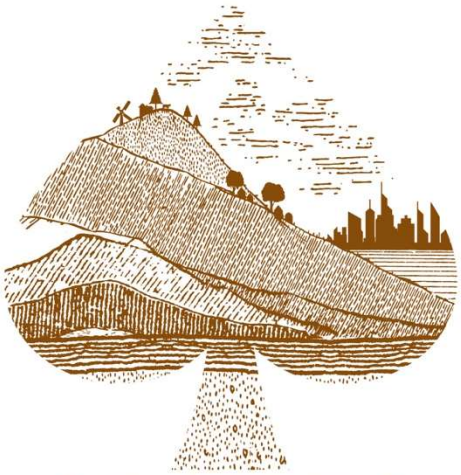

SPADES

CO-CREATION PHASE

WORKBOOK

#PILOT NAME #

February 2026

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CONTENT

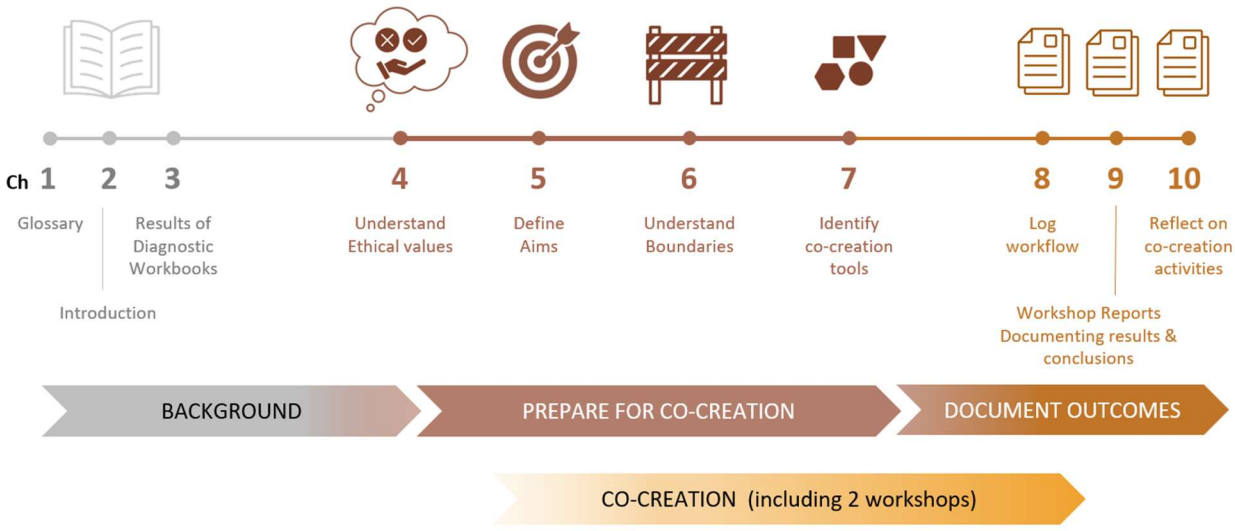
HOW TO USE THIS WORKBOOK

This workbook is guiding the co-creation phase of the pilots in SPADES project. The objective of the co-creation phase is to develop a practical strategy for each pilot to better integrate soils into spatial planning. It recognizes that this integration requires collaboration and provides guidance on how to organise participatory approaches based on local needs and challenges. This workbook supports (1) making the ambitions of the pilots in the SPADES project more precise, (2) translating them into co-creation objectives by identifying barriers that may limit them, and (3) determining a clear direction of action to achieve the pilots' aims. The workbook presents a menu of co-creation processes, methods, and facilitation options to inspire and support the development of the practical participatory strategy. Each pilot can use the workbook differently. For pilots that already have a practical participatory strategy (a plan or roadmap), it can serve as a reflective tool. For pilots looking for new ways of working and ways to refine their plan, it provides guidance and support.

This workbook is not a standalone document; there is an Inspiration portfolio and an overview of boundaries and boundary spanning instruments or co-creation methods for further support. There is a fourth file which is the PowerPoint template for filling in the direction of the aim of the pilot. All these items are in the folder co-creation phase in the TU Delft Teams environment.

Structure of the workbook

The workbook is divided into three sections. The first section contains background information in the (growing) glossary, short summary of the SPADES project and the aim of the co-creation phase and this workbook. Here we also give an insight in how the researchers have investigated the diagnosis workbook of the former phase. The second section presents guided steps to prepare for the co-creation phase and the third section the outcomes of this phase in the form of a log, reporting on the two workshops and conclusions and reflection of the workbook itself.



In more details, the first part of the co-creation workbook provides background information, including:

- An updated glossary of terms (chapter 1);
- The introduction (chapter 2);
- And the results of the diagnosis workbook (chapter 3), giving the basis where we build upon in the cocreation phase. There are some follow up questions in this part.

Then, in the second section, the practical chapters for the co-creation phase are included focusing on:

- Ethical values (chapter 4), to support the pilots to consciously consider the potential ethical issues during the work in the cocreation phase;
- Insights into how to map the process to reach the aim of your pilot(chapter 5);
- What boundaries are you trying to span in the co-creation?, or how to collaborate between soil and planning (chapter 6).
- The menu of and plan for cocreation (chapter 7) offers a pallet of processes, methods and facilitators for co-creation, that can be used by pilots to select the proper ones for their plan.
- The yellow text blocks in chapter 5 and 6 give more in-depth theory and information for readers that want more backgrounds but are not compulsory to read.

The next part is aimed at reporting the cocreation phase:

- Chapter 8 gives a Log, to annotate your workflow and experiences to keep track of the journey.
- The results and conclusions of the cocreation workshops can be reported in chapter 9 and
- any reflections on the cocreation phase from pilots to the SPADES researchers in chapter 10.

Interaction with the SPADES partners

WP3 task meetings are organised every 6 weeks. Topics will be announced in advanced. These meetings are open to all in SPADES. Check the WP3 calendar on Sharepoint to know the dates and agenda and write to the task leader if you plan to attend. Such meetings will deal with:

- Explaining the co-creation workbook, discussing the aims of co-creation in pilots for instance.
- Exchanging about common challenges among the pilots of the same family of pilots. Challenges that are common to more than one family of pilots will be discussed in WIM (walk-in meetings).
- Discussing what is happening in one pilot, to bring collective insights and support the co-creation process in this pilot.

Spades partnership has every third Wednesday of the month a Walk in Meeting (WIM) at 9.00. We will keep this timeslot to have presentations on transversal topics or methodologies.

1 GLOSSARY OF TERMS

Boundary Spanning theory: This theory explains the requirements and elements to overcome boundaries between different professional groups, such as facilitating communication and joint activities.
Keywords: co-creation, knowledge brokerage

Planning culture: The unplanned or informal aspects to the process of territorial interventions, unwritten assumptions and concepts, informal roles of inhabitants, changing reliability of governments and different perceptions of the importance of nature.
Keywords: spatial planning and design practice, planning style, planning system

Policy integration: Policy integration entails joint work across the levels of government and across the boundaries of sectoral policies to create synergies, shared goals and shared responsibilities for the implementation of those goals. In the context of spatial planning, policy integration is about coordinating the spatial impacts of sectoral policies across scales.
Keywords: vision, coordination

Planning style: This term is used to diversify between clusters of different planning systems; every system is unique but there are similar styles.
Keywords: planning culture, planning system

Planning system: Planning system is the process in which the spheres of law, regulations, policy and institutions work together at different scales, influence each other and set the planning conditions for spatial (re)development projects. The conditions on the European, national, regional and local scale are set by spatial planning policies that line out the spatial development project in which spatial design is working out the specific spatial outcomes of these policies. The term 'planning system' refers to the formal processes of planning but recognises that the professional structures of planning do not only consist of formal, written procedures and regulations which could be called planning culture.
Keywords: spatial governance, planning culture

Soil health: Soil health is defined as soils' ability to provide ecosystem services and support various land uses. It is structured around soils quality - the degree to which the inherent properties of a soil facilitate user-defined soil functions; soils quantity - soils provide resources through three-dimensional space occupancies (through all soil horizons or the soil's volume) and soil performance - soils' ability to perform soil functions and provide ecosystem services.
Keywords: soil quality, ecosystems, biodiversity, soil performance

Soil performance: Soil performance is the effect of soil quality and quality (sometimes both) on helping with planning challenges like climate change, environmental degradation and spatial quality. It is a new category introduced by the SPADES project to bridge the quality and quantity of soil to the interventions in spatial planning and design.
Keywords: added value, effects, synergy, relation to space

Soil quality: Soil quality is the chemical, biological and physical condition of soil.
Keywords: fertility, biodiversity, pollution

Soil quantity: Soil quantity refers to the availability of land and soil in relation to societal challenges such as soil as resource for building, the percentage of sealed areas and the ambition of no-net land take policy of the EU.
Keywords: resource, soil sealing, land take

Spatial planning: Spatial planning is a multifaceted process that combines legislative, regulatory, policy and institutional frameworks to manage and organize space at different scales (e.g. European, national,

regional, local). Spatial planning sets the conditions for spatial (re)development projects aiming to address existing and future challenges in a spatial system.
Keywords: coordination of policies in space, governance of territory, multi-level governance, future-orientation, land use

Spatial design: this is a multidisciplinary approach to shaping physical environments. Spatial design is an integrative discipline that combines, amongst others, elements from architecture, infrastructure development, urban design, and landscape design. The process of spatial design is a (de-linear) process that consists of 5 elements (van Dooren, 2010): 1) domains of knowledge, 2) Frame of reference, 3) Guiding theme, 4) Experimenting and Laboratory. In some countries this work is done by architects, other countries have educated urban designers. The first is originally focussed on the build object, the second on the assemblage of the build environment.
Keywords: co-creation, boundary spanning object, balance in spatial interest

Spatial (re)development: Spatial development is the umbrella term to describe various spatial processes. Spatial development relates, as the first component of the term suggests, to space and includes various levels of scale or action, which extend from the municipal to the regional and national government tier, as well as to the national and supranational level. It also relates, as the second component of the term indicates, to development, which could be understood in the descriptive (development of a space over a given time), analytical or normative (plans, strategies and concepts) sense.
Keywords: tactical, balance in spatial interest, maintenance regime

Roadmap: A roadmap is a spatially and temporally structured framework that translates a desired outcome into concrete actions. It organizes planning, design, and governance interventions across scales and over time, guiding how desired futures can be progressively made operational. It clarifies where we want to go and sets out a clear pathway for how to get there and who is involved. Rather than prescribing fixed solutions, a roadmap functions as an adaptive and relational instrument, capable of evolving as new knowledge, actors, and conditions emerge, while maintaining a shared direction for collective action.
Keywords: when forecasting pathway, spatial masterplan

Co-creation: Co-creation is a participatory, collaborative process in which a series of actors work together (e.g. communities, local actors, researchers and other stakeholders) with the aim of identifying problems, producing shared knowledge and integrative solutions. It moves from designing for people in designing with people and aims for shared authorship, expertise integration and situated knowledge creation. This process aims to negotiate conflicting values and translate complex socio-ecological realities (such as soil, water, and territory) into shared spatial imaginaries and actionable strategies.
Keywords: boundary spanning, knowledge brokerage, design

Value: something a person or group considers important, worthwhile, or desirable. Values guide our choices, shape our goals, and help us decide what matters in life. Values guide our behaviour.
Keywords: ambition, shared goals

Ethical values: are a specific kind of values. They concern what is right or good in our treatment of others and the world. They guide moral judgment and help us answer questions like: “all things considered, what should I do?” or “how can I make this world a better place?”.
Keywords: ambition, shared moral code

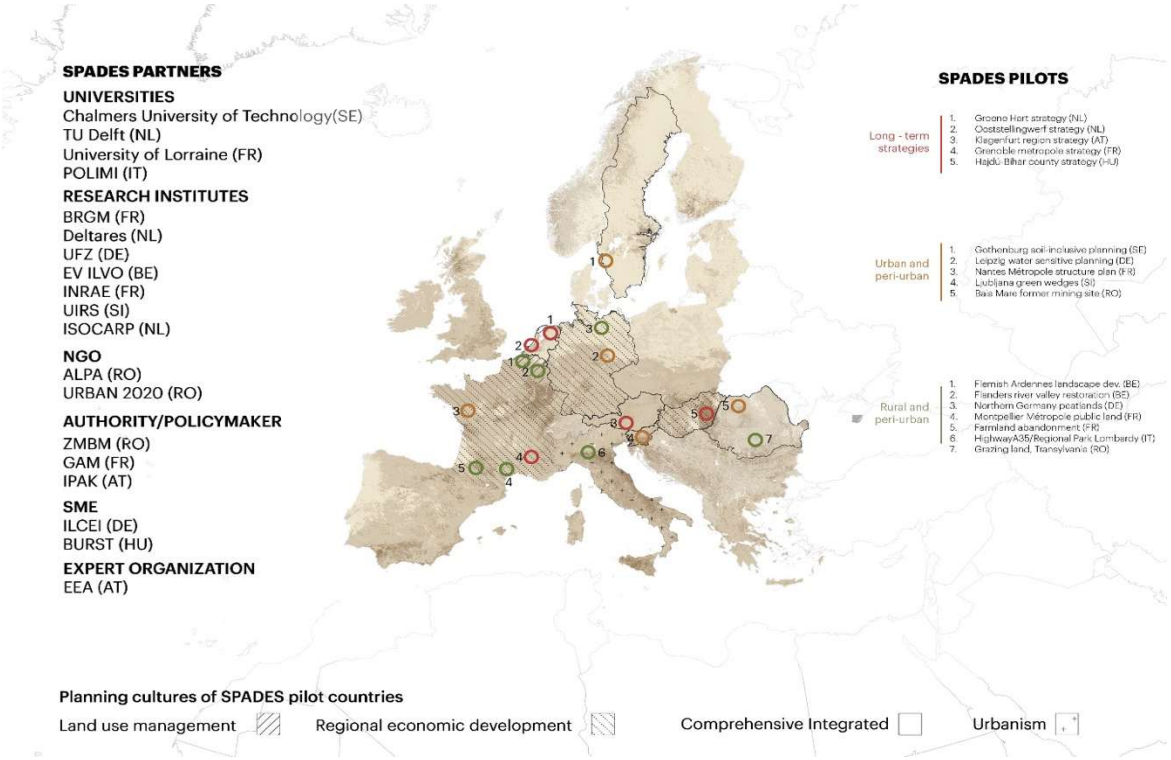
Dilemma: a situation in which a person faces two or more options, all of which have significant moral, practical, or emotional drawbacks and choosing one means giving up something important in another. They arise when no available choice leads to a completely satisfactory outcome, often because each option involves conflicting values, duties, or interests.
Keywords: challenge, boundary

2 INTRODUCTION

This chapter is a short summary of what the SPADES project and its specific perspective on how planning can become soil inclusive. This workbook is an important instrument for the project not only to be able to interact with the pilots in the project, but also to the partners to collaborate in an integrative manner. This chapter clarifies what SPADES project does, how pilots fit into the project, what is to be expected from the pilots at this phase of the research, and how the co-creation workbook fits with the work at pilot level as well as provide a platform for exchange between the work package teams and the pilots.

2.1 SPADES project

The EU Soil Strategy for 2030 aims to ensure all European soils are healthy by 2050 through sustainable land management, pollution reduction, and biodiversity protection. The EU Soil Mission ("A Soil Deal for Europe") supports this goal by promoting research, innovation, and local actions to restore and preserve soil health across Europe. The project Spatial Planning and Design with Soil, acronym SPADES, has the mission to develop, test and implement soil-inclusive spatial planning strategies in order to support the transition towards soil health in Europe. Soil health is under acute pressure and the soil's ability to perform essential ecosystem services should be improved to cope with challenges such as climate change and needs such as ensuring a healthy living environment.



Spatial planning and design are practices characterized by balancing out interests in urban, peri-urban and rural areas. These interests may include functionality, accessibility, economic prosperity but also spatial quality and care for nature. On the larger scale (national and regional) this is planned by decisions on land use, mobility and infrastructure, and on the smaller scale of the urban or rural district by designing streets, the envelops of buildings and public spaces. On all scales these planning and design activities can benefit

from taking soil care as a goal by consciously taking in the quality, quantity and performance of soil into their strategies.
The SPADES project works with pilots to learn how to enable and activate soil inclusive planning and design. The 17 pilots across 10 EU Member States, cover a broad range of land uses (urban, peri-urban and rural areas), time and spatial scales, and soil and planning challenges. Together with the local practitioners and policy makers fit-for-purpose soil-inclusive spatial strategies will be developed to support different goals such as land degradation neutrality and no net land take. The SPADES instruments will be presented in such a way - in the SPADES manual and navigator - that they can be found by the right user, and that they can be applied at the right phase of the planning and design process, and for the right purpose.

2.2 SPADES goals

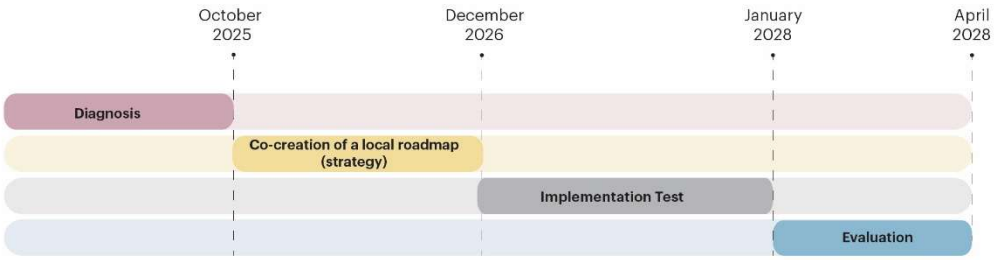
The overall aim of SPADES is to sustain and restore the Soil-Sediment-Water-system (SSW-system) and use soil- inclusive spatial planning strategies to contribute to a transition to healthier soils that can perform ecosystem services (ES) in urban, peri-urban and rural environments.
To go beyond the current state of the art and beaten tracks, SPADES has specified 5 (scientific) challenges.

- Lack of understanding of how to facilitate the transition towards healthy soils in spatial planning and design;
- Very limited innovation in the planning system and lack of a shared language;
- Insufficient methodological basis and instruments;
- Limited soil literacy by actors involved in planning and design and decision making;
- Insufficient attention for transferability of successful practices.

The SPADES project approaches these challenges by:

- Providing a comprehensive state-of-the-art understanding of whether and how soil health and soil threats are considered in spatial planning and design practices in Europe and associated countries;
- Co-creation with local practitioners and policy makers in a diverse range of urban/peri-urban and rural pilots in different member states to develop soil-inclusive spatial strategies;
- Supporting soil literacy through awareness building, exchange of best practices, creating shared concepts, training and skill development of planners and actors involved in land use decisions.

2.3 Co-creation phase



The pilots go through 4 phases: diagnosis, co-creation, implementation and evaluation. The objective of the co-creation phase is to develop a practical strategy for improving the local integration of soils in spatial planning by a structured participatory approach. This involves:

- A series of at least 2 local co-creation workshops: determination of the methods (data, approaches, instruments that appear adapted to the local case), of the key steps and monitoring indicators. Workshops will bring together diverse departments of the local authorities, and local stakeholders;
- Writing of a precise implementation plan or road map (vision, action plan) and identification of what can be achieved with the SPADES project (in relation to WP4 and WP5). To support this activity, regular meetings (about every 6 weeks) will take place at the task level 3.1/ 3.2/ 3.3, to build a community of practice between the planners of the pilots (to share data, tools, experiences, FAQs);
- Cross-fertilization workshop to present the road maps will be planned no later than December 2026. Collective decision of implementation and testing options.

2.4 Objective of this workbook

This workbook is guiding the co-creation phase of the pilots in SPADES projects. The objective of the co-creation phase is to develop a practical strategy to better integrate soils into spatial planning. It recognizes that this integration requires collaboration and provides guidance on how to organise participatory approaches based on local needs and challenges. This workbook supports making the ambitions of the pilots in the SPADES project more precise, translate them into co-creation objectives by identify barriers that may limit them, and determine a clear way to achieve the pilots aim. The workbook offers a menu of co-creation methods and facilitation options to support participatory strategy development. Pilots can use it flexibly: as a reflective tool for existing strategies or as guidance to develop and refine new ways of working.
The objective of this workbook for the SPADES pilots is to provide support in the co-creation phase of the pilots by:

a. Introducing the concise conclusions of the Diagnosis Workbook;
b. Sharing resources, methods, providing inspiration for the co-creation phase;
c. Gathering insights from the pilots.

The workbook's format allows for easy translation and for users to print it easily. The answers to the questions need to be filled in digitally. This is needed for collecting and distributing your insights among the different researchers in the project. If you have any difficulties or questions, please contact your task leader or Coline Perrin to direct your question to the researcher that can answer your question.

This workbook is the first step in collaboration and acts as a “boundary-spanning tool,” connecting different groups and perspectives. In this way, it covers a broader context than your pilot alone. **It is normal if some questions do not apply to your pilot—simply note them as “not relevant, because …”.**

Background information is given in these yellow boxes.

Blue boxes flag the possibility to ask for help to the partnership

Answers are in these boxes. You can delete the text in the box and use as much space as you need. If a question is unclear, please indicate this so we know. If a question is not relevant, you can just mention that.

3 RESULTS FROM DIAGNOSIS WORKBOOK

In this section you will find the preliminary reflections on the diagnosis phase, organized by chapter of the diagnosis workbook. These reflections provide a high-level overview of how the researchers are studying the material and what they are learning from your pilot. There is also a brief explanation of how they are conducting a more in-depth analysis, which is still in progress. Presentations from the cross-fertilization workshop (pilot presentations) and the general assembly (researcher presentations) are available in the Teams environment.

3.1 Chapter 3: Getting to know the pilots

The diagnostics carried out across the 17 pilots confirmed the coherence of the three families. Many challenges are shared by pilots within the same family; these are summarized in the paragraphs below. However, this summary table, based on the brochures produced by each pilot in 2025, shows that some challenges cut across more than one family/task. Finally, among all the challenges identified by the pilots, the yellow cells indicate the major challenges on which each pilot has stated its intention to work more specifically and to place particular emphasis within the framework of the SPADES project (according to the diagnostic results presentation slides and posters). During the co-creation phase, all WP3 task meetings remain open to all, and WP3 will foster interactions beyond the tasks' meetings, both bilateral interactions between pilots sharing similar concerns, and wider interactions between pilots belonging to different families in WIM (walk-in meetings) dedicated to transversal challenges.

Please indicate whether you consider that these challenges should be revised for your pilot below.

Pilots	Long term - strategic					Urban – peri urban					Peri urban - Rural						
Soil challenges (on brochures)	Ooststellingswerf	Groene Hart	Grenoble	Hajdu Bihar	Klagenfurt	Gothenburg	Leipzig	Ljubljana	Nantes	Baia Mare	Lombardy	Flanders	Montpellier	Gr. Bocageland	Mecklenburg-Vorp.	Cœur d'Hérault	Transylvania
Land take & urban expansion		X	X	X	X		X	X	X	X	X	X	X			X	
Soil sealing					X	X	X	X	X		X						
Soil health & degradation			X	X					X	X				X			X
Soil compaction							X	X									
Soil pollution	X			X		X											
Circular soil use						X											
Climate resilience					X								X				
Ecosystem fragmentation			X							X	X	X		X			
Agricultural transition & Pressure	X											X	X	X	X	X	
Peatland & Water-Soil imbalance		X													X		
Land abandonment & governance																X	X

Inventory of soil related challenges (in yellow what was mentioned in the folders), showing how the focus develops.

Are these challenges still relevant for your pilot? Would you like to adjust them?

Introduction to the long-term strategy pilots

The five pilots collectively demonstrate how long-term strategies can be developed in a way that is spatially inclusive, multi-level, and action oriented. Each pilot covers rural, peri-urban, and urban areas, which naturally introduces a wide spectrum of planning and soil-related challenges. By spanning this full spectrum of spatial contexts, the pilots reveal how spatial strategies can respond to highly diverse landscape dynamics, land use pressures, and environmental conditions.

A second defining feature of these pilots is their multi-scalar character. They mostly operate simultaneously at regional, subregional, and local levels, requiring the alignment of distinct systems such as ecological networks, governance structures, infrastructural frameworks, and socioeconomic processes. Working across scales highlights the interconnections—sometimes synergies, sometimes tensions—between strategic regional ambitions and concrete local realities. This approach supports more integrated decision-making, helping stakeholders understand how interventions at one level influence outcomes at another. These pilots also show the importance of linking long-term planning with short-term interventions. Strategic visions and long-range development pathways are translated into practical operational steps, management measures, and early actions. These early interventions often serve as catalysts that test ideas, build momentum, and provide tangible results while maintaining a coherent direction toward long-term objectives. In this way, these pilots operate not just as conceptual exercises but as frameworks that can guide and inspire more detailed, place-specific projects.

Finally, each of the long-term strategy pilots integrates a broad range of societal challenges. Rather than focusing on a single sector, they adopt cross-sectoral approaches that connect natural, social, and economic issues. This includes addressing climate adaptation, biodiversity, liveability, accessibility, housing, and economic vitality in relation to one another. By doing so, the pilots exemplify how long-term strategies can become powerful tools for balancing multiple public interests and guiding sustainable, resilient development.

Introduction to the urban and peri-urban pilots

Urban and peri-urban areas must accommodate a wide range of needs—housing, infrastructure, industry, green spaces, recreation, and biodiversity, sometimes even food production. The available land is limited, and the pressure to meet visible, short-term demands (e.g., housing, roads) often overshadows the less visible but critical functions of soil. At the same time, urban areas face increasingly complex societal challenges, from climate resilience to sustainable growth, that increasingly demand holistic planning approaches.

The five urban/peri-urban pilots—Nantes, Leipzig, Baia Mare, Ljubljana, and Gothenburg—face similar land and soil-related challenges shaped by urban sprawl, soil sealing, climate vulnerabilities, legacy contaminants, and fragmented governance. Although the focus of each pilot differs slightly, across all, soil is lifted forward as a foundational urban system whose performance directly influences land development, infrastructure, and ecosystems.

Common features are that soil considerations are often integrated too late in planning cycles, and data gaps, particularly site-level measurements, limit the possibility for preventive and nature-based approaches. Institutional fragmentation, misaligned stakeholder incentives, and varying levels of soil

literacy further hinder progress. The pilots' needs for boundary-spanning are across departments, sectors, and professional cultures.
The pilots show similar ambitions: all seek to integrate soil quality into planning instruments or planning processes, contribute to EU goals such as the No Net Land Take goal, enhance soil literacy, improve early-stage soil assessment, and adopt circular soil management practices. Overall, the pilots aim for a transition in which soil is evolving from an overlooked substrate to a strategic planning resource—central to resilience, climate adaptation, public health, and sustainable land-use futures.

Introduction to the peri-urban and rural pilots

Rural and peri-rural pilots face significant physical and systemic hurdles. Physical degradation, including erosion, compaction, and loss of organic matter, is driven by overgrazing and the conversion of grasslands to arable land. Economic and structural barriers further complicate sustainable management. Speculative buying and high land prices force farmers toward intensive practices to remain competitive, while urban sprawl and infrastructure projects fragment ecological corridors and consume high-quality soil. Institutional frameworks often remain siloed, polarizing nature conservation against agriculture and struggling with path dependency, where unsustainable land-use rights are difficult to revoke once granted. Further challenges include a lack of site-specific data (e.g. soil biodiversity) and power imbalances between landowners, large-scale and small-scale farmers.

To overcome these, pilots are pursuing several key ambitions to treat soil health as a central, regulated pillar of spatial planning and rural development:

- Landscape Equilibrium: Re-integrating elements like hedgerows into functional, viable agricultural models;
- Strategic Land Tenure: Using public land allocation and Land Trusts to reward farmers who invest in soil health;
- Shared Narratives: Building soil literacy and trust by reframing technical terms into local concepts;
- Binding Regulations: Embedding soil health indicators directly into local zoning documents and urban plans to ensure long-term protection.

3.2 Chapter 4: Stakeholder mapping

The stakeholder mapping activity conducted across the pilots highlight a consistently complex and institutionally dense governance context. Each pilot involves a relatively diverse group of actors, with a clear predominance of public-sector stakeholders. Ministries, regional authorities, municipalities, and public agencies typically occupy positions of high influence, reflecting their regulatory, planning, and land use mandates.

While public authorities hold most formal decision-making power, influence is often distributed across multiple departments and administrative levels. This fragmentation may create coordination challenges and can slow down implementation if roles and responsibilities are not clearly aligned. Therefore, pilot progress depends less on expanding stakeholder participation and more on strengthening coordination among existing public actors.
Civil society stakeholders, including non-governmental organisations, community groups, farmers, and local initiatives, represent a substantial share of actors across pilots. They consistently demonstrate high levels of interest and engagement. However, their formal influence is generally limited. Without clearly defined

roles and pathways into decision-making, there is a risk that their contributions remain consultative rather than impactful.

Private-sector actors appear in more selective and project-specific ways. Although fewer, they often control key assets such as land, infrastructure, or investment capacity. Their level of interest tends to increase when pilot activities intersect with regulatory requirements, financial risks, or operational responsibilities.

Academic and research institutions are present across pilots but remain underrepresented relative to their potential contribution. Despite high interest and strong analytical capacity, they are not usually positioned in high influential levels, even though they could play a valuable role in knowledge integration, evaluation, and cross-sector translation.

Overall, pilots that are more successful in engaging stakeholders are those that actively coordinate public authorities, formalize the roles of civil society and academia, and engage high-influence actors early around concrete mandates, risks, and implementation needs.

The co-creation phase offers pilots an opportunity to revisit and further develop the results of the stakeholder mapping exercises. In this context, the box below lists questions that are proposed to support and stimulate discussion with stakeholders around the mapping outcomes (these can be collected in a short summary per pilot to then be included in the final report).

Revisiting the Stakeholder Mapping process

Analysis and Understanding

1. *Have any new stakeholders emerged since the initial mapping?*
2. *Have existing stakeholders' interests, influence, or positions changed?*
3. *Are there individuals or groups influencing stakeholders' opinions? If so, should these influencers be considered key stakeholders in their own right?*

Stakeholder relationships

Use this opportunity to explore and update once more the relationships among the different stakeholders and reflect on the results:

1. *Who are the most influential stakeholders in this network, and why?*
2. *Which relationships should be actively strengthened to improve collaboration or outcomes, and what are the practical steps to do so?*
3. *Which stakeholder relationships need to be created, repaired, or rebalanced to better support our goals? For example: Might be that several actors have the same interests but never worked together in the past.*
4. *Are there any missing stakeholders or overlooked connections that should be added to the network? This goes back to the stakeholder mapping by identifying "hidden actors".*

Strategy and Engagement

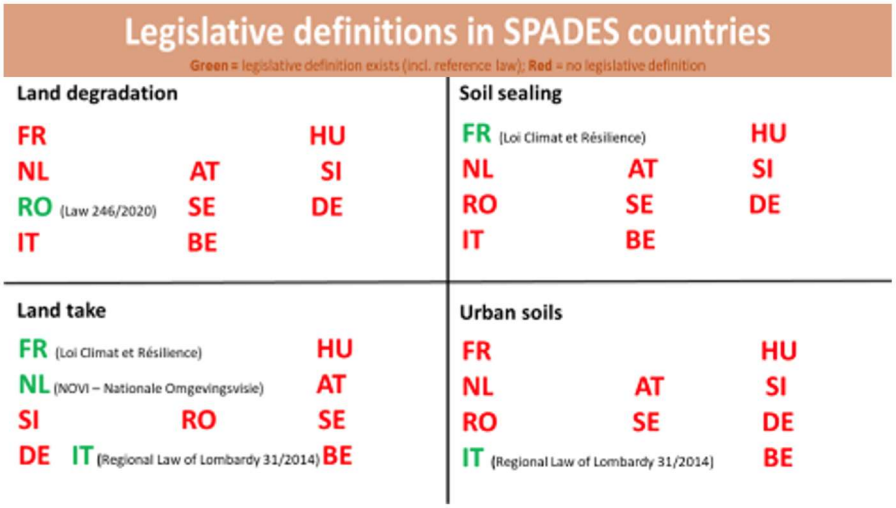
1. *How will you best support and mobilize your key stakeholders?*
2. *For neutral stakeholders, why are they neutral (lack of information, indifference, etc.), and what is the plan to inspire them?*
3. *What would "success" look like in terms of the relationships with these stakeholders (e.g., a stronger community, improved trust)?*

3.3 Chapter 5: Territorial policy, spatial planning and soil

Paragraph 5.1 Policy context European and national level

The SPADES Pilots highlighted how EU policies affect soil-related planning and management across different contexts. All 17 pilots contributed, with EU policies identified as relevant in 11 cases, pointing to a significant but uneven influence of EU-level frameworks on soil-related outcomes at national and regional levels.
Across the pilots, the Common Agricultural Policy (CAP) emerged as the most influential and cross-cutting policy. Other frequently mentioned EU policies include the EU Soil Strategy, the Water Framework Directive, the Nitrates Directive, and the Nature Restoration Law. Policy overlaps occur mainly in agriculture and biodiversity, underscoring strong links between soil management, land use, and environmental objectives.

Most identified policy impacts were described as enabling rather than constraining. This contrasts with earlier assessments (e.g. EEA, 2016) and suggests that pilots perceive EU policies as opportunities when they are effectively integrated into planning processes.[1] At the same time, considerable variation in terminology—such as land degradation, soil sealing, land take, and urban soils—was identified as a key barrier across and within national contexts. The pilots therefore emphasized that work on terminology is not merely about definitions; it is about building a shared language that enables mutual understanding and more effective collaboration, from the local level up to the European scale. This underlines the need for harmonized terminology and a common conceptual framework to support cross-pilot comparison.



Overview of legislative definitions in SPADES countries: in red there is no definition, in green there is.

Paragraph 5.2 Spatial planning clusters in Europe

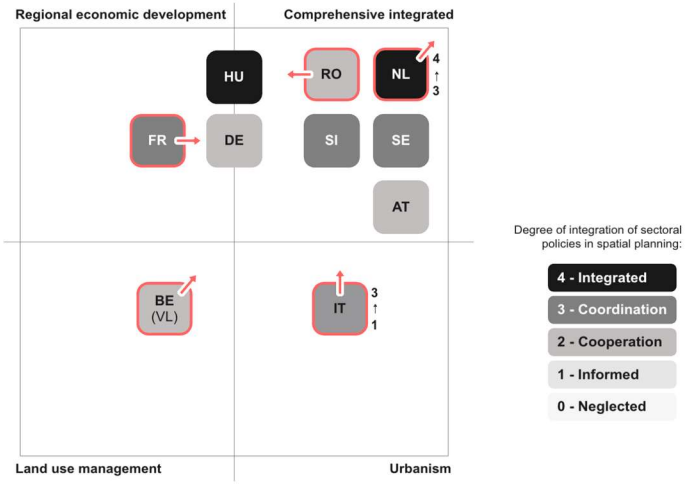
Pilot partners' responses allowed us to update the clustering of pilots according to the types of spatial planning systems within which they operate. The typology we used originally dated from the previous

[1] EEA, 2016. The direct and indirect impacts of EU policies on land. European Environment Agency, Copenhagen, DK.

decade (building on Dühr et al., 2010 and Nadin et al., 2018), making this update essential.[2] While the planning contexts of most pilots did not change significantly, new planning laws and practices in some cases required a revision of the classifications. The changes were as follows:

1. Netherlands: Following the implementation of new planning laws in 2024 and new guidance documents on soil-driven planning decisions, the system has shifted further toward a comprehensive integrated approach. This involves stronger coordination across government levels and increased integration of sectoral policies. This shift warranted reclassifying the system from "coordination of sectoral policies" to an "integrated approach."
2. France: While maintaining a focus on regional economic development, the planning system has shifted toward greater cross-sectoral policy coordination at the metropolitan and regional levels.
3. Belgium (Flanders): In the Flemish case (where planning policy is the competence of the federated regions), the system is rooted in the land-use management tradition but has been evolving to integrate aspects of a comprehensive integrated planning system.
4. Italy: Traditionally characterized by the "urbanism" tradition, the Italian system has also been evolving to include elements of a comprehensive integrated approach.
5. Romania: The Romanian system emerged as an outlier; it has moved away from a comprehensive integrated system at sub-national levels toward a regional economic development style. This is characterized by an investment orientation and a sectoral rather than integrated approach.

Thus, while there remain distinct differences between the planning systems represented among the SPADES pilots regarding legal frameworks, capacities, and practices, there has been a degree of convergence toward a more integrated approach. In these systems, the spatial dimensions of sectoral policies are more closely coordinated, potentially creating "fertile soil" for integrating soil concerns into planning and facilitating cross-pilot knowledge exchange—the primary goal of the SPADES co-creation phase.



The four sectors of planning systems and the development of the national degree of integration of sectoral policies in spatial planning.

[2] Dühr, S., Colomb, C., & Nadin, V. (2010). European spatial planning and territorial cooperation. London: Routledge. Nadin, V., Fernández Maldonado, A. M., Zonneveld, W., Stead, D., Dąbrowski, M., Piskorek, K., ... & Münter, A. (2018). COMPASS–Comparative analysis of territorial governance and spatial planning systems in Europe: Applied research 2016-2018.Luxembourg: ESPONG EGTC.

A preliminary analysis was also conducted examining the timelines of planning documents in which soil concerns appear. This analysis shows that, while in some cases (Germany, Austria, and Belgium) soils were already mentioned in planning documents several decades ago, there has generally been a growing attention to soil issues in the planning sector in this and previous decades.
Moreover, the initial exploration sought to map the governance levels at which soil is considered in planning documents and to identify where specific instruments for addressing soil within the planning process exist. At this stage, it is difficult to draw firm conclusions and further analysis is required. Nevertheless, some patterns can be observed.
In the Long-Term Strategy Pilots, multiple governance levels are typically covered, with soil addressed in planning documents at both regional and local levels. In the Dutch and Hungarian pilots, soil considerations span almost all scale levels. The Groene Hart pilot stands out as an outlier in its coverage of "in-between" levels, as the Green Heart territory spans parts of several provincial jurisdictions.
For the Urban and Peri-Urban Pilots, there is a stronger focus on mid-level territorial scales, particularly NUTS 1 and NUTS 3, with more selective coverage at the local level. Baia Mare represents an outlier in this group, as it also includes a focus on in-between scales.
Finally, among the Rural and Peri-Urban Pilots, the picture is more differentiated. There is a frequent emphasis on the NUTS 2 and NUTS 3 levels. Most scale levels from NUTS 1 to LAU 2 are covered in the Pays Cœur d'Hérault pilot, while a stronger national and NUTS 1 focus characterises the Transylvanian pilot.

Type of pilot	Pilot area	NUTS 0	NUTS 1	NUTS 2	NUTS 3	LAU 1	LAU 2	In-between
Long-Term Strategy	Grenoble (FR)			✔	✔		✔	
	Groene Hart (NL)	✔	✔	✔			✔	✔
	Hajdu-Bihar (HU)	✔	✔	✔	✔	✔	✔	
	Klagenfurt (AT)		✔	✔	✔	✔	✔	
	Ooststellingwerf (NL)	✔	✔	✔	✔	✔	✔	
Urban and Peri-urban	Gothenburg (SE)		✔			✔	✔	
	Baia Mare (RO)				✔			✔
	Ljubljana (SI)		✔		✔*	✔		
	Leipzig (DE)	✔	✔		✔			
Rural and Peri-urban	Farmland abandonment (FR) – Pays Cœur d'Hérault		✔	✔	✔	✔	✔	
	Grazing land Transylvania (RO)	✔	✔					
	Highway A 35 (IT) – Lombardy			✔	✔		✔	
	Montpellier (FR)					✔		
	Natural grasslands (BE) – Grenzeloos Bocageland		✔	✔			✔	
	Public Farmland (BE) – Flanders		✔	✔	✔		✔	

Map the governance levels at which soil is considered in planning documents.

Overall, while it remains difficult to identify overarching trends at this stage, the overview indicates that regional (NUTS 1–3) and local (LAU 2, municipal) levels are prominent across the majority of pilots in all three clusters. Clearly, further analysis is needed to draw firmer conclusions, particularly for those pilots where more area-specific planning documents were included in the workbook.

This more in-depth analysis of pilots having provided insights on more area-specific planning documentation will also explore the extent to which different dimensions of soil – quantity, quality,

and performance – are covered across the pilots, providing a more nuanced understanding of how soil is dealt with in planning. This will also open opportunities to explore what tools and methods are used to integrate a soil perspective in planning, which in turn will offer insights for co-creation phase and exchange of knowledge across the Pilots.

3.4 Chapter 6: Mapping of the spatial characteristics of the pilot

Paragraph 6.1 Spatial analysis of the territory

The diagnosis phase focused on mapping and interpreting the spatial characteristics of the pilots through three interrelated lenses: spatial planning concepts, regional development strategies, and district morphologies. This first analytical step aimed to understand the relevance and distribution of these categories across the pilots, while setting the ground for a second phase in which they will be cross-referenced with other task results, particularly soil practices and soil families. At the same time, the diagnosis explicitly sought to identify gaps, inconsistencies, and missing elements that reveal where soil-inclusive planning remains underdeveloped.

The analysis of spatial planning concepts showed a strong convergence around a limited set of themes that currently resonate in practice. Strategic pilots mainly emphasise zoning, green–blue infrastructure, regional planning and design, nature-based solutions, and climate change adaptation and resilience. Urban pilots prioritise climate adaptation and resilience, brownfield redevelopment, green–blue infrastructure, smart growth or compact city approaches, and zoning. Rural pilots foreground climate adaptation and resilience, zoning, agro-ecological planning and design, ecosystem services, and nature-based solutions. Across all pilots, green–blue infrastructure, climate change adaptation and resilience, zoning, and nature-based solutions consistently appear in the top fifteen concepts, confirming their centrality in contemporary spatial planning. Importantly, most of these concepts show medium to high soil inclusivity, indicating a strong latent potential for deeper soil integration.

Spatial concept	Level of soil integration (current)	TOTAL (3.1) - top 25% highlighted	Average (top 25%, bottom 10%)
Zoning	2	13	2.6
Green-Blue Infrastructure	2	13	2.6
Regional planning and design	1	12	2.8
Nature-based solutions	2	12	2.6
Climate change adaptation planning and resilience	1	11.5	2.7
Strategic spatial planning	1	11	2.4
Brownfield development	2	11	1.8
Ecosystem services	2	11	2.4
	2	11	2.4
Wetland planning	2	11	2.2
Long-term perspectives and futures	1	10.5	2.3
Heritage planning	1	10.5	2.1
Healthy city	1	10.5	2.5
Place-based development	2	10	2
Energy and strategic energy planning	1	9.5	2.1
Adaptive reuse	1	9.5	2.1
Learning from urban and environmental history	1	9	2
Systems thinking	1	8.5	1.7
Mixed-use	0	8.5	1.9
Smart growth (or Compact City)	2	8.5	1.5
Water-sensitive planning and design	1	8	2.5
Participatory planning and design	0	8	2.2
Land sharing	2	8	1.8
Neighbourhood design	1	8	1.6
Affordable housing	0	7.5	2.1
Conservation subdivision design	2	7.5	1.3
Land consolidation	1	7	1.6
Agroecological planning and design	2	7	1.4
Adaptive planning and design	0	6	1.6
Post-disaster planning	2	6	1.5
Watershed planning	1	6	1.75
Downtown development and revitalisation	0	6	1.4
Walkability	0	6	1.4
Biophilic urbanism	1	6	1.4
Design: public-private divides in the urban realm	0	5.5	1.3
15-minute city	0	5.5	1.3
Circularity	1	5.5	1.3
Environmental justice	1	5	1
(Expertise and) Local knowledge	1	5	1.2
Social justice	1	4.5	0.9
Social-ecological systems	1	4.5	1.1
Permaculture	2	4	1
International and transnational planning	1	3	0.6
Commons	0	3	0.8
Transit-oriented development	1	3	0.6
Spatial city	2	2	0.2

Spatial concept	Level of soil integration (current)	TOTAL (3.2) - top 25% highlighted	Average (top 25%, bottom 10%)
Climate change adaptation planning and resilience	1	12.5	2.5
Brownfield development	2	12.5	2.5
Green-Blue Infrastructure	2	12	2.4
Smart growth (or Compact City)	2	11	2.2
Zoning	2	9	2.25
Strategic spatial planning	1	9	2.25
Water-sensitive planning and design	1	9	1.8
Mixed-use	0	8.5	2.125
Nature-based solutions	2	8	1.6
Ecosystem services	2	8	2
Walkability	0	8	2
Wetland planning	2	7.5	1.875
	2	7	1.4
Energy and strategic energy planning	1	7	1.75
15-minute city	0	7	1.75
Circularity	1	7	1.75
Adaptive reuse	1	6	2
Land consolidation	1	6	2
Downtown development and revitalisation	0	6	2
Commons	0	6	2
Heritage planning	1	5.5	1.833333333
Agroecological planning and design	2	5.5	1.1
Regional planning and design	1	5	1.666666667
Long-term perspectives and futures	1	5	1.666666667
Learning from urban and environmental history	1	5	1.666666667
Land sharing	2	5	1.666666667
Conservation subdivision design	2	5	1.25
Adaptive planning and design	0	5	1.666666667
(Expertise and) Local knowledge	1	5	1.666666667
Permaculture	2	5	1
Transit-oriented development	1	5	1.666666667
Healthy city	1	4.5	1.5
Participatory planning and design	0	4.5	1.5
Neighbourhood design	1	4.5	1.5
Post-disaster planning	2	4.5	0.9
Watershed planning	1	4.5	1.5
Place-based development	2	4	1.333333333
Affordable housing	0	4	1.333333333
Environmental justice	1	4	1.333333333
Social-ecological systems	1	4	1
Social justice	1	3.5	1.166666667
International and transnational planning	1	3.5	1.166666667
Systems thinking	1	3	1.5
Biophilic urbanism	1	2.5	0.833333333
Design: public-private divides in the urban realm	0	2	1
Spatial city	2	1	0.333333333

Spatial concept	Level of soil integration (current)	TOTAL (3.3) - top 25% highlighted	Average (top 25%, bottom 10%)
Climate change adaptation planning and resilience	1	16	2.285714286
Zoning	2	16	2.285714286
Agroecological planning and design	2	16	2.285714286
Ecosystem services	2	15.5	2.214285714
Nature-based solutions	2	15	2.142857143
Green-Blue Infrastructure	2	14	2
Regional planning and design	1	13.5	1.928571429
(Expertise and) Local knowledge	1	13	1.857142857
	2	12.5	1.785714286
Wetland planning	2	12	1.714285714
Watershed planning	1	11.5	1.642857143
Social-ecological systems	1	11.5	1.642857143
Strategic spatial planning	1	11	1.571428571
Heritage planning	1	11	1.571428571
Long-term perspectives and futures	1	11	1.571428571
Participatory planning and design	0	11	1.571428571
Post-disaster planning	2	10.5	1.5
Commons	0	10	1.428571429
Land sharing	2	10	1.428571429
Systems thinking	1	8.5	1.214285714
Land consolidation	1	8	1.142857143
Affordable housing	0	8	1.142857143
Environmental justice	1	8	1.142857143
Water-sensitive planning and design	1	7.5	1.071428571
Social justice	1	7	1
Energy and strategic energy planning	1	6	0.857142857
Circularity	1	6	0.857142857
Learning from urban and environmental history	1	6	0.857142857
Conservation subdivision design	2	6	0.857142857
Adaptive planning and design	0	6	0.857142857
Neighbourhood design	1	6	0.857142857
Transit-oriented development	1	5.5	0.785714286
Place-based development	2	5.5	0.785714286
Mixed-use	0	5	0.714285714
Permaculture	2	5	0.714285714
International and transnational planning	1	5	0.714285714
Adaptive reuse	1	4.5	0.642857143
Smart growth (or Compact City)	2	4	0.571428571
Healthy city	1	4	0.571428571
Biophilic urbanism	1	4	0.571428571
Walkability	0	3	0.428571429
Downtown development and revitalisation	0	3	0.428571429
15-minute city	0	2	0.285714286
Design: public-private divides in the urban realm	0	2	0.285714286
Brownfield development	2	1.5	0.214285714
Spatial city	2	0	

Spatial concept	Level of soil integration (current)	TOTAL
Climate change adaptation planning and resilience	1	40
Green-Blue Infrastructure	2	39
Zoning	2	38
Nature-based solutions	2	35
Ecosystem services	2	34.5
Strategic spatial planning	1	31
Regional planning and design	1	30.5
	2	30.5
Wetland planning	2	30.5
Agroecological planning and design	2	28.5
Heritage planning	1	27
Long-term perspectives and futures	1	26.5
Brownfield development	2	25
Water-sensitive planning and design	1	24.5
Participatory planning and design	0	23.5
Smart growth (or Compact City)	2	23.5
(Expertise and) Local knowledge	1	23
Land sharing	2	23
Energy and strategic energy planning	1	22.5
Watershed planning	1	22
Mixed-use	0	22
Post-disaster planning	2	21
Land consolidation	1	21
Social-ecological systems	1	20
Systems thinking	1	20
Learning from urban and environmental history	1	20
Adaptive reuse	1	20
Affordable housing	0	19.5
Place-based development	2	19.5
Commons	0	19
Healthy city	1	19
Circularity	1	18.5
Conservation subdivision design	2	18.5
Neighbourhood design	1	18.5
Environmental justice	1	17
Adaptive planning and design	0	17
Walkability	0	17
Social justice	1	15
Downtown development and revitalisation	0	15
15-minute city	0	14.5
Permaculture	2	14
Transit-oriented development	1	13.5
Biophilic urbanism	1	12.5
International and transnational planning	1	11.5
Design: public-private divides in the urban realm	0	9.5
Spatial city	2	3

Collection of spatial concepts

At the same time, the analysis exposed significant absences. Concepts that are particularly relevant for rural and peatland contexts, such as paludiculture, are missing. Moreover, there is recurring uncertainty between what is understood as a spatial planning concept, a policy instrument, or a soil management practice, pointing to a need for clearer conceptual framing.

The regional development analysis revealed a logical distribution of urban and rural typologies across tasks, while also showing that certain typologies (such as linear monocentric development) are absent from all pilots. Several pilots span multiple typologies, suggesting hybrid spatial conditions that deserve further attention. Future work will link these regional typologies to spatial planning concepts and soil families.
At the district morphology level, typologies similarly follow a coherent pattern: open fields and bocage landscapes dominate rural pilots, while strategic pilots often combine multiple morphologies. Suburban areas, open fields, and industrial estates appear in more than ten pilots. This opens the way to explore whether specific morphologies systematically align with certain soil families and practices, such as sustainable farming in open-field landscapes or de-sealing strategies in modernist districts.

Overall, the diagnosis confirmed that soils are widely recognised as critical but remain underestimated and fragmented in spatial planning. Soil data is often available yet poorly integrated, appearing through sectoral or environmental frameworks rather than as a core planning driver. The next steps therefore focus on strengthening linkages with other work packages addressing soil policy and soil families and best practices, refining the list of spatial planning concepts, assessing their soil integration potential and trade-offs, and building a planning and design best-practice portfolio grounded in the spatial concepts and typologies emerging from the pilots.

Paragraph 6.2 Soil analysis of the territory

As part of the Diagnosis Workbook, the 17 pilots provided SPADES with information on how they already integrate soil as part of their territorial development in practice, with examples of tools and use-cases.
In terms of use-cases and practices for soil health, the 17 pilots presented an extensive and useful, yet diversified variety of material. The pilots provided valuable quantitative and qualitative information to complete, prioritize and further inform SPADES inventory of best practices.

Regarding the practices, following an initial filtering of non-relevant content, a total of 336 new case studies and 9 new families of practices were proposed. After an analysis focused on the quality of the data collected, it was found that out of the 336 cases, 179 lack clear links to webpages or further documentation, which presents a challenge for the scoring and usability phases of the evaluation framework.
In terms of interest, the analysis identified a high demand for solutions related to Soil Management, Agricultural Management, and Circular Soil Management. However, the analysis notes that for agricultural practices to be relevant, they must be integrated into spatial planning and offer benefits beyond simple soil protection. Conversely, there is low demand for reforestation and afforestation, partly because their relevance is highly dependent on specific soil types. There is also a noted demand for concepts like flood regulation, use change (including brownfield remediation), and de-sealing.

Regarding refining the evaluation framework, the analysis highlights several areas where the process must be refined to improve the "short list" of best practices. For example, clarifying the families' descriptions,

like policy/regulation, is currently confusing or incomplete and requires rephrasing to focus on concepts rather than just services. Also, it was proposed that circular soil management be rephrased as the circular economy of soil.
The analysis of "bad examples" shows that urban and peri-urban pilots struggle with historical problems and an uneven distribution of quantity/quality issues. Rural pilots are more concerned with recent changes and issues of soil quantity. Notably, soil performance (e.g., ecosystem services) is rarely mentioned, identifying a potential gap for future sorting.
The analysis concluded that data must be collected regarding the planning context, implementation process, participatory dimensions, costs, and direct impacts on soil health.

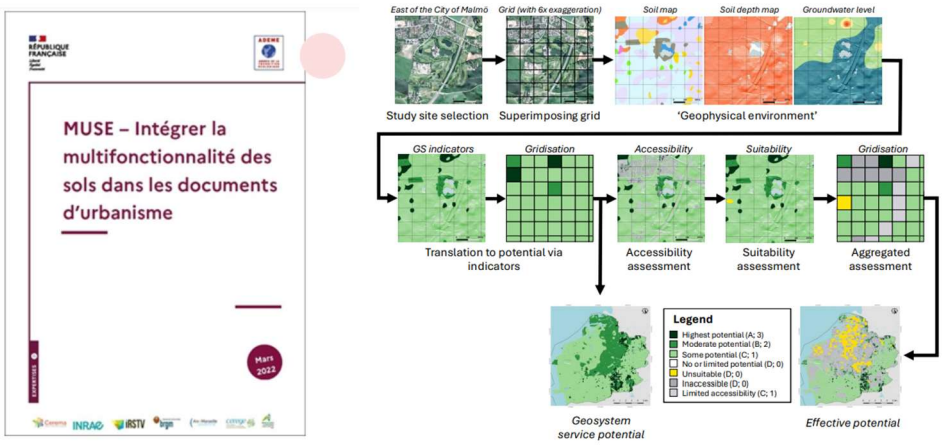
Paragraph 6.2.3 Soil assessment instruments

In terms of tools and methods, the majority of pilots have reported they currently use GIS-based platforms and national soil databases (e.g., BRO in the Netherlands, GDPA in France, DOV in Belgium), indicating a potential for future development of an operational framework in a format that is both user-friendly to soil experts and planners. However, there is a concern regarding national datasets, that their estimates are too generalized on a national level, questioning their accuracy and applicability on a local scale. Currently, used GIS tools typically support mapping, contamination tracking, and integration with land-use data. Advanced proprietary platforms like Glenn and Gokart (Sweden) or ARSO indicators (Slovenia) are also in use for urban planning and restoration potential. Only a few pilots report tools in form of geoportals that simultaneously address multiple soil quality, quantity and performance challenges. However, the pilots report in those instances, that such information is often scattered within the portal but easily navigated by experts who regularly use it.

The biggest challenges pilots report are related to fragmented, outdated, inaccessible data, or no data at all, especially at parcel-level resolution. Most requested tools are those that allow integration of multiple datasets into a single, that allow scale-transformations that are traceable in a user-friendly interface.
Several pilots report complete lack of operational decision-support systems that combine soil health, contamination, hydrology, and planning outputs. Awareness-raising tools for elected officials and participatory platforms for public engagement are also scarce and requested by pilots.
The most in-demand tools include:

- Centralized GIS-based soil databases integrating contamination, soil quality, and land-use data (Baia Mare, Grenoble);
- Parcel-level screening and compliance platforms for planners (Ljubljana);
- Decision-support tools for agroecological transition (Montpellier, Belgium grasslands);
- Dashboards for non-experts to visualize soil-related risks and best practices (Ooststellingwerf, Nantes);
- Web-based tools for abandoned farmland reuse (France).

Pilots with the weakest tool integration—such as Farmland abandonment (France) and Grazing Land (Romania)—highlight the need for affordable, accessible, and interoperable solutions.
The comprehensive review of existing soil assessment tools and methodologies indicates that the primary demand lies in tools and methods capable of consolidating fragmented datasets, facilitating clear interpretation for non-specialist users, and ensuring the systematic integration of soil-related information into planning and governance frameworks.



Such examples of tools and methods for soil assessment with the potential of wide application across the pilots are MUSE- *Integrating the multifunctionality of soils into urban planning documents (The ADEME - MUSE bookshop - Integrating the multifunctionality of soils into urban planning documents) and mapping estimated soil ecological functions using national datasets* (left), and GEOSYSTEM SERVICES – *a method for mapping of geosystem services* (right) *(https://research.chalmers.se/publication/548829/file/548829_Fulltext.pdf)*

3.5 Chapter 7: REFLECTIONS for SPADES researchers

The reflections across the 17 SPADES pilots show that the Diagnosis Workbook played a crucial role in bridging soil expertise and spatial planning, while also exposing the structural and institutional conditions that shape how such tools can be used. Strategic, urban, and rural pilots engaged with the workbook in different ways, depending on their mandates, capacities, and relationships to soil knowledge. Strategic pilots particularly valued Chapters 5 and 6, as these clarified where soil knowledge is positioned within policy systems and how soil functions can be linked to planning instruments. At the same time, they stressed that the transition from diagnosis to decision-making still lacks sufficient structure and operational clarity.

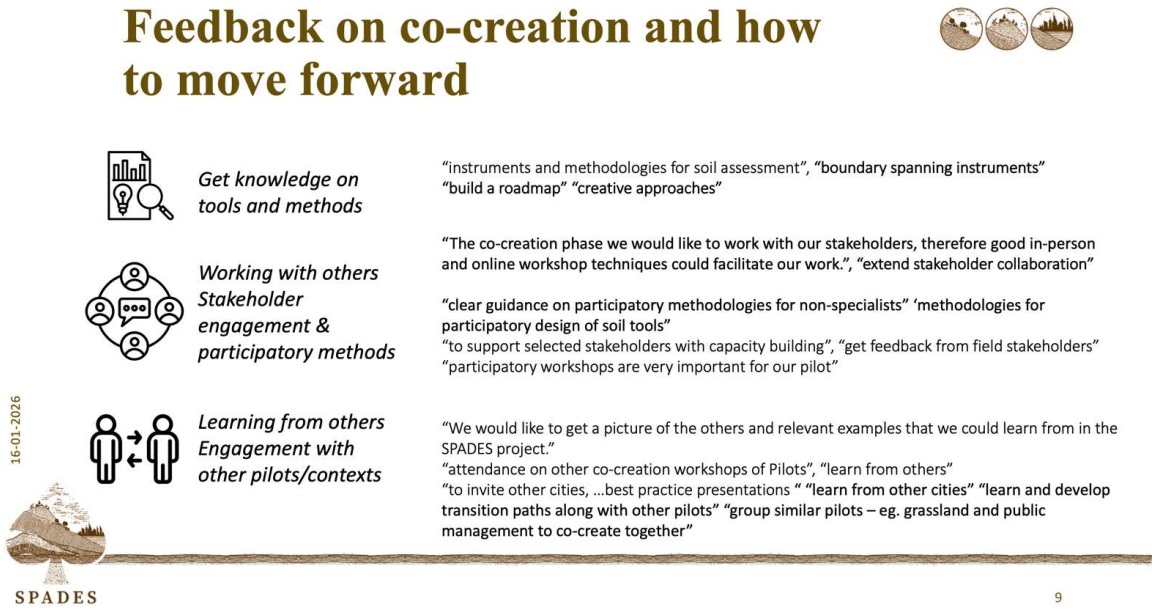
Urban pilots found the conceptual framing of the workbook, especially Chapter 4, insightful but demanding. Its length and density made it challenging to use in practice, and they expressed a strong need for clearer visual guidance, concrete examples, and case-based references. For them, the workbook worked best when it supported design-based experimentation and learning through practice, rather than as a purely analytical document. Rural pilots, on the other hand, appreciated the framework but struggled with fragmented and scattered soil data. Soil information was often dispersed between ministries, researchers, and farmers, making it difficult to translate knowledge into spatial planning without additional technical support, such as GIS expertise.

Across all pilot types, the six-week rhythm was perceived as constructive, creating momentum and a sense of "positive pressure." However, it also revealed strong differences in institutional capacity. Larger research teams could engage more deeply, while smaller municipalities found it unrealistic to complete all parts of the workbook with the same intensity. This highlighted the need for lighter, more modular formats and for stronger facilitation that can bridge planners, soil scientists, and policy officers.

The profile of respondents further illustrates how the upcoming co-creation phase is understood as a collective practice rather than a reporting exercise. Three levels of co-creation where highlighted. First, a desire to get further practical knowledge on for example instruments and methodologies for soil assessment, on how to build a roadmap and on creative approaches. The second level, to work with stakeholders, and therefore, to provide guidance on participatory methodologies and capacity building.

Lastly, a strong need to learn from each other and the possibility to follow the co-creation process of other pilots was stressed. Despite these differences, all pilots shared a desire to move from analysis to action, from data to dialogue, and from institutional silos to more integrated governance systems (see Figure below).

Overall, the Diagnosis Workbook established a shared language between soil science and spatial planning and in reframing soil not only as a biophysical layer but also as an institutional and cultural interface where transitions are negotiated. At the same time, its conceptual density, uneven access to data, and varying levels of soil literacy limited consistent use. This points to the need for a more streamlined structure, modular templates, embedded pilot cases in the Navigator, and stronger investments in facilitation, peer learning, and visual tools to translate soil knowledge into spatial practice.



4 ETHICAL VALUES

When dealing with land (transitions) and soil in pilots, many ethical values and issues come up. Therefore, we want to investigate in the co-creation phase of our pilots which values are of importance when dealing with soils in spatial planning and design, and how we can integrate those in the next steps.

4.1 What are ethical values?

- A value is something a person or group considers important, worthwhile, or desirable. Values guide our choices, shape our goals, and help us decide what matters in life. Values guide our behaviour.
- Ethical values are a specific kind of values. They concern what is right or good in our treatment of others and the world. They guide moral judgment and help us answer questions like: "all things considered, what should I do?" or "how can I make this world a better place?".
- A dilemma is a situation in which a person faces two or more options, all of which have significant moral, practical, or emotional drawbacks and choosing one means giving up something important in another. They arise when no available choice leads to a completely satisfactory outcome, often because each option involves conflicting values, duties, or interests.

4.2 Examples of values

During the co-creation phase of the pilots the following values are identified (not exhaustive):

- Empathy: essential in a multidisciplinary project with diverse stakeholders. What is it? And how do you make it an integral element of your work?
- Mutual understanding: supported by the ability to listen, collaborate, communicate clearly, and "speak the same language". This includes clarifying seemingly simple concepts, such as *soil*: what does each stakeholder mean when they use this term?
- Sustainability: lies at the core of SPADES project. What does it mean in practice?
- Justice and fairness: also lies at the core of SPADES project. What does it mean in practice?
- Avoiding burden-shifting: how to make sure that we do not passing problems or responsibilities to other areas or others, in particular the next generations?
- Land ownership: what rights *and* responsibilities come with owning land?
- Stewardship: what does this mean when soil of land is polluted?

Pilots were asked to share their reflection on relevant ethical values and concerns. This resulted in a rich variety of examples given below.

Sustainability and the price of sustainable care of soil

> "[Sustainability] is promoted by the city in general, though partly only mentioned on paper as (for example) a consequent no-net-sealing is not really implemented by the city" *(pilot Leipzig, T3.2 urban and peri-urban pilots)*

> "What guides us today in our actions is, above all, the negative impact of intensive agricultural practices and poor environmental management that has been going on for decades. For us, the

challenge is indeed to preserve and pass on soils in good health, but it is also, and above all, to restore them. In this context, sustainability is at the heart of our approach" *(pilot Pays Coeur d'Hérault, T3.3 rural and peri-urban pilots)*

"On public land, tenant farmers are now asked to respect environmental constraints, to preserve biodiversity, prevent soil erosion, etc. However, there is a dilemma here when they take over soil that has been polluted/degraded by decades of intensive agriculture: who should pay for its regeneration? The landowner (local government) or the tenant farmer? *(pilot Pays Coeur d'Hérault, T3.3 rural and peri-urban pilots)*

"In essence, the core dilemma faced by the Public Farmland Flanders pilot is whether public land is treated as a commodity to solve immediate financial problems, or as a resource/instrument (commons) to enable farmers to work in more sustainable ways and care for the soil". (*pilot public farmland Flanders, T3.3 rural and peri-urban pilots*)

Justice and equality

"What we found important in this concept was the inclusion of non-human communities who should also be eligible to justice and equity, not because they have a particular intrinsic value that human communities do not have, but rather from the perspective of sharing resources between different communities of living beings." *(pilot Pays Coeur d'Hérault, T3.3 rural and peri-urban pilots)*

"Polder consensus: Only if all landowners within a polder agree, can the *poldered* and drained peatland be rewetted. If only one owner disagrees, the rewetting becomes virtually impossible or prohibitively expensive within that polder. How to weigh individual versus societal interests here?" *(Mecklenburg-Vorpommern pilot, T3.3 rural and peri-urban pilots)*

Land ownership

"One key value is soil as a common good: soil is not just empty space available for construction, but a living system that supports biodiversity, agriculture, and essential ecological functions. This means we should see land as something to care for, not just something to use." *(Lombardy BreBeMi highway pilot, T3.3 rural and peri-urban pilots)*

Land price

"Building land is typically valued much higher than other land uses such as green spaces or agricultural fields. This higher valuation creates an inherent tendency to expand building zones, which in turn leads to increasing land sealing and the loss of natural or agricultural land." *(Klagenfurt pilot, T3.1 Long term strategies)*

Historical value

"The human-made landscape for which the Netherlands is internationally renowned forms an essential part of both local and national identity. Every major transformation requires letting go of parts of the past. For local residents, whose time horizon spans several generations, there is a strong desire to preserve the familiar landscape." (Green Heart pilot, T3.1 Long term strategies)

The economy

A challenge arises when ethical values intersect with financial and technical decision-making. Ethical commitments often come at a price: sustainability may demand more expensive methods; fairness may require longer processes, and stewardship may reduce short-term efficiency. This raises a crucial question for the project: ***How do we weigh non-financial values in a technical trade-off?*** Land price is a key denominator in most pilot projects. Tensions that result from land price cannot be resolved by formulas alone. They require open discussion, transparent justification, and a willingness to acknowledge that certain ethical considerations may outweigh financial convenience. By explicitly addressing these dilemmas, the project ensures that ethical values are not treated as optional ideals but as integral factors in decision-making.

4.3 How to address values in the pilots?

Underneath, the next steps for integrating ethics into the pilots are outlined. Because all pilots involve multiple stakeholders with differing perspectives on land and soil, values related to collaboration, communication, building trust and mutual understanding are essential to the activities in each of the individual SPADES pilots.

In the co-creation phase of the project, researchers and participants in the SPADES pilots are therefore explicitly asked to articulate, refine, and expand their core values by taking four concrete actions:

(1) Define the values at stake, explain what they mean in practice, and show how they become visible in the project;
(2) Listen carefully to stakeholders in order to understand why these values are important and to whom;
(3) In case of a conflict between values and interests, prioritize! Make informed choices, and justify them; and
(4) Show, don't tell. Translate values into tangible actions. Explain how values in the project are put into practice.

All pilot teams are invited to actively engage with these steps and embed them in their ongoing work, so that ethical reflection becomes a visible and actionable part of each project.

Why ChatGPT is not providing the answer we seek!

It is essential that project leaders and participating researchers *do not rely on AI* to generate a list of ethical values but instead formulate these values themselves. A list produced by an external tool, no matter how sophisticated (see figure 1 below), remains meaningless if it is not grounded in the lived experiences, practices, and emotions of the people involved in the project. Ethical values gain significance only when they emerge from real situations, from the tensions and dilemmas researchers encounter, and from the responsibilities researchers and planners feel toward the different stakeholders, farmers, landowners, the public and the environment. By identifying values themselves, researchers ensure that these values are authentic, context-sensitive, and genuinely connected to the challenges of their work.

TABLE 1 LIST OF VALUES GENERATED BY CHATGPT

Value	Meaning	Ethical foundation	Practical application
Sustainability	Using soil and land in ways that secure long-term ecological and social viability	Intergenerational justice	Preventing erosion, soil degradation, and overuse; promoting regenerative practices
Justice & Equity	Fair distribution of land, benefits, and burdens	Social justice	Inclusive planning, compensating affected communities, access to healthy environments
Responsibility (Stewardship)	Acting as caretakers of the land	Moral responsibility toward future generations and ecosystems	Accountable land management, maintaining soil biodiversity
Ecological Integrity	Preserving the natural functions and diversity of soil and ecosystems	Respect for nature; intrinsic value of non-human life	Limiting land sealing, protecting wetlands, enhancing soil health
Participation & Transparency	Involving stakeholders and making decisions openly	Democracy and procedural justice	Participatory planning, open data, transparent communication
Knowledge Integrity & Honesty	Conducting and communicating research ethically and truthfully	Scientific integrity and truthfulness	Transparent methods, clear communication of uncertainty, resisting data misuse
Efficiency & Prudence	Using land and resources wisely while balancing competing needs	Practical wisdom (phronesis)	Smart zoning, circular land use, multifunctional landscapes

Please consider the following questions:

(1) How can you define the values at stake, explain what they mean in practice, and show how they become visible in the project?

(2) Why these values are important and to whom? Listen carefully to stakeholders to answer this question;

(3) What are the dilemmas and priorities? In case of a conflict between values and interests, we need to prioritize! Make informed choices, and justify them;

(4) What are the practical applications of these values? Show, don't tell. How can we translate values into tangible actions.

Answers:

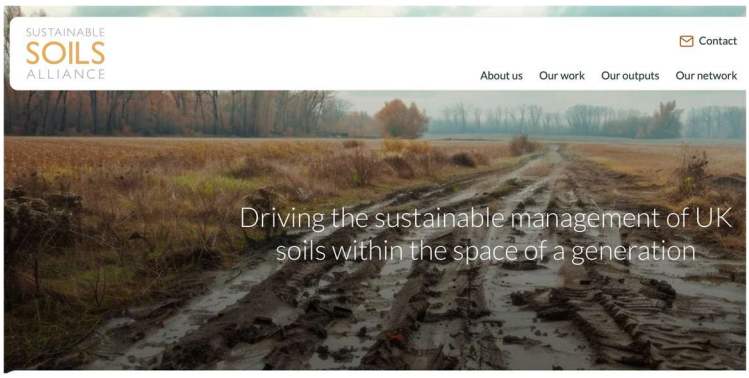
Values (1)	*Meaning in the pilot (1)*	*Important to whom & why (2)*	*Dilemmas, priorities (3)*	Practical application (4)

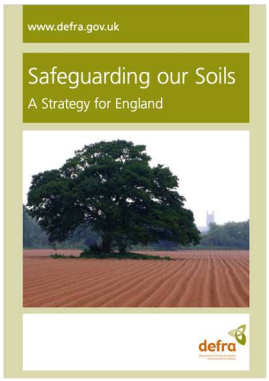
The answers to these questions feed into the formulation of the overall aim of the pilots but also specifically the objectives of the co-creation to overcome boundaries that are amongst stakeholders.

5 WHAT IS THE DIRECTION TO REACH THE AIM OF YOUR PILOT?

The diagnosis phase brought information about and for the pilots, enhancing our understanding of the planning and soil challenges and ambitions of each pilot. The Diagnosis Workbook also proposed general analysis methods (spatial policy-and soil-connected) that could produce knowledge useful in promoting soil inclusive planning.

The objective of the co-creation phase is to develop practical strategies for improving the local integration of soils in spatial planning by a structured participatory approach. This chapter is focused on understanding what change you want to achieve in your pilot wants to achieve, where are you now and where do you want to go, what is your path? Do you aim for integrating soil in policy? Or in a spatial plan? Or are you trying to rethink governance to make soil inclusive planning possible?
If you already have a plan or roadmap for a structured participatory approach or operational strategy, this workbook can help you reflect on it with the tools that we offer. If you are looking for new ways of working, need to refine your plan, or still need to create one, the workbook from this chapter on provides guidance. When you have mapped your pilots' aim in this chapter the following chapter offers a co-creation menu to help make your pilot bringing change concrete in making choices in planning your next steps.





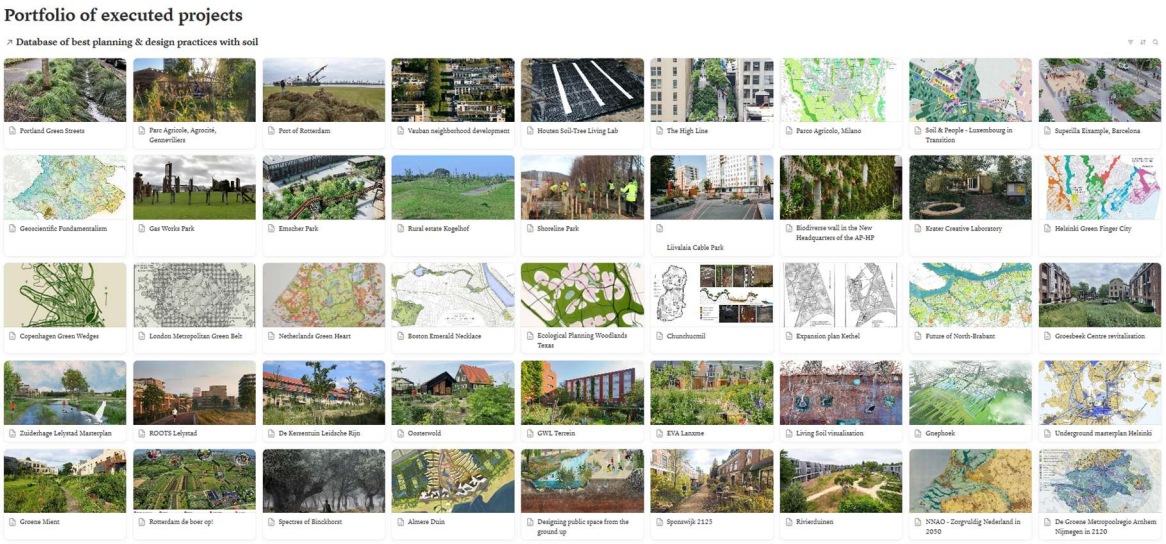
Extensive example of vision, strategies and boundary spanning instruments in the UK https://www.sustainablesoils.org/ and https://assets.publishing.service.gov.uk/media/65fd6fddf1d3a0001132adb8/CD1.I_DEFRA__Safeguarding_our_Soils_A_Strategy_for_England.pdf

5.1 The aim of the pilot

We start again with the overall aim of your pilot to set out the direction of the co-creation and select the methods suited to your objectives. Maybe these methods are not only applicable in the phases of co-creation, but can they also contribute to the implementation phase. There also can be pilots in which those two phases are not so clearly separated.

To help structure your pilot's aim—where you are starting from and where you want to go—we provide a systematic overview. You can use this to define your direction for either the co-creation or implementation phase, depending on your pilot's focus. At the end of the chapter, you will be asked to map your direction in the provided scheme, but first we will explain how it works.

In addition to this workbook, there is the SPADES Inspiration Portfolio; before rethinking your pilot's aim, we recommend reviewing the inspiration portfolio; using concrete examples can help get everyone on the same page.



Screenshot of inspiration portfolio

What examples were inspiring and why? Which ones did you miss?

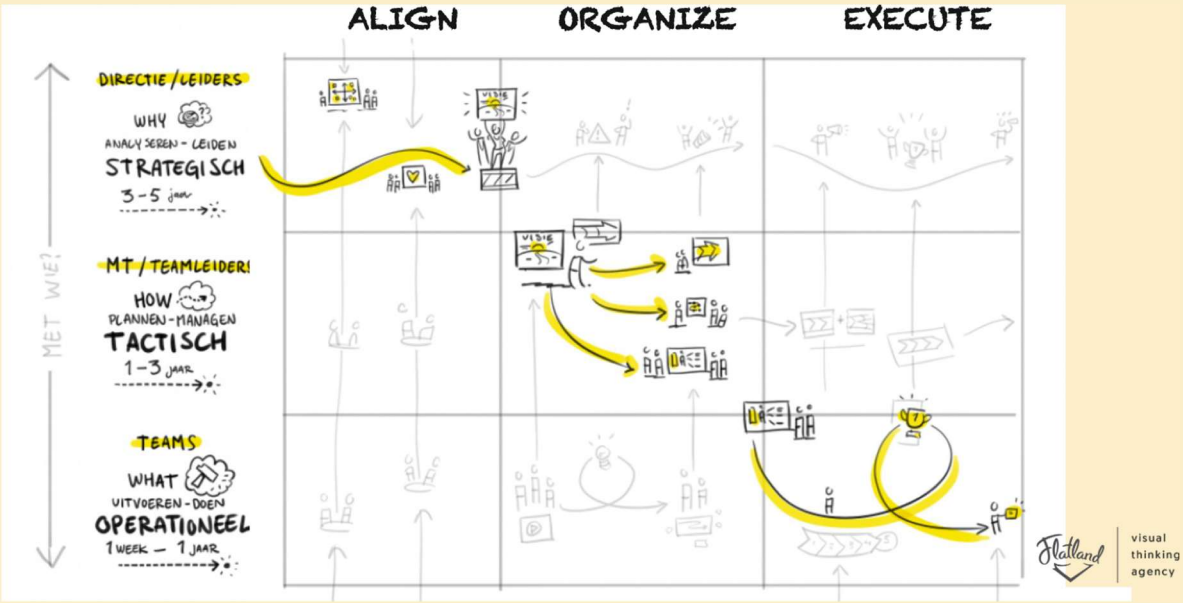
5.2 Structuring the aims of the pilots

To help understand and organize the different overall aims of the pilots in the SPADES project, and to support during the co-creation phase, we introduce three levels of management: strategic, tactical, and operational. These levels are commonly used in the corporate world to distinguish planning and execution. It is explained further in the box below, but you can also skip it.

The three levels of management: strategic, tactical, and operational originate from warfare and are widely adopted in the corporate world to distinguish aims and roles.

- **Strategic**: High-level, long-term goals, such as setting the overall direction, vision, and policy.
- **Tactical**: Medium-term actions and projects that put strategy into practice, such as regulations and spatial masterplans.
- **Operational**: Daily, short-term activities needed to carry out tactics and achieve goals, such as implementation and maintenance.

These levels can be identified in each layer of governance in spatial planning—national, regional, and local— but they will have a higher resolution and be more specific on the local scale.

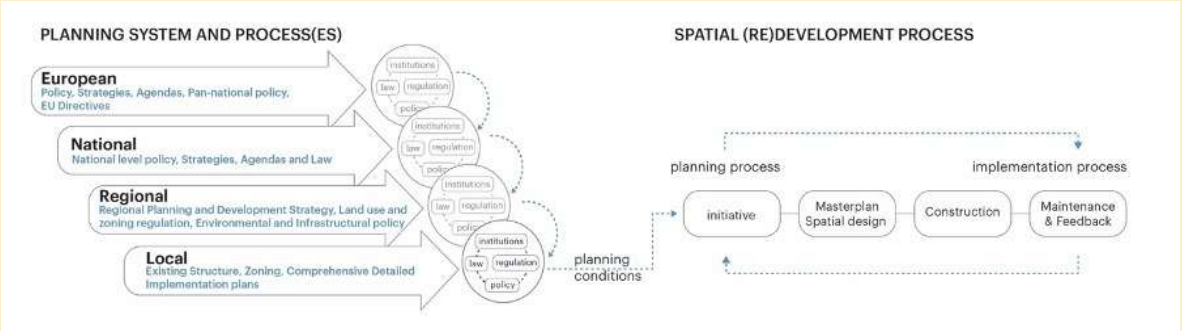


Flatland model from https://flatland.nl

The Align–Organise–Execute (Flatland) model helps make strategies, tactical, or operational plans tangible and guides how to organise activities to put them into practice. At each level, you may need to move through the steps from align, to organise, to execute before moving to the next level down. When co-creating at the strategic, tactical, or operational level, it is important to know your purpose: Do you co-create to align people around shared objectives, to organize people in their roles, or to develop the strategy itself?

There is also interaction between levels:

- Upward flow represents participation—providing input or feedback, co-deciding, or feeling involved—which builds ownership;
- Downward flow represents communication—showing what has been done with input, what choices have been made, and when people can contribute—which ensures support.



In spatial planning:

- The **strategic** level includes laws, regulations, institutions, and policies that set planning conditions, such as vision and policy guidelines;
- The **tactical** level connects these planning conditions to local needs and translates a strategic vision into a spatial vision through the first steps of the spatial (re)development process (initiative and masterplan, spatial design);

- The **operational** level is the implementation process that covers the construction and maintenance steps, where spatial plans are detailed and executed.

Soil care usually appears only at the operational level. The SPADES project aims to bring soil considerations up to the tactical and strategic levels, using the Align–Organise–Execute model. The most successful strategies emerge through collaboration across all three levels. Operational knowledge is crucial for creating effective policy, because policies must work in practice with people.

Systemic overview of the principles and their relations

This overview presents the structuring principles in a matrix with nine boxes, showing ways to enable soil-inclusive spatial planning and design across scales and development stages. The text in the boxes is aa simplification—reality is more complex—but they help you identify where you currently are and where you want to go. Pilots may operate across multiple boxes or levels at the same time. You can position yourself in one or more boxes in levels (rows) or columns, which helps define what to cover in your pilot and plan your co-creation process. In the next chapter, the soil challenges in each box are paired with a menu of suitable co-creation methodologies.

Structuring Principles	Align To a shared focus	Organise Actors involved	Execute Deliver the result
Strategical level Spatial Planning policy level includes laws, regulations, institutions, and policies that set planning conditions, such as vision and policy guidelines.	The alignment of decision- and policymakers to support a strategic vision. **Make sure soil is a topic on the decision-makers and policy agenda.**	The involvement of the policymakers and stakeholders in developing the strategic vision. **Make sure soil expertise is involved in thinking about the future.**	The implementation of the strategic vision by policymakers and stakeholders by articulating goals (planning conditions) for the development of spatial (vision) plans or regulations for projects. **Make sure to translate data into information that can be taken into policy.**
Tactical level Spatial (re)development level connects these planning conditions to local needs and translates a strategic vision into a spatial vision through the first steps of the spatial (re)development process (initiative and masterplan, spatial design).	The alignment of spatial and functional interests of the stakeholders and public in an area. **Integrate soil performance into spatial and functional interest of the spatial program.**	The involvement of the spatial designers and stakeholders in developing the spatial (vision) plan. **Make sure soil expertise is involved in the design of the plan.**	Spatializing the ambitions, the implementation of the spatial (vision) plan by spatial designers and stakeholders into detailed plans with project briefs. **Make sure to translate data into information that can be considered in the spatial plan.**
Operational level Construction and maintenance of the implementation phase, in which designs are detailed level, translates project briefs and regulations into implemented projects and maintenance plans.	The alignment of individual spatial and functional interests of stakeholders and public in building or public space. **Make soil performance part of spatial design.**	The involvement of the stakeholders and consultants in developing the project. **Make sure soil expertise is involved when designs are operationalized.**	The implementation of the project. **Make sure to translate data into designed measures and made part of maintenance plans.**

It is helpful for the pilots to define their current position and their desired result to understand the direction that needs to be addressed in the co-creation phase. To do this, it is important to identify the level at which the pilot is currently operating. It is also essential to clarify the pilot's aim and specific co-creation objectives—whether the focus is on aligning ideas and knowledge, organising people, or executing a policy, strategic plan, urban design, maintenance plan. Sometimes the pilot's aim is to integrate soil at the strategic level using all align, organise, and execute activities. In other cases, alignment at strategic, tactical, and operational levels is needed to bring soil onto the agenda. Pilots may also work to connect different levels, or co-creation at the operational level may be necessary to influence the strategic level.

	Align	Organize	Execute
Strategic (policy level)	Baia Mare, RO; Hérault, FR "systemic soil-inclusive planning" Highway A35, IT "Integrate soil into planning" Peatland, DE "Reframing the rewetting challenge to a locally embedded narrative" Grenoble-Alpes Métropole, FR "Strategy on soil management and ecological compensation."	Leipzig, DE "Political momentum> soil protection strategy."	Hajdú-Bihar County, HU "To integrate soils in the revision of long-term strategic planning policies 2028-2034." Flanders, BE "Build towards a strategic allocation policy for public farmland."
Tactical (spatial design)	Ooststellingwerf, NL "Understanding local soil and water system sand its relations with spatial planning objectives." Ljubljana, SI "Raise awareness of soil health among planners & stakeholders." Highway A35, IT "Increased awareness" (land take by infrastructure projects). Hérault, FR "Experiment new methods, Raise awareness." Nantes, FR "testing, learning, experimenting, implementing, optimizing, awareness raising." Hajdú-Bihar County, HU. "new innovative practices and methodologies." Transylvania, RO "Pilot project for community farmland and pasture governance." Bocageland, BE "Co-create new potential landscape scenarios."	The Green Heart, NL "Deepen understanding of soils and develop a Soil Vision that will inform spatial planning & design practices of all stakeholders." Grenoble-Alpes Métropole, FR "Create a soil community that connects existing initiatives and opportunities to reconcile urban densification policies." Leipzig, DE "Coalition development<> water-sensitive planning." Peatland, DE "Cooperative platform for paludiculture biomass." Flanders, BE "Establish a learning network of planning practitioners."	The Green Heart, NL "Implement pilot projects." Grenoble-Alpes Métropole, FR "test spatial planning instruments; governance mechanisms." Ooststellingwerf, NL " (soil-water-planning) better integration in Dutch newly obliged Municipal Environmental Plans."
Operational (making spatial-plans	Klagenfurt, AU "Integration and testing of a Green Space Index into binding regulatory Framework." "Regulatory Framework with guidelines for spatial planning integrating soil."	Montpellier, FR "Promote integration of agriculture into the plans supervised by other departments."	Ljubljana, SI "Test soil-inclusive detailed spatial plan"; "Promote integration into next municipal/detailed plan amendments."

and regulations)	Montpellier, FR "Leases to farmers include environmental clauses promoting soil health." Gothenburg, SE "Provide input new thematic addition on contaminated land to city plan."	Transylvania, RO “Community land banks.”	Nantes, FR "Integrate soils in urban planning documents." Baia Mare, RO "Support EU No Net Land Take 2050 objective." Bocageland, BE “Quantify transition scenarios for the local dairy farmers.” Highway A35, IT “Evaluate environmental assessments.”

Please restate the aims in your pilot (reformulating them where relevant).

5.3 Map your pilots’ aim

Maybe you already have a plan or a practical participatory strategy (roadmap) for the co-creation and implementation phase. This could be following the lines of your spatial planning workflow and do something extra to include soil. If this is the case this exercise can help you reflect on what you have planned. Maybe you are looking for new ways of working and need to refine your plan, or maybe you still have to make it. Then this exercise helps you to identify the direction for your participatory approach or practical strategy in the systemic overview of the principles and their relations. This will help to connect the overall aim of your pilot to the appropriate co-creation methods to make a plan that can be implemented that is the next step in the following chapter. Maybe these methods are applicable in both phases of co-creation and implementation, or are those phases are not so clearly separated.

Use the systemic overview to map your pilot’s aims following these steps:

Step 1: Identify current position

Shade in grey the blocks that represent past or ongoing steps in your pilot.

Step 2: Identify future direction

Shade in orange the top two priorities for the next steps your pilot aims to take.

Step 3: Indicate flow

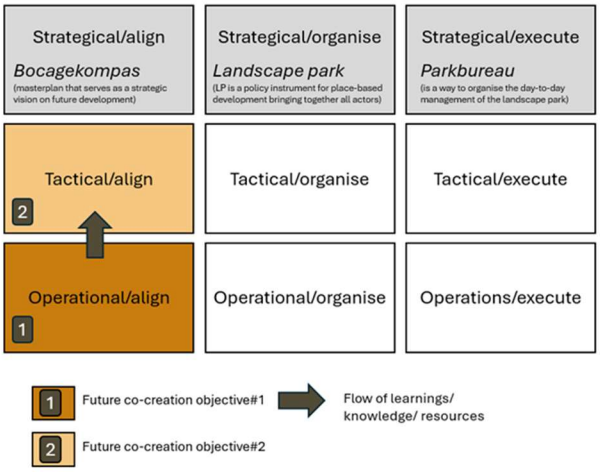
Draw arrows to show how learnings, knowledge, or resources move from past to future steps and between future steps.

Add any additional notations if needed.

Step 4: Summarize

Provide a description of your scheme (max. 200 words).

Indicative example for Grenzeloos Bocageland



Notes
The Landscape Park Grenzeloos Bocageland has worked hard in the past years on the strategical level. The region submitted a proposal to be a landscape park. For this candidacy the park needs a strategic vision the Bocagacompas. After being selected as a landscape park, a local structure to bring together the various local and non-local stakeholders was set up, including a park bureau for day-to-day management.
In short, we think the strategic level of the case is well developed.

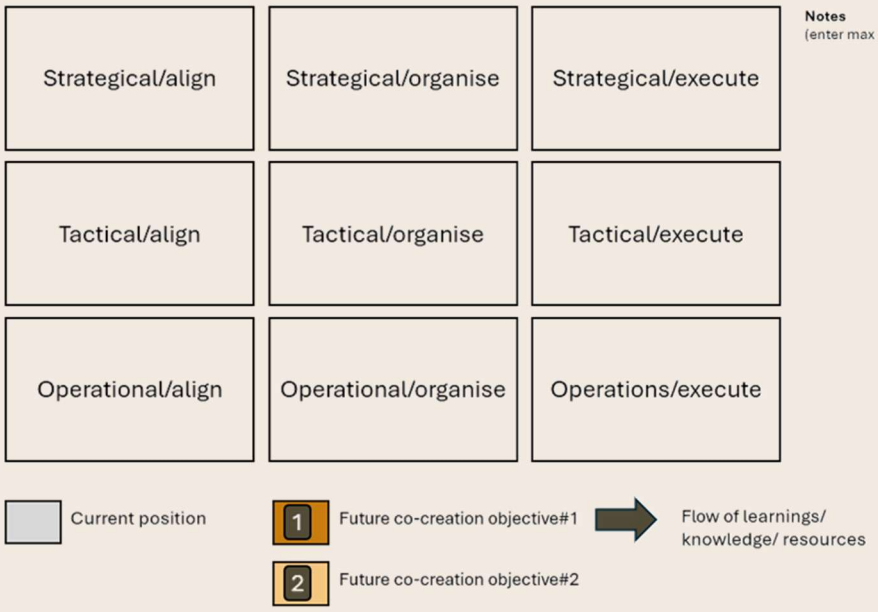
The main first step is to explore how at the operational level (AES, land use regulations, etc) steer the operability on the ground. A first step would be to explore how the various policy tools and other instruments enable for an aligned or rather a misalignment at the operational level with the strategical level. We do this via interviews with farmers, setting out stromenschema's (schemes that summarize the flow of materials and nutrients), etcetera.

Next step is to go from these individual stories at the farm level to (re)define or (re)design the future landscape development via farm-based landscape scenarios.

The ultimate dream of the pilot is to work towards a landscape development plan (instrument of the Flemish Land Agency) which would be situated at the tactical and operational level execute. Such landscape development plan is only set up after a long, intensive trajectory about the goals and the potential of such plan.

Template as shown below is available in the PowerPoint *presentation, please visualize the direction of the pilot in this PowerPoint and place a screenshot here. There are examples of other pilots there.*

Pilot Name



6 WHAT BOUNDARIES ARE YOU TRYING TO SPAN WITH CO-CREATION?

When working from a challenge with a specific ambition, a pilot will need to overcome certain **boundaries**. We identify two main types:

1. **Process boundaries** – obstacles in the spatial planning and design process;
2. **Soil-related boundaries** – technical or knowledge-related limits linked to soil.

This chapter is meant to help you to identify the boundaries that the pilots' want to overcome. To understand how to overcome boundaries in the co-creation phase, we use the theory of boundary spanning, it is other words for the same thing. Boundary spanning is like co-creation as a collaborative process where stakeholders work together to solve problems and innovate, fostering deeper engagement and better results. The co-creation phase helps pilots explore options and alternatives for their specific situation. Through co-creation, pilots can identify ways to overcome boundaries and develop a plan or roadmap to achieve their goals.

This chapter focuses on different approaches for planning how to reach a pilot's aim. Since pilot aims can vary widely, the plans to achieve them may also differ, they can focus on policy, organization or making a soil-inclusive spatial plan.

Boundary spanning theory comes from organizational studies and social psychology. It explains how people in organizations connect their company with outside sources of information. Researchers like Tushman (1977) developed the theory using ideas from open systems, contingency, and role theory. The theory shows how certain individuals, called boundary spanners, share and manage information between different groups, such as departments, companies, or industries, to support innovation and collaboration.[3]

We use it in the SPADES project because the concepts of boundary spanning, aimed at bridging soil with planning, planning with soil, represent also the products, processes and people that you intend to change. As such we use this as a check list for making the roadmap.

[3] Tushman, Michael L (1977). "Special Boundary Roles in the Innovation Process". Administrative Science Quarterly. 22(4): 587–605

Concepts in boundary spanning theory		
Boundary spanning vision	Starting points, formulated during the first phase of the development process, for the initiative and definition of an interdisciplinary development that overcomes boundaries.	
Boundaries	Perceived boundaries between communities that can be of a different nature (organizational, cultural, geographical, etc.)	
Premise	Communities are separated through boundaries that hamper communication and joint action	
Boundary spanning	Activities that are undertaken to cross boundaries, such as communication of joint activities	
Boundary spanning objects	Co-creation methods, joint activities that satisfy the involved communities, such as maps, action plans, policy notes, etc. because they contain shared knowledge and provoke action.	
Boundary spanners	People who cross boundaries and intermediate between different communities. For instance, they are accepted in this role by the communities involved because they are 'part' of different communities.	distributed agency (in the process different actors are in action in different moments)
Boundary spanning processes	Processes that are needed to produce the boundary spanning objects with the communities involved.	
Boundary spanning facilitator	This is a facilitator (interface, platform, website) that bridges wide and deep spans of information that is needed to bring a community together.	

These are the concepts of boundary spanning theory by Slob and Duin (2013),[1] Hooimeijer and Van Campenhout (2019)[2] and the added concept of boundary spanning vision and the positioning of the concept of distributed agency (Debrock, Hooimeijer, Van Acker, nd).[3][4] [5]

6.1 What boundaries do you want to span?

From the diagnosis phase, it became clear that the co-creation phase needs to address two types of boundaries: spatial planning (organizational) and soil-related (content).

Spatial planning/organizational boundaries	Pilots and boundaries identified based on the diagnosis workbooks
Multi-level Coordination Definition: Challenges arising from misalignment across governance levels (local, regional, national) or between sectors. Characteristics: Fragmented policies, misaligned strategies, inconsistent enforcement. Typical Instruments: Cross-level working groups, policy alignment workshops, inter-municipal coordination platforms.	Hajdú-Bihar (HU) – Fragmented policy integration. Green Heart (NL) – Multi-level governance fragmentation. Grenoble-Alpes Métropole (FR) – Strategic planning misalignment. Malchin's peatlands (DE) – Multi-level coordination gap. Highway A35 (IT) – Fragmented authority. Ljubljana (SI) – Hampering policy.
Cross-Sector / Cross-Departmental Boundaries Definition: Challenges in aligning different sectors, departments, or stakeholder groups within a region. Characteristics: Conflicting priorities, siloed planning, and sectoral misalignment. Typical Instruments: Cross-departmental workshops, collaborative platforms, multi-stakeholder mapping, joint scenario planning.	Green Heart (NL) – Cross-sectoral conflict. Grenoble-Alpes Métropole (FR) – Policy integration gaps. Klagenfurt (AT) – Sectoral misalignment. Ooststellingwerf (NL) – Fragmented governance. Ooststellingwerf (NL) – Policy–practice gap. Nantes (FR) – Fragmented urban governance.Leipzig (DE) – Institutional siloing. Baia Mare (RO) – Fragmented governance & complex ownership. Montpellier public land (FR) – Siloed planning. Public Farmland Flanders (BE) – Governance–market misalignment.

[4] [1] Slob A and Duijn M (2013) Improving the connection between science and policy for risk-based river basin management. In: Brils J, Brack W, Müller-Grabherr D, Négrel P, Vermaat JE (eds.) (2013) Risk-Informed Management of European River Basins. Springer pp. 347-367

[2] Hooimeijer F.L., I.P.A.M. van Campenhout (2019) Distributed agency between 2D and 3D representation of the subsurface. International Journal of 3-D Information Modeling (IJ3DIM)7(2)

[3] Shana Debrock, Fransje Hooimeijer and Maarten Van Acker (in review) Integrating the subsurface in urban development processes. A Subsurface Integration Framework based on boundary spanning theory and distributed agency

	Göteborg (SE) – to improve the overall process of handling. contaminated land in the urban development process. Ljubljana (SI) – Fragmented governance & complex ownership.
Stakeholder Engagement / Trust Boundaries Definition: Challenges rooted in weak collaboration, trust deficits, or misalignment between authorities and other actors (citizens, farmers, investors). Characteristics: Lack of transparency, weak stakeholder buy-in, conflicting interests. Typical Instruments: Co-design workshops, participatory planning, stakeholder advisory boards, trust-building interventions.	Green Heart (NL) – Cross-sectoral conflict. Ljubljana (SI) – Governance–stakeholder misalignment. ALPA – Land of life (RO) – Weak governance & trust deficit.
Implementation & Iterative Learning Boundaries Definition: Challenges in translating plans into action and enabling iterative improvement via collaboration. Characteristics: Plans exist but fail in practice, weak feedback loops, and need for adaptive governance. Typical Instruments: Adaptive management platforms, iterative co-creation processes, feedback mechanisms, pilot projects with multi-stakeholder involvement.	Grenzeloos Bocageland (BL-NL) – Implementation gap. Göteborg (SE) – Lack of inter-project coordination. Herault-Farmland abandonment (FR) – Governance fragmentation.

Soil related boundaries	
Quality	
Soil degradation vs urbanization	Hajdú-Bihar (HU)
Soil pollution and restoration	Nantes (FR)
Contaminated land	Baia Mare (RO)
Abandoned farmland degradation	Herault-Farmlandabandonment(FR)
Brownfield & contaminated sites	Göteborg (SE)
Soil fertility & erosion	ALPA – Land of life (RO)
Hydrological & soil restoration	Malchin'speatlands (DE)
Soil erosion & agricultural suitability	GrenzeloosBocageland (BL-NL)
Quantity	
Land take & ecosystem fragmentation	Highway A35 (IT)
Soil sealing & contamination	Leipzig (DE)
Soil sealing vs ecosystem preservation	Klagenfurt (AT)
Performance	
Soil–water–climate nexus	Green Heart (NL)
Multi-hazard landscape	Grenoble-Alpes Métropole (FR)
Soil-water-landscape interactions	Ooststellingwerf(NL)
Urban–peri-urban soil interface	Ljubljana (SI)
Soil & land-use multi-functionality	Montpellier public land (FR)
Soil stewardship & performance	Public FarmlandFlanders (BE)

There is a larger overview on the boundaries that the pilots are dealing with, you can find that here as background information.

Questions:

Do you recognize this for your pilot or are there any other external circumstances more specifically?

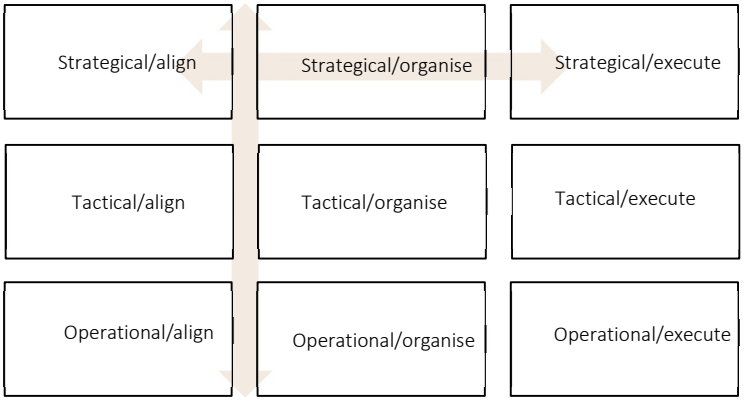
6.2 What are practical strategies (roadmap) for improving the local integration of soils in spatial planning?

The objective of the co-creation phase is to develop practical strategies for improving the local integration of soils in spatial planning by a structured participatory approach. The character and time horizon of the operational strategy depend on the pilot's aim. The strategy may target policies, a plan, or even capacity building. It can have a longer-term focus beyond the pilot or be limited to the implementation phase.

There are also many different names for practical strategies, but in the SPADES project, the pilots are asked to present a roadmap. Here we give example for the three different types of roadmaps: impact policies, impact spatial plans or impact the organization.

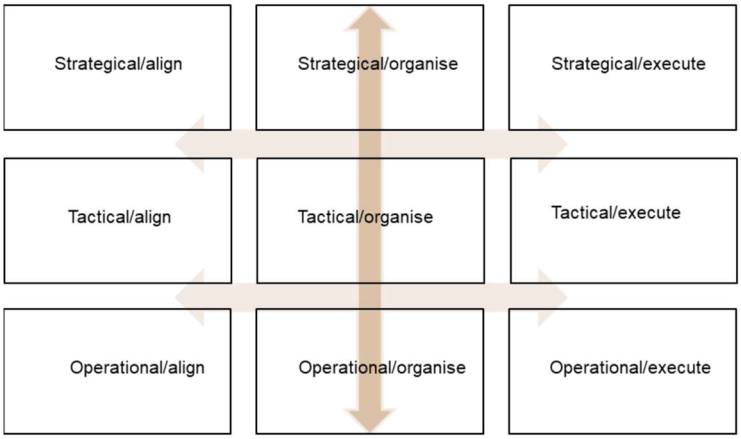
1) Policy integration roadmap - Soil Vision: A policy integration roadmap focuses on embedding soil and water into municipal planning instruments like vision, policy guidelines, ambitions. It is also about making sure to have feedback from stakeholders.

- Related/linked boundary spanning objects/facilitators:
  Policy labs, planning charters analysis workshop, cross-department workshops.
- Operates mainly at a strategic level, aiming to integrate soil into political agendas either by impacting existing policies or by creating new ones.



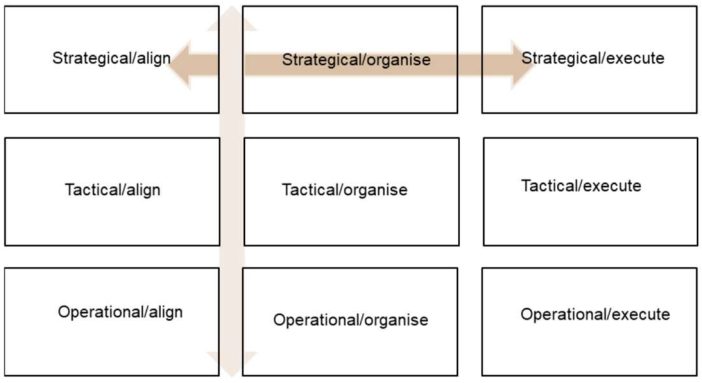
2) Stakeholder transition roadmap – Soil community: This type of roadmap centres on capacity-building and coalition-formation among actors for soil integration.

- Related/linked boundary spanning objects/facilitators: Focus groups, serious gaming, living labs, peer-learning networks, participatory process workshops.
- Operates at all three levels of strategical, tactical and operational wherever stakeholder transitions are needed. This might range from aligning or organizing communities' needs to bringing together stakeholders and political actors to develop future soil-related spatial strategies.



3) Spatial Design Roadmap -soil inclusive urban design: This type of roadmap aims at designing and tests spatial interventions related to soil.

- Related/linked boundary spanning objects/facilitators: interactive mapping; co-design; participatory mapping, prototyping, design charette, multi-criteria spatial decision analysis, research by design workshops.
- Operates at all three levels of strategical, tactical and operational wherever stakeholder transitions are needed. This might range from aligning or organizing communities' needs to bringing together stakeholders and political actors to develop future soil-related spatial strategies.



The boundary spanning objects/facilitator should provide a tangible outcome e.g. interactive mapping should result into a map, design charrettes into a scenario, cross-departmental workshops into a vision concept. This, of course, depends on the result that the pilot is aiming for.

6.3 What result are you aiming for?

What result of the pilot are you aiming at on the long term beyond SPADES? What is the particular boundary to span?

What is the desired result of the pilot as part of SPADES until 2028? What is the particular boundary to span?

What is the desired result of the co-creation phase in 2026? What is the particular boundary to span?

Which material or organizational support do you need?

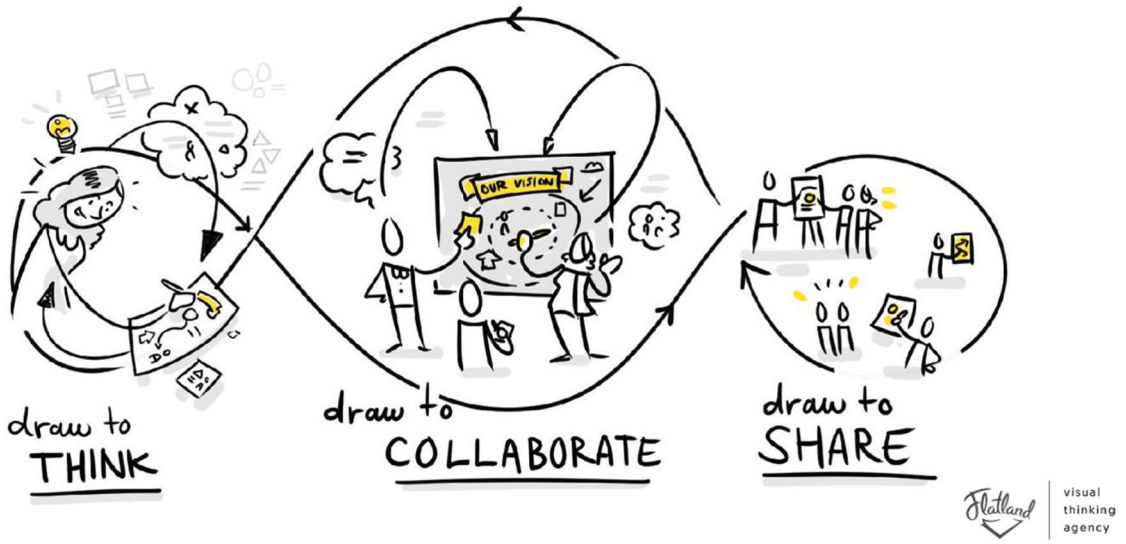
If you need help or more information you can reach out

7 MENU OF - AND PLAN FOR - CO-CREATION

This chapter offers a pallet of processes, methods and facilitators for co-creation, there are many ways how to do this, and it really depends on the aim of the pilot, the objective of the co-creation phases and the type of roadmap. The different **co-creation methodologies and activities** (depending on type of boundary to be spanned) can have a specific impact, these can be all relevant, in combinations or maybe one is more urgent:

- Knowledge development, exploration (overcoming content boundary);
- Change of way of thinking, put on the agenda, synchronise opinions/choices (overcoming content and organizational boundaries);
- Change way of collaboration, synchronise workflow (overcoming content and organizational boundaries).

This also defines with whom you would like to perform this co-creation phase and also who you need for the implementation phase: societal stakeholders such as decision-makers, societal organizations, citizens and experts like policymakers and professionals.



Flatland model from https://flatland.nl

If you need help from the partners in certain methods, please contact us

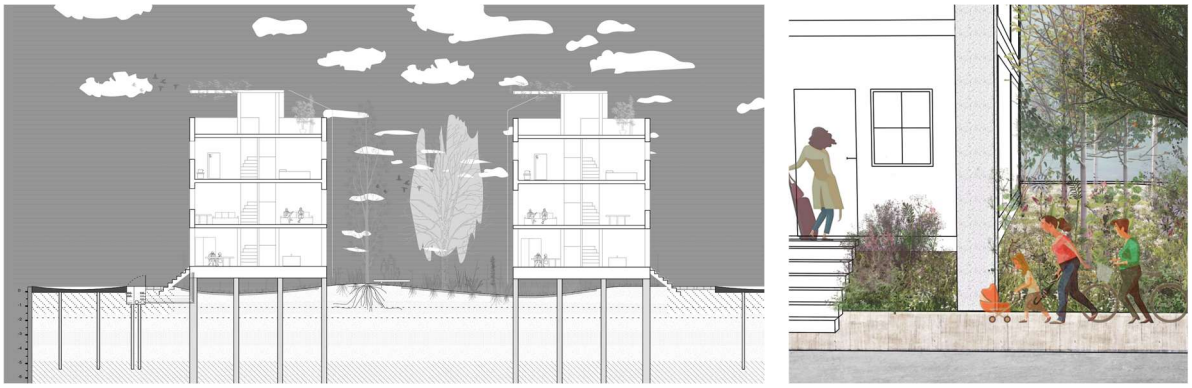
7.1 The menu: representative co-creation methods

This menu gives an overview on the connection between the goal of the co-creation, in which (an exciting) process is this taking place or could this be organised, the objects and facilitators connected to this and who to invite for the workshop or overall process. For each of the nine boxes of the systemic overview

suggestions are made. This is representative not exhaustive; you can find more information on these methods in the inspiration portfolio and folder on Teams.

Aim of the pilot Objective of the co-creation	Boundary spanning process **spatial planning and design are this inherently, most effective is to tap into this process to affect it**	Boundary spanning object or facilitator co-creation tools and methods	Boundary spanners and participants Who is leading who is participating
Strategic/align **Make sure soil is a topic on the agenda** Show urgency, develop insight, find consensus	Creating planning conditions (policy, regulations, briefs, visions) as a part of vision making process of the government.	- Research by design; - Asset Management approach.	- Decision makers; - Policy makers; - Stakeholders; - Spatial planner, spatial design, soil and other subsurface specialists.
Strategic/organise **Make sure soil expertise is involved in thinking about the future** Bring soil expertise in the workflow of policy making	Creating planning conditions (policy, regulations, briefs, visions) as a part of capacity building process of the government.	- Area specific approach.	- Policy makers; - Stakeholders; - Spatial planner, spatial design, soil and other subsurface specialists; - communities in practice.
Strategic/execute **Make sure to translate data into information that can be taken into policy** Develop agenda, policy, vision with new relations	Creating planning conditions and/or initiative phase of a spatial development (policy, regulations, briefs, visions) as a part of vision implementation process (EIA).	- Policy lab; - Capacity-building. - System Exploration Environment and Subsurface. - Co-creation.	- Decision-makers; - Policymakers; - Stakeholders; - Spatial planner, spatial design, soil and other subsurface specialists.
Tactical/align **Integrate soil performance into spatial and functional interest** Information and discussion translation of vision in spatial plan	Creating the bridge between the planning conditions in the initiative and design phases of the spatial development process by **project management** as a part of initiative phase in the spatial (re) development process.	- Research by design; - Asset Management approach; - System Exploration; Environment and Subsurface; - Co-creation.	- Decision-makers; - Policymakers; - Stakeholders; - Spatial planner, spatial design, soil and other subsurface specialists; - Environmental NGOs.
Tactical/organise **Make sure soil expertise is involved in the design of the plan** Bring soil expertise in the workflow of spatial plan (making)	Project management of the initiative phase/participatory consultancy process in spatial (re)development process to design the collaboration.	- Research by design; - Academic Workshop Soil	Decision-makers; - Policymakers; - Stakeholders; - Spatial planner, spatial design, soil and other subsurface specialists; - Environmental NGOs.
Tactical/execute **Make sure to translate data into information that can be taken into account spatial plan** Develop new soil inclusive spatial plan or implement soil in existing plan	Spatial design approach of the initiative phase/participatory consultancy process in spatial (re)development process as part of spatial design implementation (EIA)	- System Exploration Environment and Subsurface; - Cartography.	- Stakeholders; - Spatial planner, spatial design, soil and other subsurface specialists; - Environmental NGOs.
Operational/align **Make soil performance part of spatial design** Information and discussion translation of spatial plan into built project or existing built environment through maintenance planning.	Urban design approach in detailing projects and maintenance plans as a part of construction and maintenance phase of the spatial (re)development process.	- Research by design Workshop; - Asset Management approach; - Cartography.	- Engineering and spatial development on municipal scale; - Project developers; - Consultants; - Environmental NGOs.
Operational/organise **Make sure soil expertise is**	Multidisciplinary collaboration as a part of construction and	- Research by design Workshop; - Cartography.	- Engineering and spatial development on municipal scale; - Project developers;

involved when designs are operationalized Bring soil expertise in the workflow of detailing plan and maintenance workflow.	maintenance phase of the spatial (re)development process.		- Consultants.
Operational/execute **Make sure to translate data into information and made part of maintenance plans** Building of project. Develop new soil inclusive spatial maintenance plan.	Design implementation and maintenance plans as a part of construction and maintenance phase in (re)development process (EIA).	- Research by design Workshop; - Cartography; - System Exploration Environment and Subsurface.	- Engineering and spatial development on municipal scale; - Project developers; - Consultants.



Example of provocative design in which the soil water system is kept as natural as possible, and all human systems are engineered to safeguard the natural system (Hooimeijer, Lafleur, 2018)[6] see report here.

Boundary spanning objects and facilitators

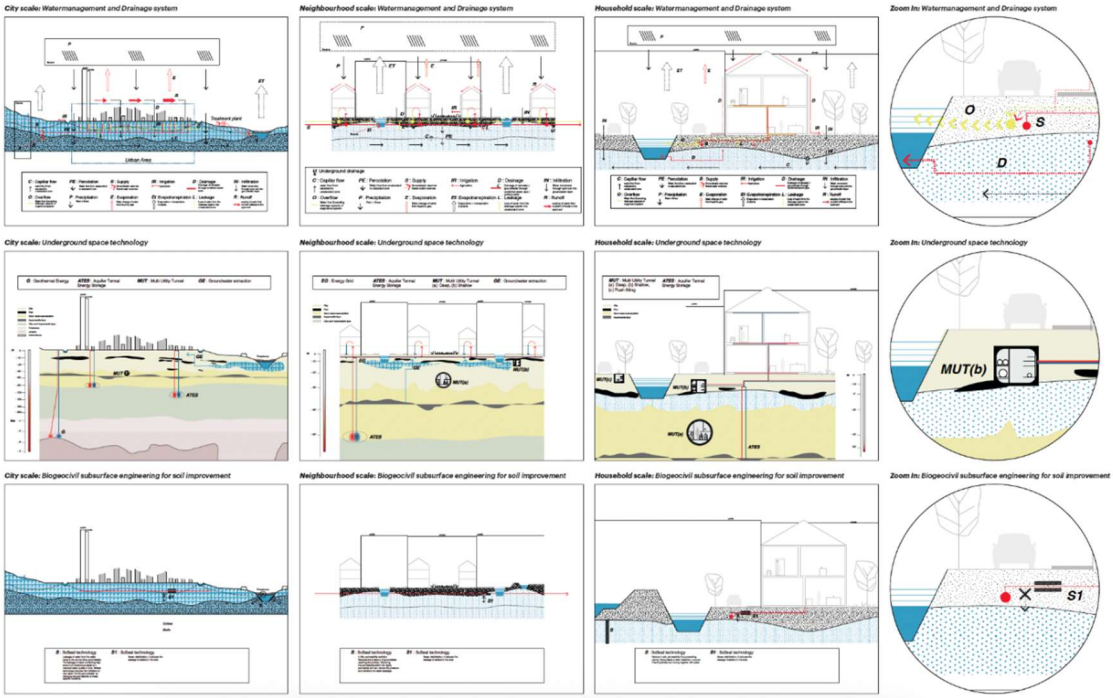
Here you find some more information on the methods presented in the menu above and the link to further documentation in the Teams environment. There is also the living document where we collect more methods, you can find that here.

Object or facilitator	Forms	Explanation
Facilitators	Area-based challenges-driven approach	Area-based, challenge-driven working is an approach where multiple spatial, social, and environmental challenges are addressed together in a specific area, guided by long-term societal goals. It 1) brings stakeholders together to understand the area and its systems (especially water and soil), 2) it creates the conditions to act, and then 3) we "learn by doing" through experiments and adaptive solutions—avoiding fragmented, sector-by-sector decisions and preventing problems from being shifted to the future.
	Policy lab	A Policy Lab is a collaborative, experimental space where diverse experts and stakeholders use user-centred methods (like design thinking) to co-create, test, and develop innovative solutions for complex public policy problems, bridging research with practical implementation. They focus on breaking away from traditional, slow policy cycles by applying agile, creative, and evidence-based approaches, often within government, universities, or think tanks, to build better, more effective policies for citizens
	Capacity Building	Capacity-building is defined as the process of developing and strengthening the skills, instincts, abilities, processes and resources that organizations and communities need to survive, adapt, and

[6] Hooimeijer F.L. and Lafleur (2018) Intelligent SUBsurface Quality 4: Drawing the subsurface: Integrated Infrastructure and environment design. Delft: University of Technology Delft

		thrive in a fast-changing world. Here we see the example of UK capacity building for soil.
	Co-creation toolkit	Not soil specific but a toolkit to make co-design practical and inspire new ways to work together. You can use the resource to deepen understanding of people's experiences, have effective conversations, imagine ideal services, brainstorm new ideas, and work together to bring them to life.
	Urban design approach	This is an infographic of the spatial development process, linkages between scales and integration of data into information.
	Learning network	A learning network connects peers, e.g., practitioners with similar tasks or ambitions, to enable continuous learning and knowledge sharing. It enables participants to learn from one another through collaboration, feedback, and diverse perspectives.
Cartography (data)	System Exploration Environment and Subsurface	Methodology to discuss technical data in the subsurface to translate it into information that can be taken into a vision or urban design.
	Interactive mapping	Interactive mapping creates dynamic, user-engaging digital maps that let you zoom, pan, click, and filter to explore locations and data, unlike static images, by responding to user input to reveal layers of information, detailed pop-ups, routes, and integrated media. It's a powerful tool for data visualization, education, urban planning, and storytelling, making complex geographic information accessible and customizable for various purposes.
	Participatory mapping	Participatory mapping is defined by a product that represents the agenda of the community. It is mapping production undertaken by communities to show information that is relevant and important to their needs and is for their use.
	Sectioning	Drawing of sections in which the attributes of what is beneath is drawn in a communicative way.
	Technical profile	Drawing of the subsurface in a plan of the area in relation to the section.
Research by design	Provocative design	Spatial design used to provoke a discussion. By (for example) asking an extreme what if question dilemmas can be disclosed. The discussion around a design is then aimed at the synchronisation of choices (values), or an Inventory of roles or steering on a process.
	Typological design	Typological design is outside of a geographical context but can be used to explore new approaches around impact of external influences on urban or landscape morphologies. It could lead to the e creation of a menu of choices, guidelines for comparable situations.
	Scenario design	With a set of designs that explore different trend-, frame-, contrast and normative scenarios you can explore futures (possible, probable, preferred, plausible). This can be done to develop knowledge, disclosing a dilemma, synchronisation of choices (values), Inventory of roles and steering on a policy process.
Literacy methods	Place based narratives	Place-based narratives are stories, histories, and accounts deeply rooted in a specific location, using its unique geography, culture, and experiences to create meaning, foster community connection, and drive local development or change. Here an example is Soil Voices - a community collecting stories and memories about soil to build a global map of soil stories.
	Academic Workshop Soil	Example of a community looking for an innovative approach to the soil in which are integral, inter-disciplinarity and futureproofing are central. This shows building of community in exchange by lectures and exhibitions.
	soil exhibition	Exhibition design, as a powerful medium of communication and interpretation, can reveal the hidden richness and regional identity embedded within the subterranean layers of soil. This is an example of the artistic potential of soil.
Decision-support tool	Asset Management approach	Asset Management of the Subsurface (AMS) is based on traditional asset management principles from the ISO 55000 family but extends beyond conventional subsurface assets such as sewer systems and underground structures. It also includes the management of subsurface ecosystem services, such as water storage, support for green spaces, and soil energy provision.

		AMS is used both to support the sustainable use of the subsurface in urban spatial planning—by maximizing benefits and minimizing risks—and to manage and maintain the subsurface and its functions over time. Central to AMS is balancing the required performance of subsurface functions with associated risks, costs, and value, enabling informed and sustainable decision-making.
	Business model driven design	Business model driven design is an approach where the spatial design of an area or landscape is based on an understanding of the processes and interactions that drive the business models of the individual land users (e.g., farmers). It is a two-way interaction, meaning the knowledge on business models feeds into the design process which aims to develop a spatial vision while the spatial design also informs and challenges the business models of local actors. This is still under development, but this is an example that covers the aim of such a method.
	Adaptation pathway	Adaptation pathways are sequences (or portfolios) of measures over time to achieve a set of pre-defined objectives under uncertain and changing future conditions. The adaptation pathway tool, through its narrative, visualizations, and multi-criteria analysis, provides a valuable platform for stakeholders and decision-makers to explore how different interests and objectives can be addressed through strategic combinations of adaptation measures. It facilitates structured dialogue by illustrating how choices made today can influence outcomes over time, helping to communicate possible futures alongside the associated costs and benefits, as well as trade-offs. Here you can find further explanations.



Example of cartography, sections explaining the water, soil and energy system over different scales (Hooimeijer, Bacchin, Lafleur, 2016)[7] link to report here

[7] Hooimeijer FL, Kuchincow Bacchin T and Lafleur F (eds.) (2016) Intelligent SUBsurface Quality 1: Intelligent use of subsurface infrastructure for surface quality. Delft: University of Technology.

Interaction around boundary spanning objects and facilitators

WP3 task meetings are organised every 6 weeks. Topics will be announced in advanced, questions around boundaries spanning objects and facilitators can be discussed during those meetings. SPADES partners meet every third Wednesday of the month a Walk in Meeting (WIM) at 9.00. We will keep this time slot to have presentations on methods that are presented here and other examples of interesting tools (e.g) MUSE, explain concretely how tools or frameworks can support planners in practice.

What do you think of the selection of methods proposed above? Do you miss any methods?

7.2 What are success factors in a co-creation workshop Here is a selection of tips for a successful co-creation workshop:

- Invite the right people, take effort in getting them together;
- Give them a good briefing before;
- Prepare the material and a clear agenda that invites everyone to participate;
- Introduce clearly the goal and steps of the workshop;
- Ensure careful introductions of participants;
- Be open to interventions of the participants;
- Keep the time (but not too rigid);
- Make sure the discussion becomes tangible in writings, drawings, pictures.

7.3 Your plan for the co-creation phase

The workbook up till now has guided you through questions that are at the basis of making a plan during the co-creation phase. We think that the inspiration portfolios, the systemic overview and the menu of co-creation help you to create options during this phase to be able to make a decision on what to implement.

In this part of the workbook, we bring the plan together by answering the questions that are organised according to the elements of the boundary spanning theory.

What is the aim of the pilot and the desired outcome? Please copy and paste from earlier answers to the questions.

How are the defined values operationalized?

What boundaries do you need to span?

What is the objective and aimed output of the co-creation phase in your pilot?

What do you want to get out of the co-creation phase (outcome)? How do you create options for the diagnosed problem or potential? What is the objective of implementation?

What ethical values are of importance in the discussions during the co-creation phase?

What are the steps over time and results per step?

What co-creation methods do you need per step?

What are facilitating tools/structures?

Who do you need to engage/involve? Results of the (updated) stakeholder analysis.

If you need help from the partners in certain methods, please contact us

8 LOG

This chapter is included to annotate the journey of this phase.

Reporter	*Decisive moments – what changed in the course of the pilot*

External factors that have been important? And how did they influence the aims and objectives?

9 RESULTS OF THE CO-CREATION WORKSHOPS

9.1 Report on workshop I

Please include here the results of the workshop. Kind reminder to reach out to ICLEI if you have activities you want to broadcast at the consortium level to EU-wide.

What is the agenda? Participants? *What are the results?*

9.2 Report on workshop II

Please include here the results of the workshop. Kind reminder to reach out to ICLEI if you have activities you want to broadcast at the consortium level to EU-wide.

What is the agenda? Participants? *What are the results*

9.3 Conclusions of both workshops (content)

What is the result from the cocreation phase, to take along in the implementation phase?

If you have additional workshops, add blocks (table)

10 REFLECTIONS FOR SPADES RESEARCHERS

As indicated in the introduction, the co-creation workbook is a tool to help all pilot partners to set-up the local activities by suggesting guiding questions and frameworks from the other SPADES partnership. In this final chapter of the workbook, we ask you to reflect on its applicability, workability and adaptability. This will help the SPADES consortium in revising and finetuning the workbook with this creating the SPADES manual for all policy makers and researchers that want to work on the integration of soils and spatial planning.

10.1 Feedback about the workbook

- What chapters or questions were useful to scope the challenge of integrating soils and planning?
- What chapters or questions were not or less useful? Why?
- What chapters or questions are missing in this workbook?
- How would you rate the format of the workbook (questions and framework to be filled in by the partners)? And how would you rate the accompanying online meetings?
- How could we improve the workbook to guide other cities and regions?

Answers:

Please don't refrain from critical questions. All suggestions and remarks are very welcome.

10.2 Looking back at the CO-CREATION phase

At this very end of the workbook, we invite you to reflect on the co-creation phase.

- What have you learned in this phase? What new insights on soils and planning, and on the needs for an integrated approach have you gained?
- How did your aim for the pilot and the objective for co-creation change throughout this phase?
- What recent external factors or events, outside the scope of the SPADES project, provided an important impetus or restraints for the next phase (implementation phase)?

Answers:

Please reflect on the statements

- *The soil challenge in my pilot is really clear.*
- *The potential of planning to address this challenge is straightforward.*
- *Soil and planning are integrated in our policies/practices.*

10.3 Looking forward to the implementation phase

We invite you to think about the next phase in the project, the implementation phase. This input will feed into the design of this phase and will give the SPADES consortium inside of your needs to develop a similar workbook for you.

- What are your objectives for the implementation phase? Did these change throughout the co-creation phase? Why?
- What are your steps forward to achieve these objectives? How would you start to work on the proposed objectives?
- What are your needs for the implementation phase of SPADES? Think about instruments, methodologies of support in workshops?
- What crucial knowledge, skills or data are you missing at the start of the implementation phase?

Answers:

10.4 Any other business

Anything else you would like to share with us?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