SPADES

DIAGNOSIS WORKBOOK

CREATED BY THE SPADES CONSORTIUM

TO SUPPORT PILOT REGIONS IN INTEGRATING SOIL INTO SPATIAL PLANNING AND DESIGN

GOAL OF THE WORKBOOK

This workbook is guiding the diagnosis phase of the pilots in SPADES projects. It is meant to collect information, to explain SPADES methodologies to help the pilots take steps in the diagnosis phase.

The project partners will support the pilot partners to fill in this workbook. Each chapter has a time frame of 6 weeks and will be introduced in the 6-week pilot meetings. When the workbook is finished this document represents the diagnosis report of the pilots. If there are questions on the workflow and the content of the diagnosis report, please contact Coline Perrin (coline.perrin@inrae.fr). If there are technical questions on the workbook itself, please contact Fransje Hooimeijer (f.l.hooimeijer@tudelft.nl)

Timeline

Find on Sharepoint the Calendar of 6-week pilot meetings in which each chapter of this workbook will be discussed

Chapter 3: March (all partners WP 1 and 2) Getting to know the pilots

Chapter 4: April/May (Helena and Roger) Stakeholder mapping

Chapter 5: June (WP 1 partners) Territorial policy, spatial planning and soil

Chapter 6: July (Task 1.2, 2.1 and 2.2 partners) Mapping the spatial characteristics of the pilots

Chapter 7: August (all partners WP 1 and 2) Final reflexions

12 October 2025: deadline for diagnosis report delivery to task lead

16 October 2025: online cross-fertilization workshop, oral presentation of each diagnosis

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CONTENTS

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.
Planning culture: There are also unplanned 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.
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.
Planning style: this term is used to diversify between clusters of different planning systems, every system is unique but there are similar styles.
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.
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.
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.
Soil quality: Soil quality is the chemical, biological and physical condition of soil.
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.
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.
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.
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 federal state 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.

2 INTRODUCTION

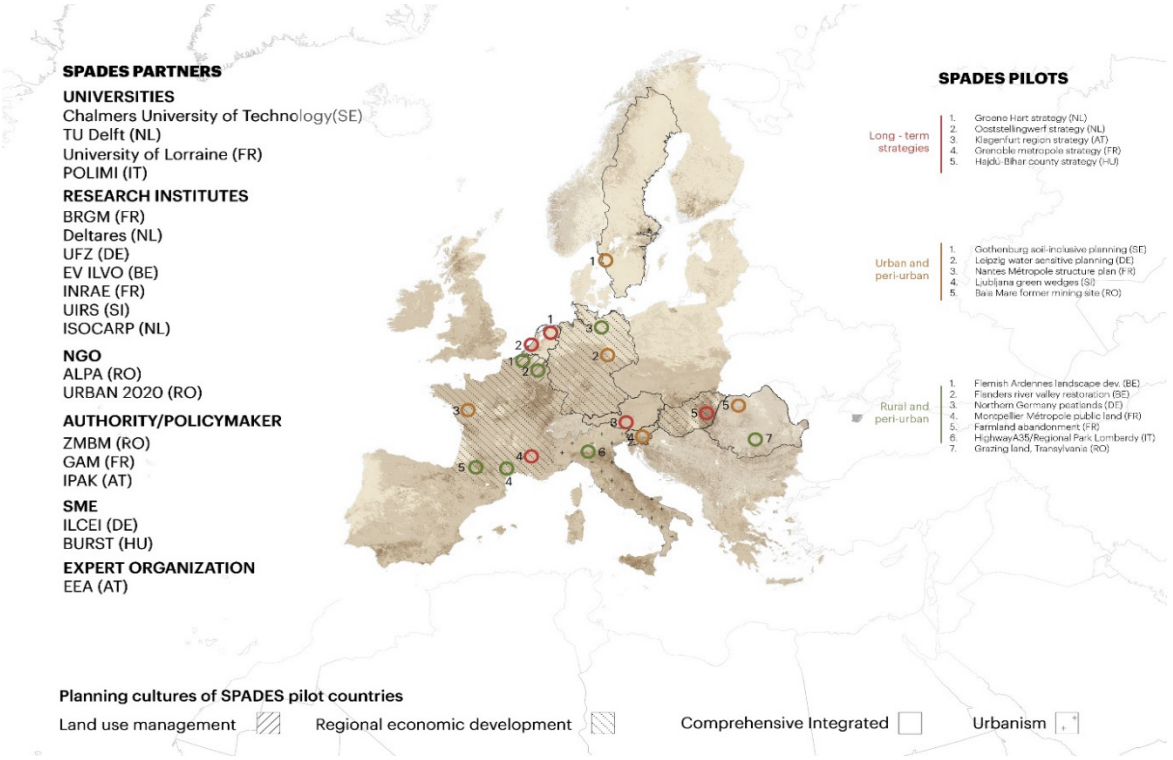
This chapter introduces the SPADES project and its specific perspective on how planning can become soil inclusive. This workbook is an important instrument for the project not only to be able to interact with the pilots in the project, but also to the partners to collaborate in an integrative manner.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

1. Reduce land degradation relating to desertification,
2. Conserve and increase soil organic carbon stocks,
3. No net soil sealing and increase the reuse of urban soils,
4. Reduce soil pollution and enhance restoration,
5. Prevent erosion, and
6. Improve soil structure to enhance habitat quality for soil biota and crops.

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 highly under pressure and the soil's ability to perform essential ecosystem services should be improved to cope with pressures such as climate change and needs such as a healthy living environment.



source: SPADES

Spatial planning and design are practices characterized by balancing out interests in urban, peri-urban and rural areas like functionality, accessibility, economics 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 in 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 (manual and navigator) so 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.

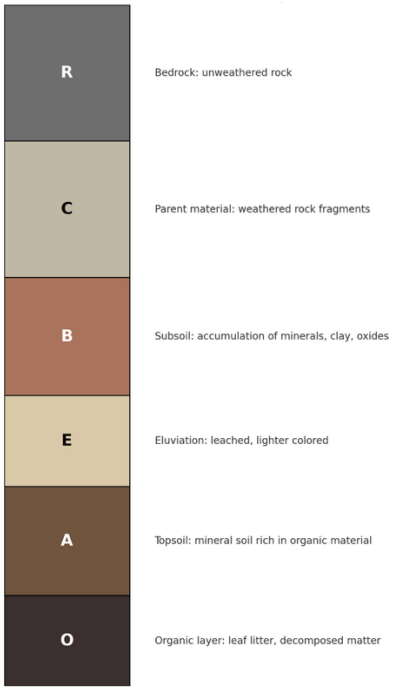
- Lack of understanding of how to facilitate the transition towards healthy soils in spatial planning and design.
- Very limited innovation in the planning system and lack of a shared language.
- Insufficient methodological basis and instruments.
- Limited soil literacy by actors involved in planning 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 if 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 What is soil

Soil is a dynamic ecosystem of Earth's surface representing a critical interface between the atmosphere, biosphere and lithosphere. Soil consists of layers (soil horizons) that were made through weathering of bare rock (parent material) over decades (younger soils) to millions of years (older soils), forming the second largest carbon pool after the oceans. The vertical cross-section of soil is also known as soil profile and it consists of soil layers, or horizons as a result of how it was formed, see figure below: *General soil layers or "horizons"*.



General soil layers or "horizons", source: Soil Horizons diagram (O, A, E, B, C, R), created for the SPADES project by ChatGPT/OpenAI, licensed under CC BY 4.0

The figure above shows that above the soil, the O layer is a layer with organic material that, depending on the nature of the soil, may consist of multiple sub-layers. The "A" or surface horizon or topsoil is a mineral layer with a lot of organic matter. This is part of the soil profile in which minerals have been for the longest time most weathered. Also, here plant growth occurs, where most of the organic matter has accumulated and that is the most biologically active part of the soil profile. The E layer is characterized by eluvial processes. Where material is washed out to the subsoil below. The B or illuvial horizon frequently exhibits specific processes features such as clay illuviation, gypsum precipitation or hydromorphic features. The subsoil is dominated by physical weathering, with less chemical weathering than topsoil and has frequently coarser texture than the topsoil. Beneath (sub)soils lie the parent material (C-horizon), or bedrock (R) which is largely unaffected and unweathered.

Generally, soils vary greatly in their profile development, horizon differentiation and overall properties. They contain groundwater(flows) at very different depths, and they have a varying ability to provide ecosystem services as a function of climate, vegetation, topography and human influences.

As a healthy and dynamic ecosystem, soil provides a multitude of ecosystem services or benefits that we obtain from them, such as biodiversity, provision of food, air quality regulation, climate buffering, water and erosion regulation, and others. Soil can provide crucial ecosystem services notably for our development, but also services that directly contribute to a sustainable and just transition to climate-neutrality by 2050, see the figure above of ecosystem services.

In order to support these ecosystem services soil provides us; it is important to manage soil health both at the surface level and through all soil layers or the whole of soils volume, see figure below.

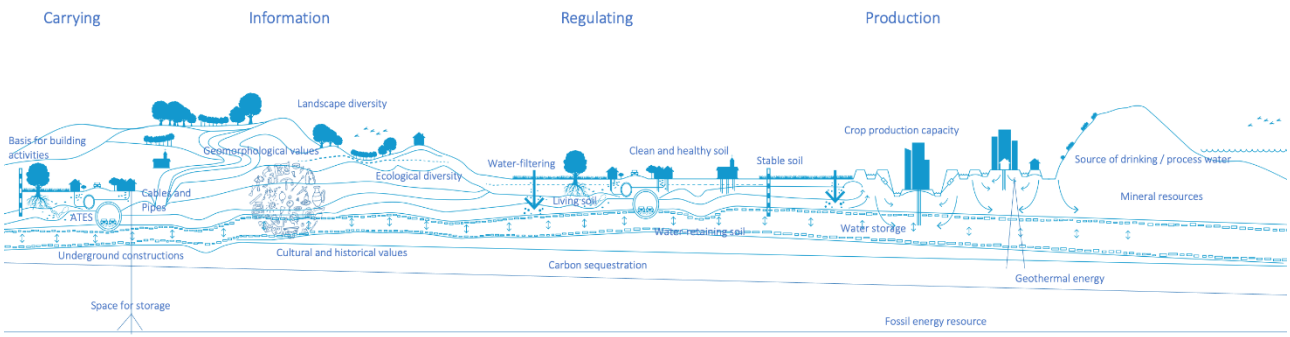


Figure showing the spatial entanglement of soil ecosystem services in (urban) landscapes, source: Fransje Hooimeijer for SPADES

2.4 What is Spatial Planning and Design

The SPADES project aims to affect the 'planning systems' and 'building practices' in the participating countries, for a better inclusion of the soil into spatial (urban, peri-urban and rural) development. The term 'planning system' refers to the formal processes of planning[1] but recognises that the professional structures of planning do not only consist of formal, written procedures and regulations. There are also unplanned territorial interventions, unwritten assumptions and concepts, informal roles of inhabitants, changing reliability of governments and different perceptions of the importance of nature that form the 'planning culture'.[2] Both formal and informal influences have to be taken into account when relating planning to soil management.

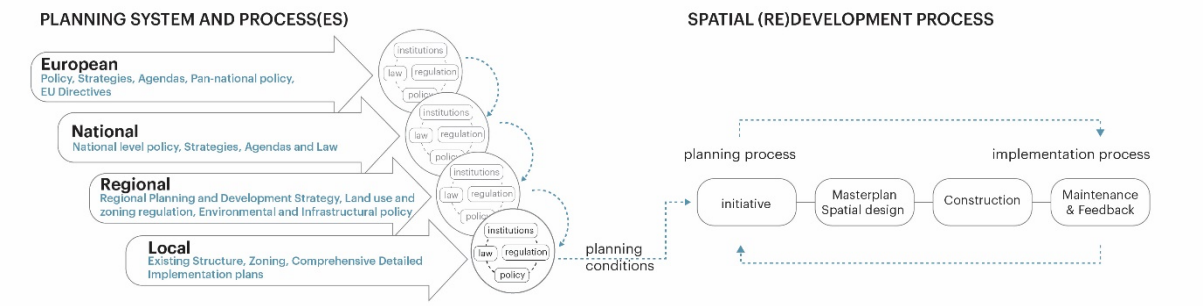


Figure of relation between the planning system and process(es) through government scales providing the spatial planning conditions for the spatial (re)development process. Source: SPADES

The planning system is a 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 trajectories of spatial development in which spatial design is working out the specific spatial outcomes of these policies. It is important to connect this top-down spatial planning with the bottom-up realisation of projects in space to ensure ambitions considering sustainability in general, and soil inclusive development in particular. That is why the pilots are very important in the

[1] Nadin V and Stead D (2003) European spatial planning systems, social models and learning. disP – the Planning Review 44(172): 35–37.
[2] Reimer M, Getimis P and Blotevogel HH (eds) (2014) Spatial Planning Systems and Practices in Europe. A Comparative Perspective on Continuity and Change. Routledge, New York, NY, USA.

project: they enable us to learn what is possible and effective on project level and what should inform the higher levels of governance that produce the planning conditions.

The spatial (urban, peri-urban or rural) (re)development process consists of six key phases: Initiation, Masterplan & Spatial Design, Construction, Maintenance, and Feedback. The first two phases are considered to be part of the 'Planning Process', whereas the last two are part of the 'Implementation Process'. Although these phases are variable, this division serves to distinguish planning from actual implementation of the plan. After each phase is completed, a set of decisions determine the possibilities and impossibilities of the next phase; new actors become part of the process, with their own need for information. These actors use and generate multiple types of data and information and use language and concepts according to their knowledge field and expertise. Because of the specialization each actor brings to the project, the consequences of acts by one actor are not necessarily directly visible for the other disciplines, and it is not possible to evaluate these various interventions as a coherent whole. However, spatial design can function as an integrating discipline to bring all interests together. With the aim of soil-inclusive development the act of design starts with observations of the spatial situation of a project which is the diagnosis phase we perform in this booklet. By including soil in the observations on the spatial situation consciously, this workbook is already spanning boundaries. Also the act of design in projecting new futures on the basis of the observations and finding synergy which we will be doing in the co-creation phase that comes after this, is an supportive 'boundary spanning' tool: to help the pilots to build bridges between the world of soil and of spatial planning and design.

2.5 Soil quantity, quality and performance in urban, per-urban and rural areas

In the SPADES project we connect planning and design to the quality, quantity and performance of soil with the aim to reach an overall soil health that is urgently needed in sustainable spatial development. By prioritizing soil health, spatial planners and designers, policymakers, and developers can create (urban) landscapes that are not only more sustainable but also more resilient to climate change and environmental degradation. In this section, we propose to explore inspiring practices of soil-inclusive planning, emphasizing strategies that enhance soil health while balancing ecological, social, and economic needs.

Globally, also the field of spatial planning and design is facing challenges of climate change, biodiversity loss, energy transition and ongoing urbanization. The soil system is part of these challenges in terms of its quality, quantity and performance (ecosystem services), all of which differ across the three spatial typologies: urban, peri-urban and rural.

The quality of soil is about the chemical, biological and physical condition. The quantity of soil refers to soil as resource for building and the relation between built- and unbuilt areas (no-net land take policy of the EU). The 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.

Soil impact in spatial planning and Design / Spatial planning and Design impact on Soil health	**Soil quality** chemical, biological and physical qualities *Challenges:* Contamination, soil degradation, fertility and biodiversity loss	**Soil quantity** availability of land and soil in relation to societal challenges *Challenges:* Land take, soil sealing, resource depletion, (European) competition for land for nature preservation,food security and urbanization	**Soil performance** soil functions and ESS role in climate buffering, biodiversity, spatial quality *Challenges:* Spatial continuity, maintenance regimes, European Green Deal initiatives, Land Use, Forestry and Agriculture Regulation, EU Forest Strategy, EU initiatives focusing on climate mitigation and adaptation, renewable energy, etc.)
Rural Production space of food, fiber, bio energy, natural resources	NBS	RE-zoning	NBS, RE-zoning
Peri-urban Space for recreation, climate services, natural resources	NBS, Permaculture, Food Forest	Green Belt, Green Heart	NBS, Sponge city, Green Blue infrastructure, Resiliency
Urban Space for climate, biodiversity, human health, spatial quality	NBS, Permaculture, Food Forest	Green city, Compact city	NBS, Sponge city, Green Blue infrastructure, Resiliency

Overview of soil quality, quantity and performance in relation to area typologies and well know concepts. Source: SPADES

2.6 SPADES Inspiration

The Maya civilization was a Mesoamerican civilization that existed from antiquity to the early modern period. The soil mantle of the tropical karst landscapes of southern Mexico was a key resource for ancient Maya agriculture and experienced deep transformation due to long-term human impacts under changing environmental conditions. The Maya cultural values and city practices were based in a strong connection between urban soil and society works because the whole community was actively involved, and knowledge about soil was shared through common social and cultural activities, not just by a few specialists. The Maya approach to a soil-aware urban society combines practices from the ground up and top-down cultural values to improve resilience, reduce reliance on distant supply chains, and maintain long-lasting relationships between people and the environment. Therefore, is an inspiration on how spatial planning can support and encouraging a widespread culture of soil care.

Sustainable spatial development can only succeed if there is a broad increase in soil knowledge and an understanding of how future generations depend on soil. Maya urban environments make space for soils through settling practices that demonstrate a concern with maintaining and enhancing the availability, proximity, and accessibility of soils. The utility of the dimensions of areas of soil as available, proximal, and accessible is dependent on how the edges of unsealed soil areas are shaped by physical and configurational characteristics in the design of the built environment.[3]

These Pedosediments generated by ancient soil erosion have been found in the piedmont and depression positions in the mountainous landscapes of Chiapas, because of lateral downslope soil removal, and in the subsurface karstic cavities in the platform of NE Yucatán, indicating vertical “soil piping.” The soils of the lowland domains show contrasting differences between the top sequences: gleyic clay–rich soils and humic alluvial soils prevail, whereas hydromorphic carbonate soils have formed in karstic depressions. These differences in the lowland soil properties led to divergent ancient Maya land use strategies; the

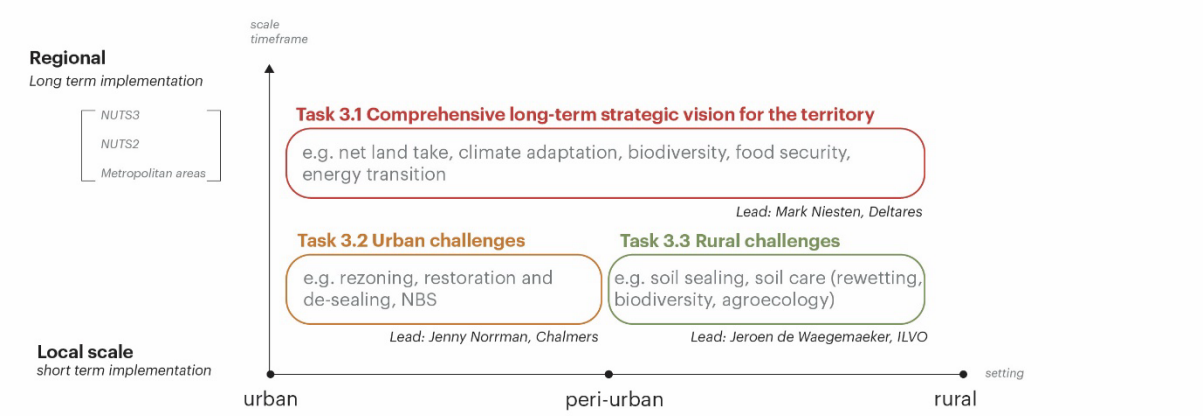
[3] Vis, B.N.; Evans, D.L.; Graham, E. Engagement with Urban Soils Part II: Starting Points for Sustainable Urban Planning Guidelines Derived from Maya Soil Connectivity. Land 2023, 12, 891. https://doi.org/10.3390/land12040891

major agricultural domain was developed in the lowlands, implying largescale artificial drainage. On the contrary, in upland Rendzinas were cultivated, implying "precision agriculture" and "container gardening."[4]

These ancient practices show the scale link between soil and spatial arrangements of the human settlements. Inspirational in finding balance with soil as a resource, soil health as a starting point and qualitative living environment.

2.7 SPADES Pilots

To change the current practice, taking account of existing systems, traditions and ways of collaboration, it is of utmost importance to involve stakeholders in land use decisions, such as landowners and managers, policy makers, authorities on different levels, and bring together the worlds of 'planning' and 'soil'. This can only be done by putting the pilots central in the project and establish a strong connection and co-creating solutions to cover different land uses and planning and soil challenges. By cocreating with pilots, SPADES truly addresses the gap between concepts and common practice by engaging with the planning communities throughout the EU; The wide diversity of pilots and their challenges ensures that SPADES is not siloed and covers all aspects of planning, thus avoiding concentrating on single soil issue or problem shifting to different locations, generations of land use functions.



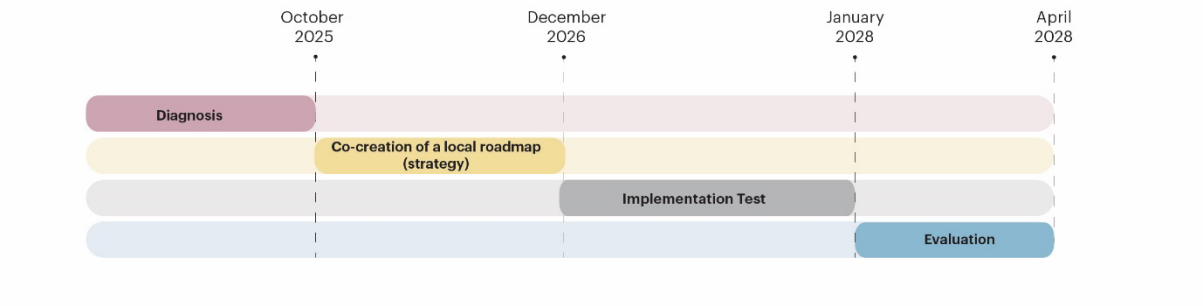
Source: SPADES

The 17 pilots in 10 member states (see image above) are clustered in three groups (strategic, urban-peri-urban and peri-urban-rural) will together go through 4 phases: diagnosis, cocreation, implementation and evaluation. The three clusters of the pilots are according to similarities between issues at hand or the considered geographic scale. Online meetings are organised for these clusters every 6 weeks, to support pilots in conducting their diagnosis. Each task meeting from March to September will be dedicated to discussing one chapter of this workbook (see Calendar of meetings).

2.8 Diagnosis phase

The pilots go through 4 phases: diagnosis, co-creation, implementation and evaluation.

[4] Sedov Sergey , Rivera-Uria M. Yazmin , Ibarra-Arzave Georgina , García-Ramírez Pamela , Solleiro-Rebolledo Elizabeth , Cabadas-Báez Héctor V. , Valera-Fernández Daisy , Díaz-Ortega Jaime , Guillén-Domínguez Karla A. , Moreno-Roso Sol de Jesús , Fedick Scott L. , Leonard Daniel , Golden Charles , Morell-Hart Shanti , Liendo-Stuardo Rodrigo R. (2023) Soil toposequences, soil erosion, and ancient Maya land use adaptations to pedodiversity in the tropical karstic landscapes of southern Mexico. In: Journal of Frontiers in Earth Science VOLUME 11



Source: SPADES

The aim of the diagnosis phase is to have a common and specific understanding what the pilots are willing to achieve in the SPADES project, what are their own challenges and opportunities:

Refine the local challenges related to soil management and spatial planning.

Prepare the co-creation phase: identify potential steps/actions that could be achieved within the SPADES project framework (= refine the specific objective for each pilot)

- Identify the local instruments, tools, and data currently used in practice.
- Pinpoint specific levers, barriers & bottlenecks to better integration (will continue until M48) This includes social, economic, and cultural factors, mapping power dynamics (among actors and policies at different levels) and highlighting trade-offs, controversies, conflicts, and existing arrangements.
- Determine the local needs for improved integration (knowledge, data, capacity building, etc.)

2.9 Objectives of this workbook

This workbook for the SPADES pilots is intended to provide contextualisation of the pilot in the spatial planning and design and soil domains on the one hand and to support the analysis of the diagnosis phase. Specific objectives of this workbook:

a. introducing the project approach, planning context and methods (stakeholder analysis, spatial mapping, etc.)
b. sharing resources, methods, providing inspiration
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.

This workbook is the first step in the collaboration and what we call a 'boundary spanning tool' connecting different groups and perspectives, in that sense it forms a larger context than your pilot is covering**. It is very possible that not all the questions are relevant for your pilot, it is fine to leave those open.**

The information given has a white background, the place for your answers is in the boxes

You can delete the text in the box and take as much space as you need, when the question is unclear, please indicate that, so we know this too, also when the question is not relevant just skip it.

3 GETTING TO KNOW THE PILOTS

This chapter is about understanding the pilot's challenges, drivers, organisation and process. The questions are formulated from these perspectives but of course could miss specific and important aspects of your pilot. The questions in the chapter are a first step to more in depth questions that will be addressed in later chapters in this workbook.

3.1 Where is your pilot?

- Where is the pilot located? What is the scale of the pilot?
- How would you describe this case? As urban? Rural? Peri-urban?

Answers:

In addition to your answers, please provide a small map that situates your pilot.

3.2 What is your pilot about?

- What is at stake in your pilot? What are the local issues or problems?
- What soil and/or planning challenges do you want to work on?
- What is the connection with the SPADES-objective to integrate soils and planning?
  Clarify in what way(s) your pilot is situated at the interface of the realms of soil and planning.

Answers:

Non-limited list of examples:

- *an urgent environmental issue is at stake and soils/planning could contribute in this way...*
- *two policy domains X and X are colliding and create disintegrated practices in the field...*
- *there is an interesting political momentum for new policy making on...*
- *the pilot finds its origin in an administrative process...*

If multiple issues or challenges are part of the pilot, please prioritise.

Please provide illustrative examples and/or figures that clarify the extent of the local challenges.
E.g. numbers on the current rate of soil sealing or bad/good examples of soil management in the area.

Please note that this information may be used to feed into the communication by SPADES.
Please indicate if there would be any reservations to use (part of) this information for communication purposes.

3.3 Who is in the pilot team?

- Who is in your pilot team? What is their connection to current soil and planning policies?
- Which skills do they have? What methods and tools would they like to employ in the pilot?

Answers:

Before going into a stakeholder analysis (chapter 3) we first like to know who is responsible for/engaged with the development of the pilot, the so-called core team. The composition of the core group influences the focus a pilot adopts, the key goals of the diagnosis phase, etcetera.

Clarifying the core team is important for expectation management with regards to your stakeholders and the project. What research or analyses are we able to conduct within the local SPADES team.

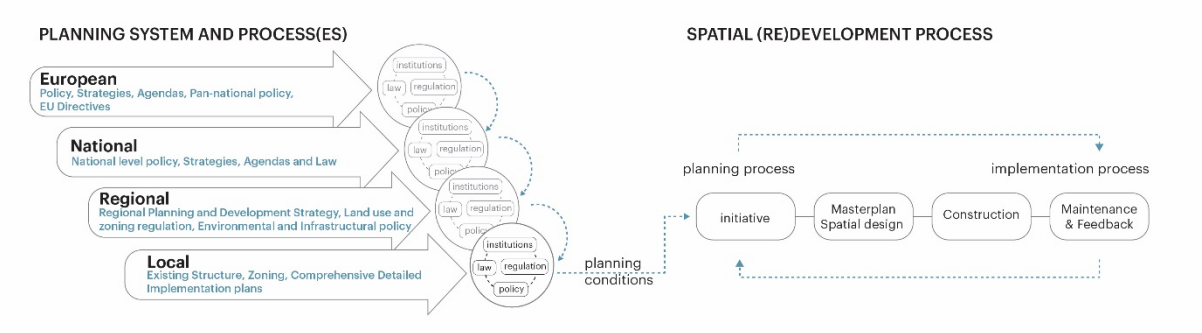
3.4 What type of development process is the pilot part of?

This question is to understand the local planning and policy context of the SPADES pilot. A more in-depth policy analysis is addressed at a later section in this diagnosis workbook. At this stage, however, we ask you to provide the main information related to the SPADES pilot.

- Who usually initiates projects in urban, peri-urban or rural development with regards to the issues or challenges identified in 2.2? Please indicate at which scale these actors are situated.
- In which phase of the policy or planning cycle is your pilot now? Initiation/agenda setting, planning/design, construction/implementation, maintenance/evaluation, etc
- What role do public authorities play in this process? Initiator, regulator, services?
- Are there certain key products connected to these phases? E.g. A zoning plan, a structure plan, decision support tool, executive tools or other? And who develops these products or provides the underlying knowledge?
- To what extent is soil currently part of the development process? If so, please describe what soil parameters are part of the equation (soil quantity, quality or performance)

Answers:

To support you a broad conceptual framework on development processes has been developed, could you position the SPADES pilot on this framework (explained in the introduction). If not, please offer an alternative to illustrate the development process of the pilot. On the left the framework list the various levels of policy making, where European policies trickle down to national, regional and eventually local policy making. On the right, the framework gives a general outline of a development process, from initiative, over design and construction to maintenance.



Source: SPADES

3.5 What is the ambition of the pilot within the timeframe of the project?

- What is the strategic importance of the SPADES project for your pilot?
- What do you want to reach within the timeframe of the project?
- Which type of strategy/instrument would you like to test?
- What are the potential opportunities for the adoption, implementation, and dissemination of soil-planning innovations in your pilot?
- What are the potential bottlenecks for the adoption, implementation, and dissemination of soil-planning innovations in your pilot?

Answers:

Please build on the answers to 2.4 to clarify what the starting point and foreseeable endpoint of your pilot is (e.g. testing, learning, experimenting, implementing, optimizing, awareness raising, coalition building...)?

Please indicate what type of support your pilot may need from the SPADES consortium to meet up with these aims? Or indicate what you want to contribute to the array of soil-inclusive planning?

4 STAKEHOLDER MAPPING

This chapter focuses on stakeholder mapping to build a clear overview of the relevant stakeholders and gain insights on their roles, responsibilities, interests and needs. This is to ensure that SPADES considers the diversity of interests, perspectives and power relations that may impact the opportunities for including soils in spatial planning and design. The collected information will help in selecting who should be involved further in the different phases of the pilots (e.g. in the participatory workshops mentioned below) and it is linked to the capacity-building programme in WP5.

Stakeholders refer to all involved in the *quadruple helix participation model* which mean the collaboration between public organisations (national, regional, local governments), private organisations (businesses, industry), knowledge institutions and civil society (communities, NGOs). Stakeholder mapping helps to systematically identify participants from all four of these groups, to understand different interests throughout the co-planning, co-design, and co-implementation phase and allows developing engagement strategies for each actor.

In terms of methodology, when possible, pilots should complete the tables in collaboration with the mapped stakeholders, who have a deeper understanding of their interests, needs, and power dynamics.

4.1 Stakeholder inventory (step 1)

- Who are your stakeholders from the public sector, the private sector, academia, the civil society and other?
- Which specific contact persons are currently involved?

Answers:

Please note that this is a living document and that your inventory will evolve throughout the SPADES project. For this reason, it is advised to update the stakeholder inventory at regular basis.

You will find the excel to fill in your analysis in your folder in the SharePoint:
SPADES pilots-PRJ | General | Microsoft Teams

Below you find an example of such stakeholder inventory.

EXAMPLE OF PILOT STAKEHOLDER INVENTORY

Stakeholder group	Stakeholder	Specified	Contact person
Public	National government	Ministry of Infrastructure and Environment	
		Ministry of Spatial Planning	
		Other…	
	Regional government	Province	
		Other…	
	Local government / municipality departments	Spatial planning and design	
		Public works	
		Urban water / sewerage	
		Roads	
		Maintenance public green	
		Mayor's office	
		Other…	
	Water boards	Administration	
		Other…	
	International governments	European Commission	
		Other…	
Civil society	Community groups		
	NGOs		
	Media		
	Interest/advocacy groups		
	Other…		

Knowledge	Universities		
	Research institutes		
	Other…		
Private	Developers		
	Housing corporations		
	Network operators		
	Utilities		
	Engineering firms		
	Building companies		
	Local industry		
	Insurance companies		
	Banks		
	Other…		

4.2 Define the stakeholders' interest, influence and impact (step 2)

Step 2 is to look at the listed stakeholders in more detail, by exploring their interest in, influence over, and likely impact of issues, interventions, projects, processes and decisions.

- What is the interest of the stakeholder identified in 3.1 for the challenge identified in 2.2?
- What is the influence of the stakeholder identified in 3.1 for the challenge identified in 2.2?
- How the stakeholder identified in 3.1. is likely to be impacted by the challenge identified in 2.2?

Answers:

Build on the inventory of 3.1 to add information on the interest, influence and impact of each stakeholder.

You will find the excel to fill in your analysis in your folder in the SharePoint, in the tabs you can find examples of the Netherlands, Slovenia and Flanders.

SPADES pilots-PRJ | General | Microsoft Teams

To help grasp and evaluate interest, influence and impact of each stakeholder, we refer to the set of guiding questions as formulated by Reed et al. (2025) in their research on the 3i analytical framework on environmental challenges. See below.

Interest

- *Which parties are already interested, and what is the nature of their interest?*
  - *What is the scope of their interest?*
  - *What aspects of an issue are they interested in?*
  - *Who within the group of which part of the organization is most interested?*
  - *Who else do you think should be interested?*

Influence

- *Which parties have the power to facilitate development of positive or negative impacts in relation to the pilot?*
  - *Do they have direct influence over impacts, for example via access to resources, organization scale, property rights, or levels of authority and expertise that give them "power over" others?*
  - *Which individuals with a group or groups within an organization have most influence to facilitate impact and why?*
  - *Who has the power to block development of these impacts?*
  - *Do they have direct influence over impacts?*
  - *Which individuals or groups have most influence to block impacts and why?*

Impact

- *Which parties might benefit most in the short-term from initial engagement with this pilot?*
  - *What types of benefits are likely to be gained for each of these parties, for example, the formation of new networks, capacity, knowledge or skills?*
- *Which parties may be disadvantaged or harmed most in the short-term, from initial engagement with this pilot?*
  - *What risks are these parties likely to be exposed to or disadvantages might they suffer, such as inflaming conflict, or misunderstandings that could lead to disengagement?*

4.3 Sketching the stakeholder map (step 3)

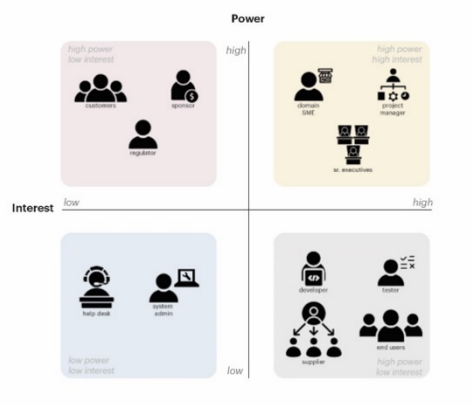
The next step in the stakeholder analysis is to cluster or group stakeholders and to identify engagement strategies (e.g. consultation, information, active engagement, etc) for the various stakeholders. You build on the work of the previous steps by sketching the various dynamics amongst the stakeholders.

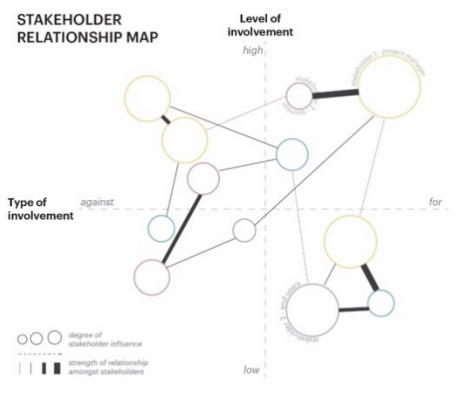
- Can you position the stakeholders along the inter the following maps and the influence (power) axes?
- Can you clarify the coalitions amongst stakeholders?

Answers:

You can make a map based on your responses in the excel to create a preliminary map. In terms of relationships, we are interested in whom you work with more frequently or less.

Examples of an interest-influence and relations map of stakeholders.





Source: SPADES

4.4 Participatory workshop(s)

As part of the minimal requirements of the diagnosis phase all SPADES pilots must organize at least one participatory workshop (you can organize more workshops if that fits with your pilot).

We kindly invite you to use this participatory workshop to collectively reflect on all or some chapters in this workbook. We also strongly advise to have conducted the stakeholder mapping prior to the workshop and to collect input of the partners on the stakeholder map.

Answers:

Please provide some details of the participatory workshop including:

- *Location*
- *Date*
- *Goal(s) (related to the chapters of this workbook)*
- *Agenda*

- *Participants*

Please provide some details on what was discussed and the main results of this/these interaction(s).

Please provide some pictures of the participatory SPADES workshop.

Please note that this workshop may be a great occasion to communicate about SPADES in your local context or to communicate about your pilot to the entire SPADES consortium. Don't hesitate to reach out the SPADES communication team for any questions or help to set-up a communication output on the participatory workshop.

5 TERRITORIAL POLICY, SPATIAL PLANNING AND SOIL

This chapter is about understanding how policies on European, and national to local scale define planning conditions for the pilots. It supports the policy analysis of the diagnosis phase of the pilots. The first part of this chapter invites the pilots to reflect on the wider policy context (5.1), on how national planning systems and planning styles differ between the pilot countries (5.2), and about the planning levels and planning documents that are relevant in the specific case (5.3). The second part of this chapter is about how to integrate soil into planning. It is going into concepts that are used to set ambitions and get people to understand and work with spatial planning (5.4) and asks about instruments that might help to bridge across different planning challenges, administrative responsibilities and stakeholders (boundary spanning instruments, 5.5). These concepts are an important part of the informal side of spatial planning and will also be a part of the next phase of co-creation.

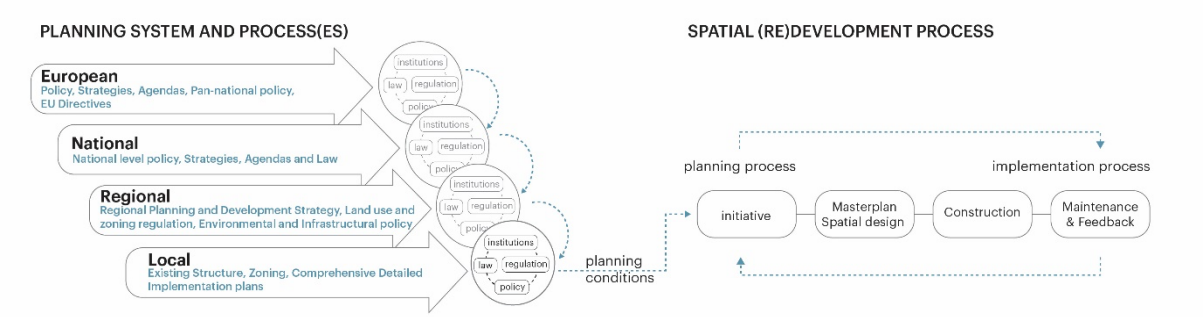


Figure of relation between the planning system and process(es) through government scales providing the spatial planning conditions for the spatial (re)development process. Source: SPADES

5.1 Policy context: European and national level

Sectoral policies at the EU scale and national levels significantly impact soil health, either driving degradation or supporting conservation. For example, policies that promote urban expansion, intensive agriculture, or industrial waste disposal often contribute to soil degradation, while those integrating soil considerations into land use planning (e.g., policies requiring environmental controls or assessments) help preserve and restore the quality, quality and performance of soil.

Understanding how sectoral policies impact soil health is essential for analyzing the planning challenges faced by the SPADES pilots. By studying local or regional effects of EU and national level policies, we will clarify whether and where certain policies pose critical barriers or opportunities to balancing soil conservation with other societal goals. Ultimately, this will help SPADES in developing relevant policy recommendations, highlighting options to integrate soil health into sectoral decision-making and to promote soil-inclusive spatial planning.

In the initial diagnostic phase of the SPADES pilots, it is therefore essential to identify key sectoral policies at the EU scale and national levels that either support or hinder soil-inclusive planning. Please help collecting examples of how policies adopted at EU or national levels impact soil heath locally or regionally. We kindly ask you to answer the following questions (own experience, desk research and stakeholder consultations can be used as methodological approaches – please indicate which evidence you are referring to):

- In the context of your pilot, do you think that there is a significant impact of EU policies or national policies on soil health? Please consider several different policy sectors, particularly those shown in figure below (boxes with dotted lines) as well as potentially positive or negative effects on soil health.

Answer (please tick a box):

- ❑ Yes, I think that there is a significant impact of EU policies on the soil health in my pilot region.
- ❑ No, EU policies do not play a major role for the soil health in my pilot region.

Answer (please tick a box):

- ❑ Yes, I think that there is a significant impact of - particular - national policies on the soil health in my pilot region.
- ❑ No, national policies do not play a major role for the soil health in my pilot region.

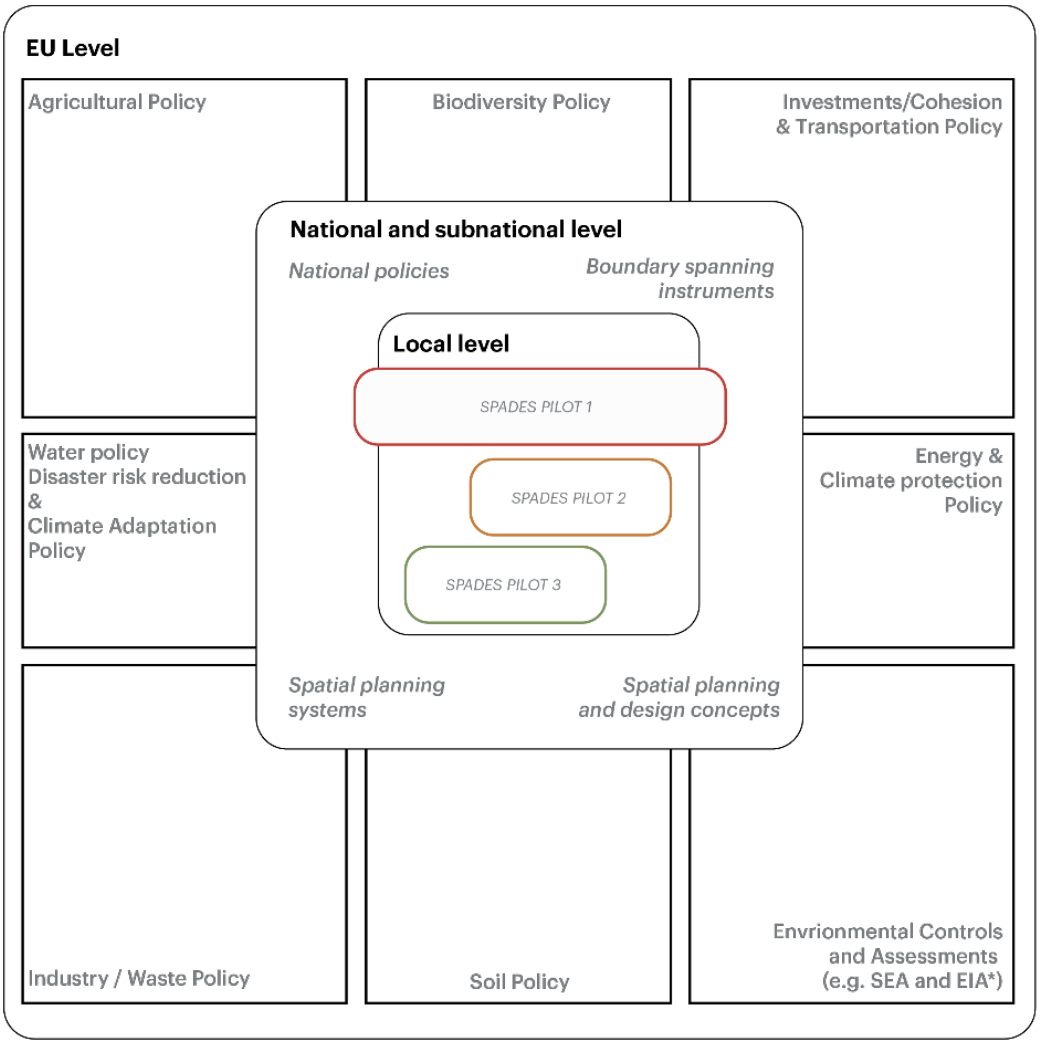


Figure above is the illustration of the policy and planning context of the pilots and of the different analytical lenses applied in Chapter 4. * SEA = Strategic Environmental Assessment, EIA = Environmental Impact Assessment. Source: SPADES

- If you ticked at least one time "yes" above, please provide us with more details. Can you describe briefly the impact pathways of up to five specific policies that you consider most important? How do they influence soil health in your pilot setting? Do they promote or compromise soil health? Are these effects direct or indirect?

Answers:

Please provide evidence by indicating which source of information you rely on (e.g. personal expertise, literature and/or interview data).

Relevant policy	Impacts on soil quality, quantity, or performance?	More specific: Impact on which Soil Mission Objective?	Description of effect and impact pathway	Source of information / evidence
Example: Agricultural subsidies provided by EU affect land management on peatland				
Common Agricultural Policy (CAP)	effect on soil performance	❑ Desertification X Organic carbon stocks ❑ Soil sealing / urban soils ❑ Soil pollution ❑ Erosion ❑ Soil structure and soil biodiversity ❑ Global footprint ❑ Soil literacy	Payments of the first and second pillar of the CAP may be received for drainage-based agricultural management on peatlands without restrictions. This does not set incentives for raising the water level. Instead, the subsidy scheme supports the status quo. If farmers re-wet their fields, they may still receive the same subsidies, as paludiculture crops are eligible for direct payments. However, the production of certain paludiculture crops, such as cattail or reed, is not recognized as "agricultural activity". Therefore, such management may become ineligible for direct payments. This significantly hinders farmers to shift their drainage-based production patterns to paludiculture.	Personal communication with XY Factsheet Greifswaldmoor-Centre https://greifswaldmoor.de/files/dokumente/Infopapiere_Briefings/202111_Opportunities-for-paludiculture-in-CAP-1.pdf UBA / DEHSt 2022: https://www.dehst.de/SharedDocs/downloads/DE/projektmechanismen/Hintergrundpapier-hemmnisse-paludikultur.pdf?_blob=publicationFile&v=3

Room for additional comments:

Furthermore, we kindly ask you to provide us with information on relevant definitions used in the context of your pilots. Specifically, we are interested to learn:

- Is one of these terms (that are related to the "Soil Mission Objectives") relevant to your pilot? (please tick the boxes of the relevant terms) And, in the context of your pilot, are specific definitions of these terms used?

Answers:

❑ land degradation
❑ soil sealing
❑ land take
❑ urban soils

If yes, please provide the definition(s) and specify its/their source (e.g. planning document, environmental assessment, etc.)

- Have definitions of these terms been adopted in the legislative framework of your pilot country?

Answers:

If yes, please provide us with the definition(s) and with the reference law (including a link to the website, if available).

- Are there in the legislative framework of your pilot country quantitative measures and quantitative targets to monitor changes in "land degradation", "soil sealing", "land take" or the extent of "urban soils"?

Answers:

5.2 Spatial planning clusters in Europe

Planning traditions vary greatly across Europe. The predominant approaches to steering spatial development and 'ways of doing things' are highly context-specific and determine how planning 'works' in different countries. In order to contextualise the SPADES pilots and to enable cross-comparisons, we need to determine in which **spatial planning system** types they operate. This will allow for understanding of the planning traditions and approaches which provide the background to the integration of soil concerns in spatial planning in each pilot, while at the same time, informing the potential transfer of knowledge and solutions across the SPADES pilots. For this purpose, we used a pre-existing typology of spatial planning systems proposed by Dühr et al. (2010),[5] distinguishing between four major **planning styles**. These are as follows (and visualized in the scheme below):

- *Comprehensive integrated planning* – Coordination of sectoral policy impacts in space through a framework of plans elaborated at different levels, from national to local, requiring responsive and well-established planning institutions and decision-making mechanisms as well as a strong political commitment to spatial planning and considerable public sector investment (countries that have features of this type: NL, AT, DE, etc...).
- *Urbanism* - Emphasis on urban design, control of land use through rigid zoning and codes, somewhat less effective in controlling spatial development (countries that have features of this type: IT, ES, EL).
- *Land use management* – Narrower focus on regulation of land use through strategic and local plans, with the central government being able to exercise some power through supervision of the planning system or setting national spatial policy objectives (countries that have features of this type: UK, BE, IE, etc..).

[5] Dühr, S., Colomb, C., & Nadin, V. (2010). European spatial planning and territorial cooperation. Routledge.

- *Regional economic planning* - reducing economic and social disparities across territories through investment in infrastructure and development, which entails a strong role of the central government in managing development pressures and steering public sector investment (countries that have features of this type: FR, PT, DE, etc.).

Within these planning styles we like to explore how spatial planning integrates with soil policies, for this purpose we categorized the SPADES pilot countries based on their **planning systems' integration with sectoral policies**. Policy integration is the "management of cross-cutting issues in policy-making that transcend the boundaries of established policy fields", which "implies going beyond mere coordination of policies and encompasses joint work among sectors, creating synergies between policies, sharing goals for their formulation and responsibility for their implementation."[6] In the context of spatial planning, specifically, policy integration entails coordinating the impacts of sectoral policies in space.

Over the past two decades, as ESPON COMPASS project showed,[7] European countries have generally moved toward greater policy integration in spatial planning, though to varying degrees. While our focus is on soil policies, this broader typology provides insights into planning systems' receptiveness to integration by leveraging existing coordination experience. It builds on the ESPON COMPASS project, which analyzed trends in how spatial planning has been engaging policy integration in a range of European countries in the period between 2000 and 2016. We used the following scale of policy integration in spatial planning and results from expert survey done as part of this project:

1. neglected (i.e. no tangible relations between sectors or recognition of other sectoral policies.);
2. informed (i.e. sharing information with soil policy, making references to soil in policy documents, for instance, but no further efforts towards coordination or integration);
3. cooperation (i.e. a measure of joint working with the soil policy sector without adjustment of neither planning nor soil sectors);
4. coordinated (i.e. clear efforts to align policies, with their mutual adjustment across planning and soil sectors);
5. integrated (i.e. similar or shared policy goals and joint policies).

The results of this categorization exercise for the countries represented among the SPADES pilots are summarized in the figure below and here. Please bear in mind that this an approximation based on the features that characterize each of the planning systems.

[6] See page 4 in Stead, D. & de Jong, M. (2006) Practical Guidance on Institutional Arrangements for Integrated Policy and Decision Making, United Nations Economic Commission for Europe andWorld Health Organization Regional Office for Europe Report ECE/AC.21/2006/7-EUR/06/THEPEPST/7 (Geneva/Rome, UNECE/WHO-Europe). Please note that policy integration may also refer to vertical integration through linking goals and actions across levels of government, even though in this case we focus on the horizontal integration across policy fields.

[7] 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.
Nadin, V., Stead, D., Dąbrowski, M., & Fernandez-Maldonado, A. M. (2021). Integrated, adaptive and participatory spatial planning: trends across Europe. Regional studies, 55(5), 791-803.

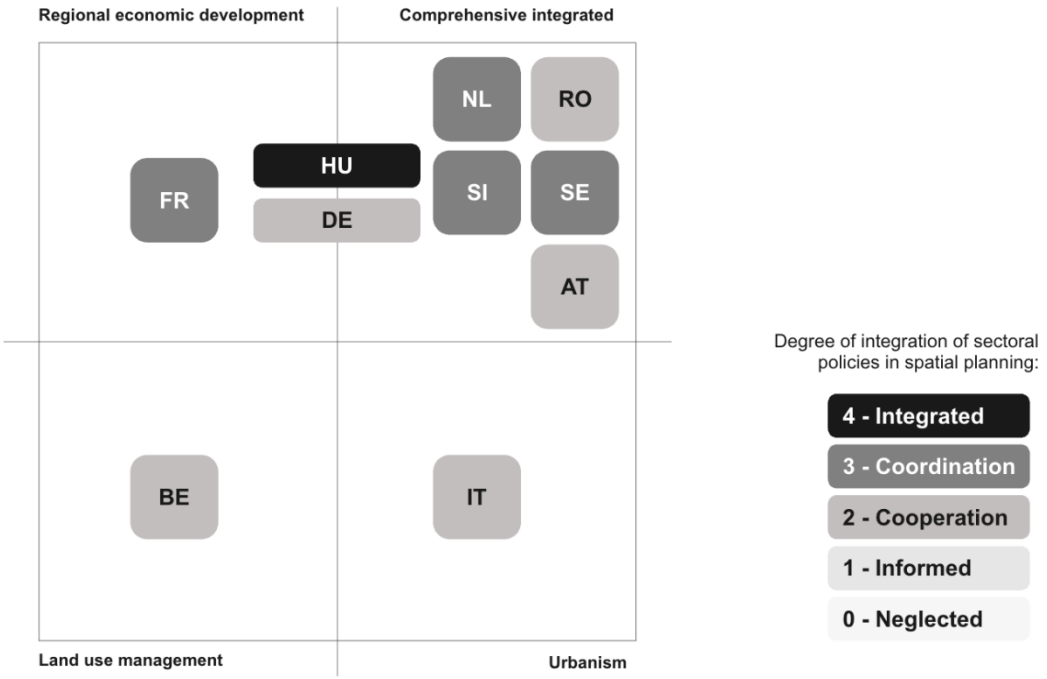


Figure above is the categorisation of the countries represented among the SPADES pilots with respect to the planning system styles and the degree to which spatial planning integrates with sectoral policies. Source: SPADES adapted from Dühr, Colomb & Nadin, 2010; Nadin et al., 2018, 2021.

In terms of the planning system styles, we can distinguish five clusters of countries, four are representative for the 4 boxes and the cluster that is a mix of regional economic development and comprehensive integrated, found in Hungary and Germany. Thus, most of the SPADES pilots operate within 'comprehensive integrated' systems, some display features of both 'comprehensive integrated' and 'regional economic development' styles, and there are also single representatives of the 'land use management' and 'urbanism' styles.

In terms of the degree of integration of sectoral policies in spatial planning, building on ESPON COMPASS data,[8] we can cluster the SPADES partner countries as follows:

- Cluster 1: integrated – Hungary.
- Cluster 2: coordination – France, the Netherlands, Slovenia and Sweden.
- Cluster 3: cooperation – Germany, Romania, Austria, Belgium, Sweden.

Thus, in most cases, there is a sound foundation to build on when it comes to experience in integration of sectoral policies in spatial planning, although for some countries, this process has remained at a more basic level with some cooperation, as opposed to more in-depth and sustained coordination or integration. There are caveats to this classification, as noted, and input from pilot partners is needed to validate it, considering any developments in spatial planning and sectoral policy integration since the mid-2010s. The clustering of planning systems is based on a 2010 study, while the classification of policy integration dates to 2018 (covering 2010–2016 trends), meaning both may be outdated.

For example, in the Netherlands, recent planning reforms—such as the National Environmental Vision (NOVI) in 2019 and the Environment and Planning Act (*Omgevingswet*) in 2024—have significantly deepened sectoral policy integration, including soil concerns. We therefore ask pilot partners to review whether an update to the classification is needed in light of recent changes.

Please consider the following questions:

[8] See pages 796-797 in this paper for reference.

- Is your country's classification within the planning system styles still valid?
- Have there been significant reforms in the past 10–15 years that might justify reclassification? If so, please list them, providing relevant documents, web links, and the year of introduction.
- If updates to the planning system affect the classification, please explain how and suggest any necessary adjustments.

Answers:

- Please also confirm whether your country's classification regarding the integration of sectoral policies in planning remains valid. If updates are needed due to recent developments, please specify which reforms or changes justify this and why. If the classification remains accurate, please state so.

Answers:

Note: This is not yet an assessment of how soil issues are integrated into spatial planning—this will be addressed in Chapter 4.3 and explored further in the SPADES project.

5.3 Planning levels and planning documents relevant for the specific case

As mentioned in chapter 4.2. SPADES pilots operate in different spatial planning systems with different planning practices. In this paragraph we zoom in to your national and local levels. The purpose of this is to better understand the key spatial planning documents and tools that influence your local pilot. The focus is on the spatial planning process, but already with some reflections on soil issues and how these are integrated into the planning process. You can list different formal or informal types of documents and/or tools (e.g. law, regulation, strategy, guidance document, advocacy document, report, etc.) that, based on your expertise, are the most relevant for the planning/soils linking and have the biggest impact on your pilot.

To collect this information, we prepared a table (see link below), which you are kindly requested to fill for your pilot. Table consists of five sections (see first row):

- Section 1: provides basic information on the documents.
- Section 2: defines the relevant level for that document and lists the related (planning) instruments.
- Section 3: provides an overview of the soil issues that the document relates to.
- Section 4: provides insights into the integration of soil issues in planning.
- Section 5: provides space for any comments, pictures, figures that could share more light on the matter.

Answers:

5.4 Planning with soil ambition

Spatial planning needs to integrate the 'making' or 'construction' the city in order to create long-term, resilient and sustainable development plans. The making of long-term plans means that we foresee developments in the city that at this moment are maybe not formally organized. Thinking about the future also needs to deal with the unplanned territorial interventions, unwritten assumptions and concepts, informal roles of inhabitants, changing reliability of government and different perceptions of the importance of nature that form planning culture.[9] Both formal and informal influences have to be taken into account when relating planning to soil management. The way to take people along in ambitions for the future is through appealing concepts. These concepts have an ambition to deal with problems or in opportunities in a specific way that is strong but open. The strength of a good concept is that multiple people can support its ambition whilst still feeling that their specific needs will be met. In spatial planning and design these concepts play a role as boundary spanner, see next paragraph, in getting new approaches implemented in practice and also influence policy for the long term. These concepts will for SPADES also be important in the co-creation phase, how can you get people behind your ambition for soil-inclusive planning, and how to operationalise it in implementation and making new policy?

- Can you indicate in the following list of concepts is they are suitable in your pilot?

Answers:

For the concepts below, please indicate their relevance in your context— 0 meaning 'not familiar with this concept''; 1 = 'occasionally used in my context'; 2 = 'commonly used' 3 ='core/key concept'

Green concepts are assessed by the SPADES team as explicitly soil-inclusive, based on descriptions by spatial planning and design experts*
Yellow concepts clearly promote functions that the soil could provide (e.g. water regulation, heat stress reduction, carbon storage, biodiversity, and the production of crops, water, minerals, and energy, as well as cultural, historical, and landscape value), but without directly mentioning soil*
Red concepts have a potential for soil to be integrated, but the connection to soil is less direct or more abstract*

*The scoring is based on our evaluation of contributions in Van Assche, K. & Beunen, R. (2023) Elgar Encyclopedia of Urban and Regional Planning and Design. This work presents 144 spatial planning and design concepts, which we filtered and assessed based on whether they already incorporate soil or have potential to do so. Concepts marked with an asterisk (*) are not included in the encyclopaedia but were added by the SPADES team.

Resilient & adaptive planning and design

Score (0-3)	Concept
	Adaptive Planning and Design: A flexible approach to planning that allows developments to adjust to changing conditions and uncertainties.
	Climate change adaptation planning and resilience: Strategies aimed at reducing vulnerabilities and enhancing the ability to cope with climate change impacts.

[9] Reimer M, Getimis P and Blotevogel HH (eds) (2014) Spatial planning systems and practices in Europe. A comparative perspective on continuity and change. Routledge, New York / Oxon, USA.

	Energy and strategic energy planning: The spatial organisation of energy production, distribution, and consumption within urban and regional planning.
	Post-Disaster Planning: Leveraging (natural) disasters as opportunities to build resilience through strategic planning processes (e.g. by appointing infiltration and buffer zones against flooding).
	Water-Sensitive Urban Design (WSUD)*: Urban design that integrates sustainable water management into landscapes and infrastructure.
	Watershed Planning*: A stakeholder-driven process to assess a river's health, its watershed, and identify interventions to reduce pollution and improve ecosystems and communities.

Future-oriented, large-scale planning and design

Score (0-3)	Concept
	International and Transnational Planning: Planning that involves multiple countries, often focusing on cross-border issues, policies, and collaboration.
	Long-Term Perspectives and Futures: Planning approaches that incorporate foresight and scenario building to anticipate future challenges and opportunities.
	Regional Planning and Design: Planning that focuses on a larger geographic area, typically encompassing multiple municipalities or regions.
	Strategic Spatial Planning: Planning that establishes an evidence-based, cohesive, and long-term foundation for coordinated actions and decisions across different sectors and jurisdictions.
	Systems Thinking: A holistic planning approach that considers interconnections and feedback loops within urban and natural systems.

Social and equity-oriented planning and design

Score (0-3)	Concept
	Affordable Housing: Providing housing that is accessible to people with low or moderate incomes.
	Commons: Shared resources managed collectively by a community.
	Environmental Justice: Ensuring that no group of people bears an unfair share of environmental burdens or lacks access to environmental benefits.
	(Expertise and) Local Knowledge: Incorporating local knowledge and expertise in planning to enhance relevance and effectiveness.
	Participatory Planning and Design: Collaborative approaches where communities actively contribute to the planning and design process.
	Social Justice: The fair distribution of benefits and burdens in society, addressing inequalities.

Land management

Score (0-3)	Concept
	Land Consolidation: The process of reorganizing fragmented land holdings into more efficient units.
	Zoning: A regulatory framework that designates land use categories and development standards within a given jurisdiction.

	Land Sharing*: A development approach that integrates human activity with environmental conservation, using higher density and mixed-use spaces to preserve green areas within urban settings.

New Urbanism: sustainable, compact, connected communities

Score (0-3)	Concept
	Adaptive Reuse: Repurposing existing buildings for new uses, preserving historical or structural elements.
	Brownfield Development: Redeveloping land previously used for industrial or commercial purposes, often contaminated.
	Downtown Development and Revitalization: Efforts to reinvest in and rejuvenate urban core areas.
	Heritage Planning: Planning that protects and manages cultural heritage resources.
	Learning from Urban and Environmental History: Understanding past urban and environmental developments to inform future planning.
	Mixed-Use: Urban development that combines residential, commercial, and recreational functions within the same area.
	Neighbourhood Design: Creating and shaping residential areas to enhance social, economic, and environmental conditions.
	Place-Based Development: Development tailored to the unique characteristics and context of a specific location.
	Design: Public-Private Divides in the Urban Realm: The tensions and interactions between publicly and privately owned spaces in cities.
	Smart Growth (or Compact City*): Policies that promote sustainable, compact, and transit-friendly urban development while curbing sprawl.
	Walkability: The design of urban environments that prioritise pedestrian movement, accessibility, and safety.
	15-Minute City*: An urban model where residents can access essential services and amenities within a 15-minute walk or bike ride.
	Circularity*: An approach that embraces circular economy principles to reduce waste and maximise resource efficiency.
	Healthy City*: A city designed to promote physical and mental well-being for its residents.
	Spatial City*: A theoretical concept where housing and infrastructure float above the ground of the existing city, minimizing land consumption.
	Transit-Oriented Development (TOD)*: Compact, mixed-use development centred around public transport hubs to reduce car dependency.

Nature-integrated planning and design

Score (0-3)	Concept
	Biophilic Urbanism: A planning approach that integrates nature into cities to enhance human well-being and ecological health.
	Conservation Subdivision Design: A development strategy that clusters buildings on less ecologically sensitive land while preserving large, contiguous natural areas for conservation.

	Ecosystems Services: The benefits people derive from nature, such as clean air, water regulation, and biodiversity.
	Green-Blue Infrastructure*: Networks of green spaces and water systems designed to provide ecological and social benefits.
	Nature-Based Solutions*: Urban and environmental strategies that harness natural processes to address challenges like flooding and heat.
	Social-Ecological Systems: Integrated frameworks that recognise the interdependence of human societies and natural ecosystems.
	Agroecological Planning and Design*: Integrating ecological farming principles into planning to enhance food security and sustainability.
	Permaculture*: A sustainable land-use design philosophy that mimics natural ecosystems to support food production and resilience.
	Rural-Urban Linkages (RULs)*: The interactions between rural and urban areas, shaping economic flows, migration, and resource use.
	Wetland Planning*: Policies and strategies to conserve, restore or create wetlands for biodiversity, flood control, and water filtration.

Are there any relevant concepts in your context that we may have missed?

5.5 How to include soil in planning

The care for soil is a new topic in spatial planning and design that gained interest in the past decade. In the past here have been other topics and challenges that came up in a comparable way and also needed to be integrated in policy and practice of spatial planning and design. For example, in the Netherlands the rising sea levels, flooding rivers and increasing rainstorms have been a huge topic and in the past 20 years and there have been many efforts to integrate the water challenge in day-to-day planning. There needed to be a boundary overcome between the spatial planning and design world on the one side and the water related disciplines and organisations. Examples of boundary spanning activities that led to policy integration were programs where research-by -design was used to learn what new policies were possible, translation of water maps into maps that could be used as a base for design, toolboxes of solutions that were connecting water related and other societal challenges, etc. These activities have led to new policy instruments like the water-stress test and the inclusion of water in structural and zoning plans.

Concepts in boundary spanning theory	
Premise	Communities are separated through boundaries that hamper communication and joint action
Boundaries	Perceived boundaries between communities that can be of a different nature (organizational, cultural, geographical, etc.)
Boundary spanning	Activities that are undertaken to cross boundaries, such as communication of joint activities
Boundary spanning objects	Tangible products of 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 in order 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.	
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.	

These are the concepts of boundary spanning theory by Slob and Duin (2013),[10] Hooimeijer and Van Campenhout (2019)[11] and the added concept of boundary spanning vision and the positioning of the concept of distributed agency (Debrock, Hooimeijer, Van Acker, nd).[12]

We can name these activities boundary spanning and the instruments that support transition of policy **boundary spanning objects or instruments**. For the co-creation phase we will offer more insight in this topic and instruments.

- Have you worked with, or do you know these types of instruments, and have you may be used these for other topics like the Netherlands used them for water integration in spatial planning?

Answers:

[10] 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

[11] 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)

[12] 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

6 MAPPING OF THE SPATIAL CHARACTERISTICS OF THE PILOT

This chapter provides information and asks questions to support the spatial analysis of your pilot. This is usually done in the initiative and spatial design phase of a project. The project works from the belief that policy can only be made when on the project scale is defined what works and what not. Spatial development starts with the analysis of what is there, not only the problems but also the potentials for a future sustainable functioning of a spatial area.

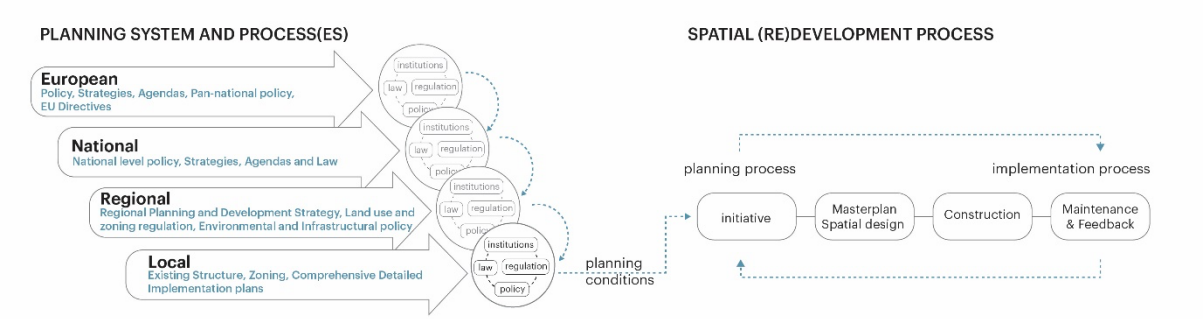
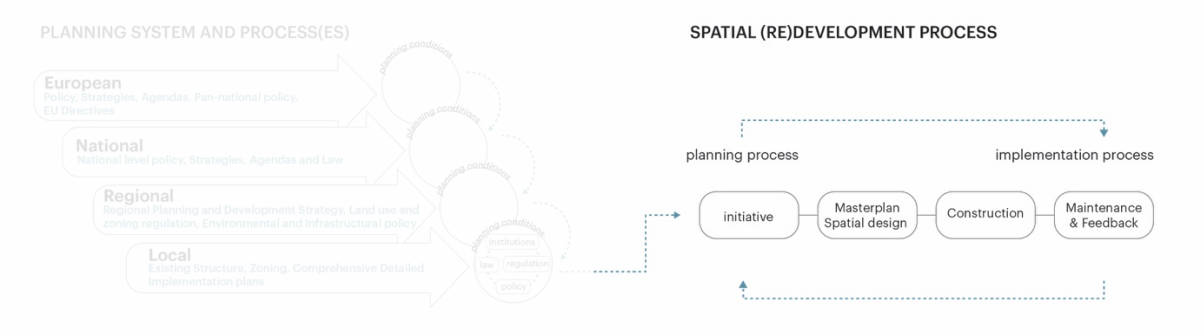


Figure of relation between the planning system and process(es) through government scales providing the spatial planning conditions for the spatial (re)development process. Source: SPADES



Source: SPADES

In the process of a spatial (re)development there are different phases. Each phase has a different focus and need for information. Generally, the resolution of data and information becomes more and more precise over time towards the building of a project. In the first phase the data is generally on quite a low resolution to enable the connection between different topics. However, the challenge today is to take soil data into this first phase and the question is how.

6.1 Spatial analysis of the territory

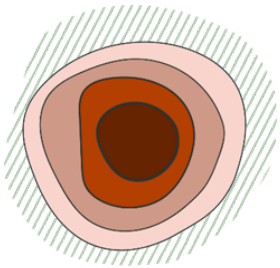
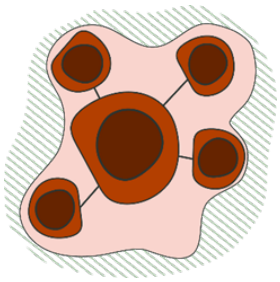
Spatial design is a (de-linear) process that consists of 5 elements (van Dooren, 2010): 1) domains of knowledge, 2) Frame of reference, 3) Guiding theme, 4) Experimenting and Laboratory. In this chapter we are gathering knowledge about the spatial situation of your pilot (1) but we also give you a frame of reference (2) on how the relation between space and soil can be understood. The Guiding theme is something that helps decision making and can be found in concepts as presented in the previous chapter. Experimenting with different ways to design and also the laboratory where different forms of creativity can be used will be part of the co-creation phase.

6.1.1 Identification of the regional scale

Regional scale development refers to the spatial configurations and interconnections of urban, peri-urban and rural areas. The spatial development at the regional scale is defined by physical structure, spatial organisation, and the relationship between built-up areas and natural features, such as green spaces, waterways, and topography and geomorphology. Think of it as the 'big picture' development structure of your pilot area.

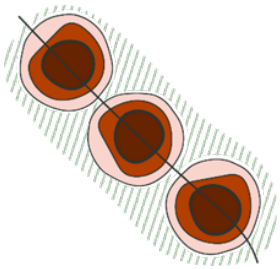
For this section, we have created a set of 'typical' spatial development models. These are generalisations of development – in reality, there are many nuances to areas that impact how they have developed. Note that in these graphical representations, the darker brown areas represent urban centres, the lighter colours represent the suburbs and peri-urban spaces, and the green shading represents rural areas (natural or agricultural).

Please indicate which development model most closely represents your pilot case study. It may be possible that your pilot is a combination of multiple models, in which case please describe what this looks like in the space below. We also encourage you to draw your own graphical representations, especially if none of these are accurate for you. While we do not specify the land uses on these graphical images, feel free to add your own labels for how specific areas are used or if there are significant topographic features. We also understand that the regional development examples below are not all at the same scale – please choose the scale that is most relevant to your pilot.

Monocentric development	Circular Polycentric Development/Satellite Settlements
Strong dominant centre (e.g., downtown or central business district), which concentrates economic, political and social activities; often has radial transport networks that extend to surrounding peri-urban and rural areas. In practice, purely monocentric cities are becoming increasingly rare, as areas expand and become more complex. Some examples can still be found in parts of Europe where cities are distributed over wider areas.	Main central node surrounded by smaller, decentralised but connected hubs. These 'satellite' areas are developed to manage congestion and distribute population. They are connected to the main city via transport networks, reducing pressure on the main urban core.
Example: Bucharest region 	Example: Paris New Towns 
Source: SPADES from Bentlage et al., 2020; Nabielek et al., 2016	Source: SPADES from Bentlage et al., 2020; Desponds & Auclair, 2016

Linear polycentric development

Built up area with multiple centres aligned along a transport or natural corridor (e.g., shaped by mountains, rivers, or coasts), offering high levels of accessibility to adjacent populations, as well as to the countryside.

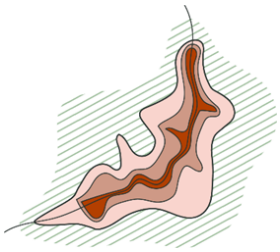


Example: Cote d'Azur, FR

Source: SPADES from Cats & Birch (2021); Albrechts & Tasan-Kok (2009)

Linear monocentric development

Like linear polycentric development, but with a more continuous monocentre. In the example below, Innsbruck is not a perfect monocentre, with scattered economic activities, but it demonstrates an elongated, linear settlement shaped by surrounding geographic features.

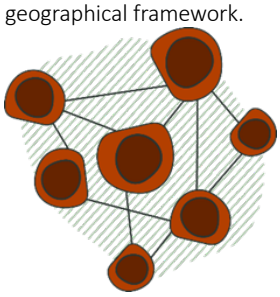


Example: Innsbruck, AT

Source: SPADES from Nabielek et al., (2016); Albrechts & Tasan-Kok (2009)

Network polycentric development

Series of interconnected urban centres that together function as a unit. These urbanised areas are of similar size and importance, existing within a larger shared geographical framework.



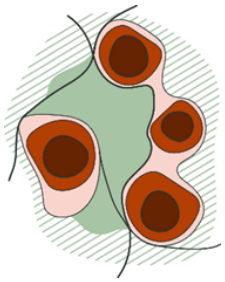
Example: Ruhr area (Duisburg → Essen → Bochum → Dortmund, DE)

Source: SPADES from Cats & Birch (2021); Kebza (2024)

Rim city polycentric development

Largescale network of interlinked cities forming a cohesive metropolitan area around a rural, peri-urban or agricultural area. Characterised by regional cooperation & shared infrastructure.

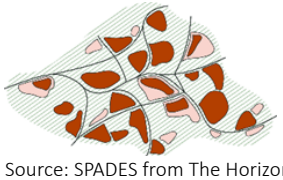
Example: Dutch Randstad



Source: SPADES from Zonneveld & Nadin (2021); Gil & Read (2014)

Fragmented, patchwork horizontal development

Consists of discrete clusters of built-up, spatially distinct areas that have developed as distinct 'islands', separated by non-urban land (e.g., green spaces, industrial areas, agriculture). Can be the result of leap-frog development sprawl, or occurs in low-density, dispersed countries. Planning strategies attempt to connect, rather than centralise.



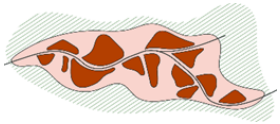
Example: Flanders, BE

Source: SPADES from The Horizontal Metropolis between Urbanism and Urbanization (2018)

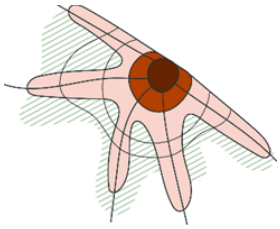
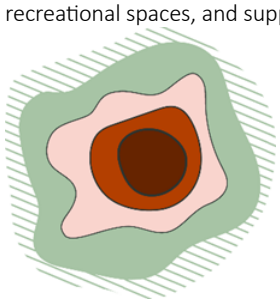
Continuous horizontal development

Continuous, sprawling, low-density 'fabric' where urban and rural elements are integrated, forming an extensive but loosely connected system. Characterised by a lack of boundaries between built/rural areas and distributed urban functions. No clear urban hierarchy (less of a city vs suburb distinction) & defined by mixed land use (urban, industrial, agricultural, and natural).

Example: Veneto Region, IT



Source: SPADES from The Horizontal Metropolis between Urbanism and Urbanization (2018)

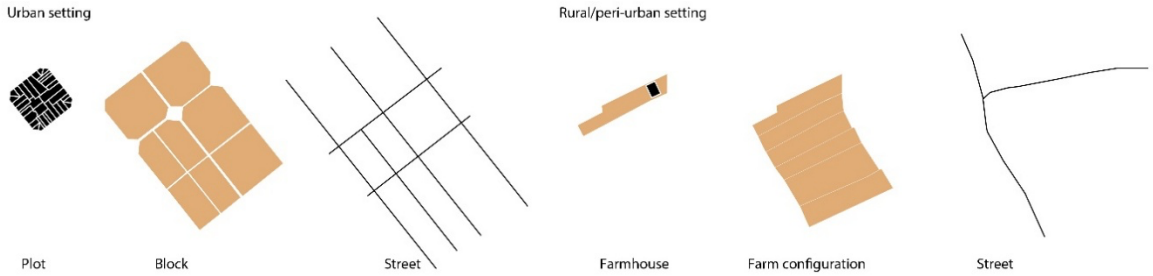
Green finger city / Green wedges	Metropolitan green belt / Emerald necklace
'Built-up areas that extend outward from the urban centre along transport corridors, separated by continuous, less developed green 'wedges' that extend from the city centre to the countryside. The green wedges are intended for recreation, nature protection, and agricultural purposes.  Example: Copenhagen, DK Sources: Hautamäki (2021), Lemes de Oliveira (2019)	Protected green space surrounding a city or town to limit uncontrolled expansion/sprawl and secure green space. Green Belts serve many purposes, including preventing neighbouring towns from merging, limiting countryside encroachment, maintaining biodiversity, providing recreational spaces, and supporting agriculture.  Example: London, UK Sources: Hope (2024), Lindley (2017), Pourtaherian & Jaeger (2022) I

- What does your region look like? (sketch and description)

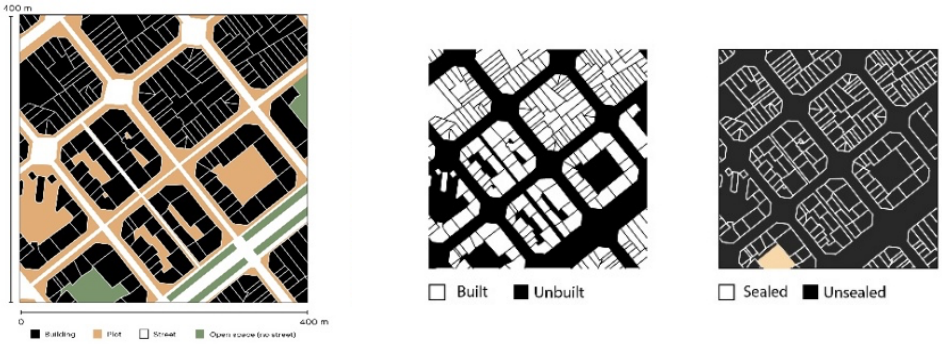
Answers:

6.1.2 Identification of the district scale (either urban, peri-urban and rural scale)

District scale typologies refer to the different spatial structures and organizational patterns that define cities and urban areas, peri-urban and rural areas. Each typology reflects different urban, rural and peri-urban design philosophies and socio-economic influences, shaping how urban and rural areas function and evolve over time.[13] Typologies at an urban setting are comprised of plots, blocks and street layouts whereas rural and peri-urban typologies consist mainly of a building/farmhouse, farm configuration and street layout.



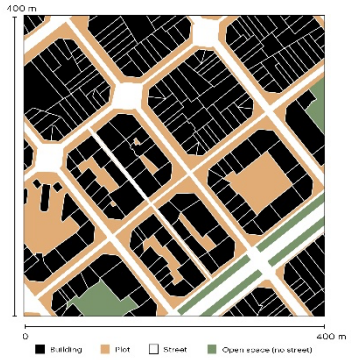
Below an example of an urban typology (1. Grid). Typologies are relevant to address the ratio between the built and unbuilt environment as well as the degree of soil sealing of an area.



[13] Heeling, J, Meyer, VJ & Westrik, JA 2002, Het ontwerp van de stadsplattegrond. SUN, Nijmegen.
UN HABITAT, 2023, Rapid urban planning tools for city extension

Below, select from the list any relevant typologies that are present in your area:

1. **Grid (urban)**
   Based on a structured grid layout with straight streets intersecting at right angles.
   - Promotes easy navigation, efficient land use, and expansion possibilities.



Barcelona, Spain

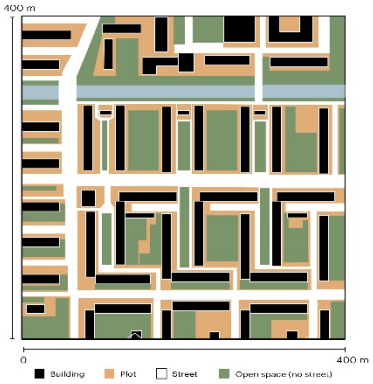
Examples: Barcelona (Cerdà's Plan), New York City (Manhattan), Athens (Greek urban block)

2. **Radial – concentric (urban)**
   Developed around a central point (e.g., a marketplace or palace), expanding outward in rings.
   - Promotes hierarchical zoning with the most important functions at the core

Paris, France

Examples: Paris (Haussmann's redesign), Karlsruhe, old structure of Moscow

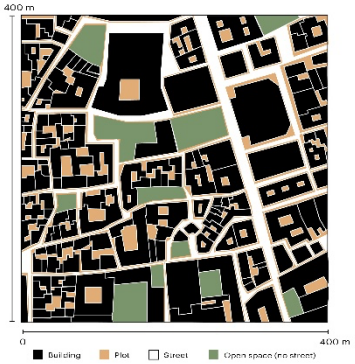
3. **Modernist/Functionalist (urban)**
   Influenced by modernist planning principles like those of Le Corbusier.
   - Focus on zoning, large open spaces, and separation of work, living, and recreation.



Amsterdam Zuid, Netherlands

Examples: Brasília (Lucio Costa & Oscar Niemeyer), Chandigarh (Le Corbusier)

4. **Organic (urban)**
   Developed gradually over time without a preconceived master plan.
   - Characterized by irregular street patterns, narrow alleys, and winding roads.



Rome, Italy

Examples: Medieval European cities like Bruges, old parts of Amsterdam, historic urban areas

5. **Multifamily complex (urban)**
Urban residential typology consisting of a single building or a group of structures designed to accommodate multiple households in separate units.
- Characterized by high diversity in number of stories and size and relatively high percentage of open space

Kirchheim, Heidelberg, Germany

Examples: Monte Sacro, Rome, Alexandria, Egypt

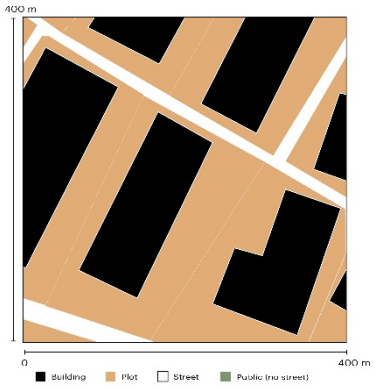
6. **Suburban development (urban & peri-urban)**
A low-density urban expansion on city outskirts.
- Characterized by residential zones and car dependency

Hellerup, Denmark

Examples: Hellerup (Denmark), Alcobendas (Spain), outskirts of major European cities

7. **Industrial estates (peri-urban)**
Designated areas developed for industrial activities such as manufacturing, warehousing, and logistics.

- Characterized by large plots and street corridors, mostly located in urban peripheries



Industrial Zone, Bucharest, Romania

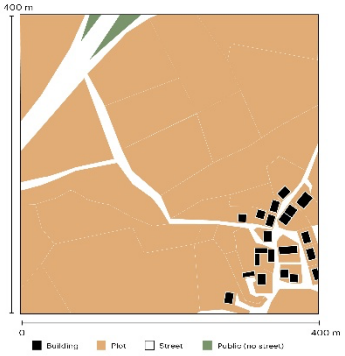
Examples: Lyon–Saint-Exupéry Industrial Park, Katowice special economic zone

8. **Linear (urban & peri-urban)**
Built along a central axis, such as a river, road, or railway.

- Encourages transport-oriented development and industrial corridors.

Haaltert, Belgium

Examples: Haaltert, Belgium, Veneto region, Italy
The Volga River cities in Russia

9. **Open fields (peri-urban & rural)** Patterns, organization, and land-use structure emerge when agricultural landscapes are divided into rectilinear plots. • common in planned rural settlements, modern industrial agriculture, and historical land division  Groene Hart, Netherlands Examples: Roman centuriation system, Jeffersonian grid in the U.S.	10. **Bocage (peri-urban & rural)** Defined by irregularity and enclosure, contrasting with the open-field systems of grid-based open fields. • Small, irregular parcels of land enclosed by natural boundaries (hedgerows, tree lines, ditches)  Vendeé, France Examples: Dispersed rural dwellings

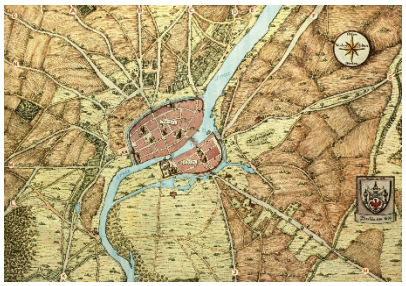
- Which of these typologies are present in your area?
- Are there other typologies present (please mention or draw them below)?

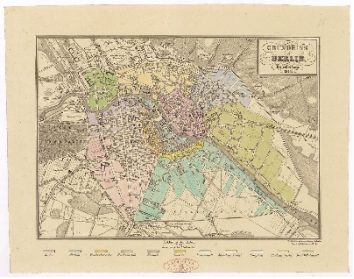
Answers:

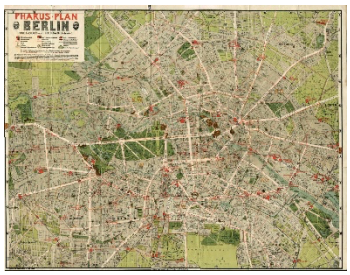
6.1.3 History of the area and how it functions

Reading of the history is an important step in understanding the current state of a site. A series of historical maps will show important moments in your area's evolution and will make it possible to reflect on the relationship between urban – rural development and soil. These will probably be present important milestones or phases that have altered the area's development. You can take a look at infrastructural development, technological innovations and economic factors (eg. Resource-based regions, shrinking cities, ports/strategic growth corridors) that have impacted spatial form.

See example below of historical maps from Berlin, Germany at important phases of the city's development:


Berlin, 1600 – a city is born


Berlin, 1840 – change to a metropolis



Berlin,1920 – Greater Berlin is created

Source: Public domain from https://www.the-berliner.com/berlin/historical-maps-of-berlin-from-1600-to-1920/

Answer:

Please present the series of maps and reflect on:

Are there relevant key moments in your area that impacted the relation to soil?

6.1.4 Ecosystem Mapping

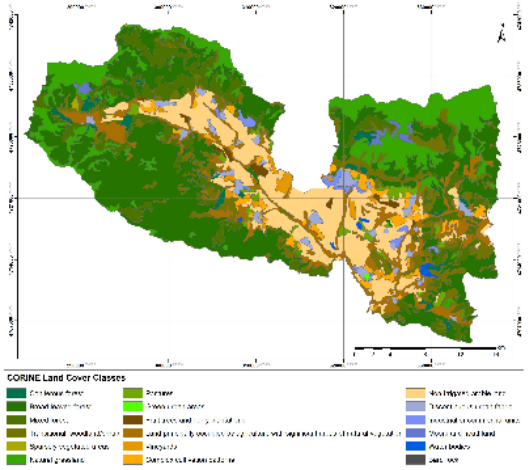
- We like to get to know more about the natural features that characterise your pilot. Please identify the landscape and ecological features in your pilot that are most relevant to the planning challenges encountered in your case study. Examples can include, but are not limited to, natural conditions (soil types/functions, topography, water networks),[14] land cover, land use, green/blue infrastructures, ecological networks, ecosystem services, biodiversity, land suitability maps, erosion, landslide risk, and/or contamination.

Answers:

- Once you have identified these features, please provide corresponding maps (either existing or newly created), such as the examples below. Please include labels or legends so that the maps are understandable for those unfamiliar with your specific context. It is not necessary to provide a comprehensive map of the area but rather choose to map the ecological features that you

[14] See for examples Ecosystem Classification: IUCN Global Ecosystem Typology 2.0. https://portals.iucn.org/library/sites/library/files/documents/2020-037-En.pdf

consider key to understanding your case study. Be sure to include an explanation for why you have chosen to map these specific features – what about them is important? It may be useful to think about the interconnections between the ecosystems, soil, and social systems present in your pilot.



Ecosystem Sub-classes
source: One Ecosystem, 2017, CC BY 4.0.

Answers:

Note that it is not necessary to be an expert mapmaker for this. If you do not have access to mapping software, we welcome hand-drawn maps, illustrator sketches, labelled satellite imagery, etc.

6.1.5 Evaluation of what is important considering soil

- What was learned in this diagnosis step?
- Which topics or specific strategies are interesting for you?

Answers:

6.2 Soil analysis of the territory

From green infrastructure deployment and regenerative land management to policies that promote soil conservation and rehabilitation, one of the goals of SPADES is to make an inventory on practical and

successful demonstration of soil-inclusive spatial planning and design. By establishing a portfolio of good practices that demonstrate how urban and rural planning can align with natural soil processes to improve soil health, and maximise the benefits derived from ecosystems services, we want to provide evidence-based information to facilitate decision-making for soil-inclusive spatial planning.

6.2.1 Soil-inclusive practices

As established in 6.1, different spatial typologies call for different approaches to soil health in their planning process, whether they are related to soil and land use, soil management strategies, or measures that contribute to the long-term objectives of the Soil Mission.

In first six months of SPADES, we have analysed 30+ inventories and identified 500+ cases implementing solutions that directly enhance soil related ecosystem services and support soil performances. We have clustered them in 10 "families" that we present here as examples to inspire you in this diagnosis process and feed into your reflection to identify possible opportunities and areas of interventions to improve soil health in your pilot. These 10 families do not exhaustively cover all soil-inclusive practices but present a classification of the case-studies we have collected so far.

<table>
<tr><td colspan="3">1. Circular Soil Management (or handling)</td></tr>
<tr><td colspan="2">A holistic approach applying circular economy principle to soil management, emphasizing closed-loop systems, soil health, and sustainability. This instrument can be used to predict how much soil will be excavated in relation to construction works and urban development in a city.</td><td>  </td></tr>
<tr><td>Soil Mission Objectives</td><td>Planning Concepts</td><td>SDGs</td></tr>
<tr><td>1. Reduce desertification
2. Reduce soil pollution and enhance restoration</td><td>Climate change adaptation planning and resilience
Long-Term Perspectives and Futures
Strategic Spatial Planning
Systems Thinking
Place-Based Development
Circularity</td><td>  </td></tr>
<tr><td colspan="3">Example: Circular soil management in Høje-Taastrup (Denmark)</td></tr>
</table>

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

<table>
<tr><td colspan="3">2. De-Sealing / De-Paving</td></tr>
<tr><td colspan="2">Physical removal of soil sealing (incl. paving), such as roads, parking lots, buildings, terraces, driveways, as to restore soil permeability and soil's contributions to other natural ecosystem services.</td><td>  </td></tr>
<tr><td>Soil Mission Objectives</td><td>Planning Concepts</td><td>SDGs</td></tr>
</table>

1. Reduce desertification 2. Conserve soil organic carbon stocks 3. Stop soil sealing and increase re-use of urban soils, 6. Improve soil structure to enhance soil biodiversity	Adaptive Planning and Design Climate change adaptation planning and resilience Water-Sensitive Urban Design (WSUD) Long-Term Perspectives and Futures Biophilic Urbanism Nature-Based Solutions	
Example: Nancy Urban – Urban soils sealing and desealing		

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

3. Ecological Farming / Agroecology		
Agricultural management approach to ensures healthy farming and healthy food. It protects the soil, the water and the climate. It does not contaminate the environment with chemical inputs or use genetically engineered crops.		
Soil Mission Objectives	Planning Concepts	SDGs
1. Reduce desertification 2. Conserve soil organic carbon stocks 4. Reduce soil pollution and enhance restoration, 5. Prevent erosion, 6. Improve soil structure to enhance soil biodiversity	Adaptive Planning and Design Climate change adaptation planning and resilience Water-Sensitive Urban Design (WSUD) Long-Term Perspectives and Futures Biophilic Urbanism Nature-Based Solutions	
Example: Fertility management in viticulture		

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

4. Regulative, Normative or Policy		
Mandatory regulation that includes requirements related to enhancing soil health and increasing ecosystem services		
Soil Mission Objectives	Planning Concepts	SDGs

1. Reduce desertification 2. Conserve soil organic carbon stocks 3. Stop soil sealing and increase re-use of urban soils 4. Reduce soil pollution and enhance restoration 5. Prevent erosion, 6. Improve soil structure to enhance soil biodiversity	Adaptive Planning and Design Climate change adaptation planning and resilience Water-Sensitive Urban Design (WSUD) Long-Term Perspectives and Futures Conservation Subdivision Design Wetland Planning Conservation Subdivision Design Zoning	
Example: Urban wetland protection law in Chile		

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

5. Protection by Coverage		
Planting cover crops, annual crops, and perennial crops and leaving crop residues or living mulches on the ground. Soil health practices that maintain cover year-round improve soil health and protect soil from wind and water erosion.		
Soil Mission Objectives	Planning Concepts	SDGs
1. Reduce desertification 2. Conserve soil organic carbon stocks 3. Stop soil sealing and increase re-use of urban soils 4. Reduce soil pollution and enhance restoration 5. Prevent erosion, 6. Improve soil structure to enhance soil biodiversity	Climate change adaptation planning and resilience Post-Disaster Planning Water-Sensitive Urban Design (WSUD) Long-Term Perspectives and Futures Biophilic Urbanism	
Example: Climate conscious perennials in Szeged (HU)		

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

6. Reforestation / Afforestation

Reforestation is the process of replanting trees in areas that have been affected by natural disturbances. Afforestation is establishing a forest in an area where there was no forest before, or not for a long time.		
Soil Mission Objectives	Planning Concepts	SDGs
1. Reduce desertification 2. Conserve soil organic carbon stocks 4. Reduce soil pollution and enhance restoration, 5. Prevent erosion, 6. Improve soil structure to enhance soil biodiversity	Adaptive Planning and Design Climate change adaptation planning and resilience Water-Sensitive Urban Design (WSUD) Long-Term Perspectives and Futures Regional Planning and Design	
Example: Reversing land and soil degradation through reforestation- Republic of Moldova		

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

7. Soil Improvement / Regeneration		
Process of improving the quality of soil for example, by adding organic matter, which helps to improve drainage, water retention, and nutrition for plants. It could involve returning nutrients and organic matter to the soil to restore fertility and productivity.		
Soil Mission Objectives	Planning Concepts	SDGs
2. Conserve soil organic carbon stocks 4. Reduce soil pollution and enhance restoration, 6. Improve soil structure to enhance soil biodiversity	Climate change adaptation planning and resilience Brownfield Development Long-Term Perspectives and Futures Conservation Subdivision Design Nature-Based Solutions Agroecological Planning and Design Permaculture	
Example: Improving soil quality with phytoremediation		

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

8. Planned Urban Green Spaces		
Public or private owned open-space areas planned to allocate parks, gardens, playgrounds and others, including plant life, water features.		
Soil Mission Objectives	Planning Concepts	SDGs
1. Reduce desertification 2. Conserve soil organic carbon stocks 3. Stop soil sealing and increase re-use of urban soils 4. Reduce soil pollution and enhance restoration 5. Prevent erosion, 6. Improve soil structure to enhance soil biodiversity	Climate change adaptation planning and resilience Water-Sensitive Urban Design (WSUD) Systems Thinking Environmental Justice Participatory Planning and Design Social Justice Land Sharing Neighbourhood Design Design: Public-Private Divides in the Urban Realm 15-Minute City Healthy City Spatial City Green-Blue Infrastructure	
Example: Braille Public Garden, BARI, Italy		

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

9. Use change		
Use the change of an area with the purpose of soil regeneration or conservation.		
Soil Mission Objectives	Planning Concepts	SDGs
1. Reduce desertification 2. Conserve soil organic carbon stocks 4. Reduce soil pollution and enhance restoration, 5. Prevent erosion, 6. Improve soil structure to enhance soil biodiversity	Climate change adaptation planning and resilience Strategic Spatial Planning Adaptive Reuse Brownfield Development Learning from Urban and Environmental History Place-Based Development Circularity	
Example: Brownfield to living space in Pörtschach		

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

10. Flood regulation		
Measures such as soil water retention, for how much water a particular type of soil can retain.		
Soil Mission Objectives	Planning Concepts	SDGs
1. Reduce desertification 2. Conserve soil organic carbon stocks 3. Stop soil sealing and increase re-use of urban soils 4. Reduce soil pollution and enhance restoration 5. Prevent erosion, 6. Improve soil structure to enhance soil biodiversity	Adaptive Planning and Design Climate change adaptation planning and resilience Post-Disaster Planning Water-Sensitive Urban Design (WSUD) Watershed Planning Long-Term Perspectives and Futures Regional Planning and Design Systems Thinking Zoning Learning from Urban and Environmental History Green-Blue Infrastructure Wetland Planning	
Example: Floodplain restoration for flood protection along the lower Danube river		

- Are you familiar with this family of practice? If yes, do you know any other case-studies that relate to this family? Can you provide a link to this reference?

Answers:

5.2.2 Help us identify and evaluate good practices

- Thinking about your soil and planning challenges, which family or families of practice do you think has the more potential to help?

Answer:

- Would you identify other types of practices as soil-inclusive?

Answer:

- Do you have examples of projects / measures / strategies / use change implemented in your territory that supported soil health?

Answer:

- Do you have examples of projects / measures / strategies / use change implemented in your territory that negatively impacted soil health?

Answer:

- When looking at an inventory of best practices for inspiration, what types of information is are the most useful to you?

Answer:

6.2.3 Understanding soil and its 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.

How can one assess soil health? By soil sampling, soil qualitative and quantitative data is obtained that could be put into a normative range through scoring methods. In a complimentary way, soil profile description can be used to examine soils structure through interpretation of soil texture, horizon development, color, etc. using globally accepted guidelines for profile descriptions.

In soil science, many tools and methods have been developed to assess these characteristics, a key objective of SPADES is to understand:

- Which are the most useful for planning?
- What types of tools planners are the most comfortable with?

Answers:

Categories of tools and methods	Examples of soil assessment tools and methods to address soil quality, quantity and performance	Please mark down if you have heard of such (yes/no), and if not if you heard of some similar data sources.	Would you be interested in using them if such were available for use in your respective country (yes/no)?
1. Soil repository	EJPSoil Datahub Eurofins old soil analysis reports		

Collection of soil sampling analysis, current and or historical	Any type of soil related information database (digital and or physical) one obtains through development work or other		
2. Models to assess soil functions **Soil health scoring methods- evaluating soil functions based on biological, physical and chemical properties of soil**	SF-toolbox		
	SUPRA		
	MUSE		
	Cornell Soil Health Assessment		
	EkoGeoKalkyl 1.0 (Eco Geo Calculator)		
	BDSolU		
3. Digital Map- GIS Geographic Information System - digital database of soil quantitative data with a spatial resolution	Soil function map of Austria		
	Soil and Crop Inventory		
	Inventory of potentially contaminated areas		
	GMES Fast Track Service on Land Monitoring (Land FTS LM) Soil Sealing database		
	Land use maps		
4. Catalogues National, regional, local reports, planning documents, interviews, historical data on the site	Land consumption territorial dynamics and Ecosystem services		

Remarks:

6.2.6 Soil information data sources availability and use

Using tools and/or methods from these categories of instruments, one can create its own soil assessment inventory. Soil information can be stored in an easily accessible georeferenced GIS layer and overlapped with soil quantity data through other existing available cartography (geological maps, land use, infrastructure networks, etc.) and additional valuable information (reports, interviews, etc).

It is important to note that sometimes there is already existing and/or historical soil quality data that can be transformed into a GIS layer, therefore extra sampling is not required. This way soil quantity and quality information, are given a spatial resolution, all in function to answer soil performance challenges to conserve or improve existing soil health. The quantity of soil refers to soil as resource for building and the percentage of unbuilt areas as is the ambition of the no-net land take policy of the EU. The soil performance is the effect of soil quality and quantity (sometimes both) on helping 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.

- Below you will find an overview of soil quality, quantity and performance challenges that the previously mentioned soil assessment tools are addressing. Please mark down existing inventories or instruments you are aware of that you are currently using to access soil information and mark if they address the below listed challenges.

Answer:

The examples provided in the first two columns in the table below, you are free to delete and fill in with your own answers.				
	Examples		Soil information data source- pilots' inventories (e.g. maps, soil physical and chemical analysis, ground water table)	
	SUPRA	Soil function map of Austria	Name of tool / inventory	Name of tool / inventory
Soil quality challenge				
Soil fertility and soil nutrient cycles	+	+		
Reduce soil pollution and enhance restoration	+	+		
Reduce desertification	+	+		
Reduce soil compaction	+	+		
Prevent soil erosion	+	+		
Soil quantity challenge				
Avoid land take	+	+		
Avoid, reduce or compensate for soil sealing		+		
Re-use of excavating urban soil sealing				
Avoid land grabbing				
Soil performance challenge				
Improve climate buffering, incl water regulation, heat stress	+	+		
Conserve or increase organic carbon stocks	+	+		
Improve soil structure and habitat quality for soil biodiversity	+			
Contribute to energy transition	+			

Improve production for food, fibre and biomass	+	+		

6.3 Synthesis

- Throughout the dynamics of the project, do you take note of the issues that may arise in terms of soil management on site?

Answer:

- What challenges exist in accessing, interpreting, and applying soil data? (e.g : access, cost, time, capacity, resources, other)?

Answer:

- What are the most pressing (soil) challenges in your pilot and how would you solve them with the information you have today?

Answer:

- Would you be interested in creating your own soil database comprising of existing and potential additional soil analysis data (soil quality) that could be incorporated in an existing or newly developed tool? If so, in your opinion what would be the motivations for actually using this tool? And the obstacles?

Answer:

- Should this tool be a very operational tool for planning stakeholders or primarily an awareness-raising tool for elected officials?

Answer:

- The information of soil can have different forms, if you already have soil maps in terms of quantity/quality/performance, can you already identify areas where there could be an opportunity for improvement/action/experiment/testing in the timeline of the SPADES project?

Answer:

7 REFLECTIONS FOR SPADES RESEARCHERS

As indicated in the introduction, the diagnosis workbook is a tool to help all pilot partners to set-up the local research for policy innovations by suggesting guiding questions and frameworks from the other SPADES work packages. In this final chapter of the diagnosis workbook, we ask you to reflect on the applicability, workability and adaptability of the diagnosis workbook. 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.

7.1 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 (every 6 weeks)?
- 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.

7.2 Looking back at the diagnosis phase

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

- What have you learned in this diagnosis phase? What new insights on soils and planning, and on the needs for an integrated approach have you gained?
- How did your objectives for the pilot and the aim for policy innovation 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 (co-creation phase)?

Answers:

Please reflect on the statements that were pitched at the online kick-off meeting of WP3 (19/02/2025).

- *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.*

7.3 Looking forward to the co-creation phase

We invite you to think about the next phase in the project, the co-creation 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 co-creation phase? Did these change throughout the diagnosis 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 co-creation 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 co-creation phase?

Answers:

7.4 Any other business

Anything else you would like to share with us?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