedieos river was addressed through its involvement in frequent flooding, with occasional consequent property damages. Especially from the Water Development Department's part, the river is of interest for water management and flooding mitigation plans, approaching it primarily as infrastructure rather than a vital part of the urban life and urban environment.

Similarly, the various NGOs approached in the course of the exploratory/diagnostic phase, given their expertise, better understand the natural system in larger scales and the importance of maintaining nature and creating conditions to enhance biodiversity. However, the experience and activities of NGOs aim to include the human as part of nature, establishing an understanding of interconnectedness between human-nature relationship, Through their projects, the different NGOs communicate to citizens the importance of finding a balance between built and unbuilt

environment, creating the means of coexistence among nature and human activity, and ensuring the preservation of biotopes and biodiversity while benefiting the services of nature on mental and physical health.

On the other hand, the Strovolos Municipality, as well as the different community members, so far interviewed, treat nature as a service, a place of relaxation and recreation. Our discussions so far were surrounded by the need to improve the infrastructure in the linear park to facilitate human visitation and create comfortable conditions for humans. Little has been said about the impact of human intervention on biodiversity and the environment. Others make use of the park for exercising, cyclicling and running, reporting that the decreased temperature and the view of nature are more favorable for their experience. Lastly, few people mention the use of the linear park for mobility, accessing it by foot or by bike to move from their place of residence to other locations.

Overall, the human - nature relationship in Cyprus is a multifaceted term and can have different meanings for different stakeholders. For Strovolos pilot, the challenge is to form a collective understanding on how this relationship should be approached and create a balance of diverse opinions towards a holistic understanding of what is nature and its role for the environment. This can be achieved in various ways, including assigning a specific stakeholder as the voice of nature, or collaborating and resolving nature-related conflict. While a specific strategy has not yet been established, we believe that there is available knowledge and expertise to move forward and overcome this challenge.

Strategy and actions for the LKL

In reflecting on our strategy and actions thus far for the Strovolos Pilot within the TRANS-Lighthouses project, the CyI team acknowledges the diversity among stakeholders and the challenges inherent in mobilizing and engaging them towards a common goal. With Strovolos Municipality serving as a hub for numerous institutions, NGOs, and thousands of citizens, the array of opinions, interests, and motivations is expectedly vast.

While engaging with individual stakeholders has proven relatively straightforward, the central challenge lies in orchestrating their collective participation in a collaborative and co-creative process. The pivotal question that emerges is: what strategies can effectively unite diverse stakeholders, particularly governmental representatives, to foster collaboration and co-creation?

Furthermore, a pressing concern revolves around enabling the community to assume ownership of spaces created by the Municipality for their benefit. Despite these spaces being intended for public use, there's a prevailing sense of detachment and lack of responsibility among citizens towards them.

These are considerable challenges that have also been encountered in the assessment case, yet no definitive solutions have been identified thus far.

One potential avenue for addressing these challenges involves stakeholder engagement in the design and implementation of NBS in the Strovolos pilot area. By actively soliciting their input and participation throughout the process, stakeholders can develop a sense of ownership and

investment in the sustainability of these solutions. However, sustaining this engagement over the long term remains a concern.

One encouraging observation is the absence of entrenched resistance or stubbornness among stakeholders. Through our outreach efforts, we've found a willingness among most individuals to consider new ideas and adapt to change. While resistance to change inevitably exists, the receptivity demonstrated by stakeholders underscores the potential for unlearning efforts and activities. With the right opportunities and guidance, stakeholders are open to challenging their existing assumptions and embracing alternative perspectives.

In navigating the formalization of the LKL structure, addressing these questions and implementing strategies to foster collaboration, ownership, and a culture of learning and unlearning will be paramount. Leveraging the insights gained from the assessment case and the mapping of participatory culture, we aim to develop pragmatic solutions tailored to local challenges. By fostering inclusive governance structures and nurturing a spirit of openness and collaboration, we can cultivate an environment conducive to transformative collective action and sustainable development.

3. Formalizing the LKL

Creating cooperation, understanding and dialogue

Registration of activities

Cooperation, understanding and dialogue activities for the LKL have not yet been performed. As the Strovolos pilot progresses, we are collecting the knowledge of diverse stakeholders and making arrangements for potential collaborative activities and workshops. Such activities are planned to take place in different phases. First by engaging the community, building a common understanding among the citizens on their vision about the future NBS implementation, and later by involving the key stakeholders and NGOs in the discussion to share their expertise and experience.

Workshops with the community will focus primarily on sharing experiences, and understanding the challenges of the diverse social groups, but also the role of nature in participatory processes. With the activities planned prior to this workshop, we expect each of those groups to have built a knowledge regarding the local biodiversity and the challenges identified in Pedieos river ecology. Therefore, the participants of the workshop will not only act as their social group representatives, but also as the voice of nature. To facilitate the procedure, the cards developed can be used to form a board game, asking the participants to balance the potential interventions based on its impact on society, environment, and economy, while restricted by a specific budget. Therefore, this workshop will encourage the community to rethink the impact of their vision and understand the difficulties of participatory budgeting.

Due to the upcoming local authorities elections and the strict schedule of the municipality, such activities will be delayed for July. However, we are in contact with the municipality representatives, and the other key stakeholders, including governmental agencies and NGOs to arrange unlearning activities, where participants will be asked to rethink their initial assumptions or knowledge based on dialogue and exchange of opinions. The presence of NGOs is critical as they will be acting through their expertise and experience, while governmental agencies will be

able to share the regulations and other specificities on potential barriers regarding the implementation of NBS,

An open dialogue among authorities, NGOs and community is important to take place, as there is a need to reconsider the current governance model, and potentially re-evaluate the current policies. Thus far, the meetings revealed that each stakeholder lacks the outside perspective and the current approaches are usually mono-dimensional. These activities are expected to broaden their perspective and re-consider their approaches, by collaborating with other stakeholders in the formation of future plans, actions, and policies.

Results of the activities and dialogue opportunities

The outcomes of the unlearning activities are not yet available as the elections are restrictive to the engagement of the Municipality, a key stakeholder, in any of these activities, and therefore will be delayed for after June.

Social mobilization and engagement

Registration of activities

Social mobilization and engagement activities were conducted by the CyI team in different formats, including meetings, interviews, and participation in outreach events. More specifically we targeted focus groups through organized settings and other community members through information booths set up in local events.

Focus Groups
To ensure inclusivity, we targeted underrepresented community groups:

1. Children: Our discussions with the local Scouts have shown promising alignment with TRL goals. The Scouts expressed eagerness to participate in co-diagnostic tasks, leveraging their rapport with the community to foster trust and engagement. The meeting with the Scouts Leader opened a dialogue regarding the importance of biodiversity in the Pedieos river and the availability of diverse spaces for further improvement of the human-nature relationship.

2. Elderly: We engaged with the local Adult's Center, providing a platform for elderly residents to voice concerns and preferences regarding the linear park. Their feedback highlighted issues of safety and maintenance, as well as a desire for greater inclusion in decision-making processes.

More activities are organized in the future, including meetings with the church as a means to approach migrants and low-income families, contacting organizations related to people with disabilities and local youth artists.

Outreach Activities
We have also seized opportunities to engage with the public through local events, including the Happiness Fair, sCYence Fair, and Blood Donation & Brunch Event. These events provided avenues for interactive engagement, including surveys, mapping exercises, and interviews, garnering positive feedback and interest in TRL's approach to community involvement in urban development.

Our interactions with the community have been instrumental in shaping the progress of the Strovolos Pilot. We have learned that despite initial mistrust, physical interaction and diverse data collection methods have proven enlightening and productive.

While those activities have been so far with single stakeholders, we plan to run workshops that bring the diverse community members together and use the appropriate tools, engage them in a cooperative dialogue to exchange opinions and ideas on the development of NBS at the linear park. These activities will create a platform for an open and transparent discussion, creating the foundation for an innovative co-governance model. Furthermore, we aim for those activities to be informative and educative regarding the specificities around intervening in natural environments, the impact on biodiversity and our role in preserving and maintaining the ecology of the river. The diverse stakeholders will be asked to rethink their initial expectation and integrate in their vision the responsibility derived from a collaborative effort to implement a NBS.

The methodology of the workshops will follow data-enabled and data-driven participatory applications and digital tools that facilitate the involvement of community in decision-making, through scenario-testing, simulations, and visualizations (Giraud & Artopoulos, 2023; Urban Periscope Project, 2023).

However, to organize such an event, the participation of the Municipality is critical. With the local elections coming up, we will not be able to run any collaborative activities in June. In the meantime, Strovolos team is trying to engage more and more community members (migrants, low-income families, people with disabilities), by joining events with NGOs and the Municipality, as well as contacting more organizations that can be relevant to the project.

Results of the activities for social mobilization and engagement

Beside the content of the discussions with the diverse social groups outlined above, including their challenges and needs for the linear park of Pedieos, we have conducted an online survey with the reactions of community members on the current image of the linear park of Pedieos river.

As the results show so far (19 responses), the linear park collects positive feedback when it comes to shading spaces, minimum interventions in nature and seating places. In the comments associated with these ratings, people mentioned that it is important to have seating spaces but the current ones need maintenance, and that light-structured bridges and earthy pavement is very appropriate in nature space.

Mixed opinions were gathered around the current drinking water facility, arbitrary stray cats shelters and the entrances to the park. The participants are specifically considered about the hygiene of the water facility, since it is not protected from the animals, and they don't feel safe using it. For the shelters the comments were diverse, with some people arguing against maintaining stray cats in the area and others supporting the improvement of accommodating facilities for them.

Finally, very negative reactions were expressed for individuals appropriating the park for private use and littering the space, as well as drawing random graffiti on the bridges, creating an aesthetically unpleasant environment.

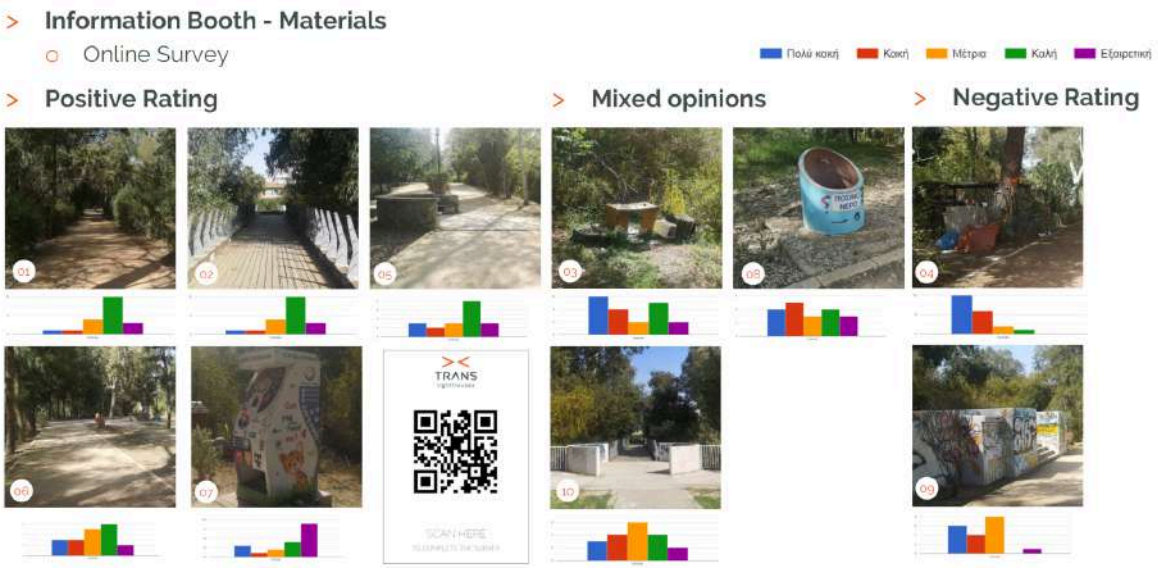

Figure 68: Results of the online reactions survey (blue - worst, purple - excellent)

Promoting this survey during outreach events, with available tablets for on-spot completion, was a very effective practice. With this survey we managed to also collect contact information and demographic data, giving us the opportunity to identify potential participants in future pilot's activities.

Creating a structure for participatory governance

Description of the co-governance model

Activities relating to the Strovolos Pilot have not yet reached the point where a co-governance model has been chosen. Preliminary discussions and analysis of results did yield some reflections. Importantly, upon reviewing the initial results collected on co-governance practices in the Strovolos pilot area, it is evident that various approaches exist, each with its own implications for stakeholder engagement and decision-making processes. These observations prompt reflections on strategies, opportunities, and challenges in mobilizing members and fostering collaboration within the TRL project.

- **Limited Practices:** Regarding limited practices, initiatives primarily driven by public authorities reflect an informative or corporate model of governance. These initiatives often involve public infrastructure repairs and emergency responses, where decision-making is centralized and top-down. Similarly, efforts such as collective cleaning projects or tree planting campaigns are indicative of this approach, emphasizing the authoritative role of institutions in driving community actions.

- **Partial Practices:** Moving towards partial practices, there is a shift towards a more consultative or advisory model of governance, particularly in matters concerning neighborhoods. Public deliberations, a common practice in Cyprus, exemplify this approach, allowing for public input and feedback on proposed interventions. While this model promotes some level of engagement, it still falls short of fostering true collaboration and co-creation between authorities and communities.

- **Integral Practices:** In contrast, integral practices embody a cooperative or co-productive model of governance, characterized by collaboration, data analysis, and community involvement. These initiatives are often led by research institutions or non-governmental organizations and prioritize inclusive decision-making processes. Rather than solely relying on governmental institutions, these efforts leverage the expertise and resources of diverse stakeholders to address complex challenges effectively.

- **Nature Practices:** Initiatives driven by NGOs, non-profit organizations, and academic research projects exemplify a transformative or human nature model of governance. These efforts prioritize societal and environmental transformation, leveraging research findings to inform policy and action. Projects conducted by organizations like Birdlife Cyprus, Terra Cypria, and the Cyprus Energy Agency exemplify this approach, focusing on sustainable development and environmental conservation.

- **Strategies for Co-production:** To enhance the co-production of NBS, various strategies can be employed. Digital tools and gamification can facilitate engagement and knowledge sharing among stakeholders, making complex concepts more accessible. Empowering NGOs and research institutions with funding and policy support can amplify their impact, enabling them to lead initiatives effectively. Additionally, transferring influence and power from governmental institutions to experts in academia fosters more informed and inclusive decision-making processes.

- **Preliminary Recommendations for Participatory Strategies:** Moving forward, several recommendations can enhance participatory strategies within the Strovolos pilot area. Capacity-building activities are essential for fostering knowledge and awareness among stakeholders, empowering them to actively engage in decision-making processes. Engaging citizens in data collection and monitoring activities through citizen science initiatives promotes inclusivity and enhances community ownership of projects. Establishing working groups and feedback mechanisms ensures ongoing collaboration and adaptability, allowing projects to respond effectively to changing needs and priorities. Transparent and widely visible communication channels are essential for disseminating information and fostering community engagement, ensuring that diverse voices are heard and valued.

- **Innovation Opportunities and Challenges for Transformative Governance:** Despite the growing interest in environmental research and collaboration workshops in Cyprus, there is a need to increase visibility and engagement among stakeholders. Developing a digital platform to showcase research findings, facilitate collaboration, and advocate for policy change presents an innovative opportunity. However, ensuring inclusivity and overcoming barriers to engagement remain key challenges. Addressing factors such as digital literacy, language barriers, and access to technology will be crucial in ensuring equal participation among diverse stakeholders.

In conclusion, leveraging diverse governance models and adopting innovative strategies can enhance co-governance practices in the Strovolos pilot area, leading to more effective and inclusive decision-making processes. By fostering collaboration and co-creation among stakeholders, the TRL project can achieve its goals of promoting sustainable development and environmental conservation in the community.

Establishing a modus operandi

Although the Strovolos pilot has not yet operationalized its chosen co-governance model, initial reflections and thoughts offer a promising, dynamic and inclusive governance structure. More specifically:

- **Governance Structure:** Co-governance in Strovolos should involve a dynamic interplay among various stakeholders, including public authorities, academic institutions, NGOs, and community members. The operational model should emphasize a transformative, participatory approach integrating governance practices from different domains.

- **Steering Committee:** A multi-layered, inclusive governance structure is essential. A Steering Committee comprising representatives from local government, academic institutions, NGOs, and community leaders will provide strategic direction and oversight, ensuring projects align with sustainability and community goals.

- **Working Groups:** Working Groups will focus on specific themes such as urban green spaces, water management, and community engagement. Each group will include experts, local residents, and representatives from relevant organizations, fostering a collaborative approach to problem-solving and implementation.

- **Community Assemblies:** Regular community assemblies will directly engage local residents in governance. These forums will discuss upcoming projects, gather feedback, and foster a sense of ownership among community members.

- **Digital Platform:** A central digital platform will serve as a hub for information sharing, project updates, and citizen engagement. It will facilitate transparency, provide access to resources, and enable digital participation through forums, surveys, and interactive tools.

Further, innovative aspects of this structure and approach include:

- **Integration of Digital Tools and Gamification:** Technology will enhance citizen engagement and data collection. Gamification elements will make participation more engaging, especially for younger demographics. Residents can earn points or badges for participating in (online and offline) activities, reporting issues, or contributing to discussions. Digital rewards can be translated into tangible incentives.

- **Empowerment of NGOs and Academic Institutions:** The model will strategically empower NGOs and academic institutions with funding, policy support, and significant decision-making roles. These organizations bring valuable expertise and a community-centric approach, ensuring well-informed and impactful initiatives.

- **Adaptive Management:** Ongoing feedback and adaptive management mechanisms will allow the system to respond to changing conditions and community needs. Regular evaluations and adjustments based on community feedback will ensure governance remains relevant and effective.
- **Capacity Building and Education:** Emphasizing capacity building and education, the model will conduct workshops, training sessions, and informational campaigns to equip

community members with the knowledge and skills needed for effective participation in governance.

Additionally, the participatory dimension could include:

- **Citizen Science Initiatives:** Residents will actively participate in data collection, monitoring, and research activities. Citizen science projects will contribute valuable data on environmental conditions, biodiversity, and urban infrastructure, enhancing data quality and community investment.

- **Collaborative Decision-Making:** Working groups will operate on a consensus-based approach, ensuring all voices are heard and considered. This fosters a sense of ownership and responsibility among participants, leading to sustainable outcomes.

- **Transparency and Communication:** Transparent communication through the digital platform, community assemblies, and regular updates from the Steering Committee will build trust and ensure informed, meaningful participation.

- **Inclusive Engagement Strategies:** Efforts will be made to reach diverse community groups, including marginalized populations. Outreach programs, multilingual resources, and accessible meeting formats will ensure all community members have opportunities to engage in governance processes.

Importantly, a number of challenges and solutions might need to be considered:

- **Digital Divide:** Not all residents have equal access to technology or digital literacy. The model includes provisions for in-person engagement opportunities, such as community assemblies and local workshops. Public access points with internet and digital literacy training will help bridge the digital divide.

- **Engagement Fatigue:** Sustaining long-term engagement can be challenging. Varied and dynamic engagement strategies, such as gamification and diverse communication channels, will keep participation interesting and relevant.

- **Balancing Interests:** Different stakeholders often have competing interests. Consensus-based approaches within working groups will mediate conflicts and find mutually acceptable solutions. Transparent communication ensures all parties understand decision rationales.

- **Resource Allocation:** Limited resources can constrain project implementation. The model emphasizes leveraging partnerships and securing external funding from grants and donations to supplement municipal resources.

Finally, concerning future directions, the co-governance model for Strovolos should be scalable and adaptable, potentially serving as a blueprint for other regions. Future directions include:

- **Expansion of Digital Tools:** Enhancing the digital platform with more interactive features, such as real-time data visualization and augmented reality, can further engage the community and provide valuable insights for decision-making.

- **Regional Collaboration:** Expanding the model to neighboring municipalities can foster regional cooperation on larger environmental and social issues, creating a cohesive and resilient urban landscape.

- **Policy Advocacy:** Using the digital platform and other engagement tools to advocate for policy changes at local and national levels will ensure governance structures evolve in response to community needs and scientific advancements.

- **Sustainability Initiatives:** Integrating more sustainability-focused projects, such as renewable energy installations and sustainable transportation solutions, will enhance community resilience and reduce environmental footprints.

Monitoring and constant reevaluation

In the Strovolos pilot area, reflective monitoring and continuous adaptation can ensure that governance remains responsive, effective, and aligned with community needs and environmental realities. The approach can be multi-faceted, integrating feedback mechanisms, adaptive management strategies, and ongoing evaluation processes.

Reflective Monitoring
Since reflective monitoring involves systematically tracking the progress and impact of governance initiatives, this process should include several key practices:

- **Data Collection and Analysis:** Using a combination of citizen science and professional monitoring, data can be collected on various aspects of governance projects. This will include environmental indicators (e.g., air and water quality, biodiversity), social metrics (e.g., community engagement levels, satisfaction), and economic impacts. Tools such as digital sensors, mobile apps, and online surveys can facilitate this comprehensive data collection.

- **Regular Reporting:** The governance structure can mandate regular reporting intervals, where working groups and the Steering Committee review collected data and assess progress against established goals. These reports are made publicly available through the digital platform to ensure transparency and community involvement.

- **Community Feedback Loops:** Community assemblies and the digital platform can serve as channels for continuous feedback from residents. Regular town hall meetings and online forums allow community members to share their experiences, voice concerns, and suggest improvements. This feedback is integral to the reflective monitoring process, ensuring that governance remains attuned to the needs and perspectives of the community.

Continuous Adaptation and Governance Integration
Continuous adaptation ensures that governance structures can evolve in response to new information and changing circumstances. This dynamic approach involves several strategies.

Adaptive management incorporates flexibility and responsiveness into the governance structure. Action plans are designed with built-in review points where strategies can be adjusted based on monitoring data and community feedback. For example, if a green space initiative encounters challenges such as poor plant survival rates, the working group can revise planting techniques or select more resilient species based on reflective monitoring insights.

To prepare for future uncertainties, scenario planning is employed. This involves creating multiple potential future scenarios based on current trends and data, and developing adaptive strategies for each scenario. This proactive approach enables the governance structure to anticipate and respond to possible changes in environmental, social, or economic conditions.

Continuous adaptation is supported by ongoing capacity building within the community. Training programs and workshops equip residents with the skills and knowledge needed to participate effectively in governance processes. This includes training in data collection methods, digital literacy for engaging with online platforms, and understanding environmental management practices.

New initiatives are often tested as pilot projects, allowing for experimentation and refinement before broader implementation. Successful pilot projects can be scaled up, while those that face significant issues can be revised or abandoned based on reflective monitoring outcomes. This iterative approach minimizes risks and maximizes the effectiveness of governance interventions.

Reflective monitoring and continuous adaptation are embedded into the governance structure at multiple levels. The Steering Committee oversees the integration of reflective monitoring and adaptive management across all initiatives, ensuring consistent data collection, robust feedback mechanisms, and timely and effective adaptations.

Working groups are empowered to make adjustments to their plans and strategies based on monitoring data and community feedback. This decentralized approach enables swift responses to emerging challenges and opportunities.

The central digital platform plays a crucial role in facilitating reflective monitoring and continuous adaptation. It aggregates data, hosts feedback channels, and provides tools for scenario planning and reporting, ensuring that all stakeholders have access to the information needed for informed decision-making**.**

Conclusion

By systematically collecting data, engaging the community in feedback loops, and employing adaptive management strategies, the governance model can remain responsive and effective. This dynamic approach will ensure that governance initiatives are continually refined and improved, fostering a resilient and sustainable community. Through these practices, Strovolos can serve as a model for participative governance that is both innovative and adaptive to changing conditions. This work will be further deepened and refined as part of T4.3 to ensure its long-term impact and adaptability.

San Lorenzo/Rome Pilot

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1. Exploration of the territory, its actors and challenges

Description of the territory

The pilot area is located in the II District (19.66 square Km) of the Municipality of Rome.

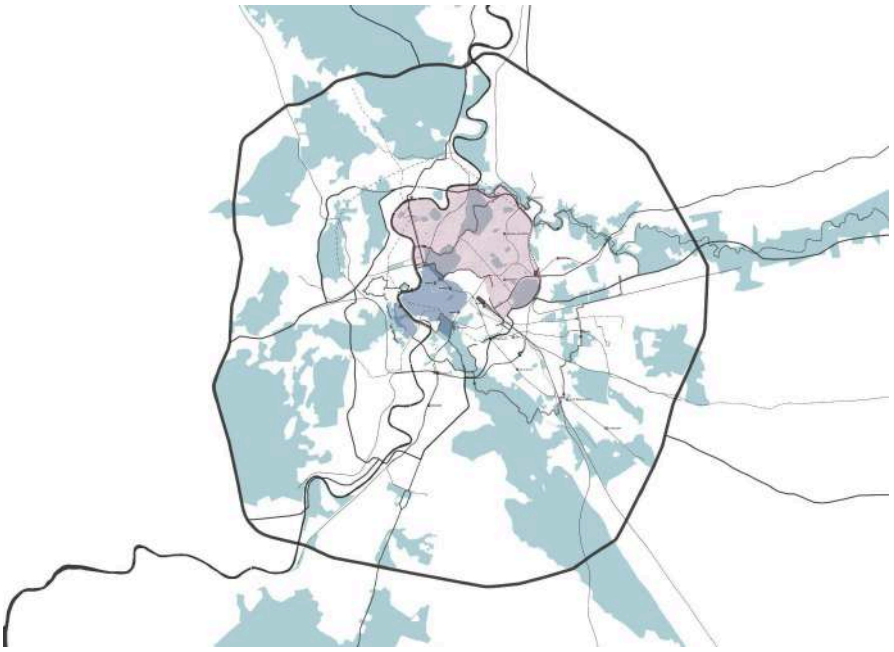

Figure 69: The Green areas of Rome and the II District

The 64% (82,000 ha, U.O. Statistica Roma Capitale, 2015) of the total area of Rome is made up of green areas but, despite the generous amount of areas at the urban scale, the most compact neighborhoods lack in parks and public gardens that have significance at the local scale.

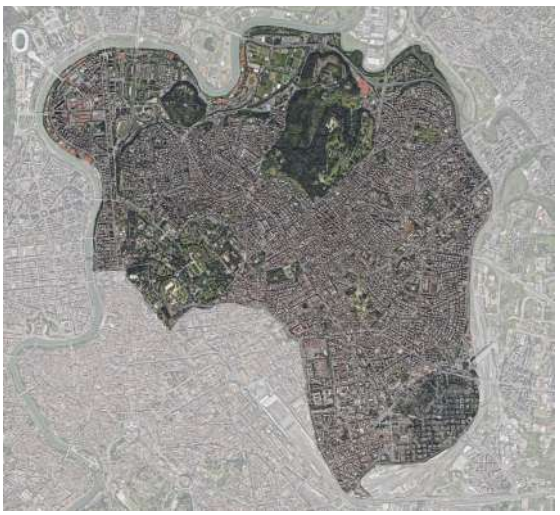

Figure 70: The II District of Rome Municipality

The II District has a total population of 167,649 inhabitants within a 19,66 square Km area and hosts 3,36 square Km of green area. It is one of the most densely populated in Rome (8389 inhabitants/km^2 - see Figure 03) and 68.2% of the territory consists of artificialized soils (see Figure 04). Parks and gardens cover a total area of 3,364 square Km, a large part of which is made up of historic gardens located in the north sectors of the District (Villa Ada, Villa Borghese and Villa Torlonia). The district is organized into 11 areas: Villaggio Olimpico, Parioli, Flaminio, Salario, Trieste, Villa Borghese, Villa Ada, Nomentano, San Lorenzo, Universitá and Verano (see Figure 05) very different in social, economic and environmental terms. From an infrastructural point of view, the District is connected to the national high-speed railway network through the Tiburtina station, the second railway station in Rome and the sixth in the country in terms of passenger traffic. It is also home to the campus of La Sapienza University, the first University in Rome and largest in Europe with 115,000 students.

Figure 71: The II District areas/neighborhoods with Tiburtina Station

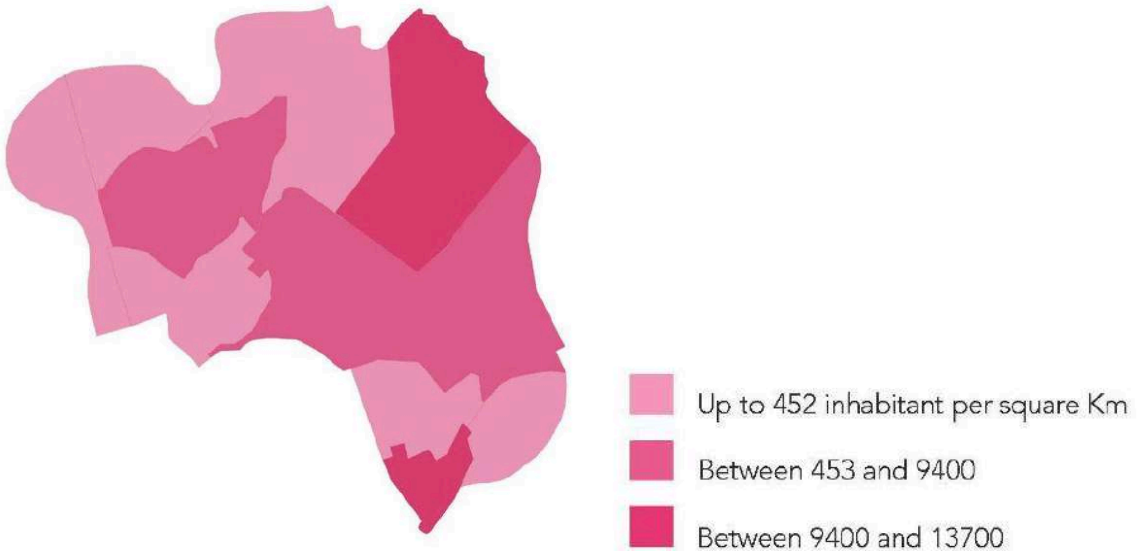

Figure 72: Population density (our elaboration on data driven from Department of Statistics of the Municipality of Rome, 2016)

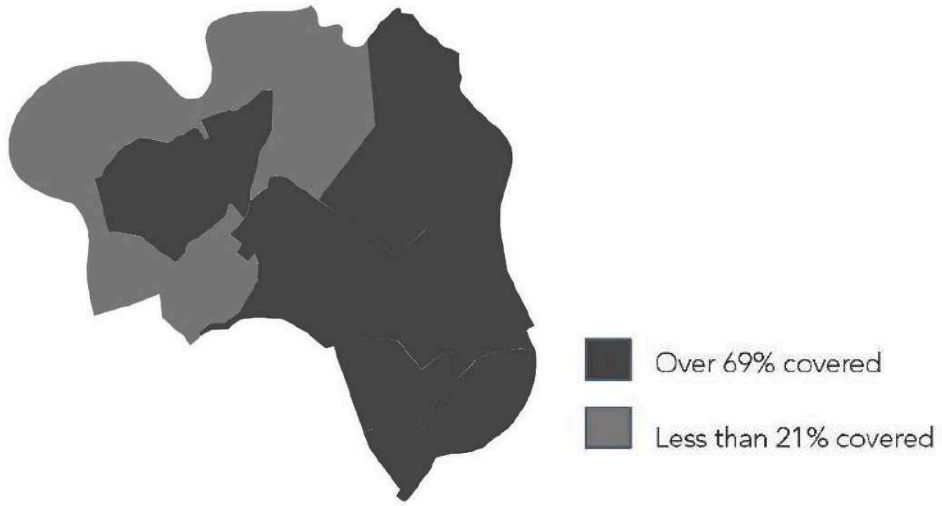

Figure 73: Artificial soil cover (our elaboration on data driven from Department of Statistics of the Municipality of Rome, 2016)

Micro: territory of pilot case

The pilot area is located in the San Lorenzo neighborhood in the southwestern sector of the II District. San Lorenzo has 8 700 inhabitants and covers an area of 0, 52 square km (U.O. Statistica Roma Capitale, 2015).

Figure 74: San Lorenzo neighborhood

The area is located behind the ancient via Tiburtina, a consular road of Rome, and, therefore, within the complex system of transformations and stratifications of an area that has had human presence since the very first settlements of the Latin population and, subsequently, of the Romans.
Bordered to the west by the Aurelian Walls and to the east by the Church of San Lorenzo, it is a plot of land physically located between the part of the neighborhood built in the XIX-XX century and the campus of the Sapienza University built in the 1930s. Moreover, in the block of the pilot area there are buildings built in the 1960-70s for the extension of the Sapienza campus (the student house, offices, canteen).

The neighborhood
San Lorenzo neighborhood was constructed between 1884 and 1888 to house railway workers and craftsmen who had migrated to Rome from the countryside. During the 1980s, the neighborhood gradually shed its working-class roots due to progressive gentrification. The original inhabitants were supplanted by students from Sapienza University (which also relocated some departments and institutes to the area). Today, San Lorenzo is recognized as the primary university district of Rome, attracting young people boasting numerous restaurants and clubs. The neighborhood is also characterized by a strong presence of activists, NGOs and associations. The local community is actively resisting ongoing gentrification processes. San Lorenzo faces challenges due to a lack of public open spaces, and many community efforts are focused on advocating for the redevelopment of existing public areas and the creation of new parks and gardens.

The pilot area
The pilot area is of approximately 5000 square meters, and it is delimited north by via de Lollis, west by via dei Dalmati, south by a wall belonging to a private construction and east by the building owned by Lazio Disco (the student house, offices, the dining hall) (see Figure 02).

Figure 75: Aerial view of the Pilot area

The area has been widely researched by the Superintendence (Sovraintendenza Speciale Archeologia Belle Arti e Paesaggio di Roma) due to the presence of construction remains dated from VII century BC up to the Middleage. Since the Middleage the area remained uninhabited until the modern neighborhood was built in the late XIX century.

The historical stratification is distributed in sections from an elevation of approximately +43.70 meters above sea level (asl) down to a depth of approximately +38.00 meters (asl). The ground level elevation of the current city's floor is set at approximately +47.00 meters (corner of Via dei Dalmati-via De Lollis).
The historical richness of the stratification is further demonstrated by the variety of building techniques and materials used in the anthropization of the site.

Following the results of archaeological investigations and excavation campaigns, the Special Superintendence of Rome initiated in 2018 the procedure for the declaration of archaeological interest for the entire area pursuant to Legislative Decree 42/2004 (Code of Cultural and Landscape Heritage).
Moreover, the pilot case is located in what is called “ambito di valorizzazione” (valorization scope) in the Rome General Masterplan, which means that the following objectives are planned for the area of the pilot case:

- Demolition of the prefabricated structures on Via Tiburtina and reconfiguration of the head on Piazzale del Verano;
- Redevelopment of the facades on Via Tiburtina and recovery of abandoned buildings;
- Definition of pedestrian permeability to connect university structures with the urban fabric of San Lorenzo.
- Adaptation and expansion of sports and leisure facilities.
- Redefinition of open spaces and precarious uses with enhancement of the facades.

Moreover, in the pilot area are present two examples of monumental trees that require protection. Those are two examples of Australian pine (Casuarina Equisetifolia), which are the remnants of private villas from the XIX century.

Finally, the pilot area is divided as follows: parcel 410 borders Via De Lollis and Via dei Dalmati (owned by Rome Municipality); parcel 411 is located in the centre of the plot (owned by La Sapienza University); finally, parcel 203 (owned by Lazio Disco) is at the eastern edge, adjacent to the Student House. In the following diagram, parcel 410 is indicated by the letter "A"; parcel 411 by the letter "B"; parcel 203 by the letter "C" (see Figure 03).

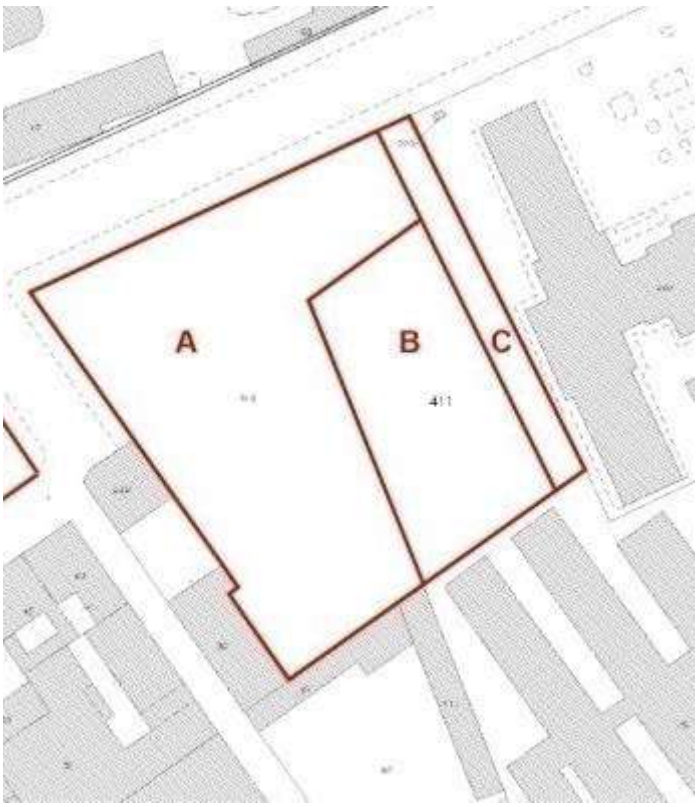

Figure 76: Ownership of the pilot area

Socio-economic description

The maps show the social and economic diversity that characterises the territory of the II District. In particular, Parioli and San Lorenzo have the highest proportion of foreign residents (see Figure 09). On the other hand, with regard to children aged from 0 to 3 years, the neighborhoods with the highest presence are Villaggio Olimpico, Villa Ada and San Lorenzo (see Figure 10).

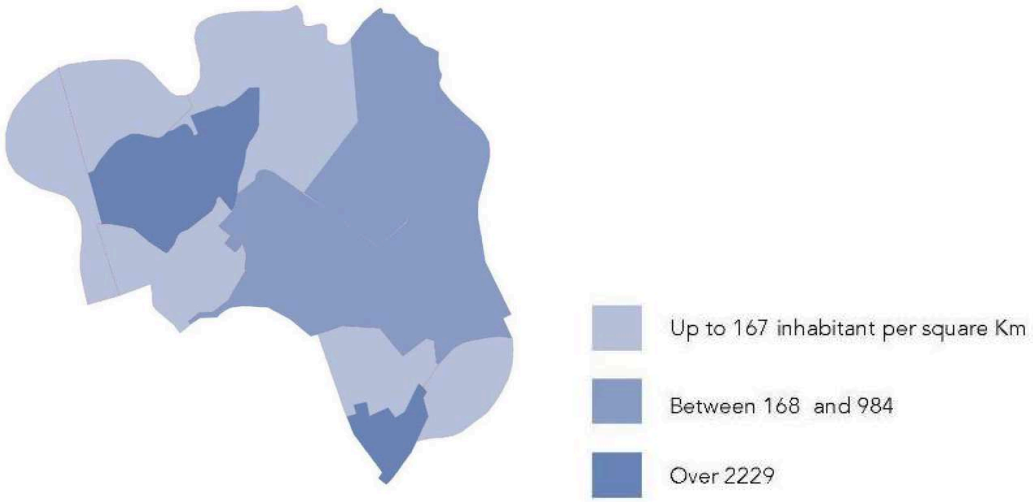

Figure 77: Foreign residents (our elaboration on data driven from Department of Statistics of the Municipality of Rome, 2016)

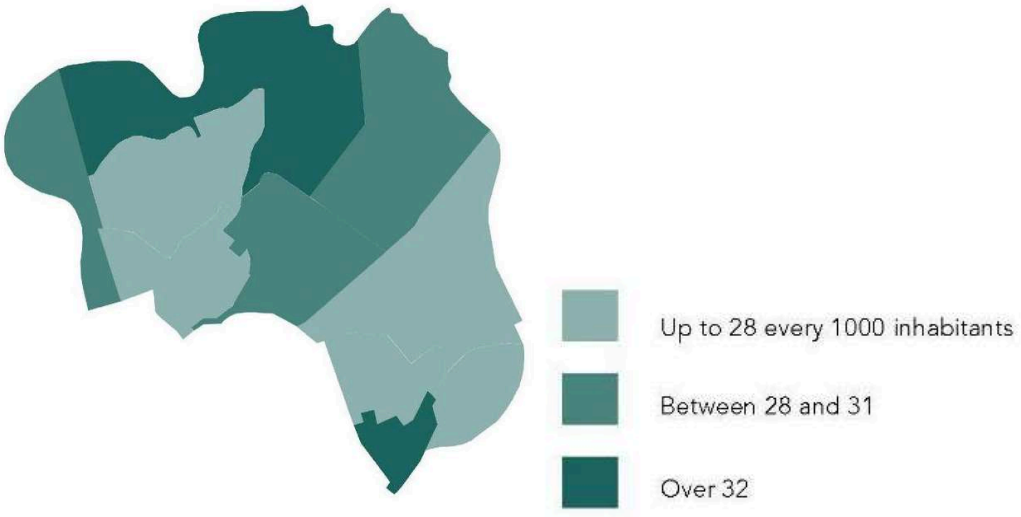

Figure 78: Kids between 0-3 years (our elaboration on data driven from Department of Statistics of the Municipality of Rome, 2016)

In recent years, the ageing index of the District (2008-2013) has experienced a reduction of 15% (The ageing index is calculated as the ratio of the population aged 65 and over to the population under 15, multiplied by 100).

Micro: territory of pilot case

From the early stages of its formation, the neighborhood of San Lorenzo, where the pilot area is located, began to attract the working classes of the Capital, and, given its proximity to the Verano cemetery and the railway station, the residential settlement attracted a large number of carpenters, welders, stonemasons, tinsmiths, bricklayers, and artisans. While the cemetery and craftsmanship have long been key elements in defining the neighborhood's essence, over the years, this bond has weakened, making way for an important element that has once again transformed the area: the presence of the University campus and the increasing number of students who have flocked to the area, adding to, but also replacing, the local population. This settlement pressure has over time led to a noticeable change in the neighborhood's socioeconomic characteristics. New commercial activities and catering services (pubs, restaurants, pizzerias, bars) have emerged, and nightclubs and cultural associations have begun to proliferate. This transformation of the productive fabric has developed in parallel with the decline of traditional artisanal activities, resulting in the loss of skills and related knowledge. High rents and increased traffic volumes are further serious crisis factors for traditional craftsmanship, to the point of considering relocating activities to a functional area with services and facilities capable of accommodating various production specializations.

The analysis of continuities and discontinuities in the historical events of San Lorenzo reveals the image of a neighborhood that has "grown" accustomed to the concrete and symbolic implications of change as a prerogative of its territory and social composition. Among the many elements that have contributed to this, it is worth mentioning the bombing of 1943, the progressive establishment of the Sapienza University, and the socio-demographic and productive turnover linked to the turnover of residents and entrepreneurial initiatives, initially centered on craftsmanship, now focused on activities related to commerce and leisure.

In this succession of discontinuities, the characteristic that has sedimented to define the main continuity of the neighborhood is what can be defined as the community spirit of San Lorenzo: the propensity for exchange, acceptance of others, relationality, and solidarity. Historically facilitated by social homogeneity and the evident physical delimitation of the neighborhood, that community spirit is now under strain in an attempt to resist a process of social recomposition in which the individual components do not seem to proceed in a shared direction.

Also, from the analysis of the economic and productive balance of San Lorenzo, it emerges substantially that in recent years there has been a traumatic reconversion of the productive fabric, which has shifted the neighborhood from its previous artisanal vocation to specialize in commercial tertiary and public service activities (pubs, restaurants, etc.).

This has resulted in a lack of harmoniousness in the local entrepreneurial structure, leading to the progressive loss of the neighborhood's productive heritage previously guaranteed by artisans and their workshops, partially replaced by artistic craftsmanship (ceramics, glass, leather, but also plastic material obtained from industrial waste) mainly oriented towards creations of aesthetic value. It is also noted that students are a social group that is stable as a whole and changing in its components: the number of out-of-town students living in San Lorenzo is more or less always the same, while individual students remain, on average, for no more than a few years.

Today, 16% of the neighborhood's total population is made up of foreigners. The average age of residents is 47.1 years, with 46.8% of the population falling into the over 15 age group. Regarding the structure of the family units, 55.9% consist of single-member households, 22.4% of families have 2 members, 12.8% have 3 members, and only 8.9% are families with 4 or more members. 19.9% of the population has only a primary school education or no formal education. Concerning the unemployment rate, it stands at 8.9%, with students comprising 6.9% of the total population, and retirees making up 23.7% of the total population. The men's employment rate is higher than that of women(70.7% employed men and 60.9% employed women).

Houses have an average size of 72.2 square meters, with 90.9% of them occupied by residents. 70.6% of families reside in owned houses, while only 18.6% of families live in rented accommodation (data source: Mapparoma, 2018).

Lessons from the participatory culture

Opportunities and barriers for participatory governance based on T4.2

The pilot area presents very strong opportunities and barriers for participatory governance. Mainly, the presence of many associations and activist groups operating in the area, involving a very large sector of the population, can provide a large base of people interested in being engaged in participatory processes. Moreover, generally speaking, the population has a strong feeling related to ecological issues, but they lack green public spaces to initiate activities related to them. Similarly, there is a strong commitment to social issues and many activities for social mutual aid. Conversely, a long and deeply rooted history of struggles against private developers and transformations of the public commons in the area, which were mostly lost by the local activists, has left the population with a general sense of mistrust towards local government and about the outcomes of the dialogue with the local institutions.

Opportunities and barriers for participatory governance based on the assessment case

The context

Piazza Gioacchino Rossini occupies the area of the ancient churchyard, which was also a cemetery, of the church of San Giacomo Maggiore. The square was originally surrounded by bollards to prevent carriage traffic, and historical documentation reveals that the square originally housed a portion intended for greenery.

After the transfer of the cemetery to the Certosa at the beginning of the nineteenth century, the area was expropriated and opened to traffic under the name Piazza San Giacomo. It was dedicated to Gioacchino Rossini in 1868, the year of the death of the composer from Pesaro.

The square has gone from hosting religious ceremonies to hosting the international congress of sacred architecture (1955), to becoming the scene of student protests in the 1970s.

Facing the square area, the Basilica of San Giacomo Maggiore built in 1267, the G. B. Martini Conservatory and, on the opposite side, the 16th-century Palazzo Malvezzi De' Medici, which houses the Metropolitan City of Bologna. On the south side of the square, along via Zamboni, there are Palazzo Magnani, which houses remarkable frescoes, the Quadreria, and the Palazzina Lambertini, the birthplace of Pope Benedict XIV.

Despite its historical and iconic value, the square had so far been used as a parking lot for cars, and therefore did not represent a place for stopping and socializing. Pedestrians could walk along the edges, in a space shared with cars. Furthermore, the presence of cars in the centre of the square interfered with the view of the important architectural heritage of historical and artistic value that overlooks it.

After a trial period, the Municipality of Bologna decided to pedestrianise the square in 2019.

The transformation process

The transformation of Piazza Rossini arises from a series of experimental and demonstrative actions on the cultural heritage of via Zamboni provided by the European project ROCK, a European H2020 research-action project. The project monitors its outcomes through a system of sensors detecting flows, environmental parameters, and perceptual changes in the use of spaces.

The focus on Piazza Rossini was made during the U-Lab 2018 Laboratory conducted by the Foundation for Urban Innovation. From the over 250 people who participated in the engagement process, the need to restore a dimension of sociality to the square emerged, enhancing the collaboration of local actors.

The first action was the experimentation of a temporary lawn in September 2019 during the event "Le Cinque Piazze," as part of the Bologna Design Week and Researchers' Night, curated by the Foundation for Urban Innovation and the University of Bologna - Department of Architecture.

The idea of a temporary lawn instead of the parking lot, realized on that occasion through self-construction, was born during the co-design workshop with university students (coordinated by the Foundation for Urban Innovation and the Department of Architecture of the University of Bologna, in collaboration with the Rusconi Foundation) and inspired by a suggestion obtained by consulting historical archival material where a portion of the ancient churchyard intended for a lawn is clearly visible.

The goal was to test (in an unexpected way for users) new uses of a public space, previously denied, in the heart of the university area.

After the positive feedback from this experience, the Municipality of Bologna decided to definitively pedestrianize the square, in line with the direction already indicated by the Urban Plan for Sustainable Mobility, which aims to increase pedestrian traffic, especially in areas of remarkable architectural value.

The project
The current setup is part of the approach to pedestrianize the square. It will therefore also be temporary, and the experimentation will last about a year, pending the definition of the final layout. It proposes a lawn of over 300 square meters raised from the ground by 15 centimeters: this space contains the soil and the irrigation system necessary to ensure the preservation of vegetation. A wooden border delimits the area, which is made accessible to all through a ramp on the side of Palazzo Malvezzi.
The square also hosts a system of wooden planters with shrubs, aromatic plants, perennial herbs, and grasses arranged parallel to via Zamboni. The plants have both an aesthetic function and a conservation and development function of biodiversity in urban areas, with an ecological, social, recreational, and educational purpose. The planters also serve as supports for messages encouraging care of the space and informing about the transience of the installation.
In the area, there are also two illuminating elements shaped like large red flowers, the Maxxi Poppy by Viabizzuno, a partner of the ROCK project.
The project is funded by the European Union's Horizon 2020 research and innovation program through the ROCK project (Regeneration and Optimization of Cultural heritage in Knowledge and creative cities), coordinated by the Municipality of Bologna. The Unipolis Foundation is also a partner and financier of part of the project.

Co-design
"Green Please: the unexpected lawn" is the project proposed for the initial temporary redefinition of the square and is the result of a shared process. The project was conceived through a workshop of co-design and co-construction involving students from the Department of Architecture at the University of Bologna, coordinated by the Urban Innovation Foundation. Additionally, the design idea originated during the participatory workshop "U-Lab" held in the university area, which saw the participation of over 250 people and from which emerged the need to restore a social dimension to the square, emphasising the collaboration of all stakeholders in the area (institutions, associations, students, etc.), with particular attention to vegetation and lighting as design elements.

Integrated approach
The project is integrated into a circular system of actions. The experimentation is part of a broader strategy of actions that systematically involved all public spaces in the university area - as the name of the initiative "Le Cinque Piazze" (The Five Squares) of Zona-U recalls - developed in synergy with the programming of the Bologna Design Week and the Researchers' Night of September 2019. It is a proposal and an event dedicated to urban redevelopment, the enhancement of cultural heritage and its accessibility, the encouragement and promotion of the care of public space, through the development of its potential by imagining and experimenting with different and unconventional uses, from an environmental sustainability perspective.

Memory
Reuse of public space and connection to historical heritage. Piazza Giacomo Rossini is a public space of great historical and architectural value. Many significant buildings define the facades of the square: the Basilica of San Giacomo Maggiore, the former convent complex of Santa Cecilia, home to the "Giovan Battista Martini" Music Conservatory; the late Renaissance facade of Palazzo Magnani - currently used as a bank headquarters - which preserves remarkable frescoes and a public art gallery inside; the Palazzina Lambertini, an example of eighteenth-century civil architecture; and the sixteenth-century Palazzo Malvezzi, currently the seat of the public institution "Metropolitan City" of Bologna. The public square has long served as a parking lot for cars and bicycles, preventing citizens from using it to stop, gather, and socialize: pedestrians could

only walk on the narrow sidewalks next to the road lane, while the presence of parked vehicles in the centre of the area interfered with the view of its architectural scenery. The unexpected perception of the square space proposed by the temporary reuse project - which transformed part of the parking lot into an "unexpected" green lawn - in addition to experimenting with new uses and offering the opportunity to rediscover and appreciate the architectural details overlooking the square, finds a historical reference. As shown by various archival documents - maps and views (Detail of the Ditio Bononiensis in the Sala Bologna in the Vatican, 1575; View of Piazza Rossini by F.B. Werner, 1732) - part of the ancient churchyard or cemetery of the Basilica of San Giacomo Maggiore had a vegetated pavement: the choice therefore, recovers part of the historical memory of this Bolognese square.

Sustainable experiment

Testing sustainable strategies for urban regeneration: In September 2019, the experimentation of the "Cinque Piazze" experiment will equip Piazza Rossini with a temporary installation, designed and co-built with students who transformed part of this area - usually used as a parking lot - into a green space, proposing an unexpected perception of the area and restoring the trace of the ancient churchyard of San Giacomo Maggiore. The choice of grass as a temporary regeneration device fits into a policy context, which sees European capitals at the forefront in the commitment to address climate change, even creating urban forests (for example, Paris) to reduce CO2. Heatwaves in Bologna are becoming more frequent: as highlighted by the IdroMeteoClima Report of the Emilia-Romagna region, in 2019 the urban areas of the Po Valley recorded up to 60 tropical nights (with a minimum temperature above 20°C) and 80 hot days (with a maximum temperature above 30°C). Future scenarios, elaborated by Arpae Emilia-Romagna, show a probable increase in the average temperature in Bologna by 2°C for the period 2021-2050 compared to 1961-1990, with the strongest anomalies that can occur during the summer period, resulting in an increase in heatwaves. The city of Bologna must therefore adapt to climate change and rising temperatures, with concrete actions that follow its extensive planning and programming (BlueAp Adaptation Plan, Mayors Adapt, new PUG with its resilience goal, etc.). This can be done both with demonstrative (and symbolic) actions aimed at changing user behaviour, and with real "devices" that help reduce temperatures in urban spaces. The grass in Piazza Rossini, and the subsequent discussion around it, can address both objectives. Integrated technologies, such as sensors for indoor and outdoor comfort and flow sensors, record space conditions and uses, designing sustainable future configurations. For these reasons, the ROCK process - based on research-action-research (ROCK cycle) - is guaranteed.

Opportunity

An active demonstration of space reappropriation The temporary experiment was successfully embraced by citizens, with a weekly presence of approximately 200,000 visitors - monitored through crowd analysis sensors installed in the area - who not only passed through but also spent some time in the square. The installation was widely commented on social media, receiving about 85 shares on Instagram and 38 articles on blogs and social networks. Furthermore, a large number of local associations and social entrepreneurial activities (such as Salvaiciclisti, Dynamo, Kilowatt), professional intermediaries (Order of Architects of Bologna), and ad hoc initiatives (Strade Aperte Bologna) enthusiastically supported the initiative as a first step towards a vision and future action for the city. These events quickly led to the Municipality's decision to transform it into a permanent solution for pedestrianising the space. Emerging from the COVID-19 pandemic, cities are adopting various strategies to provide citizens with a larger and healthier public space, to create more attractive situations for visitors, and to offer inclusive environments to the broader categories of citizens in an attempt to regain a social dimension. It is widely shared that a space like the lawn in Piazza Rossini can represent another opportunity for experimentation in the

current era, to monitor flows and adjust design to contingent needs with the useful integrated support of technological tools. It fits into the general trend of providing temporary spaces to test, verify, correct, and retry solutions for cities in constant evolution and change, in an attempt to slow down the threat of climate and global changes with successful local small-scale efforts. Finally, it fits into a future vision for cities that are changing their rhythms and timings (e.g., fast-slow integration) made possible by a particular use of technologies as empowerment devices, used to monitor small-scale local experiments and verify their effects for the green city of the future.

Lesson learnt

The project demonstrates the possibility that it is possible to use a temporary project to convince both citizens and local authorities of the value of pedestrianisation and the return to pedestrian parts of the public realm that have been taken over by car traffic. The project acted as a trigger to initiate a progressive discussion about the need to pedestrianize areas and reassigned them to the citizens through a project with very low budget project, due to its temporary nature, and with an action of tactical urbanism, enabled the same conversation to shift to other areas of the city, especially to streets across schools, where the need to dedicate space to children's and adults' activities was particularly felt as a priority by both the inhabitants and the local authorities.

Figure 79: picture of an event in Piazza Rossini, Bologna

Definition of the pilot case goals

Since the beginning of the TRANSLighthouses project there has been a change in the pilot area. The previous area was located in the San Lorenzo neighborhood too but was within the property of the University Sapienza. The area was called "Pratone di Economia" and presented a couple of issues that led to the decision to switch the area of intervention: on the one hand, there is the presence of underground catacombs underneath the area, which creates many additional problems to the possible transformation of the area, on the other hand, and most importantly, the area is subjected to the opening time scheduled by the University of Sapienza, as it is enclosed within its fences, which means that this space wouldn't be completely open and accessible to the population 24/7. The reflections on the above mentioned issues and the keen willingness by the II Municipality to collaborate with the TRANSLighthouses project led to the decision to switch from the "Pratone di Economia" to the area in Via de Lollis.

Community social characterization: The most represented groups in the Via de Lollis area are middle class citizens and university students and workers.

Motivation of the pilot: Population density, lack of public green areas, pollution, neighborhood services, green spaces are all aspects that affect our way of life, health and well-being. In Rome, many city's open spaces are in a state of neglect, especially outside the historic city centre and this is particularly true about the open spaces in the San Lorenzo neighborhood.

Existing NBS applications and initiatives: Urban Forestation and NBS for a sustainable future (ISPRA), Biodiversity Center (CNR), ongoing PNRR research on Biodiversity, Forestation and creation of Green corridors.

Leverage resources for NBS: Local bottom up initiatives emerged during the pandemic period to request for green and recreational areas.

Governance in the pilot case: The Sapienza Department of Architecture and Project co-leading a local Urban Lab with institutional and local stakeholders to represent the local NBS anchors and implement the project.

Local governance profile: DiAP (Department of Architecture and Project of Sapienza University, the team leader of the roman Pilot belongs to this department) and Rectorate of Sapienza, II District - Rome Municipality, City Planning Dept. of Rome and Cultural Heritage Institutions, schools, local social groups and NGOs.

Target group: Students of all levels, women, elderly people. Unemployed youth and migrants.

Small scale NBS testing: Tactical urbanism action able to redesign the public space in a more sustainable way. Increase in sports facilities and accessibility for children, spaces to rest and study in the open air.

Challenges raised during the preparatory meetings: During the meeting emerged the need to include experts in participatory processes in the Sapienza research team.

Who owns the land? Sapienza University - Rome Municipality - Lazio Disco

Related projects to create synergies: Actions from the part of the local schools; enhancement of archaeological area; investment of the municipality in NBS.

Possible local partners, associations, initiatives and champions to be engaged: Sapienza students, School "Istituto comprensivo Saffi Borsi", Parents association Saffi Borsi School, Asilo Regina Margherita (Day care via dei campani), Nido Lucignolo e Pinocchio (Daycare Via dei Sabelli, 88 - 00185 Roma), Nido Sardi (Daycare, Via dei Sardi, 35)

Ecological challenges

Ecological goals and description of the NBS

Environmental Challenges: From an early analysis of the area, the following issues seem relevant and to be possibly addressed by the pilot project: Mitigation of heat island effects and improvement of air quality; increase the biodiversity and the quality of ecosystem services offered

in the urban community; enhancement of the quality of public space; improvement of sustainable mobility; enhancement of archaeological sites**.**

Local values and attitudes towards the ecological challenges

The area is dense in activism and grassroot participation, many claims are directed towards the need of public and green areas in the neighborhood. The lack of public green spaces is felt as a major ecological challenge and the agenda of the pilot is to increase the amount of green public space in a fairly dense area where most of the surfaces are impermeable and sealed.

Socio-economic challenges

Identification of marginalized knowledges and of needs of marginalized groups

Social Challenges: To facilitate the interaction and exchange between the different communities of inhabitants: seniors (over 65%) and children (under 15) (35%). 12% of foreign population. A specific goal will be to include students in the conversation.

Economic Challenges: Worldwide, universities are engines of urban regeneration. Knowledge Economy can encourage integrated-sustainable-oriented practice.

Identification of presences and absences

Modern Urbanism in San Lorenzo failed to enhance the open spaces. The neighborhood suffers from a significant lack of parks and gardens, which is one of the most pressing issues for the local community. NBS (Nature-Based Solutions) represent an opportunity to channel the energies present in the area (Associacions and activists) and the need to make the neighborhood a more sustainable place to live. Local stakeholders are already aware of the importance of sustainability issues, and the Pilot project on Via De Lollis provides an opportunity to voice their concerns. Furthermore, the pilot project also presents an opportunity for collaborative engagement with students from Sapienza University, who are frequently viewed by the local community as outsiders.

2. Collecting the required knowledges for the Living Knowledge Lab

Creating relationships with partners

Networking and exploratory activities in territory

The following subsections are concise and provide still early reflections on the pilot and the LKL due to the fact that the Pilot Area has been recently changed due to the motivations that are explained above in the document.

Several bilateral meetings have been conducted between the Department of Architecture and Design of Sapienza University and the II District of the Rome Municipality to discuss common goals and share targets, the meetings have helped identify and shift to the current pilot area whose ownership is shared between Sapienza and the II District. Moreover, those meetings have helped unearth the governance system and the participatory culture embedded in the II District. Additionally, a series of contacts have been made with the Rectorate of the Sapienza University to get in contact with the students associations of the University. Beside that, the pilot leader has contacts with the association of parents of some of the daycare facilities in the neighborhood of San Lorenzo. Four interviews have currently been undertaken, one with an elective representative of the II District of Rome, one with a parent of young children living in the area and connected to the parents' association; one with the president of the largest student association of Sapienza University, one with a researcher of Sapienza University.

Meetings with elected representatives of II Municipality of Rome and with archeological Superintendence have been held since May 2023 to ensure a collaboration between the DiAP and the II Municipality:

- 10 May 2023: meeting with Urban Planning Councilman Dott. Veloccia
- 9 June 2023 meeting with II Municipality President
- 25 October 2023: meeting with Elective representative of II Municipality
- 21 November 2023: meeting with Elective representative of II Municipality
- 4 March 24: meeting with Elective representative of II Municipality

- 1 February 2024 visit to the Catacombs with Elective Representative of II Municipality

Bringing members/stakeholders in the LKL

The identified stakeholders for the LKL are: the II District of Rome Municipality, Sapienza University, representatives from the Students' Association of Sapienza, parents from parents' association of local daycare facilities (Comitato Genitori Saffi Borsi) and researchers from the TRANSlighthouses partner Sapienza.
The role of the researchers from the Department is to coordinate and facilitate the exchange of knowledge and to lead the different tools for co-designing the solutions, Sapienza moreover, is involved as the owner of part of the area. Similarly, the II District is the owner of another half of the area and has recently approved a resolution to create "green classrooms" in the open spaces of the District. The representatives from the students' association will act as champions for the goals of the students of Sapienza, who make up a large part of the citizens living and using the area of San Lorenzo. The representatives of the parents' associations will contribute bringing their objectives to the table of discussion as the goal of the Pilot is to engage in NBS related to education and public open space.

Inclusion of marginalized knowledges

Generally, the voices of the students of all the levels are relatively less heard therefore, to include students and their parents (when they are too young to speak for themselves) helps facilitate the inclusion of marginalized knowledges in the area.

Inclusion of youth

The goal of the pilot, which focuses on the interaction between NBS and education, is to include youth for creating NBS that are directed and destined to them. To do so, the student association and the parents association will be included in the process.

Relationship with and view of nature (human-nature relationship)

There have been other attempts to include nature-based solutions in the area, this can be exemplified with the project for the creation of a micro-pedagogical forest in the Parco dei Caduti in San Lorenzo (see Annex I), This shows how the need for open spaces connected with nature is particularly needed in the area which lacks green spaces. This need is particularly felt by students and their parents, that is why they must be included in the process to find NBS for the area in via de Lollis.

Strategy and actions for the LKL

The LKL will need to overcome the distrust between the population and the district by enabling new practices next to old ones finalizing to overcome the power relationships in place. Moreover, enabling local groups to take ownerships of the co-designed solutions will help ensure representativity of stakeholders and inclusion of their knowledge. A challenge that the pilot will face will be how to approach and motivate the stakeholders during the process, understanding what they want and what they can get from this process.

3. Formalizing the LKL

Creating cooperation, understanding and dialogue

Registration of activities

For the formation of the LKL are envisaged workshops to present the goals of the pilot cases and consequently understanding what are the objectives of the different stakeholders involved. The activities will be based on dialogues from the different actors to promote mutual understanding and shared goals. The LKL is not formalized yet as there have been delays due to the change in the Pilot area from the “Pratone di Economia” into the current area in Via de Lollis.

Results of the activities and dialogue opportunities

The process of formation of the LKL and its activities is still ongoing therefore it is still hard to register the outcomes of the learning activities and dialogues for creating cooperation and mutual understanding. Currently a series of conversations have happened with the II district, the Rectorate of Sapienza University and a Student association of Sapienza.

Social mobilization and engagement

Registration of activities

The process of formation of the LKL and its activities is still ongoing therefore it is still hard to register the communication activities and dialogues for creating cooperation and mutual understanding. Currently a series of conversations have happened with the II District, the Rectorate of Sapienza University and a Student association of Sapienza.

Results of the activities for social mobilization and engagement

The process of formation of the LKL and its activities is still ongoing therefore it is still hard to register the activities for social mobilisation and engagement. Currently, it has been engaged in a fruitful conversation with the II District which has agreed to additionally fund the pilot case with a budget that matches the funds provided by the Horizon project. We are currently in the process of engaging one of the largest student associations of Sapienza University to have it actively participating in the participative process.

Creating a structure for participatory governance

Description of the co-governance model

The stakeholders will be organised in formal and informal ways, the structure of the co-governance system will be based on the need to overcome social and ecological challenges. UNIROMA1 will act to rethink NBS in a way that participation and participatory activities can move towards true participatory governance. The objective is to allow vulnerable groups such as the youth to truly participate in the co-governance system. Currently, an agreement has been signed between the Department and the II District of Rome Municipality that ensures a scientific collaboration to develop an NBS green classroom in the area, the agreement is part of the co-governance model as it ensures the scientific knowledge produced in the University to be a support to the goals of the II District of Rome Municipality.

Establishing a modus operandi

A set of educational interactive artistic and scientific activities will ensure the process to be inclusive of different groups, especially the youth and the students. The activities will gather the different actors together to learn and produce knowledge related to the pilot area. The co-governance system will ensure co-production of knowledge, co-diagnostic of the challenges and goals of the area, and co-design of the actions to be undertaken.

Monitoring and constant reevaluation

Reflective monitoring and continuous adaptation will be included in the participative governance structure, internal checking on how the process is unfolding and developing will be done, and

similarly, checking with the other stakeholders will be included to understand what can be adjusted or adapted. The reflective monitoring could be based on interviews, surveys, roundtables and other discursive systems to gather opinions on the process.

Barcelos Pilot

Authors:
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1. Exploration of the territory, its actors and challenges

Description of the territory

Territorial description

Macro: rural /forest /urban lighthouse

Barcelos is a Portuguese city in the sub-region of Cávado (NUT III), belonging to the region of Norte (NUT II) and the district of Braga. It is the seat of the municipality of Barcelos, which has a total area of 378.9 km2, 116,766 inhabitants[2] in 2021 and a population density of 308 inhabitants per km2, subdivided into 61 parishes[3]. The municipality is bordered to the north by the municipalities of Viana do Castelo and Ponte de Lima, to the east by Vila Verde and Braga, to the southeast by Vila Nova de Famalicão, to the southwest by Póvoa de Varzim and to the west by Esposende.

The morphology of the Minho region is marked by the existence of cuts originated by fracture alignments coming from various directions, of which the Cávado river stands out. It is in this hydrographical basin that most of the municipality of Barcelos falls, located in the downstream sector, close to the coastline. These constraints mean that this region has an extensive coastline, open valleys and several areas of erosion. These areas open up large clearings that are intensively exploited.

On a larger scale, the minimum altitude (less than 5 meters) of Barcelos is observed in the South, at the crossing of the Cávado River into the municipality of Esposende. The highest altitude is 488 meters, corresponding to the geodesic landmark of S. Gonçalo, in the northwest.

At the forestry level, it is part of the Northern Forestry District - Baixo Minho. In terms of area, the municipality of Barcelos covers a total of 37,893 hectares spread over 61 parishes .

The distribution of the total area shows that the largest area is located in the western part of the municipality in the parishes of Fragoso and Vila Cova. Currently, in the municipality of Barcelos, the predominant land use is agricultural land with 42.8%. Forests account for 32.1% of the total area of the municipality, while social areas account for 16.4%.

Figure 80: Barcelos and location of the pilot schools

Micro: territory of pilot case

The pilot schools are located in various areas of the Barcelos Municipal territory.
One school, Vila Cova secondary school, is located in Vila Cova, the largest parish in the municipality of Barcelos, with an area of 1,295 hectares, and also one of the most populous. This parish is about ten kilometers from the urban center of Barcelos and eight from Esposende, with its territory stretching between the E.N. 103 (Barcelos-Viana) and the E.N. 103-1 (Barcelos-Esposende).

The parish of Vila Cova has become a focus of attraction, as it is located in the geographical center of a valley that descends from the slopes to the north of the parish of Feitos to the river Cavado. The entire rural road network at this end of the municipality of Barcelos connects radially from Vila Cova to the neighboring parishes of Curvos, Vila Chã, Gemeses and Palmeira de Faro (municipality of Esposende), as well as to all those bordering the municipality of Barcelos - Feitos to the north, Vilar do Monte and Creixomil to the east and Perelhal to the south.

Access to Vila Cova is reasonable. The construction of the access link to the A 28 was an important milestone in this regard. The road network that connects this group of parishes is served by a network of public and school transport that converge or flow into Vila Cova, allowing people to move around and centering various services and facilities of collective interest here.

EB 2,3 Abel Varzim, an elementary school is located in Vila Seca which is a Portuguese parish in the municipality of Barcelos, with an area of 4.34 km^2[1] and 1064 inhabitants (2021 census). Its population density is 245.2 inhabitants/km^2. Located on the south bank of the River Cávado, Vila Seca is accessed by the A11 at the first exit and by road 205, which faces the municipality of Esposende to the west.

Finally, School Center António Fogaça, a kindergarten and primary school is located in the parish of Vila Frescaínha S. Pedro. This parish, located on the plain, has already seen a large increase in housing developments, mainly on the slopes of the Portela hill, the majority of which are houses. Its territory is delimited by Vila Frescainha (São Martinho), by the Union of Parishes of Creixomil and Mariz and, to the south, by the River Cávado, with the parish of Gilmonde on the opposite bank. However, there has also been an increase in commercial and industrial construction. This former parish is crossed by the National Road 103-1, which connects those coming from the city of Barcelos to the parishes of this municipality located further to the west, to the municipality of Esposende and to the coastal area, being an important land communication route, serving not only this land, but also its neighbors.

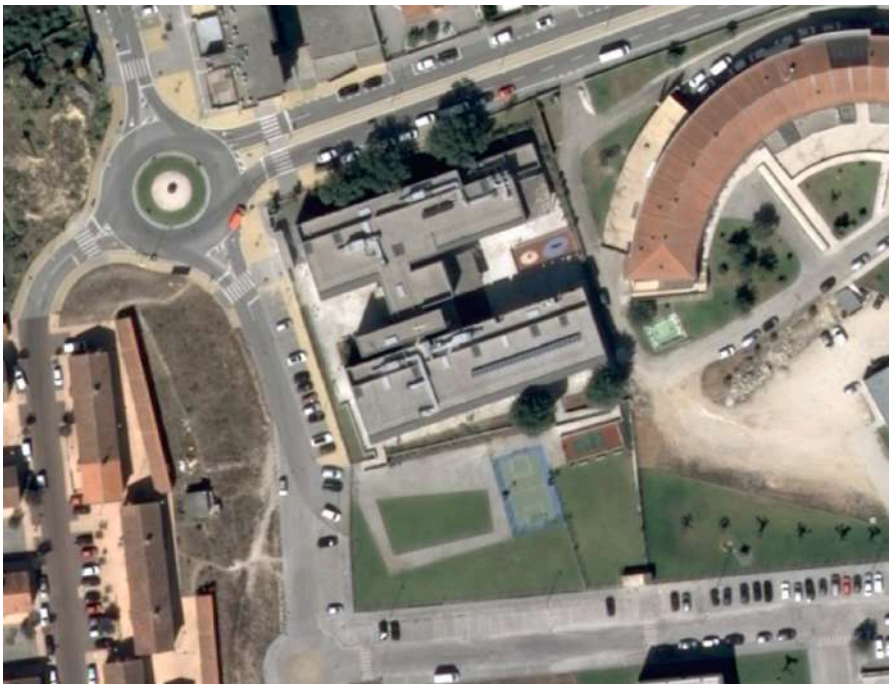


Figure 81: School Center António Fogaça

Figure 82: EB 2,3 Abel Varzim

Figure 83: EBS Vila Cova

Socio-economic description

Macro: rural/urban lighthouse

Barcelos is a Portuguese city in the sub-region of Cávado (NUT III), belonging to the region of Norte (NUT II) and the district of Braga.

Resident Population

It is the seat of the municipality of Barcelos, which has a total area of 378.9 km2, 116,766 inhabitants in 2021 and a population density of 308 inhabitants per km2. Given the data from the 2021 Census, the municipality of Barcelos registered 116,766 inhabitants, 3,625 fewer than in the 2011 Census, when 120,391 inhabitants were registered. Ten of the 61 parishes recorded population growth, while the average was -3%.

Age Structure

The age structure of the resident population in Barcelos reveals an ageing population, as a result of both a decrease in the number of young people and an increase in the elderly population, in line with current demographic trends, i.e. ageing at the bottom and top of the age pyramid. Since the last intercensal decade, 2011, Barcelos has been progressively losing young people (0-14 years old) and gaining elderly people (65 and over). Data for 2021 indicates that 24.5% of its population is under 24 and 20% is over 65.

Economic Activities

When analyzing the distribution of the employed population of the municipality of Barcelos by sector of economic activity, it can be seen that, in 2021, 50.4% of active residents were employed in the secondary sector, which confirms the importance of industry in the municipality's economy as well as its industrial character. This is followed by the tertiary sector, which employs 47% of active residents, and finally the primary sector, which employs only 2.6% of the population. The tertiary sector has become increasingly important in the municipality's economy, to the detriment of the other sectors, and is the only one to have seen an increase in the proportion of the population employed, compared to data from the last decade.

Levels of Education

The municipality of Barcelos has seen a significant improvement in the population's levels of qualification over the last decade, with a significant increase in the proportion of the population with the highest levels of education (secondary and higher), and a significant decrease in the percentage of residents with no level of education.

Urban center

Barcelos is an urban center and a municipality with specific natural and historical conditions, supported by sustainable development. The city is considered as an important cultural, economic and tourist center in the Minho region, and is an important development hub for the region, offering visitors and residents a wide range of opportunities in various areas. Barcelos is considered one of Portugal's historic cities, with a rich cultural heritage and a privileged geographical location, situated on the right bank of the river Cávado, surrounded by a stunning natural landscape. In addition, although the center of Barcelos is urban, the rest of the surrounding area is mostly occupied by rural and natural spaces (parishes), which is a factor of

interest for the pilot project to encourage contact with nature and greater environmental awareness.

Micro: territory of pilot case

The pilot project is located in three schools in different parishes in the municipality of Barcelos. As such, the pilot project area is located in rural, forest and urban areas.

Vila Cova

This forest area is home to the Vila Cova EB 2,3 and Secondary School, with 337 students from the 2nd, 3rd and secondary cycles. Vila Cova is the largest parish in the municipality of Barcelos, with an area of 1,295 hectares, and also one of the most populous. This parish is about ten kilometers from the urban center of Barcelos. It has an area of 15.73 km^2 and 2449 inhabitants (2021 census). Its population density is 155.7 inhabitants/km^2. 2,449 inhabitants.

In the geosocial context, various services and activities are provided here for the populations of the neighboring parishes, who benefit from various facilities and services. The secondary sector is predominant, with the majority of the active population working in a local industry context and agriculture.

The school is also located close to a forest area which might have a significant role in the NbS solutions.

Vila Seca

It is in this rural area that EB 2,3 Abel Varzim is located, with 373 students from the 2nd and 3rd cycles. Vila Seca is a parish in the municipality of Barcelos, with an area of 4.34 km^2 and 1064 inhabitants (2021 census). Its population density is 245.2 inhabitants/km^2. The primary and secondary sectors predominate in this parish, with the majority of the active population working in local services, industry and agriculture.

The Abel Varzim Social, Cultural and Recreational Center, located in Vila Seca, seeks to respond to the needs of the community by providing assistance to children, young people, the elderly, the disabled and developing the cultural, professional, educational and economic-social domains.

Vila Frescaínha S. Pedro

The António Fogaça School Center is located in Vila Frescaínha S. Pedro, close to the historic center and in an urban area. Nearby is the Cávado River, as well as the Azenha River Park. In this Urban area, both the secondary and tertiary sectors predominate, as it is an area with many commercial areas and services.

The school center has 315 pre-school and 1st cycle students. This school has a vegetable garden: they plant to harvest before summer. Vegetables and aromatic herbs cannot be used in the canteen, but they are sold to colleagues as a way of buying seeds for the following year and parents contribute some seeds, plants and pots.

Figure 84A - EB 2,3 Abel Varzim

Figure 84B - EB 2,3 Abel Varzim

Figure 85A: Centro Escolar António Fogaça

Figure 85B - Centro Escolar António Fogaça

Figure 86A - EBS Vila Cova

Figure 86B - EBS Vila Cova

Lessons from the participatory culture

Opportunities and barriers for participatory governance based on T4.2

T4.2 was very useful in identifying the opportunities and barriers we faced in participatory governance, since by defining the methods we would use, in our case mainly exploratory interviews, this allowed us to get closer to the stakeholders in the pilot project and also in the assessment case. This approach put us in a position to consider several issues that were raised and that are very important for the pilot. Understanding the target groups, the methodologies, and the indicators helped us to have a better understanding of the opportunities and challenges we faced. With regard to our pilot project, we can identify the following:

Opportunities:

- people are more likely to be in nature, to appreciate its beauty and benefit from it. There is also a greater awareness of the need to change habits in order to protect the environment. As awareness of the importance of nature and climate change grows, it is becoming increasingly clear that we are inextricably linked to our environment. From pollinating plants to regulating the global climate, nature plays a vital role in our survival and well-being. Climate change, resulting from unsustainable human activities, is exacerbating natural disasters and affecting weather patterns, putting biodiversity at risk. People know to recognize these problems and that it is crucial that we adopt meaningful measures, from mitigating carbon emissions to protecting vulnerable ecosystems, and that by valuing and protecting nature, we are investing in our own future and the well-being of future generations.
- Some nature-related associations have been identified and could be allies in the process of creating and mobilizing the LKL. Parents' associations are also very active and involved. There are projects related to afforestation developed by teachers involved in the pilot, and there are also teachers involved in the pilot that are used to participatory processes**.**
- The sessions to present the pilot project and the TRANS-lighthouses consortium, as well as the thematic workshops that have been developed and which address NbS and climate change, the processes of co-creation, participation and co-governance for participatory budgeting, the importance of play combined with risk and nature, have been valuable and useful as a way of raising awareness and involving the school community.
- The existence of the Municipal Climate Action Plan, especially the Climate risk map - climate risk around schools, is of great importance in providing valuable information to be transmitted to the schools involved in the pilot project.
- The Cávado River Ecological Corridor Master Plan, located close to one of the schools, presents itself as an incentive to enjoy nature more.

Obstacles:

- Convincing people to engage in processes of co-participation, co-creation and co-governance can be a challenge, as many are used to traditional hierarchical structures and may be reluctant to take on a more active role. However, these processes offer a unique opportunity for people to become an active part of the solutions to the challenges they face in their communities and societies.
- Explaining nature-based solutions can be challenging due to their complex nature and the lack of understanding about the benefits they offer. The challenge lies in conveying how nature can be a powerful ally in solving problems, often surpassing conventional technological approaches. Although technology plays an important role, nature-based solutions are often more sustainable, resilient and economically viable in the long term. What's more, for people who are disconnected from nature in their daily lives, it becomes harder for them to understand how it can be a source of solutions. Conveying the importance of nature conservation and its potential to solve problems requires education and raising awareness about the ecosystem services it provides.
- Naturalizing school playgrounds can be a challenge, as many schools are used to concrete structures and standardized playground equipment. However, it is crucial to recognize the benefits of creating more natural environments for children's development. One of the main challenges is changing the mindset around what constitutes a proper school playground. There is often an ingrained belief that traditional playgrounds are safer and more fun, while nature can be seen as unpredictable or dangerous. It is therefore important to educate educators, parents and students about the benefits of exposure to nature, such as improvements in mental health, creativity and problem-solving. In

addition, access to nature can be limited in dense urban areas or in schools with limited budgets. Overcoming these limitations requires creativity.

- Another challenge is to ensure that natural spaces are accessible and inclusive for all children, regardless of their physical or mental abilities. Finally, it is important to involve the children themselves in the process, encouraging them to share their ideas and preferences for the design of the school playground. This not only increases their sense of ownership and connection with the space, but also ensures that it meets their needs and interests. We are doing the reverse of what was done several years ago and implementing NbS in school playgrounds which have almost no nature, requires a change of mentality.

Opportunities and barriers for participatory governance based on the assessment case

The assessment case is located inside the High School of Barcelos. predominantly in urban area. The Barcelos Arboretum is a botanic garden part of the green spaces of the Barcelos Secondary School. It was planted in the autumn/winter of 1986/1987 and includes woody plants restricted to the flora of Portugal mainland. It is organized according to phyto-geographical criteria of the natural forest of mainland Portugal (and not by taxonomic criteria) based on the existence of 5 poles of ecological differentiation, namely: Atlantic, Oro-Atlantic, Thermo-Atlantic, Iberian and Eu-Mediterranean. The arboretum has a didactic objective, such as supporting basic and secondary education in the municipality, as a permanent incentive to defend the natural environment; and promoting knowledge of Portuguese indigenous flora. In one hectare we have 250 different native taxa, including some rarer bulbous plants and larger ferns, totaling 1650 individuals, among trees, shrubs and sub-shrubs.

The Arboretum of High School of Barcelos is a live and interactive knowledge platform that privileges research, investigation and knowledge, open to the local community and other local schools, as a focal point to environmental and science knowledge sharing. The Arboretum has already received several awards. The project will be particularly relevant for the pilot from the perspective of people's interaction with a wide variety of existing species, in the heart of the City of Barcelos, and a source of inspiration for new NbS.

Challenges:

- Maintenance: maintaining the Arboretum involves costs and availability
- Funding: difficulties in acquiring funding for maintenance and new acquisitions
- Opening to the community: Residents can come and visit the arboretum with a guide but there are fewer visits than expected.
- Promotion: more work is needed to publicize the existence of the Arboretum.

Related projects with synergies:

- Project “Adopt a plant from the Arboretum”
- ERASMUS program exchanges
- European Researcher’s Night

Local partners, associations, initiatives and champions engaged:

- Local Schools and teaching community of the involved schools
- Youth associations/groups
- Local municipalities (Barcelos)

- Local cultural and environmental associations

Figure 87A - High School of Barcelos

Figure 87B - High School of Barcelos

Figure 88A - Arboretum - High School of Barcelos

Figure 88B - Arboretum - High School of Barcelos

Figure 89A - Arboretum - High School of Barcelos

Figure 89B- Arboretum - High School of Barcelos

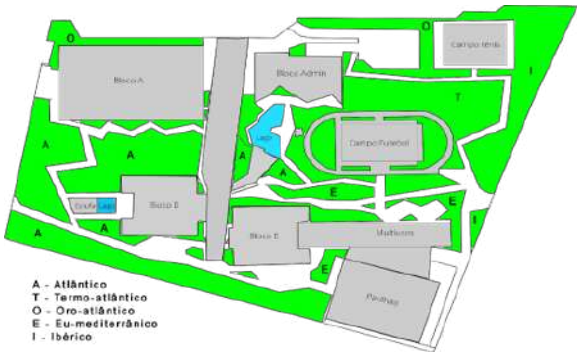


Figure 90A Arboretum Map - High School of Barcelos

Figure 90B - Arboretum Activities- High School of Barcelos

Figure 91A - Arboretum Activities- High School of Barcelos

Figure 91B - Arboretum Activities- High School of Barcelos

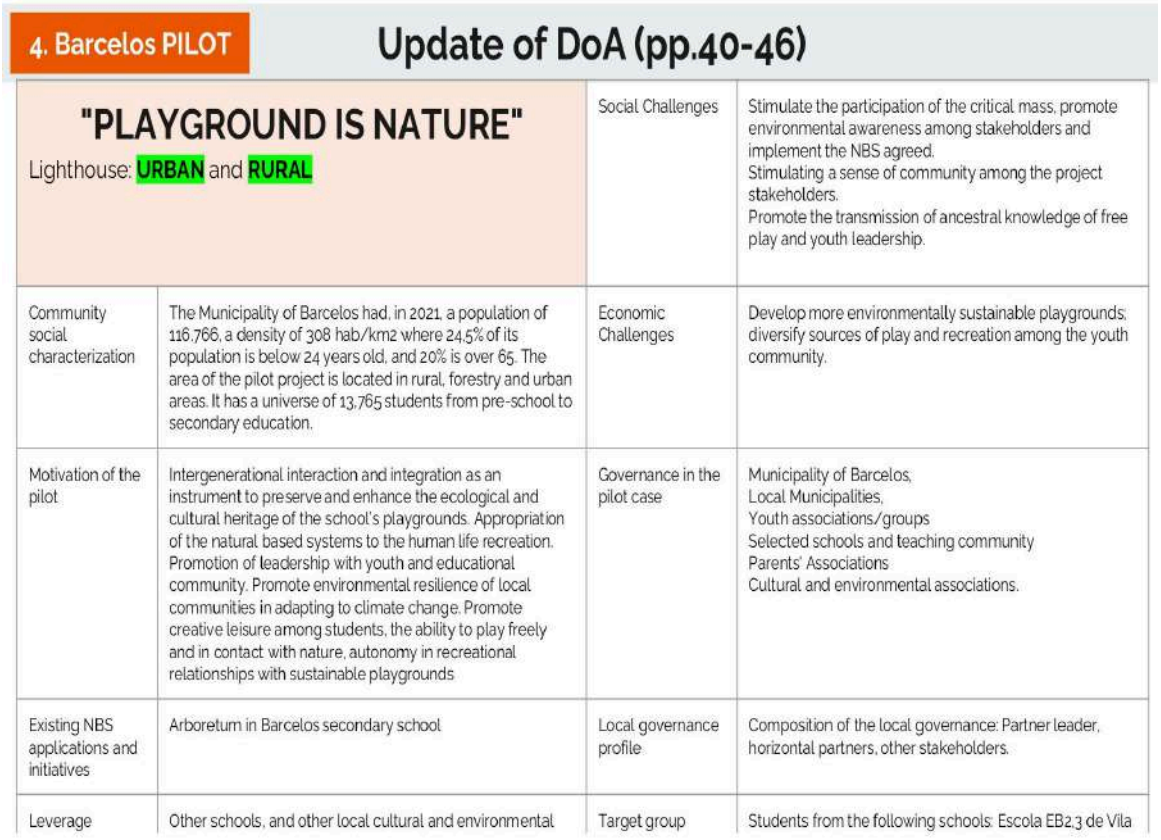
Figure 92 - Arboretum Award- High School of Barcelos

Definition of the pilot case goals

The pilot project is entitled "Playground is Nature" and will be implemented in three schools, in different parishes, in the municipality of Barcelos. As such, the pilot project area is located in rural, forest and urban areas.

The pilot aims to:

- Co-create recreational spaces through Nature-Based Solutions (NbS) and a participatory process involving those who use them (students, teachers and operational assistants).
- To promote intergenerational interaction and integration as an instrument for preserving and enhancing the ecological and cultural heritage of school playgrounds.
- Appropriation of natural systems for human recreation.
- Encourage leadership among young people and the educational community.
- Increase the environmental resilience of local communities in adapting to climate change.
- Provide creative leisure among students, the ability to play freely and in contact with nature, autonomy in recreational relationships with sustainable playgrounds.



4. Barcelos PILOT

Update of DoA (pp.40-46)

"PLAYGROUND IS NATURE" Lighthouse: URBAN and RURAL		Social Challenges	Stimulate the participation of the critical mass, promote environmental awareness among stakeholders and implement the NBS agreed. Stimulating a sense of community among the project stakeholders. Promote the transmission of ancestral knowledge of free play and youth leadership.
Community social characterization	The Municipality of Barcelos had, in 2021, a population of 116.766, a density of 308 hab/km2 where 24,5% of its population is below 24 years old, and 20% is over 65. The area of the pilot project is located in rural, forestry and urban areas. It has a universe of 13.765 students from pre-school to secondary education.	Economic Challenges	Develop more environmentally sustainable playgrounds; diversify sources of play and recreation among the youth community.
Motivation of the pilot	Intergenerational interaction and integration as an instrument to preserve and enhance the ecological and cultural heritage of the school's playgrounds. Appropriation of the natural based systems to the human life recreation. Promotion of leadership with youth and educational community. Promote environmental resilience of local communities in adapting to climate change. Promote creative leisure among students, the ability to play freely and in contact with nature, autonomy in recreational relationships with sustainable playgrounds	Governance in the pilot case	Municipality of Barcelos; Local Municipalities; Youth associations/groups Selected schools and teaching community Parents' Associations Cultural and environmental associations.
Existing NBS applications and initiatives	Arboretum in Barcelos secondary school	Local governance profile	Composition of the local governance: Partner leader, horizontal partners, other stakeholders.
Leverage	Other schools, and other local cultural and environmental	Target group	Students from the following schools: Escola EB2,3 de Vila

Figure 93 - Powerpoint Barcelos Pilot - A

4. Barcelos PILOT

Additional information

"PLAYGROUND IS NATURE" Lighthouse: URBAN and RURAL	
Challenges raised during the preparatory meetings	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.
Who owns the land?	Mostly public land
Related projects to create synergies	Workshop "Learning to play and playing to learn" and KIT of traditional playground games made available to all Pre-school and 1st cycle Basic Education classrooms.
Possible local partners, associations, initiatives and champions to be engaged	Local Schools and teaching community of the involved schools Youth associations/groups Local municipalities (Vila Seca, Vila Cova, Vila Frescainha São Pedro) Local cultural and environmental associations Parents associations

Figure 94 - Powerpoint Barcelos Pilot - B

Ecological challenges

Ecological goals and description of the NbS

The main goals on the implementation of NbS in the school's is to promote biodiversity, and climate adaptation, mitigation and resilience in the playground areas. The primary intention of this initiative is to enhance and integrate the ecosystems of school surroundings in a sustainable approach into the daily playground activities of the students.
The main ecological problem of our pilot projects is the lack of nature inside the school areas and loss of biodiversity in general. The pilot schools are significantly aseptic and with artificial structures, significantly impermeabilized with concrete and asphalt and other artificial structures which lack natural shadow areas. The climate change scenarios and the projected increase of temperature, heat waves, and heavy rain might have a significant impact on the ability of students to freely and safely enjoy playgrounds. This pilot project will allow the schools community (students, heatcherts, educators, and staff members) to decide on what natural based solutions are more suitable and adapted to the needs and expectations. The selection of NbS should consider, as much as possible, the integration of the ecological and climate issues: enhancement of ecosystems, promotion of biodiversity, climate resilience (mainly: temperature, heat waves and heavy rains) and climate mitigation (energy efficiency, carbon capture and reduction of cartoon emissions).

Local values and attitudes towards the ecological challenges

In the last decades we have observed an artificialization and impermeabilization of schools grounds and playground areas. One of the main challenges is to promote and explain, among the community, the benefits of the renaturalization of school grounds and in particular the playground areas. Another challenge is to adapt the information to the geographical areas of the different

pilots to the needs and expectations and perceptions of the communities located in the urban, rural and forest areas.
We also identified a poor understanding on the part of the educational community of the benefits of NbS in schools. They consider it to be dangerous in terms of exposing pupils to natural ecosystems: trees, insects, plants, grass, etc.
We have to take into account local social interaction and behavioral aspects: attitudes, habits, behaviors, resistance and fundamental values of the community in relation to NbS and the ecological context or climate change, and try to break down the barriers that hinder the implementation of NbS. Seek to emphasize experience and socio-cultural knowledge, bearing in mind the LKL's focus on the diversity of knowledge mobilized in the context of NbS implementation.

Socio-economic challenges

Identification of marginalized knowledges and of needs of marginalized groups

Since our pilot will be developed in school institutions, identifying marginalized knowledge and their needs is not applicable, as schools play a crucial role in promoting equality, equity and inclusion of marginalized groups. By providing quality education for all students, regardless of their ethnic, social, economic or other background, Schools contribute to reducing disparities and creating equitable opportunities for success.

In addition, schools can implement specific policies and programmes to meet the needs of marginalized groups, such as inclusive education programmes for students with special needs, support programmes for low-income students or intercultural education programmes for students from different ethnic or cultural backgrounds. By creating an inclusive and welcoming school environment where all students feel valued and respected, schools not only promote equality and fairness, but also contribute to the development of a fairer and more inclusive society as a whole.
As such, everyone will have an active voice and participation in the pilot process, regardless of their socio-economic status, age, gender, ethnicity, race or culture.

Identification of presences and absences

Nature-based solutions can make urban regeneration inclusive by creating economic opportunities with marginalized or disadvantaged groups, such as the long-term unemployed, at-risk youth or people with disabilities. These businesses can offer training, decent jobs and participation in the local economy, allowing these groups to access resources and opportunities they wouldn't otherwise have.
In addition, NbS often adopt a solidarity economy approach, which focuses on cooperation, fair distribution of resources and democratic decision-making. This contributes to the sharing economy by promoting the creation of networks and value chains based on collaboration and concern for the well-being of all those involved. This approach can generate sustainable jobs, strengthen the local community and promote more equitable and sustainable urban development.
However, specifically in our pilot, the NbS will be implemented in school playgrounds, and are outside the scope of the social solidarity economy, so it is not possible for us to identify absences and presences, or their approach to sustained or introduced inequality.

However, when implementing the NbS, designed and conceived in a co-creation model, we will endeavor to take into account economic models that value a social and solidarity economy.

2. Collecting the required knowledges for the Living Knowledge Lab

Creating relationships with partners

Networking and exploratory activities in territory

To recognize the territory, visits were made to the schools where nature-based solutions will be implemented. It was recognized that the playgrounds in the schools involved in the pilot project are not natural. In fact, in the last three decades, with the emergence of school centers, there has been a trend towards the creation of very artificial playgrounds.
We conducted interviews with school directors with the aim of identifying the motivation for involvement in the pilot project, the relationship between the school and its stakeholders and nature, the activities carried out, local associations with activities related to nature.
Awareness workshops are being held to raise awareness about nature-based solutions and their relationship with climate change.
Since it was identified that interested parties have little experience in co-creation, participation and co-governance processes that are essential for the effectiveness of the implementation of participatory budgeting, workshops with this theme are also scheduled to bring important knowledge to the development of the pilot.
In the interviews carried out, we also identified that there is a lot of protection and some fear that students are taking risks when playing during school breaks. However, controlled risk during play is essential for children's learning and development of autonomy. Playing stimulates imagination, creativity and problem solving, as well as promoting social interaction and the development of motor skills. Facing moderate challenges and overcoming obstacles helps children develop risk assessment, decision-making and self-confidence skills. Contact with nature offers a variety of sensory stimuli and opportunities for exploration and discovery.
With the aim of creating awareness of the importance of playing in nature and with controlled risk, workshops will be held on this topic. All these awareness-raising actions, in addition to bringing more knowledge about the different themes present in the pilot, provide greater involvement of all actors belonging to the educational ecosystem, from principals, teachers, staff, parents and students.

Figure 95A - Workshop Participatory methods and Participatory Budgeting
Escola EB 2,3 Abel Varzim - A

Figure 95B - Workshop NbS and Climate Changes
Centro Escolar António Fogaça - A

Figure 96A - Workshop NbS and Climate Changes
Escola EB 2,3 Abel Varzim - A

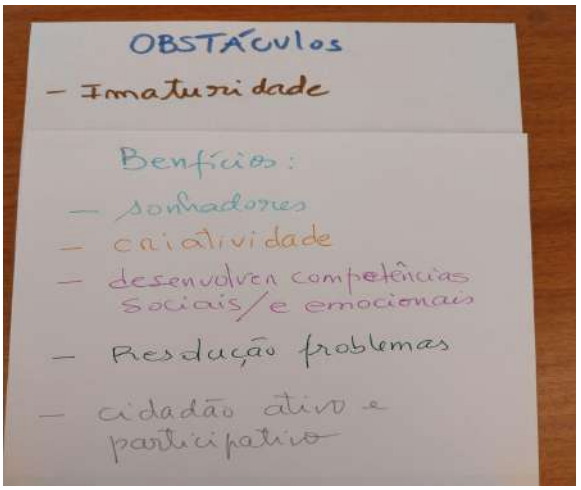


Figure 96B - Workshop Participatory methods and Participatory Budgeting
Escola EB 2,3 Abel Varzim - B

Figure 97A - Workshop NbS and Climate Changes
Escola EB 2,3 Abel Varzim - B

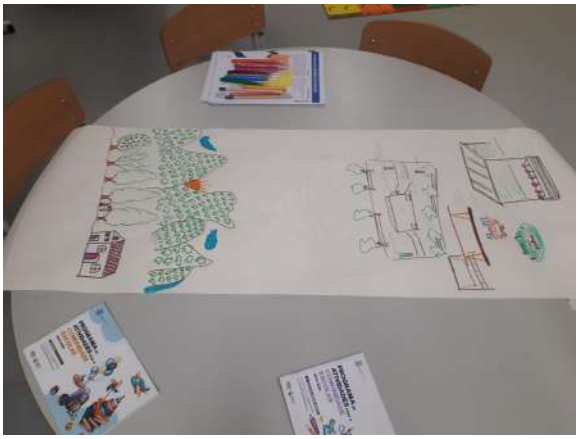


Figure 97B - Workshop NbS and Climate Changes
Centro Escolar António Fogaça - B

Figure 98A - Workshop NbS and Climate Changes
Escola EB 2,3 Abel Varzim - C

Figure 98B - Workshop NbS and Climate Changes
EBS Vila Cova - A

Figure 99A - Workshop NbS and Climate Changes
EBS Vila Cova - B

Figure 99B - Workshop NbS and Climate Changes
EBS Vila Cova - C

Bringing members/stakeholders in the LKL

The stakeholders involved in the pilot are the school headmasters, coordinators and teachers, students, operational staff, parents, parish councils and local associations.

It is important to give an active voice to everyone involved, but especially to students, as we want ideas for nature-based solutions to come from them, as they are the main users of school playgrounds. Teachers will have a fundamental and guiding role towards students based on the training we will provide them on the subject.

Also operational staff play a key role in promoting healthy, inclusive, and nature-connected schools and institutional environments. Training will be carried out with the aim of promoting training to equip them with the necessary skills and knowledge on the pilot themes. Addressing topics such as nature-based solutions and their relationship with climate change, allows operational staff to provide fundamental knowledge that guides the construction of a promising path to face climate change in a sustainable way, in order to promote the co-creation of recreational spaces, with those who use them (students, teachers, operational staff) and with the inclusion of Nature-based Solutions, as well as bringing an understanding of play, risk and nature

as interconnected elements, the role they play in the healthy development of children and their integration into school recess as a way of promoting valuable learning experiences.
It is also important to involve parents, especially to make them aware of what nature-based solutions are and how they can be implemented in school playgrounds, as well as the basis for the importance of playing in childhood, and how nature can be a source of sensory stimulation and provide opportunities for exploration and discovery.
Good relationships with directors and the entire extended team are essential to always maintain effective communication, so that the entire process is inclusive and transparent.
Parish councils and local associations will play a supporting role in the development and implementation of the pilot.

Inclusion of marginalized knowledges

Since our pilot will be developed in school institutions, the inclusion of marginalized knowledge is represented, as schools play a crucial role in promoting equality, equity and inclusion of marginalized groups. By providing a quality education to all students, regardless of their ethnic, social, economic or other background, schools contribute to reducing disparities and creating equitable opportunities for success.
As such, everyone will be included in the pilot project process, regardless of their socioeconomic status, age, gender, ethnicity, race or culture.
As the project progresses, we will be more aware of whether difficulties arise and what experiences are relevant with these groups.

Inclusion of youth

In our pilot project, young people play a fundamental role, as the pilot will be implemented in three schools, more specifically in the school playgrounds that young people enjoy. We have three schools involved with students at different educational levels. The António Fogaça School Center has pre-school and first cycle students, aged between 3 and 10 years old. Escola Básica 2,3 Abel Varzim has second and third cycle students, aged between 10 and 15 years old. The Vila Cova Basic and Secondary School has second and third cycle students, as well as secondary students, ranging in age from 10 to 18 years old.
Students will have training on the subject of nature-based solutions and climate change, as well as on participatory budgeting in order to present their campaigns for the NbS ideas they intend to implement.
Some students from EB 2,3 Abel Varzim and EBS de Vila Cova will attend training in digital content, in order to train and involve young people in creating content for the website about the pilot project of which they are part, encouraging them to share their experiences and perspectives. This training will also have a face-to-face component, in Trento, Italy.

Relationship with and view of nature (human-nature relationship)

In the last three decades, with the creation of school centers, we have seen a growing artificialization of playgrounds and school environments. And now we're doing the reverse process, which is a challenge. There has been a national standardization of the school model and no concern about adapting it to the location of each school. This has also created a distancing of our stakeholders from the concept of nature within schools.

In our pilot, nature must take center stage as a stakeholder so that the surrounding ecosystems are respected. It is essential that the Nature-Based Solutions implemented are compatible with the surrounding territory from a phytosociological point of view, with climate change being taken into account. Nature must have an active voice and the challenge is for stakeholders and the community to hear this voice.

Strategy and actions for the LKL

Mistrust between population and municipality *A good relationship is essential, as is transparent communication.*	Enabling new ideas and practices next to old ones *It is desirable and possible that alongside already implemented ideas and practices, there is room for the creation of new ideas, new practices, new beliefs.*	Overcoming power relationships *The pedagogical autonomy of school groups will be a challenge to overcome with regard to power relations.*
Ensuring representativity of stakeholders and inclusion of knowledges *With the inclusion of staff, students and parents we will seek to ensure representation as well as the inclusion of knowledge that they can bring.*	Enabling local groups to take ownership *The idea is precisely that the local groups, namely the pilot schools, have an active voice and make decisions about the implementation of the project, and that's what we're working towards.*	Definition of pilot case *will be measured by evaluating the effectiveness and viability of small-scale implementation*
Ensuring continuity in a changing political landscape *It can be a challenge to ensure continuity, as in addition to the political scenario there may also be changes in the governance of school.* *In all the actions we have carried out with the pilot schools, we have tried to convey the important idea that the project has continuity beyond the individuals. This is a major challenge, since not only can the political landscape change, but the teachers involved themselves often change schools every school year.*	How to create social inclusion and long lasting social cohesion in the local community (no one left behind). *It is the duty of schools to seek to ensure inclusion and equity. However, in the actions we are planning for the next school year, we have plans to involve the community as much as possible, such as parents and associations that can contribute to the project.*	What is to be unlearned from present approaches of co-governance *The decision hierarchy and the power to redefine from scratch*
What is to be unlearned and learned between the LKL members	How can members be approached and motivated, what do the stakeholders want and what can they gain?	What is to be learned in the new LKL regarding absences and unlearned regarding presences.

The continuity of projects beyond people	- *better quality of life* - *better conditions for educational success* - *new values related to sustainability* - *perception of climate issues*	- *no data*

3. Formalizing the LKL

Creating cooperation, understanding and dialogue

Registration of activities

In formalizing the LKL, we have been developing workshops to raise awareness of the issues surrounding our pilot, such as Nature-Based Solutions, participatory models and participatory budgeting, and playing in nature and its relationship with risk. Attendance at the workshops in the pilot schools has been very positive, involving everyone from teachers to the staff. In September, with the start of the new school year, we will begin another set of actions, this time also involving students and parents.

Workshop	Pilot School	Date / Timetable
NbS and Climate Changes	Centro Escolar António Fogaça	27/03/2024 - 9h30 - 12h30
Participatory Methods and Participatory Budget	Centro Escolar António Fogaça	07/05/2024 - 17h - 20h
Play, Risk and Nature	Centro Escolar António Fogaça	29/05/2024 - 17h - 20h
NbS and Climate Changes	EB 2,3 Abel Varzim	27/03/2024 - 14h30 - 17h30
Participatory Methods and Participatory Budget	EB 2,3 Abel Varzim	08/05/2024 - 14h30 - 17h30
Play, Risk and Nature	EB 2,3 Abel Varzim	22/05/2024 - 14h30 - 17h30
NbS and Climate Changes	EBS Vila Cova	22/05/2024 - 14h30 - 17h30
Participatory Methods and Participatory Budget	EBS Vila Cova	12/06/2024 - 14h30 - 17h30
Play, Risk and Nature	EBS Vila Cova	19/06/2024 - 14h30 - 17h30

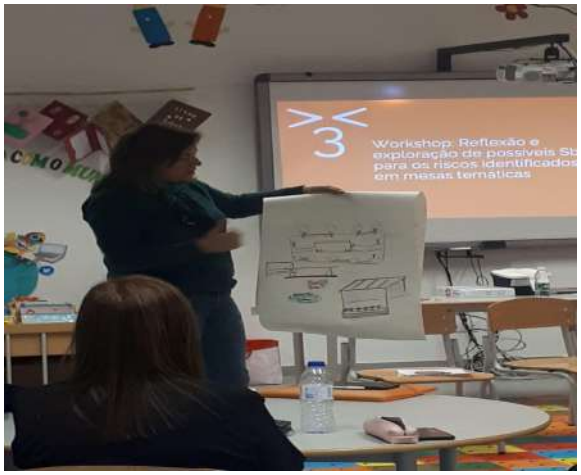


Figure 100A - Workshop NbS and Climate Changes
Centro Escolar António Fogaça

Figure 100B - Workshop Participatory methods and Participatory Budgeting
Escola EB 2,3 Abel Varzim - C

Figure 100C- Workshop NbS and Climate Changes
Centro Escolar António Fogaça

Figure 100D- Workshop NbS and Climate Changes
EBS Vila Cova - A

Figure 101A- Workshop NbS and Climate Changes
EBS Vila Cova - B

Figure 101B- Workshop NbS and Climate Changes
EBS Vila Cova - C

Results of the activities and dialogue opportunities

The awareness raising activities for the themes of the pilot project will take place mainly at the end of June and it will only be at the beginning of September 2024 that the training workshops for teachers will take place, which will contribute to fueling the living laboratory of knowledge. We still lack data to fill in this topic.

Social mobilization and engagement

Registration of activities

The awareness raising activities for the themes of the pilot project will take place mainly at the end of June and it will only be at the beginning of September 2024 that the training workshops for teachers will take place, which will contribute to fueling the living laboratory of knowledge. We still lack data to fill in this topic.

Results of the activities for social mobilization and engagement

The awareness raising activities for the themes of the pilot project will take place mainly at the end of June and it will only be at the beginning of September 2024 that the training workshops for teachers will take place, which will contribute to fueling the living laboratory of knowledge. We still lack data to fill in this topic.

Creating a structure for participatory governance

Description of the co-governance model

The pilot project in Barcelos defined the co-governance model as involving those who are present in school playgrounds, such as students, operational assistants and teachers. We are also considering extending the model to parents and parish councils.

Establishing a modus operandi

Our modus operandis is to hold training workshops so that participatory budgeting can then be successfully implemented, giving students an active voice. These workshops will only begin in September with the start of the new school year.

Monitoring and constant reevaluation

It will require a capacity for continuous adaptation and flexibility so that we can respond to new circumstances and unforeseen events.

Estarreja Pilot

Authors:
Eduardo Mendes (CME)

1. Exploration of the territory, its actors and challenges

Description of the territory

Territorial description

Micro: territory of pilot case

Estarreja is a council located in the coastal zone of the Center-North of Portugal, part of the Aveiro District and sub-region of Baixo Vouga, and belongs to the NW zone of NUT II – Center Region. The council is bordered by the municipality of Ovar to the North/Northwest, Aveiro to the South, Murtosa to the West, and Albergaria-a-Velha to the East. It covers an area of 108 km2, hosting a population of 26 584 individuals, translating into a population density of 246 ind./km2 (Censos 2021). Since 2013 the council has been divided into five parishes, namely Avanca, Pardilhó, Salreu, União de Freguesias de Beduído e Veiros and União de Freguesias de Canelas e Fermelã. The majority of the council spreads on a rural matrix, in which residential areas interconnect with gardens, crop fields, pastures and production forests. Bordering Estarreja to the West is a large coastal lagoon – Ria de Aveiro -, which is one of the most important wetlands in northern Portugal in terms of natural values, biodiversity and ecosystem services. As an integral part of the wetland, there are several natural habitats that are not only vital for the survival of several animal species, but also play an important role in maintaining water and environmental quality. For this reason, the Aveiro Lagoon is included in the Natura 2000 network, and classified as a Special Area of Conservation and a Special Protection Area for birds.

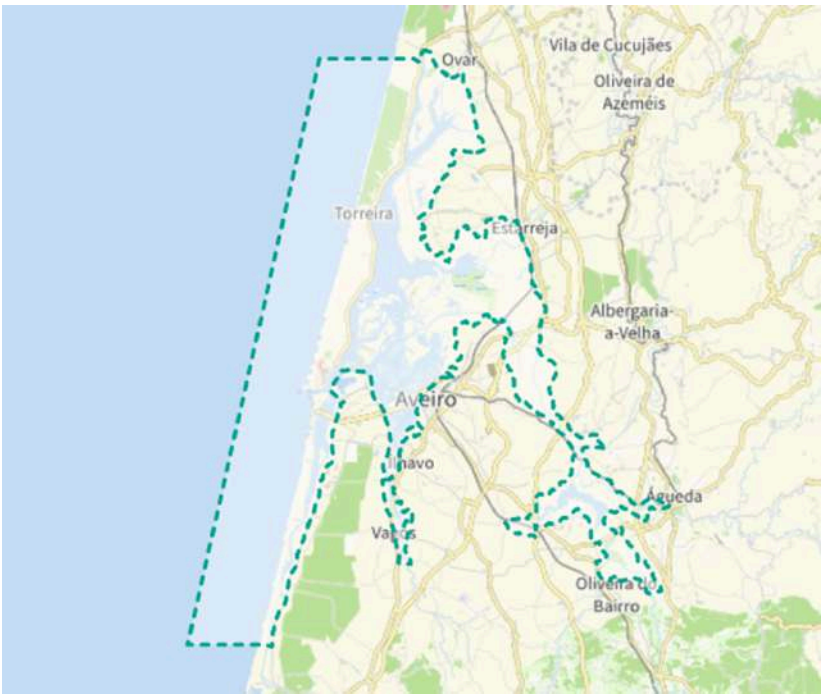


Figure 102 – Map of the Ria de Aveiro Natura 2000 site. (https://biodiversity.europa.eu/)

The area of the pilot case illustrated on the figure below covers all the parishes in the council of Estarreja, focused on places with the presence of natural and cultural values. Taking into account the hypsometry and land use, three main parts can be defined in the municipality of Estareja: to the west, a low-altitude and flat area, partly influenced by the Aveiro Lagoon; an intermediate area, which contains most of the residential areas, interspersed with gardens and crop fields; and to the east, an area with higher altitudes and relief, where production forest dominates, with some farming and residential areas.

Figure 103 – Administrative boundaries of the Estarreja council and its five parishes. Source: SIG Estarreja,

In the flatter area, the presence of fresh and brackish water from the rivers and coastal lagoon determines a great diversity of habitats and biodiversity, namely natural wetland habitats such as marshlands, reedbeds and rushes, and farming landscapes like cropfields, pastures and the *Bocage* - a mosaic landscape composed of small cropfields and pastures, separated by live fences of autochthonous trees, shrub and herb hedgerows, and by a dense network of narrow waterways. Most of these lowlands are part of the Natura 2000 mentioned above (Figure 1).

The intermediate part of the council holds most of its residential areas, mostly organized on a rural matrix in which gardens and cropfields (mostly maize fields) are frequent. However it also includes the urban center of Estarreja, as well as industrial areas such as the EcoParque and the Chemical Complex.

To the east, in addition to the housing areas, organized in clusters of varying density, the main landscape units are forest crops, consisting essentially of eucalyptus monocultures, and some farming fields mostly occupied with maize.

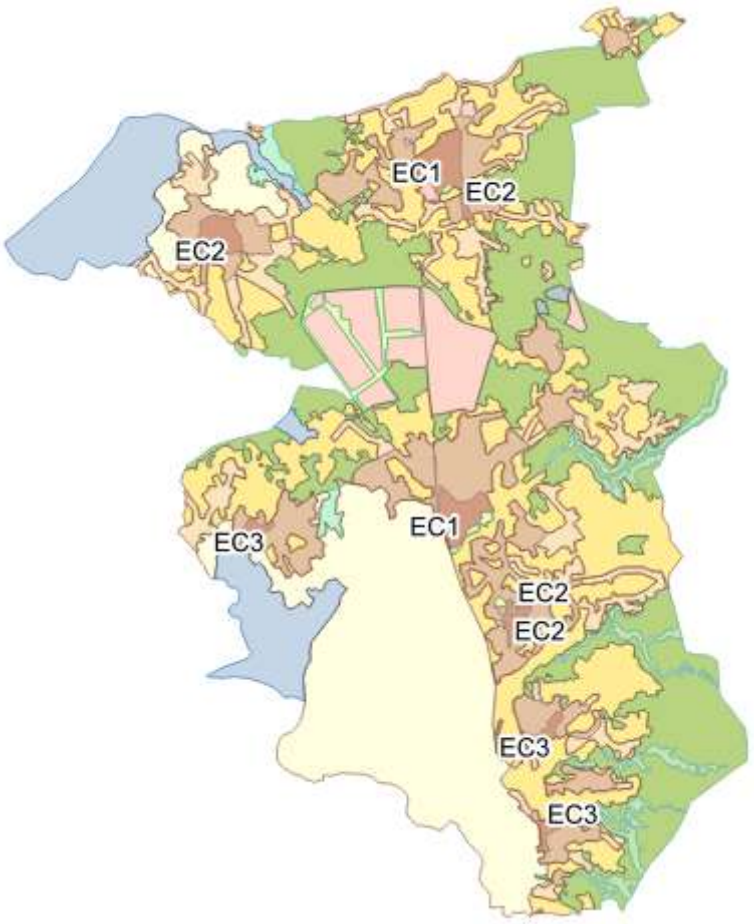


Figure 104 - Main land use in Estarreja territory. Legend: green - production forests, light green – conservation forests; yellow - farming areas; dark brown - urban centers; light brown – residential areas; beige – low-density residential areas; pink – business areas; eggshell – other farming areas; blue – lagoon (Ria de Aveiro). EC stands for Central Spaces [Espaços Centrais], levels 1 (council-focused commerce and services) to 3 (site-focused commerce and services). Source: SIG Estarreja,

Uniting all areas and crossing the council are several freshwater watercourses, essential for local biodiversity and various activities carried out in the territory, especially agriculture and livestock production. The Antuã River is the largest among these watercourses, and crosses the city of Estareja, ending up in the Aveiro Lagoon.

Socio-economic description

Micro: territory of pilot case

Estarreja council has a total population of 26 584 individuals, and a population density of 246 ind/km2 (Censos 2021). The council is divided into five parishes, whose population is of 6 189 residents in Avanca, 4 176 in Pardilhó, 3 815 in Salreu, 10 047 in União de Freguesias de Beduído e Veiros and 2 770 in União de Freguesias de Canelas e Fermelã (as of 2011). Most of the population lives in the parishes of Avanca and U.F. de Beduído e Veiros, in which are found the main urban features of the council, and thus the highest population densities.

In terms of age groups, and as of 2017, 65,83% of the population was between 15 and 64 yo, 21,25% over 65 yo, and 12,92% below 14 yo. The tendency in the previous years was a general population decline, with a significant 14,53% reduction in the 0-14 yo group. In the same year, the council had a negative population growth rate, with a crude birth rate of 0,71%, and a mortality rate of 1,33%.

This tendency was maintained in the recent past, and in 2022 crude birth rate was 0,79% and mortality rate was 1,28%. Aging index has increased in the last two decades, from 100,6 in 2001 to 185,6 in 2021, surpassing the increase registered for the Aveiro Region. However, in the last decade a significant increase was registered in life expectancy in the council, consistently surpassing the values registered for mainland Portugal, which were 79 years in 2010-2012, and 81,07 in 2020-2022.

In terms of education, in 2022 there were 3 888 students enrolled in compulsory education in Estarreja, namely 685 in pre-school, 933 on 1st Cycle (1st to 4th grades), 520 on the 2nd Cycle (5th to 6th grades), 886 on the 3rd Cycle (7th to 9th grades) and 864 on Secondary School (10th to 12th grades). Regarding gender, there were 2 057 male students and 1 831 female. Currently there are 15 educational establishments with pre-school classes (46.7% of them public), eight establishments with 1st Cycle of elementary school (87,5% public), and three with 2nd Cycle, three with 3rd Cycle, and one with Secondary education, all of them public. The number of teachers in the council was 401 in the school year of 2020/21, 10% less than in 2011/12. There are no institutions of higher education in the council.

The Social Development Plan of Estarreja (2019) identified the following as some of the main challenges regarding education in the council:

- Low educational and qualification levels, inadequate to the market;
- lack of educational offer, that results in youth searching for options outside of the council;
- Absenteeism and school abandonment.

In 2021, Estarreja had an illiteracy rate of 2,66%, reflecting a decrease from the values registered in 2011 (4,2%). These are lower than the values registered for mainland Portugal, but still higher than those of the Aveiro Region. The proportion of the population by level of education in Estarreja was, in 2021: 12,61% none, 25,02% 1st cycle, 13,53% 2nd cycle, 17,22% 3rd cycle, 19,97% secondary, and 11,65% higher education.

Regarding housing, in 2021 it was identified that in Estarreja 20% of residential buildings were built prior to 1960, and 29,78% between 1961-1980, higher proportions than the ones verified for the region and mainland Portugal. Considering all buildings, 75,24% were used as primary habitation, 10,33% as a secondary habitation, and 9,23% of residential buildings in the council are vacant, for different reasons. Private ownership is clearly dominant, with 77,77% of buildings being privately owned, and 15,01% rented.

Mostly due to its privileged location, close to Aveiro harbor and several industrial areas, as well as for its good accesses, Estarreja is characterized by a strong business dynamism, recognized both at national and international levels. The chemical industry is of high significance, and recently several other industries were created in order to efficiently use its secondary and waste products. Besides that, the diversification of industrial production and businesses was a strategic goal, and thus the Eco-Parque and Business Incubator were created. In 2016 there were 24,6 companies/km^2 and 25,5 establishments/km^2, being the majority composed of less than 10 workers (96,4% and 96%), and 77,32% of the businesses were individual. In the same year, local establishments and companies employed 10 712 and 8 121 people, respectively.

Most of the working population in Estarreja and the Aveiro Region works in the tertiary sector, followed by the secondary sector and, with a much smaller proportion, the primary sector. The average monthly income of the employed population in the Aveiro Region, according to the

National Institute of Statistics, has been gradually increasing over the past few years. However, this does not reflect purchasing power, as it does not account for inflation. The average monthly income in Estarreja grew from €1104,98 in 2017 to €1349.15 in 2021, and is now the highest within the Aveiro Region. The historical reference of higher average earnings among the male population compared to the female population remains evident today. In 2021, in the Aveiro Region, the average monthly earnings of male workers were €276.59 higher than the average earnings of female workers. Global unemployment rate in Estarreja in 2021 was 6,24%, being 5,49% in male population and 7,09% in female population. From 2001 to 2021, beneficiaries of the Social Integration Income decreased by 29,25%, from 1118 to 791, and in 2022 34,17 inhabitants per 1000 received this income. Following the national and regional tendencies due to population aging, the number of pensioners has increased and in 2021, 344,46 inhabitants per 1000 were pensioners.

Criminality has decreased in the recent past, although with a slight increase in 2022, possibly influenced by the pandemic, resulting in a criminality rate of 7,5‰ regarding crimes against physical integrity, and 3,4‰ regarding driving under the influence of alcohol.

Regarding ethnic diversity, Estarreja hosts a significant Roma community(gipsies). However, to our knowledge, there is no data available on their social statistics. In the last decade an increase in migration to Estarreja has been felt, and the foreign population has more than doubled, increasing from 1,1% of the total population of the council in 2011 to 3,1% in 2022. In 2021, the most frequent nationalities among the foreign residents in Estarreja were Brazilian, Venezuelan, Indian – reflecting the statistics registered in other municipalities of the Aveiro district -, as well as Nepalese and Chinese.

Lessons from the participatory culture

Opportunities and barriers for participatory governance based on T4.2

The major opportunity is the pilot case itself, as a nature conservation strategy opened to the process of co-creation. It's a pioneer strategy which enables the participation of diverging and different stakeholders, opening the opportunity to improve the participation culture within the council, and to establish a multidisciplinary approach to territory management. It will allow participation in the development of strategies and plans, and at the same time the co-creation of activities related to the conservation of nature and the local cultural dimensions attached to it. This will additionally be an opportunity not only to trigger participation, but to implement actions and deliver results (outcomes), which will help build trust regarding participatory approaches and its effectiveness.

The presence of environmental NGOs, and the close relationship established between the municipality and them, may help build a different way of interacting with nature. Some relations with other key stakeholders are also already present, due to the development of municipal initiatives/events that require collaborative work with schools, farmers, landowners, etc. These may boost stakeholder and citizen engagement. Identified champions may also facilitate the engagement/representation of farmers, livestock and timber producers, among others.

Incorporating environmental NGOs in the participatory process, as well as the technical vision from municipal technicians and universities, will ensure the presence of Nature in the discussion, based on scientific and practical knowledges, thus strengthening the point of view of biodiversity preservation.

The further involvement of schools will be needed, which may result in the opportunity of boosting participatory culture in adolescents and youth, and improve their relationship and knowledge about nature and local biodiversity. The several existing/former projects with schools, especially in the field of environmental education, may facilitate the engagement of this stakeholder and target-group.

Due to the broad-focus of the pilot case and consequent diversity of stakeholders involved, several barriers and obstacles may appear, and were already highlighted during the interviews developed under Task 4.2. The main barriers identified, and mentioned by several interviewees, were the lack of participatory culture in the council, and the mistrust regarding participatory approaches and its effectiveness (e.g. lack of practical outcomes). Because of this, and directly linked to it, it can be inferred that another main barrier may be the successful engagement and mobilization of stakeholders. Furthermore, since we aim to implement a participatory process focused on nature conservation, which may be seen as a niche topic by itself, mobilization may be even more challenging and participation slimmer. Also, the most frequent relationship with nature observed in the council is mostly based on an extractivist approach, which can result in a weak mobilization towards the protection and conservation of natural values.

Nevertheless, mapping allowed the identification of different champions, relevant at local or council levels, with different backgrounds and areas of influence, that may be crucial in the engagement and mobilization of some key actors. Due to the good professional relationship already established with some of these champions, their engagement may become easy. However, as they have significantly different profiles, some may prove challenging to engage,

especially due to their personality, background, vision, or negative perception of the municipality or participatory approaches in general.

Although one of the main conclusions achieved through the analysis of T4.2 interviews is that participatory culture in Estarreja is weak, and that participatory approaches are scarce and often allowing only limited participation, some relevant projects and initiatives that use participatory approaches in the council were identified. Even though most of them are cultural initiatives, some lessons learned can be used, and some inspiration can be taken out of them and applied in a NbS scenario. The collaboration with some cultural entities in the council, and the establishment of new partnerships, may also provide the opportunity of further engaging and mobilizing different target groups within the citizens.

Opportunities and barriers for participatory governance based on the assessment case

The assessment case of the Municipality of Estarreja is BioRia, a municipal program focused on Nature Tourism, Environmental Education and Biodiversity Conservation.

BioRia was created in 2004 under the motto "know, in order to protect", with the main goal of promoting and communicating Estarreja's natural patrimony. With the implementation of 8 free-entry trails, located in all of the council's parishes, BioRia invites citizens, students and tourists to explore the territory, from natural ecosystems to farming landscapes and residential areas. This initiative evolved throughout the last two decades, and is currently an undeniable brand in the region. In a summarized overview, within the scope of BioRia, hundreds of environmental education activities were developed in the field, both for the general public and for schools. The relationship with the latter is especially relevant, since several activities are developed every year with students from pre-school to secondary, not only from local schools, but also from different locations in the country, as well as students and researchers from universities.

Other specific actions promoted by the municipality, or resulting from collaborations with social NGO's, also enabled the inclusion of elders, people with disabilities and ethnic minorities (e.g. Roma people, migrants) in these educational, awareness and sporting/leisure activities throughout the years. Besides this, several independent or volunteer-based initiatives have been developed regarding ecosystem restoration, invasive species control, forestation, among others. Two big events in Estarreja are developed within the scope of BioRia: ObservaRia – a Nature Tourism and Birdwatching Fair, and BioRace – an obstacle run, developed in the agricultural landscapes of the BioRia trails, both following the main goal of the project of promoting the region's natural patrimony.

Considering the above mentioned, BioRia provides several good examples in terms of NBS results and outcomes, and the involvement of different types of public and target-groups in activities and initiatives centered around nature and biodiversity. The collaborations established with different actors in the territory are also a positive outcome of the project, as engagement for the pilot case may be easier.

Lastly, BioRia is an example of the political impacts that an NBS may provide, as it actually changed the public perception of Estarreja, increasingly recognized for its natural heritage rather than its industry and respective environmental impacts, which were for decades the main traits attributed to the council.

Due to the private ownership of the land, even in the Natura 2000 area, working with land-owners, farmers, timber and livestock producers is crucial, but it has been a challenge difficult to surpass. The different visions, interests and ideas for the territory are a barrier to collaborative work, and thus the conservation of natural values have suffered recently due to a lack of strategy and multi-disciplinary approaches. Also, and despite that BioRia has successfully involved several target-groups in its activities and initiatives, there is a lack of participation by the citizens in decision-making and structuring of the program. This would probably boost a sense of belonging, and further involve citizens with nature topics. Additionally, and even though different activities were developed throughout the years with different goals and focus, most of them have more pedagogic/informative approaches, lacking space for discussion and exchange of knowledges.

Definition of the pilot case goals

The pilot case was born from the environmental degradation felt in the last decade in the council of Estarreja, caused essentially by a lack of a management strategy for the territory that envisions all interests of its main actors. Since the majority of the territory is privately owned, land-owners, farmers, livestock producers, foresters, conservationists, hunters and fishermen, etc., have all been working towards their individual goals, frequently harming one another, and especially harming local natural values, resulting in a loss of habitats and associated biodiversity and ecosystem services.

The main goal of the pilot case was from the beginning the preservation and promotion of Estarreja's biodiversity, but actually changed slightly since the start of the TRANS-lighthouses project.

Initially, and after an internal collaborative work, the main goal of the pilot case was set at the co-creation of a local classified area, namely the BioRia Natural Park. This classification process would be initiated and coordinated by the Municipality, supported by Portuguese legislation, in particular by Decree-Law no. 19/93, from January 23rd. However, we intended to include in the process several partners that would represent key stakeholders and reflect the different interests and visions for the territory, working collaboratively. Participatory approaches would be used throughout the entire process, in order to create a space for discussion and knowledge-sharing, ultimately resulting in the co-creation of the classified area regulations, co-implementation of measures, and the set up of a co-governance model.

However, as TRANS-lighthouses meetings and workshops took place, and after discussion among the teams from Centro de Estudos Sociais de Coimbra and the Municipality of Estarreja, we understood that by starting the process from this premise, we would be reducing the possibility of key stakeholders to take part in decision-making, and choosing a solution that might not be considered as the best by some of them. Therefore, we decided to take a step-back, and set the pilot goal as the "co-creation of a strategy to protect and promote Estarreja's natural patrimony". By doing this, we intend to provide involved stakeholders with the possibility to take part in the decision-making process regarding which strategy to adopt, truly enabling co-creation and co-design from the very beginning of the process. The end result may still be the classification of a local protected area, but other discussed solutions/measures may be adopted instead (or in addition to), provided that they respect the focus and scope of the project – the protection and promotion of local natural values.

We aim with this project to co-create a strategy for the preservation of the council's natural patrimony, and to balance human activities with nature conservation, unlocking the potential of a true sustainable development for Estarreja. We also aim to improve the sense of belonging

regarding natural areas in Estarreja, promote the relationship human-nature, and implement multi-disciplinary approaches to territory management and planning. Lastly, we aim to create a co-governance model for the NBSs adopted, and a space for regular discussion and knowledge-sharing among the main actors in the territory.

Ecological challenges

Ecological goals and description of the NBS

The territory of Estarreja is diverse, and holds several landscapes that reflect the diversity of interests and activities in force in the council. Natural habitats are closely linked to farming landscapes or to production forests, as well as to residential and even industrial areas. On one hand, the landscape heterogeneity found in part of the council may provide different niches for biodiversity, boosting its richness. On the other hand, habitat fragmentation and low landscapes connectivity, as well as an intensive land management, without the use of sustainable practices, may impact several species and negatively affect the council's biodiversity.

On the lower lands of Estarreja, within the Ria de Aveiro Natura 2000 site, rice fields were once one of the main landscape units. However, due to difficulties felt by the farmers and consequent lack of profitability, this type of culture is progressively being abandoned or changed to easier and more profitable crops. This dramatically changes the landscape, as instead of flooded fields (rice fields and adjacent land), the area is left with dry areas, mostly used for maize production or pastures, and loses all the biodiversity associated with freshwater environments. This also allows the invasive plant species to take hold, aggravating environmental impacts.

The increase of maize fields also promotes the intensification of practices, with higher impacts on local biodiversity. The search for profitability makes bigger fields more appealing, and the typical smallholding scheme is changed to larger crop areas. This reduces landscape diversity, and directly affects species of plants and wildlife, threatening also the typical landscape scheme known as *Bocage* – an agroecosystem composed by small cropfields and pastures surrounded by live fences (native trees and shrubs) and by freshwater ditches.

On the higher parts of the council, production forests are dominant, and composed of eucalyptus (an Australian tree) monocultures. Contrary to what a native forest would represent, these simple and ever-young forests are poor in terms of biodiversity, as they hold low diversities of plant species, and consequently, low diversities of wildlife. Additionally, eucalyptus plantations tend to impoverish soil quality, and are extremely susceptible to wildfires, demanding constant prevention measures. Still, wildfires are frequent, and in 2022 a large fire affected a great part of the forested area, threatening even some close residential areas. With climate change, and as heat waves may become progressively more frequent, a different strategy should be adopted, promoting not only territory resiliency, but also forest biodiversity.

Local values and attitudes towards the ecological challenges

As the pilot case has a municipal scope, the position of the community regarding its goal, and regarding nature in general, is extremely variable. We expect to encounter several actors with a more extractivistic point of view regarding nature, especially regarding farming, forestry, hunting and fishing, that may depreciate the impacts of human activities in the environment. These actors

often mistrust NbS and undervalue the services provided by natural ecosystems. However, we hope that by creating a space in which they may discuss and exchange with citizens with different views and concerns, as well as with technicians and NGOs, all interests may be conciliated, resulting in better planning for the future of the territory. Nevertheless, the position stated above is of course a generalization, and different views and opinions are present even within the same category of stakeholders. There are a few known examples of farmers that care about nature and wildlife, and that use sustainable practices in their daily activities.

Additionally, we expect to have the participation of citizens that have concerns about local natural values, both in the perspective of biodiversity conservation, and of nature tourism and general well-being. The region's natural patrimony is seen by many as an important asset, and as something worth protecting and maintaining, especially (but not only) for leisure and sporting purposes.

Schools are also involved in several environmental education initiatives, thus teachers and some students are expected to have a positive attitude towards environmental challenges and pilot case goals. The fact that every public school in Estarreja is considered an Eco-school is a good example of the presence of awareness initiatives promoted by the schools, focused on different subjects regarding the environment.

Socio-economic challenges

Identification of marginalized knowledges and of needs of marginalized groups

One of the main goals of Estarreja's Pilot Case is to create a space for discussion and knowledge sharing, in which all interests and visions for the territory should be represented. Therefore, the CME team is applying efforts in communicating and engaging the territory's stakeholders, and trying to reduce as much as possible the number of absences. However, due to the council-wide scope of the project, this will be difficult to maintain throughout the project, and absences will have to be continuously evaluated and monitored.

As mentioned in the socio-economic characterization of the territory, gender inequalities are undoubtedly present in the council, and reflected for instance in statistics such as income and unemployment. These inequalities may also be present in the LKL, as some key actors in the territory, such as farmers, foresters, livestock producers, among others, are mostly male. This may have a negative impact on female participation, not only because of under representativeness, but also due to a certain level of inhibition due to cultural background. If this is verified during the LKL's, specific methodologies may be applied to ensure that this target group is heard. This reinforces the need for a continuous and critical monitoring of the participatory activities.

A common absence in participation in Estarreja is that of youth, usually an underrepresented group, and frequently outside of decision-making processes. This lack of voice is probably due to different factors, among which there is surely the lack of participatory culture in the council, as well as the disconnection/disinterest of youth regarding politics and lastly the necessity for implementation of specific methodologies to engage and mobilize this target group. Through T6.4, we started to build a relationship with the secondary school (teachers and students), aiming to improve the inclusion of this target group in Estarreja's pilot case, and a participatory process will be implemented with students from three to five classes, from 8th, 9th and/or 11th grades.

With both initiatives we aim to empower youth regarding participation and co-creation of NBS, boosting collaborative practices and enabling direct influence in decision-making regarding their own territory. Through the participatory process with 8th, 9th and/or 11thgraders, we also intend to promote a communication between students and their peers, teachers and families, especially their elder family members, not only to boost the participation of this marginalized group, but also to produce stronger and more comprehensive results for the pilot case.

Identification of presences and absences

Regarding absences, due to group specificities, we expect to encounter some difficulties in engaging and mobilizing migrants and the Roma people community. As no specific methods are yet designed to solve this issue, these groups may become absent from the pilot case implementation. The need for directed methodologies, and the lack of time and human resources available to implement them, may complicate an immediate solution.

Regarding migrants, as most are quite new in the council, and due to strong cultural differences, linguistic barriers, lack of actions focused on inclusion, among other factors, a weak integration with the territory and local communities is often visible. Again, the need for focused human resources is a barrier to the inclusion of this group in the pilot case from the start.

As soon as the LKLs are formalized and the first sessions are carried out, an analysis on the existing presences and absences will be developed, and specific methodologies may be created to overcome the latter.

Regarding the social dimension of the pilot case, as we aim to gather and sit at the table different categories of actors, interests and views, we hope to create a space of knowledge sharing and openness to different opinions and positions. If this is successful, and to some extent, LKLs may bring some benefits regarding social cohesion and tolerance, and hopefully create tools for a sustainable development of the council, either as a whole, or as a part, namely its locations, strengthening the relationship between public bodies and other stakeholders.

Concerning the economic dimension, and since the main goal of the pilot case was adjusted and its outcomes are now fully dependent on co-creation processes, it is not possible for us to predict in what ways the pilot case may promote solidarity economy or boost local economy in general. It will be up to the participants from the LKLs to propose, discuss and create measures and solutions for the territory that may end up boosting specific economic dimensions.

2. Collecting the required knowledges for the Living Knowledge Lab

Creating relationships with partners

Networking and exploratory activities in territory

Several actions and initiatives were developed in order to establish or promote the relationship with stakeholders, and their link with specific TRANS-lighthouses tasks and/or with the main goals of Estarreja's pilot case. In addition to targeted initiatives, several informal conversations with different actors were held, mostly during the day-to-day work of the municipality, in order to start communicating the pilot case and its goals for the territory.

Due to their direct influence in territory management, one of the first established relationships was with farmers, namely rice producers. This crop is important as cultural patrimony in Estarreja, and as it promotes greater extensions of flooded areas in the fields, it actually supports a high biodiversity. Because of this, two meetings were held (February 23 and March 8) with the two main rice producers in the council, identified champions in the territory, a local parish representative and municipal technicians and a counselor. The main goal was to understand the farmers main difficulties, and try to co-design some possible solutions. These meetings were followed by a field visit, developed on March 16, to analyze the situation in loco with most of the previously mentioned interveners. It was a good opportunity to build trust, and to start the dialogue about the balance that can exist between nature and agriculture, and to slowly introduce the main goals for the pilot case. One outcome of these actions is the continuation of the initiative "Arroz com História [Rice with history]", consisting of a collection of free-registration activities, open to the general public, that accompany the rice cultivation process – sowing, planting, weeding, harvesting and tasting. These start in May and follow the rice production cycle until october.

A related action, although independent from the TRANS-lighthouses project, can also help to enhance this relationship, since a documentary is being produced about the rice culture in Estarreja, and involves the collaboration of the CME team. It will be focused not only in the farming point of view, but also in the ecological and cultural dimensions of the territory, and it should be broadcast on national TV in 2025.

One meeting with teachers was held at the Secondary School (February 19), to share some highlights about the TRANS-lighthouses project and the goals of the Estarreja pilot case, that allowed the scheduling of two presentations directed at students from 10th to 12th grades. These, developed in February 22 and March 7, intended to share with youth the goals of the pilot case, and gather interested students to take part in T6.4.

On March 28, a presentation was developed at the plenary session of PACOPAR, a consultative panel composed by representatives of local businesses and industries, the municipality, local parishes, health organizations, media, and local authorities. We intended to present the TRANS-lighthouses project and the pilot case to some important stakeholders, and open the possibility for future collaborations within its scope.

In June, a workshop with different stakeholders - foresters' association, local parish, environmental NGOs, citizens - took place, focused on evaluating the potential implementation of a

micro-reserve, in private land, promoted within the scope of a master's thesis project. This was only possible due to a multi-disciplinary approach, and to the collaboration between different actors in the territory. This was an interesting way to start involving stakeholders in participatory approaches regarding nature conservation, and may facilitate their engagement in the pilot case.

Before the pilot case kick-off, we will promote internal workshops, open for collaborators of the Municipality of Estarreja, from elected representatives to operational workers. As most live and work in the council, and are in contact with different stakeholders and citizens, they may have an important role regarding the communication and dissemination of the pilot case,while providing relevant contributions for the mapping and identification of local natural values. The workshops will take place during office hours, to boost participation. As outcomes we expect not only some direct contributions for the pilot case, but also to achieve a higher resilience in the project due to higher internal participation and knowledge, and a better communication to the citizens and stakeholders promoted by the municipality's collaborators.

In july and october, meetings with teachers and coordinators of the cluster of schools took place. These started the discussion on how to include students in the pilot case, resulting in the definition of a script that will allow three classes from 8th and 11th grades to co-create and co-implement NbS during the 2024-25 school year, in collaborative work under the scope of different areas such as biology, geography, philosophy and citizenship.

Bringing members/stakeholders in the LKL

The pilot case has a council-wide scope, and encompasses the five different parishes that compose the municipality, which include seven different towns/villages: Avanca, Beduído (Estarreja Center), Canelas, Fermelã, Pardilhó, Salreu, and Veiros. As they are home to unique territories and natural and cultural values, LKL must take these individualities into account, and ensure an adequate representativeness throughout the process. In order to do so, a LKL will be established in every town/village of the council, in a decentralized approach, and citizens will be invited to take part through a directed communication campaign. As they are the main actors in the territory of each town, we aim to include not only the citizen perspective, but also that of landowners, farmers, foresters, livestock producers, hunters and fishermen, local businesses, among others. In addition, direct invitations will be made to actors whose visions align with the pilot case goals, as well as to previously identified champions who can help to overcome blockades and reach consensus. Furthermore, direct invitations made to environmental NGO's acting in the territory, as well as to municipal technicians, will ensure their presence in all sessions, and therefore a constant presence of Nature at the table. Lastly, direct invitations will also be addressed to local social NGO's, and to local cultural and sporting associations, boosting the diversity of participants, and the possible involvement of important groups such as women, youth, elders, among others.

From the abovementioned stakeholders, it is expected from citizens the identification of relevant/interesting/important sites with natural and cultural values, and a respective historic background. Citizens will probably bring to the table the perspective of a site within their town that should be restored or improved, or an environmental issue that they want to be solved. Some conflicts between urban/rural day-do-day and wildlife or spontaneous/wild vegetation will surely appear, and may even consist barriers for the LKL's development. The extractivistic perspective of some farmers and foresters may also be a blockade, as profitability plays an important role. This barrier may be surpassed by the presence of local champions that may help to establish dialogues, reach compromises and provide practical examples of success with sustainable

practices. Hunting may also be a troublesome subject, not only because of the expected conflicts with nature conservation or nature tourism, but also because currently all of the municipality territory is considered a hunting zone, with no compromise with different visions or interests.

In addition to the decentralized LKL developed in each of the towns and villages of the council, a centralized and more institution-wise LKL will be created, aiming to bring together public entities and organizations that have competences regarding territory management. These will include entities with different visions, knowledges and from distinct fields of work, such as nature conservation, agriculture, forestry, academia and scientific research, urban planning, etc. These will include organizations that will easily align with the pilot's goals, for instance the National Institute for the Conservation of Nature and Forests, and the Departments of Biology and Environment and Planning from the University of Aveiro, all with good and close relations with the Municipality of Estarreja. With a position that may on occasion be conflictual, due to a more extractivist perspective of the territory, are farming/planning entities such as Regional Direction for Agriculture and Fisheries, and the Commission for Coordination of Regional Development of the Centre. These will be formally invited to participate by the Municipality, as well as the Portuguese Environmental Agency, a public entity with competences in different areas of the environment, namely water resources, a key subject for Estarreja. Also, this LKL will include representatives from local parishes, municipal technicians, NGO's or citizen associations.

Inclusion of marginalized knowledges

Although marginalized knowledges often include traditional or ancient knowledges threatened by modern practices or scientific advances, we believe that scientific knowledge, especially regarding ecosystem management and biodiversity, is a marginalized one within some of the main actors in Estarreja community. Some preconceptions and prejudices about nature and biodiversity are perpetuated and shared, while scientific and factfull knowledge is often disregarded or underappreciated, even if presented by an expert in the field. To manage this in the pilot case activities, the presence of technicians, researchers and environmental NGOs is essential, so that environmental scientific knowledge has a voice.

Other marginalized knowledges related to nature may include ancient practices in farming and forestry that were altered or lost due to new, easier, more profitable, or more intensive practices. Nevertheless, these knowledges and practices are often seen with nostalgia by most, and most are somehow maintained. Some cultural traditions set on the natural patrimony are also becoming less frequent, but still developed by a few intervenientes. Tradicional uses for specific sites, plants or other natural resources may also arise during the pilot case's activities, in what may be considered as well a marginalized knowledge.

Inclusion of youth

Youth is a common underrepresented group, but due to the efforts that the Municipality applies in environmental education in schools, and to the characteristics of the pilot case, the involvement of this grouphas been seen as important for the development of the project. For now, it has been defined in three different approaches, which may evolve into different initiatives throughout the pilot implementation. Firstly, within the scope of WP6 and T6.4, and since there are no higher

education institutions in Estarreja, a meeting with teachers was promoted at the Secondary School (February 19), to share some highlights about the TRANS-lighthouses project and the goals of the Estarreja pilot case. This allowed the scheduling of two presentations directed at students from 10th to 12th grades, developed on February 22 and March 7, with the goal of sharing with youth the objectives of Estarreja's pilot case, and gathering interested students to take part in the online training of T6.4. Eight students contacted the CME team, and showed interest in getting involved in the project, one of which gave up later. An informal meeting was then scheduled with the remaining seven students, with the presence of 5 of them, to get to know each other, clarify doubts concerning the project, and analyze the calendar of webinars. Most of the students are from the 10th and 11th grades, and one from the 12th, and the ages are between 16 and 18 yo.

The second methodology used to include and engage youth was a photovoice/photography contest, as a result of a collaboration with three teachers (two of them on internship) from the Secondary School. The contest "Estarreja through a lens – the biodiversity of the council" (Figure 4) was open to all 8th graders, and each entry in the contest should be composed by a picture of an animal or plant species, accompanied by its common name, and by a sentence/short paragraph about the species, either a fun fact, a story told by a family member, or a particular use or importance. The main goal was to invite students to look towards local biodiversity, and involve their families/friends/neighbours in the process. Additionally, the outcome of the contest was an exhibition at the BioRia's Environmental Centre with the best images, and it included a prize (composed of BioRia products) for the best three sets of image-common name-paragraph. Communication to students was performed directly in the classroom by the teachers involved, and through posters placed in different spots within the school. Since participation was free, the students engaged were very few, and only six sets of pictures-text were received. Classification of the pictures should be finished soon, and the pictures will be posted at BioRia's social media.

Figure 105 - Poster from the photography contest "Estarreja por uma lente: a biodiversidade do Município" developed with teachers from the Estarreja Secondary School.

Lastly, a parallel process to the LKLs developed with the general stakeholders will be developed in schools. A main approach has been designed on a co-creation process between the municipal team and an external advisor from the University of Aveiro, following a capacitation session for municipal technicians, and lastly with teachers from local schools. The co-created approach, to

be implemented in november, consists of a first session, develeoped in the classroom, to present the pilot case goals and the goals of this initiative. The students will be challenged to identify, alone or with their family members, specific locations within the council with interesting natural values, potential to restore, or to boost human-nature relationship. The site may be a natural habitat, a park, a garden, a leisure or sporting site with interesting natural features, or simply an altered area or vacante slot with restoring potential. The locations will then be analised in groups of 4 to 5 students, that will vote and select one as the group case. Each group will characterize the selected site, and build a shared vision for its future. The proposals will then be voted and selected in class (biology or citizenship classes) and one NbS per class will be implemented. A walkthrough will be developed, followed by the final co-design and co-creation steps, in order to co-implement the class-NbS.

This approach was initially proposed to the teachers and heads of the School Cluster in meetings developed in june and october, and was fine-tuned by teachers and the pilot case team. It will target students from (at least) three classes from 8th and 11th grades, as the academic programs allign with the pilot case's goals, bringing value for both sides. With this initiative we intend to promote communication between students and their families, especially their elder family members, not only to boost the participation of this marginalized group, but also to produce stronger and more comprehensive results for the pilot case. This will also strengthen the LKLs implemented in the council, not only through the outcomes from co-implemented solutions, but also through the engagement of students' and their families/relatives, and will promote the inclusion of youth in public decisions and territory management.

Relationship with and view of nature (human-nature relationship)

The diversity of stakeholders in Estarreja's pilot case is high, and this is reflected in several different perceptions and interests regarding nature and biodiversity. Since Estarreja is a council with a strong agriculture tradition, and cropfields are an undeniable mark in the landscape and a common presence amongst the different parishes, farmers will play an important role in the pilot case. The most frequent perception of nature by farmers is usually based on profitability and exploitation. How to explore the territory and how to maximize profits are common subjects, and nature and biodiversity are often seen as barriers and obstacles to personal gains. Wild plants are frequently seen as "weeds" and pests, and wildlife is seen with mistrust and often associated with negative impacts on farming, as potential sources of damage and problems such as yield reductions. Because of this, nature and sustainable practices are often linked to a decrease of profitability, and deemed economically unviable. The use of pesticides is common and widespread, with a generalized notion that only the cultivated plant is welcome, and everything else is harmful. However, farmers also have a strong attachment to the territory, a rich knowledge of its history and functioning, and some even have a positive view of biodiversity and use responsible practices in order to protect it. Public entities representing farming interests will also have an important perspective, as sustainable practices are more and more central in public policies.

Foresters and timber producers, or simply landowners whose parcels are occupied by production forests, also share this extractivist view of nature. As most of native tree species common to the area are of low-growth, they were replaced by a fast-growing exotic species – the eucalyptus. The widespread monocultures of this exotic species have several environmental impacts that are usually less known or ignored by the producers, who even violate some laws and regulations in

order to maximize production areas and associated profits. However, there is an association of foresters that manages and represents some of the timber producers/landowners. This association has some opening to different and new approaches, and has knowledge regarding national laws, and interest to comply with them and balance this activity with conservation measures.

Hunters and amateur fishermen are diverse groups by themselves. Although there are some responsible individuals who care about the environment and the regulations put in place to protect natural resources, there is also the individualistic perspective in which personal gains are the main drivers, even if at the expense of some impactful measures in the territory, habitats or species. The presence in the council of two associations focused on these activities promotes some responsibility in its members, and may help achieve balance and consensus.

Environmental NGO's, Municipal technicians and Academia will represent scientific knowledge, and concerns regarding nature and biodiversity conservation. The knowledge of the territory's natural values, ecosystem functioning and biodiversity distribution is key in this process, ensuring nature sits at the table as a stakeholder, through different perspectives.

Citizens will also play a major role in the LKLs, but since it cannot be divided into target-groups, their visions and interests are really diverse, and therefore their relationship with nature assumes inumerous shapes.

Strategy and actions for the LKL

After several discussions with the internal team from the municipality, and with TRANS-lighthouses partners, we decided to create several LKL's, located in each of the seven towns/villages of the council: Avanca, Beduído (Estarreja Center), Canelas, Fermelã, Pardilhó, Salreu and Veiros. The main goal of this approach is to use as an engagement and mobilisation tool the sense of belonging felt by citizens and stakeholders that live and work in the territory. Approaching a council-wide project at several local levels is therefore expected to help mobilize and engage more stakeholders, and also boost inclusion and diversity.

At the start of the LKL's, an umbrella communication campaign will be developed, publicizing the schedule of walkthroughs, workshops and co-diagnostic sessions, accompanied by direct contacts with key-stakeholders and champions. The communication campaign will include printed materials such as posters, MUPI's and outdoors, placed in strategic sites in each town/village, as well as digital news and social media contents released in municipal websites/social media accounts. A kick-off event will also take place to present the project and communicate the pilot case's goals.

In order to achieve a successful mobilization of stakeholders, an easy and clear language and transparent communication are crucial, especially in order to overcome an expected mistrust regarding the project and even towards its promoter, the municipality. Furthermore, in order to reduce mistrust and boost the project's credibility, an external and impartial team, with proven experience in the field, will be hired to ensure mediation and facilitation of all LKL meetings, leaving the municipality technicians to work collaboratively as stakeholders during the sessions. After a thorough research, three options were identified, and the public acquisition process is underway. With the collaboration of this external team, we also aim to better manage conflicts

between stakeholders with opposing views, which will be essential for maintaining their continuous engagement and mobilization. A careful management of expectations is also important, not only to understand what is feasible and within the competences of the municipality, but also to ensure that there are practical outcomes of the collaborative work, whose absence is usually referred to as a negative aspect of participatory processes in Estarreja, and highlighted often during mapping of local participatory culture.

BioRia, the assessment case of the Municipality of Estarreja, is a good example in many ways, especially in promoting contact with nature and sharing knowledge about local biodiversity and ecosystems with different types of public and target groups. However, a major shortcoming of the implementation of this well known and established NBS is the lack of involvement of stakeholders in the creation and implementation phase. Although cherished by a great part of the council population, it is also seen with some mistrust by some of the actors that actively manage the territory. This is one of the main lessons learned with this initiative, and something that the Municipality wants to change in the approach of its pilot case, creating spaces for conversation, debate, sharing, and collaborative work. The inclusion of stakeholders in the decision-making process, and in the implementation phase of the process may also improve the sense of belonging and respect towards the natural values of the council, and boost their perception regarding participatory methods and approaches, and ultimately improving the relationship with the council's public bodies.

3. Formalizing the LKL

Creating cooperation, understanding and dialogue

Registration of activities

Since the acquisition of external services for the mediation and facilitation of the LKL sessions is seen as essential to ensure the adequate course of the pilot case and to achieve its main goals, the formalization of the LKL is slightly delayed due to internal legal and economic processes. By recommendation of the Data Protection Officer currently working with the Municipality of Estarreja, an amendment had to be created before starting the acquisition process. Since the preparation of this document, to be attached to new acquisition contracts celebrated by the municipality, was a collaborative process between the DPO, Pilot Case coordinators (Division of Environment and Sustainability), and the Division of Administrative and Legal, it was time-consuming and therefore delayed the start of the internal expense process, and thus the formalization of the LKL. The acquisition of services is now finalized, and the implementation of the LKL will start in the beginning of 2025, in order to avoid the Christmas period, unfit for mobilizing stakeholders.The strategy co-defined consists on the establishment of 6 Local LKLs, namely in Avanca, Beduído (Estarreja Centre), Canelas & Fermelã (Union of Parishes), Pardilhó, Salreu and Veiros. Besides these, an Institutional LKL will be formalized, to gather contributions of entities with competences in territory management in the diagnostic stage. This LKL won't be active in the co-design stage to avoid conflicts of interests, as these entities have direct and legal responsabilities in approving/rejecting interventions in the territory. Co-diagnostic activities and walkthroughs will be developed between january and february.

Unlearning workshops will be developed, following guidelines and frameworks created by TRANS-lighthouses partners, and some of the main internalized assumptions were already identified during the Learning/Unlearning Workshop developed on march 1, at the consortium meeting. The four internalized assumptions identified by the CME team were 1) Nature is often seen as an obstacle to production (e.g. to agriculture); 2) NbS and nature protection mechanisms are not profitable; 3) Public participation is meaningless, it has no or little impact, and there is disbelief in participatory processes; 4) Municipalities are providers and responsible for everything – Citizen's perception of municipalities as responsible for everything in the territory rather than collaborative governance with the actors involved. In this workshop, some recommendations were achieved, including fostering democratized dialogue and "leading by example", which can be achieved by showcasing those alternative approaches are possible, or by sharing different knowledge and memories about how to produce differently. Moreover, the importance of clear communication was again emphasized.

Picking up on the subject of clear communication, we expect that, with the collaboration of an external team, and the development of an ambitious communication campaign, it will be possible to communicate and publicize adequately the goals of the project and manage expectations of the actors. Furthermore, it will be essential to mediate and manage conflicts, promoting dialogue and convergent topics and opinions.

Regarding the question of "What is the level of difficulty for the pilot coordinating team when it comes to identifying who are the conventional actors?", we assume that it will be easy, especially because of the knowledge that exists about the territory and its actors. As a municipality, most of the categories of stakeholders have already crossed paths with the work of its collaborators or initiatives, thus allowing a better understanding of who are the actors, and what are their visions, needs and interests. Nevertheless, since citizens will be called to take part in the participatory activities, it is not possible to predict and identify all actors involved or their specificities.

Concerning the question of "What is the level of difficulty for the pilot coordinating team when it comes to entering into dialogue with conventional actors at different scales?", we would say intermediate. Entering into dialogue should be accessible in most of the situations, and concerning different actors. However, it may prove difficult at some points, due to conflicting views and positions regarding other actors. The pilot coordinators are technicians (life sciences), with positions based in scientific knowledge that sometimes can be challenged by different actors and their visions. The use of an external and impartial team to mediate all sessions will help to overcome this difficulty, manage possible conflicts and avoid bias.

The school-based LKLs (with a minimum of 3 classes) will start in the month of november, and its activities will run until the end of the school year.

Results of the activities and dialogue opportunities

As the LKL's are not yet formalized yet, there is no information available regarding this topic.

Social mobilization and engagement

Registration of activities

Since there was some uncertainty regarding the starting dates for the LKLs, due to the previously mentioned acquisition of external services, no public kick-off event, activities or workshops were

developed until now to mobilize and engage citizens. The communication materials are already in production, and will promote the scheduling of walkthroughs and co-diagnostic phase. A social media campaign will be launched in the platforms managed by the municipality, and direct contact and invitation of key-stakeholders and champions will take place.

Results of the activities for social mobilization and engagement

Since no mobilization and engagement activities took place to the moment, no results are yet available.

Creating a structure for participatory governance

Description of the co-governance model

As LKLs are yet to be formalized, and the structure of co-governance is a matter of discussion and agreement among the different actors, it is not yet possible to describe the selected model.

Establishing a modus operandi

As described in the previous paragraphs, LKLs are not yet established, and thus no co-governance model was already discussed and defined.

Monitoring and constant reevaluation

A constant monitoring and reevaluation process will be defined with the external facilitation team, in direct articulation with the TRANS-lighthouses partners, namely from WP5 and WP6, and according to the Reflexive Monitoring framework.

CLOSING SECTION

Main Findings and Results

The following table presents the primary findings and results for each of the pilots. It should be noted that the pilots are at different stages of the formalization process for their LKL. Nevertheless, it is possible to understand that there is a significant diversity in the LKL characteristics, processes and goals:

PILOTS DIVERSITY AND SCALE OF INTERVENTION

The challenges and opportunities that were identified in the TRANS-lighthouses Living Knowledge Labs need to be understood in relation with the characteristics of the intervention area, namely to the lighthouses context - urban, rural, forest and coastal. In this sense, school yards of Barcelos, urban plots of Rome and Brussels, the riverfront in Strovolos, the rural farms of Roskilde and Cáceres, rural area of Estarreja, and the forestry path in Lagoa, Azores, differ in terms of scale and environment, but also in terms of social and economic context.

GOALS	**Pilot Cases**
Engage local associations	All
Collaborative platform of actors	All
Job creation	All
Water management	Brussels
Bio-waste management	Cáceres
Regeneration of agriculture soils	Roskilde
Regenerative farming	Roskilde
Water trail for sustainable tourism	Lagoa
Improve accessibility	Strovolos, Rome
Co-creation of human-nature solutions	Strovolos
Cultural heritage by improving public space	Strovolos
Co-create “Playground is Nature”	Barcelos
Preserve and promote natural heritage	Estarreja
Integrate Nature Based Solutions into local governance	Lagoa, Strovolos, Rome, Estarreja, Brussels

TERRITORIAL LKL CHALLENGES AND OPPORTUNITIES (URBAN AND RURAL)

TRANS-lighthouses Living Knowledge Labs face a range of territorial challenges and opportunities that are often deeply interconnected. In the pilot cases of Brussels and Rome, rapid

urbanization has exacerbated problems such as noise pollution, traffic congestion, and flooding, further complicated by a lack of adequate green and blue spaces and insufficient water management, namely in urban parks.

The high density of built-up areas in these cities, alongside monofunctionality in some spaces, such as in the Rome university area, limits the multifunctional use of urban areas, reducing their social and environmental resilience.

Borders of the buffer zone between North and South of Cyprus, namely in the linear park of Pedieos (Strovolos) often highlight the challenges of managing land use and maintaining ecological balance.

However, cities also possess significant opportunities. Urban heritage in cities like Barcelos, Rome, and Brussels provides an invaluable resource for cultural identity and economic development, while educational spaces, such as the schools in Barcelos demonstrate the potential to serve as community hubs, fostering social integration and learning beyond the classroom.

Living Knowledge Labs in rural areas

The pilot cases situated in rural areas reported different territorial challenges. In fact, European rural areas are suffering the impact of an intensive modern agriculture activity increasing the greenhouse gas emissions as demonstrated in Zealand, Denmark, by the University of Roskilde, and threatening environmental resources.

This scenario is also growing in Spain and Portugal, but the Living Knowledge Labs are also exploring new opportunities, such as the water trails in rural and forest areas of Azores, namely in Lagoa, the balance between agriculture and forest that is characteristic of Barcelos and unique unique ecosystems of Cáceres and Estarreja, where historical heritage dialogues with a rich biodiversity,

ECOLOGICAL CHALLENGES AND OPPORTUNITIES

Climate change is increasing the societal and environmental challenges to the planet, and naturally to the TRANS-lighthouses Living Knowledge Labs. Depending on the European region, and local context, the ecological challenges can be more or less severe.

Heat effects and floods are usually together, as we could recently see in Valencia floods (Spain, October 2024) after a long period of heat and dry weather. The LKL of Brussels, Rome and Strovolos are specifically concerned with these two ecological impacts. This is the result of the urban expansion with high density, extensive impermeabilization of the soil and lack of nature and green spaces. To mitigate these challenges, Strovolos proposes to enhance biodiversity in River Linear Park and Brussels wants to promote sustainable water management to enhance biodiversity, heat islands and water quality.

In the rural areas, the pilots consider that intensive agriculture is affecting the ecological system and other ways of managing the resources are needed. Roskilde and Cáceres see an opportunity to do things differently. The first by introducing regenerative farming and the second by promoting organic waste management. In the same line of thought, Lagoa is working to balance nature rights with human use, namely in the case of the forest trails.

SOCIAL CHALLENGES

The pilots reported social challenges that create constraints to the activation of the Living Knowledge Labs. In the urban areas, gentrification and marginalised groups are changing the social context (San Lorenzo, Rome), while in the rural areas or small cities, as Cáceres or Barcelos, the population is declining, namely youth, and unemployment rates are higher, as in Cáceres. Several partners reported the difficulties in engaging marginalized groups and minorities (Lagoa, Brussels, Strovolos).

In this sense, some opportunities rise in the pilot cases due to multiculturalism and community vibrancy contribute to its unique identity (Brussels, Barcelos). collaboration with local organisations (Cáceres, Barcelos, Roskilde, Lagoa, Brussels), dialogue with youth community of students (Rome), balance between traditional and contemporary use of the city (Strovolos).

PARTICIPATORY CULTURE CHALLENGES AND OPPORTUNITIES

As reported in D4.2, pilots have different levels of participatory culture, either at the municipal and academic sphere, as well as at the civic society one. The level of participatory culture has an impact on the participatory governance models, if they exist.

The activation of the Living Knowledge Labs was anchored in the engagement of citizens and stakeholders, namely on their interest and commitment to participate, but pilot cases identified challenges, opportunities and they proposed some recommendations. The most evident barrier is the lack of existing participatory culture that provokes resistance towards co-creation and co-governance (Barcelos, Estarreja, Strovolos and Rome). In some cases, this is due to previous urban planning decisions (Rome), to limit resources and voluntary commitments (Brussels and Roskilde) or to different priorities and perspectives of social groups (students, residents, and migrants). The focus of the LKL on nature, NBS and climate adaptation is complex and suffers from an extractivist approach to nature (Barcelos and Estarreja and Lagoa).

The participatory process is opening several opportunities with the active participation of citizens in decision-making processes through public consultations, municipal-led initiatives (Brussels), active associations, parents, and teachers (Barcelos and Estarreja), participatory budgeting (Lagoa) and awareness sessions and municipal plans encourage nature engagement. (Barcelos). Participation is also an opportunity to explore knowledges that can empower citizens, namely on farming legislation, on NBS, biodiversity protection and nature management.

COLLECTING THE REQUIRED KNOWLEDGE

The Living Labs are rooted in the exchange of knowledge to establish a shared foundation for future initiatives that will transform both their territories and communities. To this end, several collaborative strategies with local communities have been implemented to gather the necessary knowledge. These include partnerships with diverse stakeholders to activate Living Labs (Cáceres, Strovolos, Estarreja) and collaborations with associations to involve marginalized groups (Cáceres, Lagoa, Brussels). Additionally, efforts such as mapping participatory cultures to enable governance diversity and foster cooperative dialogues (Lagoa), organizing decentralized LKLs for broader community representation (Estarreja), and creating a centralized LKL to align public entities and organizations (Estarreja) were key.

These collaborations created opportunities for dialogue between the project and the community

through online and in-person meetings to share knowledge (Cáceres, Roskilde, Barcelos), extensive networking to promote citizen science, youth engagement, and tourism training (Lagoa), development of prototypes and experiments to test solutions (Cáceres), and the selection of pilot areas based on community agreements, municipal support, and future waste ordinances (Cáceres). Exploratory visits and interviews in schools identified artificial playgrounds and participation incentives (Barcelos), while internal workshops for municipal staff improved project communication (Estarreja).

These actions were made possible through the active involvement of students and operational staff, fostering inclusive, nature-connected school environments (Barcelos). Nature-based Solutions (NbS) in schools provided jobs, training, and economic opportunities for marginalized groups (Barcelos). Youth engagement was further strengthened through diverse activities, including photography contests and co-creation processes (Estarreja).

Ultimately, the shared goal across all initiatives was to prioritize nature as a central element while considering the broader territorial context.

FORMALISING LIVING KNOWLEDGE LABS

The formalisation of the Living Labs is based on the effective engagement of the local actors through actions that promote interaction and the construction of a common understanding. During the pilot meetings, that took place every month, partners shared strategies and tools to support the engagement process and the formalization of the living lab, namely informal meetings with stakeholders and inhabitants (Brussels), meetings to share concepts like Integrated Stormwater Management (Brussels), training workshops, meetings, and events on environment (Lagoa), planning of activities with stakeholders (Strovolos), students workshops in school on NBS (Barcelos), meetings with barbecue (Brussels), meetings with underrepresented groups like children and elderly (Strovolos), participation in local events to receive feedback and do online survey (Strovolos), thematic working groups with associations (Roskilde).

Nevertheless, pilots promoted innovative actions related with TRL specificity that can be highlighted, such us learning/unlearning workshop on nature and participation (Estarreja), regional LKL to support decentralized solutions and networking (Cáceres), and pilot coordination group with Roskilde (RUC), employing a Reflexive Monitoring with stakeholders to enhance the project management and organize stakeholders based on their expertise and organizational culture (Lagoa).

Future Actions of the LKL

Future activities planned include neighborhood walkthroughs, photovoice workshops, and interviews (Brussels), workshop to co-create a pilot plan (Roskilde), workshops to foster a shared vision for NBS implementation (Strovolos) Educational, artistic, and scientific activities designed to engage youth on co-creation (Rome), workshops to introduce pilot goals (Rome), proposed creation of a professional association for an ecosocial economy for biowaste (Cáceres) and a citizens communication campaign (Estarreja).

Challenges

Although the LKLs are starting their activity, some pilots are already facing some challenges related with difficulties to keep the LKL engaged over a long-term period (Cáceres), high pressure from municipalities to use conventional waste companies (Cáceres) and bureaucratic issues with the contract of external services for the mediation and facilitation of the LKL sessions (Estarreja).

Conclusions

Common achievements

The Living Knowledge Labs (LKL) of all pilot cases are active with a well defined intervention area, based on the identification of territorial, ecological and social challenges and opportunities that demonstrate the relevance of the goals defined for the lighthouse.

Although the pilot cases are very different, as explained, the interaction between partners in the monthly meetings established a platform of understanding that promoted a balance between the scale and the scope of the interventions.

Collaborations between municipalities and academia were agreed to improve the capacity to develop research and action in each lighthouse. In this sense, several municipalities - Rome, Strovolos and Lagoa - were integrated in the project as associated partners.

With the support of WP4, namely task 4.2, the map of participatory and governance culture in each pilot case, created the ground for the design of a participatory strategy for the co-creation of nature-based solutions (NBS), namely the co-diagnostic and the co-design, already in progress under task 5.2.

The Pilot Roadmap is well represented in this deliverable as well as in the diagrams developed in the MIRO, a digital software being used to support the co-creation of processes, as represented in the figure below with a screen shot of the lighthouses workflow:

These strategies were detailed with activities and tools developed together with WP6, taken in consideration the experience existing in the partners. The local community is involved in all LKL, including the citizens, with public activities (Strovolos, Lagoa), the associations (Rome, Estarreja, Brussels), the schools (Barcelos, Rome), the farmers (Cáceres, Roskilde). Nevertheless, youth was involved in all LKL in dialogue with task 6.4 and representatives participated in the Turim Youth workshop, July 2024.

Challenges

The pilots operate within a diverse range of contexts—urban, rural, forest, and coastal areas—each with unique goals for co-creating Nature-Based Solutions (NBS). They also vary in their stages of maturity and development, which adds to the complexity of aligning the goals and expectations of different stakeholders, particularly concerning the design and timeline of NBS.

Common challenges include managing a diverse group of stakeholders, structuring the Living Knowledge Lab (LKL) to address local barriers, fostering engagement and shared ownership, formalizing group dynamics, and exploring innovative participatory governance approaches within the LKL framework.

These challenges often manifest as barriers to progress, such as limited experience with participatory processes, a lack of tradition in collaboration, distrust among stakeholders, resistance from powerful actors, budget constraints, insufficient human resources, limited time for participation, and difficulties in accurately identifying the needs of each pilot. Addressing these barriers will be critical to the success of each pilot.

Recommendations

The activation of the Living Knowledge Labs in the pilot cases faced several challenges and some recommendations were agreed during the Cáceres consortium meeting (28-30 October 2024):

- Prepare agreements with municipalities that are not initial partners, such as Rome, Strovolos and Cáceres, because it is necessary to clarify their participation as "observers" and to establish goals, strategies, methodologies, interventions areas, and collaborative activities.
- Promote methodologies to give voice to nature, through methodologies that explore the participation of non-humans, in order to reconnect people with nature
- Identify territorial challenges that are concrete constraints for the implementation of NBS, like floods, heritage, biodiversity, intensive agriculture
- Map social challenges that have a special impact on the participatory culture and on the socio-political
- Form and mobilise a cohesive group for developing pilot case
- Connect to other WP's that involve mapping / participation techniques
- Identify previous experiences of participatory activities, LKLs and engagement of vulnerable groups are very diverse
- Bring together a group of people for a change (= the pilot case) based on knowledge of the existing network of stakeholders, strengthen connection
- There are some essential prerequisites to activate LKL: having contacts with a broad (informal) network and local NGOs, agreement with municipality, coordinate TRANS conceptual tasks and with other pilots, have concrete ideas/draft about pilot, knowledge on social issues and identification of vulnerable groups;
- To go forward, pilots can explore some strategies, such as mobilising field (project presentations, participatory and community-building activities, other CoA activities, activities that involve vulnerable groups), ask for political support, direct and target-specific communication, identification and use of champions, guidelines & methodological framework.
- To enable participation in the next steps or in future projects, pilots proposed the following recommendations: complexity requires tangible and personalized projects (Brussels), small projects foster stronger engagement (Brussels), local ambassadors and partnerships enhance participation (Brussels, Estarreja and Lagoa), fostering a participatory culture and communication regarding regulatory changes (Cáceres).

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Annexes

Table with the comparison of the Pilot Roadmap

This table supported the construction of the main findings and results presented in the Closing Section. The selection of the main findings was done by the coordination of the deliverable and validated by the pilot partner.

Territory	Brussels	Cáceres	Roskilde	Lagoa	Strovolos	San Lorenzo/Roma	Barcelos	Estarreja

Macro:

- Brussels City, one the 19th municipalities in Brussels Regio with **diverse neighborhoods and significant historical and political importance.**
- **The urban expansion led to the covering of rivers** and increased soil sealing, disrupting natural water absorption.
- **Brussels faces socio-spatial fractures, economic inequalities**, and issues of social cohesion, particularly in densely populated and impoverished neighborhoods.

Micro:

- Laeken is a diverse and vibrant district with significant socio-demographic variety, ongoing urban development, and **challenges related to noise**

Cáceres province in Extremadura, notable for its **rich historical heritage** and **biodiversity**, includes unique ecosystems like dehesas, protected species such as the Iberian lynx, and **spans diverse geological formations**.

- Denmark has **59% of its land dedicated to agriculture and 25% to forests and nature areas.**
- Danish agriculture heavily relies on **intensive methods, contributing 23% of the country's greenhouse gas emissions**, primarily from livestock farming like cattle and pigs.
- **The majority of Danish farmers are male (94%) and over 55 years old, Average farm size is 83 hectares.**

- Pilot located in Azores, specifically on São Miguel Island in the municipality of Lagoa that covers urban, rural, forestry and coastal areas.
- **The "Water Trail" pilot spans rural and forestry areas** between Santa Cruz and Água de Pau parishes, emphasizing **coastal integration and community heritage.**
-

Macro:

- Strovolos Municipality, Cyprus' second largest, is located in Nicosia and **borders the buffer zone between North and South** Cyprus.
- Strovolos is characterized by a **young population,** various infrastructure including schools and social services. Established in 1986, Strovolos saw post-1974 refugee settlement and industrial growth, balancing urbanization with a preserved historical core. **The Pedieos River Linear Park enhances biodiversity with 46 green spaces and 65 playgrounds.**

Micro:

- Located within Pedieos River

Macro:

The II District located in Rome municipality, home to historic gardens and villas, densely populated and hosts La Sapienza University and Tiburtina Station, a major rail hub

Micro:

San Lorenzo Neighborhood is in the southwestern sector of II District, originally built for railway workers, **gentrified in a hub for students and activism**. **Lacks public open spaces.**

There has been a recent shift in the pilot case area.

Macro:

Barcelos is a city and municipality in the Northern region of Portugal characterized by diverse landscapes (coastlines, valleys, and forests). The municipality predominantly consists of **agricultural land (42.8%) and forest areas (32.1%),** with significant socio-economic development in its urban center, known for its **cultural and historical heritage.**

Micro:

- Estarreja is a council located in the coastal zone of the Center-North of Portugal, **it blends rural and residential areas with gardens, crop fields, and production forests.**
- Bordered by the Aveiro Lagoon to the West, a vital wetland part of the Natura 2000 network that i**ncludes diverse habitats like marshlands, reedbeds, and agricultural landscapes, crucial for biodiversity**

Ecological challenges	Brussels	Cáceres	Roskilde	Lagoa	Strovolos	San Lorenzo/Roma	Barcelos	Estarreja
	- **Urban heat islands** exacerbated by dense urbanization, reduced natural cooling and climate change - 27% of the Brussels City territory at risk for **flooding** due to **pollution, traffic and flooding problems.** - Community concerns: in Laeken are related to **insufficient trash bins, lack of commercial diversity, heritage maintenance, mobility and safety concerns,**	**Organic waste management** generates methane emissions and leachate, harming air quality, water sources, and biodiversity. Valuable nutrients in organic waste are wasted in landfills,	- **Intensive agricultural practices** strain climate, nature, and environment, with livestock production a major emitter. - Predominantly conventional management with	- **Balancing nature rights with human use of natural assets.** - Evaluating trail carrying capacity to prevent ecological damage. - Mitigating natural hazards like	**Urban expansion causes:** - Limited biodiversity and green spaces - Flooding risks from the Pedieos river persist - Lack or, or low quality public Linear Park near Strovolos' historic center, the area **blends traditional artisanal professions in the historic core with modern** commercial activities along Strovolos Avenue, supported historically by the Pedieos River's natural resources.	- **Heat Island effect (mostly impermeable area)** - **Low air quality** - Low biodiversity and lack of public green spaces - Heavy traffic	- **Lack of biodiversity promotion and climate resilience in school playgrounds.** Climate change poses risks such as heat waves and heavy rains, The pilot project includes **schools in Vila Cova (forest area), Vila Seca (rural area), and Vila Frescaínha S. Pedro (urban area),** each serving as community hubs providing educational and social services, Vila Cova - industrial and agricultural employment, Vila Seca services and agriculture, Vila Frescaínha S. Pedro - commercial and service-oriented activities,	- **Estarreja's landscape diversity includes farming, production forests, and urban areas, impacting biodiversity.** - Former rice fields in the Ria de Aveiro Natura 2000 site

high soil impermeability and increased frequency of extreme precipitation events following climate change

degrading soil fertility and increasing dependence on synthetic fertilizers.
High energy consumption, inadequate recycling practices, and public participation barriers hinder effective organic waste management.
Solutions: Creating a sustainable and efficient participatory organic waste management system through small-scale decentralization via domestic, community, and agrarian composting, determined collaboratively between residents and local councils using the Menu MATER tool.

monoculture crops, intensive plowing, chemical use and large-scale farming
- Limited adoption of organic and conservation agriculture

landslides and controlling invasive species.
- Restoring trail sections with endemic plants to combat environmental stress.
- Perception of the water trail as a landscape feature, highlighting a need for strategies to reconnect the community with its ecological significance.

space (except for urban parks)
- Habitat loss and predation by stray cats on indigenous species

Divergent attitudes among stakeholders towards citizen engagement, environmental education, accessibility and collaborative efforts.

affecting student safety and comfort.
- Lack of sustainable ecosystem practices into daily student activities.
- Lack of natural elements and permeable surfaces in schools.

are replaced by maize fields, reducing freshwater biodiversity.
- Eucalyptus monocultures dominate higher areas, posing biodiversity challenges and wildfire risks.
- Some stakeholders hold extractivist views on farming, forestry, hunting, and fishing.

Socio Economic challenges	Brussels	Cáceres	Roskilde	Lagoa	Strovolos	San Lorenzo/Roma	Barcelos	Estarreja
	- Marginalized groups in Laeken, including **low-income families, minorities, immigrants, disabled people, elderly and children**, are underrepresented in participatory processes, leading to unmet specific needs. - ·Lack of awareness and knowledge about Integral Water Management and NBS in Laeken, Laeken-North showing potential for NBS but suffering in some neighborhoods (Cité Modèle) from lower quality of life and perceived lack of investment	**Urban:** - Stable population with an economy primarily based on services, tourism, and construction, with limited industrial contribution - **Unemployment rate of 15.36% in 2024**, with efforts to reduce it through tourism and new job opportunities in decentralized biowaste management. **Rural:** - Facing significant **population decline** and high depopulation rates. - Economy focused on agriculture, livestock, food industry, and tourism, with significant agroalimentary and tourism sectors with	- The pilot case focuses on enhancing practices marginalized in Denmark's industrialized agriculture context via regenerative farming. - Emphasis on understanding and addressing **gender disparities, age demographics** (with younger members in regenerative farming), educational backgrounds, and involvement of practitioners vs other stakeholders from the regenerative world.. - N**eed for increased engagement with municipal actors** to bolster transitions to regenerative practices, aiming to forge	- Addressing low democratic participation with over 80% abstention rate in recent elections, hindering inclusive development. - Enhancing social inclusion and cohesion by **engaging marginalized groups in entrepreneurship initiatives.** - Overcoming financial constraints and institutional gaps to integrate environmental concerns into local socio-economic initiatives effectively.	- **Low representation in decision-making of marginalized groups** that lead to ineffective engagement and participation - Limited opportunities for community input in decision-making processes, lack of trust in local authorities, and insufficient awareness of environmental impacts among the public. - **Community interest in urban nature, history of Strovolos,** willingness to participate in project activities, and supportive engagement from NGOs and community groups.	- Historically working-class residents, now mostly populated by university students. **Gentrification** leading to higher rents and traffic, - Transformation from artisanal to commercial and leisure-focused activities. - ·Loss of traditional productive heritage, replaced partly by artistic craftsmanship. - Strong community spirit, currently under strain due to social recomposition.	- **Demographic challenges with an aging population and declining youth,** impacting economic and social dynamics. - Important cultural, economic and tourist center in the Minho region - Significant improvement in the population's levels of qualification. - Economy primarily industrial, with a significant shift towards the tertiary sector,	- Aging population trend - Increasing migration with foreign residents and significant Roma community presence. - Low educational and qualification levels, inadequate to the market; - Lack of educational offer, that results in youth searching for options outside of the council; - High absenteeism and school abandonment.

compared to Laeken-South.
- Social housing deterioration and isolated households persist, exacerbating socio-economic disparities.

unemployment rates ranging from 9% to 25%,

Common:
- Regulatory barriers hindering sustainable practices.
- Limited community engagement inclusivity.
- Persistent socio-economic disparities affecting project success.

partnerships that support local food systems and climate initiatives.

Participatory Culture	Brussels	Cáceres	Roskilde	Lagoa	Strovolos	San Lorenzo/Roma	Barcelos	Estarreja
	- Active participation of citizens in decision-making processes (public consultations, municipal-led initiatives, etc.) - Lack of proximity - Lack of inclusion aspect of participation. - Residents need concrete and tangible and personal projects. - Crucial to link integral water management measures to personal interests and local needs, (e.g.: rainwater for a vegetable garden or planting more trees in a street.) - Complexity requires tangible, personalized projects. - Small projects foster stronger engagement. - Local ambassadors enhance participation. - Broader community needs to drive true dynamics.	**Urban**: Efforts in urban areas involve the Department of Waste and Environment and the Department of Citizen Participation, fostering a participatory culture and communication regarding regulatory changes. , **Rural**: while rural initiatives include establishing Composting Knowledge Communities and proto-Living Labs to promote local engagement in composting practices.	- Flat democratic structure and diverse memberships but, passive participation and lack of formal leadership - Limited resources and voluntary commitments hinder farmer participation. - Local initiatives face national farming legislation challenges and resistance from agricultural lobbies. - Need to engage institutions/municipalities in food procurement and climate adaptation. actions.	- Participatory culture in Lagoa includes mechanisms like participatory budgeting, public consultations, and parish council engagements. - - Challenge in engaging communities around NBS concept and climate change awareness. - Lack of participatory culture necessitates strengthening partnerships for a unified approach. - Various local knowledge	- Identified rare participatory initiatives and low citizen engagement; highlighted indifference, governmental challenges, and participation issues. - Addressed political obstacles among public authorities, noting sustainability as a collective action opportunity. - Emphasized stakeholder mapping, inclusive communication, and sustainability events to overcome barriers effectively. - Promoted inclusivity, continuous engagement, transparency, and accountability for sustainable participatory initiatives in Strovolos Municipality.	- San Lorenzo's diverse population, including students, residents, and migrants, poses challenges due to differing priorities and perspectives. - Previous urban planning decisions ignoring community input have created skepticism towards participatory processes. - San Lorenzo's diverse population, including migrants and international students, faces challenges due to language barriers and cultural differences, However, this brings rich cultural perspectives and potential for innovative solutions,	**Barriers:** - Overcoming reluctance towards co-creation and co-governance - Difficulties to educate the public on the benefits of complex NbS - Shifting to natural playgrounds faces resistance and budget constraints. **Opportunities:** - Growing appreciation for nature protection engagement and supports NbS. - · Active associations, parents, and teachers support participatory projects. - · Awareness sessions and municipal plans encourage nature engagement. -	**Barriers:** - Lack of existing participatory culture within Estarreja and skepticism towards participatory effectiveness - Difficult mobilization of stakeholders, particularly for niche topics like nature conservation, - Predominant extractivist approach to nature limits community mobilization for conservation efforts. **Opportunities:** - Pilot case serves as a pioneering strategy for nature conservation, fostering co-creation and diverse stakeholder participation. - ·Learning from local champions and cultural initiatives and collaborating with NGOs, schools, and local initiatives builds trust and enriches the participatory processes. - Scientific expertise ensures effective biodiversity

preservation and nature management.

Assessment Case	Brussels	Cáceres	Roskilde	Lagoa	Strovolos	San Lorenzo/Roma	Barcelos	Estarreja
	Technocratic vs Democratic Discourse: - PCE led by technical experts, focusing on specialized knowledge and practical implementation, with limited citizen involvement beyond informational sessions. - Advocates for greater citizen participation, valuing local knowledge and community engagement in decision-making processes, exemplified by initiatives like Brusseau(Bis) project integrating citizen expertise across various project scales.	- Electoral processes and regulatory frameworks have hindered the progress of decentralized composting. - Community and agricultural composting projects faced the same stringent requirements as large composting facilities, impeding their development and sustainability.	/	Overlap with the Pilot Case	- Understanding Complexity - Building Trust and Collaboration - Leveraging Local Knowledge - Fostering Social Capital and Innovation by drawing on cultural identity and history - Central Role of Local Communities - Effective Stakeholder Engagement - Collaborative Action for Land Degradation - Balancing Indigenous Knowledge with Sustainability	/	**Main challenges:** - High maintenance (costs and availability), low availability of fundings - Less public and guided tours than expected - Better promotion and communication to the public is necessary **Opportunities:** - The Barcelos Arboretum offers an interactive platform for environmental education, enabling research and community engagement. - Support to local schools and initiatives like "Adopt a Plant," ERASMUS exchanges, etc. and bolster participatory governance through collaborative efforts - Enhance knowledge of Portuguese flora.	**Main challenges:** - Private land ownership complicates collaboration with landowners and farmers. - Diverse interests among stakeholders hinder strategic conservation efforts. - Lack of citizen participation in decision-making. - Activities focus more on pedagogic approaches rather than discussion and knowledge exchange. **Opportunities:** - Establishes collaborations with NGOs and various stakeholders, enhancing community engagement. - Political impact: Shifts public perception of Estarreja towards natural heritage, away from industrial focus.

Pilot goals	Brussels	Cáceres	Roskilde	Lagoa	Strovolos	San Lorenzo/Roma	Barcelos	Estarreja
	- Using (NBS) and Integral water management to reduce flooding and urban heat, enhance biodiversity and meet community needs .in Laeken with a prior focus on Verregat - Engage local associations - social housing cooperative (Comensia) and neighborhood representatives to ensure community involvement and real integration of community needs.	Implementing decentralized composting as an efficient, nature-based solution for bio-waste management in both urban (Cáceres municipality) and rural (Cáceres province) areas, enhancing environmental, social, and economic outcomes. through job creation and regeneration of agricultural soils.	- **Establish Living Knowledge Lab (LKL):** Create a collaborative platform between Roskilde University and the Danish Regenerative Farming Association to develop regenerative practices, including farmer-to-farmer knowledge exchange and capacity building. - **Strengthen Regenerative Knowledge Base:** Conduct action research on human-nature relations in regenerative farming vs industrialized methods. Explore how socio-economic models like Community Supported Agriculture (CSA) can support regenerative practices. Disseminate findings to promote regenerative farming across Denmark. - **Develop Small-Scale Farming Model:** Design and test a decentralized	- Establish "Trilho Janela do Inferno (Rota da Água)" in Lagoa Municipality as a vital asset for sustainable tourism in the Azores. - Develop strategies to foster community engagement, promote environmental education, and integrate Nature Based Solutions (NBS) into local governance to protect biodiversity and water resources.	Implementing NBS to enhance biodiversity and cultural preservation, awareness and human-nature interaction, address water challenges, improve accessibility, foster social interaction, and raise community awareness of local biodiversity and the benefits of introducing nature in the city for the well-being. Building on cultural heritage for improving the quality of public space.	Implement and test NBS through leveraging local initiatives and resources by creating green, recreational spaces addressing high population density and lack of public green areas in San Lorenzo. Foster community engagement and well-being by engaging middle-class citizens, university students, and workers in participatory processes. Increase sports facilities, open-air study areas, and improve accessibility for children and the elderly.	Implement "Playground is Nature" pilot project in 3 schools in rural, forest, and urban environment to co-create sustainable recreational spaces, foster intergenerational interaction, and enhance environmental resilience through Nature-Based Solutions (NbS).	Initially aimed to co-create a local classified area via participation, now focused on co-creating a strategy for preserving and promoting Estarreja's natural heritage. **Goals:** Co-create a sustainable development strategy balancing human activities with nature conservation, fostering community engagement, human-nature relationships, multidisciplinary planning, and co-governance in Estarreja.

model for small-scale regenerative farming practices. Pilot a collaborative governance framework involving farmers, municipalities, and rural communities to implement regenerative farming practices locally.

Collecting the required Knowledge	Brussels	Cáceres	Roskilde	Lagoa	Strovolos	San Lorenzo/Roma	Barcelos	Estarreja
	The LKL representatives share common objectives: improving environment and quality of life and promoting social cohesion.	- Selection of pilot case areas based on community agreements, municipal support, and future waste ordinances. - Initiated partnerships with various stakeholders for proto Living Labs (pLLs) and Cáceres Living Labs (LKL) after engaging in territory exploration and networking for composting initiatives. - Developed 20 composting experiences varying from co-designed to diagnosis-oriented. - LKL started with monthly online meetings from December 2023 focused on knowledge	- Regular meetings , seminars and workshops are organized to develop, and coordinate actions and explore and network actors from regenerative agriculture. - Engaging youth aged 25-44 from the Regenerative Farming Association in the pilot and emphasizing collaboration with the Regenerative Agriculture School to integrate students into practical farming and community activities is planned.	- Ongoing mapping of participatory culture in Lagoa aims to generate practical solutions for local challenges within the Living Knowledge Lab (LKL), enabling governance diversity and cooperative dialogues among stakeholders. - Extensive networking efforts to involve over 15 organizations, strengthen collaboration, promote project outcomes and explore opportunities in citizen science, youth engagement, and tourism training. - Effort to Integrate local marginalized knowledges from	Established relationships with key partners (Strovolos municipality, Water and Forest Departments, NGOs, etc.) and integration of their expertise into TRL projects. Ecological initiatives need stronger citizen participation and community responsibility through better communication and education.	Identifying LKL stakeholders and aligning goals through meetings with Sapienza University, II District, elected representatives, archaeological superintendence, student associations, researchers, and parent's association of local daycare.	- Exploration visits and interviews at schools identified artificial playgrounds and motivations for participation. - NbS awareness workshops were held and participatory process training workshop will follow and enhance involvement of stakeholders. - Active involvement of students and operational staff promotes inclusive, nature-connected school environments - NbS in schools offer jobs, training, and local economic participation for marginalized groups.	- Establishing partnerships through meetings and workshops with key stakeholders. - Youth involvement through various activities: photography contest, co-creation process, - Engaging rice producers and schools to integrate local initiatives. - Present at PACOPAR to engage diverse local businesses and organizations. - Planned internal workshops for municipality staff to enhance project communication. - Organizing decentralized LKLs across Estarreja to ensure diverse

		co-production, action research, governance, and pilot case implementation. - Collaboration with Caritas and Educatierra to include marginalized groups.		rural workers, manual laborers, and elderly individuals aims to avoid social alarm and misunderstandings ,		- Necessity to place nature as central and take into account surrounding territory	community representation. - Creating a centralized LKL to align public entities and organizations.

Formalizing LKL	Brussels	Cáceres	Roskilde	Lagoa	Strovolos	San Lorenzo/Roma	Barcelos	Estarreja
	- LKL formalized and composed by representatives from Comensia and inhabitants' representatives following several informatl meet-ups. - Initial social cohesion activity conducted via a barbecue, engaging local residents and tenants to introduce Integrated Stormwater Management (ISWM) concepts. - Future activities planned include neighborhood walkthroughs, photovoice workshops, and interviews to deepen understanding of environmental issues and community perspectives.	- Difficulties to keep the pLL engaged over a long-term period: **Pinofranqueado pLL:** engaged 15 homes and 2 restaurants initially, but city council ceased support in May 2024. **Arroyo de la Luz pLL**: Engaged schools and elderly residents, but switched to conventional waste management; activities moved to surrounding areas. **Madrigal de la Vera pLL**: Conducted workshops with local schools; ended in June 2024. **Torremayor pLL:** Engaged 10 homes and 2 cantines, collected valuable composting data, but the municipality opted	- Collaboration initiated with the Regenerative Farming Association for the Living Knowledge Lab (LKL). - Formed a Pilot Coordination Group comprising RUC researchers and association representatives. - Conducted a workshop in January 2024 to present the TRANS-Lighthouses project, engage approximately 30 association members, and co-create ideas for pilot plan development. - Currently formalizing working groups involving association members focused on community-supported agriculture and biodiversity topics.	- Initiated with training workshops, meetings, and events (World Water Day and Environment World Day) involving over 100 youngsters and 15 organizations, focusing on environmental education and youth engagement through art and dialogue. - Currently developing a participatory governance model to organize stakeholders based on their expertise and organizational culture, aiming for effective decision-making and cooperation. - Employing a Reflexive Monitoring process alongside the PDCA cycle to adapt strategies in	- Planned cooperation, dialogue, and understanding activities with diverse stakeholders in phases. - Scheduled workshops to engage community and stakeholders, fostering a shared vision for NBS implementation. - Engaged underrepresented groups like children (scout groups) and elderly through focused discussions and outreach. - Participated in local events to gather community feedback and conducted an effective online survey for broader input.	The LKL is not yet formalized. The following activities are scheduled: - Workshop sessions planned to introduce pilot case goals and align stakeholder objectives through dialogue and mutual understanding, despite delays caused by the change in the pilot area. - Educational, artistic, and scientific activities designed to inclusively engage youth and students, ensuring co-production, co-diagnosis, and co-design of actions for the pilot area.	The LKLs are not yet formalized since the workshops for teachers will start in September 2024. The following students workshops have already been given in the 3 schools: - NbS and Climate Changes - Participatory Methods and Participatory Budget - Play, Risk and Nature	- -

for large-scale waste management.
- High pressure from municipalities to use conventional waste companies; planned another composting master's course (Oct-Dec 2024) with UEX.
- Regional LKL to support decentralized solutions and networking (TRL 2024-2026).
- Proposed creation of a professional association for an ecosocial economy for biowaste,

real-time, integrating stakeholder feedback to enhance project management and outcomes.