Soils for Europe

Mid-term evaluation of the regional nodes and soil week events

Deliverable D4.7

28 November 2025

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1 Introduction

Deliverable D4.7 “Mid-term evaluation of the regional nodes and soil week events” provides an account of the work that has been developed within the scope of the Regional Nodes and the Soil Weeks (WP4) between 2023 and 2025 (M7-M36). This document presents:

i. The steps that were undertaken to establish these activities and the applied methodology;
ii. A summary of the results achieved so far;
iii. An evaluation of the progress made;
iv. A reflection on the challenges faced and accomplished successes.

It builds on Deliverable D4.6 “Initial report on the implementation status of the Regional Nodes”, submitted in May 2025 (M18).

SOLO – Soils for Europe aims at identifying the Research and Innovation (R&I) priorities for healthier soils in Europe. To achieve that goal, 9 transdisciplinary Think Tanks have been established, each dedicated to one of the Mission Soil’s objectives, plus an additional topic on the nature conservation of soil biodiversity. Focused on specific soil health dimensions, the Think Tanks capture the general state of the art at the European scale; however, they do not necessarily apprehend regional specificities and priorities. To do so, SOLO has developed two different, yet complementary activities: the Regional Nodes and the Soil Weeks. Through distinct mechanisms, both activities engage diverse stakeholders from across 4 and 12 European countries respectively, to collect their input on the R&I needs and priorities at the national and regional scales. This input is then integrated in SOLO’s roadmaps, therefore rendering them regionally-sensitive.

The establishment and characterisation of SOLO’s 4 Regional Nodes has been described in Deliverable D4.6. The Nodes intend to be representative of specific land uses (agroforestry, mixed-farming, forest and urban-rural gradient) within different countries (Portugal, the Netherlands, Hungary and Sweden), and are concretely located in 30x30 kms areas (Mértola, Achterhoek, Keszthely Hill Region and Skåne, respectively). To address the R&I soil-related challenges in each region, multi-actor stakeholder groups have been created and curated over the course of 3 sequential rounds of workshops (held between June 2024 and January 2026, expectedly). The workshops have allowed for the identification of the most relevant Mission Objectives, drivers, knowledge gaps and actions in each region. These elements will later be brought together in regional roadmaps, actionable at the regional scale.

So far, and as planned, 3 yearly Soil Weeks have taken place (in 2023, 2024 and 2025). Each Soil Week consists of 12 separate events, organised across Europe (Spain, the Netherlands, Germany, Bulgaria, Sweden, Portugal, Finland, Hungary, Greece, Norway, Belgium and Italy) by different SOLO partners. The main purpose of the Soil Weeks is to both collect regional input by engaging regional stakeholders, and to raise awareness about the importance of soil health across a wide range of countries. To achieve this twofold goal, Soil Week events took the form of free-standing activities of different types (e.g., seminars, field visits, outreach initiatives), focusing on one or two previously selected Mission Objectives. Every year, all Mission Objectives were covered, alternating from country to country. During the Soil Week events, partners collected information on the regionally-relevant knowledge gaps, bottlenecks and actions, following the elements of SOLO’s Think Tank roadmaps. This methodological consistency allows for an easier integration of knowledge across scales, ranging from the regional to the European level.

Indeed, the ultimate goal of the Regional Nodes and the Soil Weeks is to contribute to the regionalization of the roadmaps, by:

i. Validating the Think Tank's results at the regional scale and by complementing those results with context-specific input;
ii. Providing the information that allows assessing synergies and trade-offs across regions.

The progress achieved in this process of knowledge integration is addressed in detail in Deliverable D4.2 "Integration, synergies and trade-offs across roadmaps and Mission". However, in order to better contextualize some of the aspects that are tackled in the present Deliverable, it is relevant to mention that, so far, roadmap regionalization has been achieved through:

- SOLO's workflow between project activities (described in Deliverable D4.6; explanatory figure below, Figure 1): promoted a continuous and organic integration, as Think Tanks interacted with and had access to the regional activities' results;
- Analysis of the overarching themes of the knowledge gaps identified by the Regional Nodes and Soil Weeks (methodology and results presented in Deliverable D4.2): applying the same methodology as to the Think Tanks' roadmaps allows for the identification of the most relevant overarching themes, as well as the synergies and trade-offs, across regions.

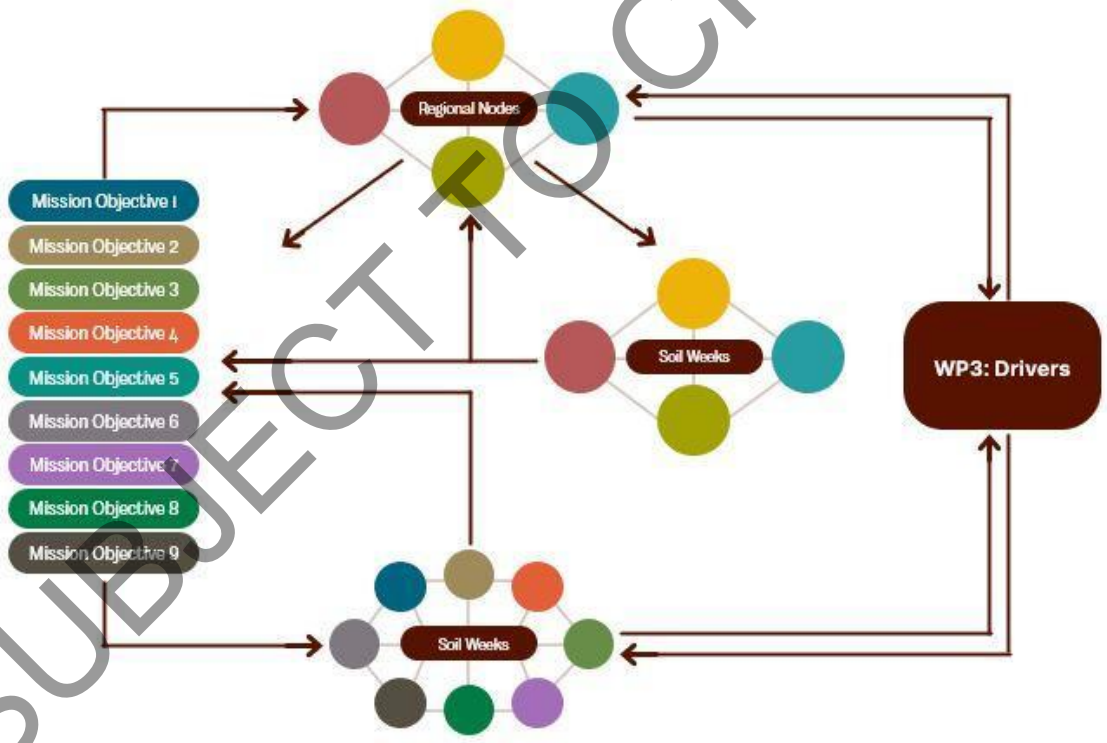

Figure 1 - Workflow between Think Tanks, Regional Nodes, Soil Weeks and DPSIR-based driving forces analysis.

This Deliverable is divided into four main chapters. The Introduction sets the scope of this document. Chapter 2 focuses on the Regional Nodes and Chapter 3 on the Soil Weeks. Both chapters follow the same structure: they first describe the common methodology for each activity,

then present an overview of the preliminary results, and discuss the outcomes of the mid-term evaluation, keeping the future steps on the horizon; finally, a summary of the individual preliminary results is presented, per Regional Node and Soil Week country. The complete activity results are presented in Annexes 1 and 2. The fourth and final Chapter brings together the main conclusions on both the Regional Nodes and the Soil Weeks for comprehensive, closing remarks on SOLO's regional activities.

Before proceeding, it is worth clarifying that the majority of the content presented in this Deliverable corresponds to the data that was collected in the Regional Node workshops and Soil Week events by all the partners involved. Additionally, partners were asked to write Node or country-specific mid-term evaluation narratives addressing all of the workshops or events that were held so far. The components and structure of the narratives were adapted from what was proposed in WP5's Deliverable D5.2 "Identification and description of the KPIs to monitor the Mission R&I priorities", and the main purpose was for each partner to synthesize and reflect on their activities' achievements, giving particular focus to impact (in terms of Stakeholders and beneficiaries, Outcomes and results, Transformation and change, Real-world examples and stories, and Broader societal significance). This reflection is intended not only as evaluation of past activities, but also as guidance for the future.

Input was also collected through individual semi-structured interviews, which were conducted by Evora with all the Regional Node and Soil Week partners, between May and June 2025. A script was prepared, the interviews were recorded, and individual summary sheets were produced. These encounters were also designed to allow for dialogue. The purpose was to take the opportunity to exchange experiences and ideas one-on-one, allowing for the interviewer (Evora) to answer doubts or make suggestions for the partners' future activities. This format proved to be very useful, as it achieved the threefold goal of gathering input, promoting reflection and providing guidance.

A final source of information was a brief online survey that intended to assess the functioning of the workflow of all SOLO activities, namely the integration of regional input (both from Regional Nodes and Soil Weeks) in the Think Tanks' roadmaps. Detailed results are presented in Deliverable D4.2.

2 Regional Nodes

2.1 Introduction: common methodology

The foundations for the Regional Nodes were laid in Deliverable D4.6 “Initial report on the implementation status of the Regional Nodes”. In that document, the approach and methodologies that are common to all 4 Regional Nodes were described in detail, defining their constitutional principles, elements and structure. Topics addressed included:

i. Previous Mission Soil projects with regional activities on which SOLO is building;
ii. Functioning of the workflow between SOLO activities;
iii. Stakeholder selection;
iv. Protocol for the establishment of the Regional Nodes;
v. General protocol for the workshops;
vi. Guiding questions for the 1st workshop.

Even though it would be redundant to repeat the description of all of those elements, it is important to note that they remain as the foundations for the Regional Nodes. Only a few minor adaptations have been made to respond to vulnerabilities, needs or opportunities that were identified as the workshops were put into practice. Although these changes will be further explored along the document, it is useful to briefly summarise them from the start.

The first change is related to the distinction between focus land use and landscape approach. The focus land use corresponds to the main research subject of each Regional Node, and the landscape approach is an integrated perspective, which analyses the interaction between the focus land use and other land uses in the region. The distinction between the two was made not just in theoretical terms, but also for its operationalization during the workshops (Round 4, in particular). However, after the second round of workshops, it became clear that this level of abstraction is not compatible with the process of co-creation of knowledge with a diverse group of stakeholders. This theoretical distinction is difficult to grasp, especially because stakeholders are mostly interested in discussing their region’s reality in the most practical manner possible. Insisting on this distinction would therefore be time consuming and, ultimately, counterproductive, as it would risk exhausting stakeholders’ motivation to participate. It has therefore been decided that this distinction would not be made directly with the stakeholders during the workshops; instead, Regional Node partners will use the collected information during the workshops and attempt to infer that distinction in the reports and regional roadmaps only, namely by pinpointing explicit references to the focus land use.

The second change is related both to the central topic of the 4th round of workshops and to the actionable regional roadmap. Partly as a consequence of the previous point, it was decided that the topic of the last round of workshops would be changed. It was initially planned to centre the discussion on the assessment of the actions’ synergies and trade-offs on Mission Objectives at the landscape level, which would entail making said distinction between the focus land use and the landscape level. In parallel, it became clear that the main output of the Regional Nodes should be as useful to the stakeholders as to SOLO, not only so they could better understand the importance of their contribution, but also to promote a sense of ownership and responsibility over the regional roadmap. This is particularly relevant because it might impact the stakeholders’ willingness to continue the Regional Nodes once SOLO comes to an end. Taking all of these aspects into consideration, it was decided that the 4th round of workshops will be dedicated to

discussing the implementation of the regional roadmaps and/or the prospects for the continuation of the Regional Node. In practice, this will likely translate into validating all of the roadmap elements that have been gathered so far, and discussing aspects that are fundamental to the regional implementation of the roadmap (e.g., defining responsible entities for the actions).

Finally, adaptations have been made to the general methodological approach to the Regional Nodes. The first protocols were essential to provide a common ground to all the Regional Nodes, and to ensure data standardisation and comparability. However, it soon became clear that strictly following the guidelines would be counteractive. Flexibility was needed to provide the Regional Node partners with room to adapt to regional specificities and needs, particularly in what concerns stakeholder engagement. As a consequence, it was agreed that partners had the flexibility to decide how to reach the results, as long as the workshops' output was the same (a common reporting template per workshop). Although the activity coordinator (Evora) always provided a proposed workshop structure for guidance, partners were free to adapt it. As will be discussed further ahead, flexibility has proven to be essential for the Regional Nodes to acknowledge and address regional particularities – and, ultimately, to achieve the intended results.

In spite of this shift towards a more flexible approach, the functioning of the Regional Nodes remained the same. Months before each workshop, the activity coordinator (Evora) proposed the structure of the workshop and the respective reporting template, which put in evidence what the intended outputs were. After a more in-depth interaction with WP4 leaders (NIOO) to ensure the adequacy of those tools to the final goal of providing regionalized input to SOLO's overarching roadmap, those documents were shared with the other two Regional Node partners for feedback.

Communication among partners was therefore regular, mostly via email. However, SOLO's in-person general meetings have been crucial moments for experience exchange and joint reflection, as internal sessions exclusively for Regional Node partners have been held in every meeting so far.

Collaboration was also further developed with WP3, both online and during in-person meetings. Even though it had already been mentioned in the previous Deliverable that WP3 would identify drivers that induce changes both for soils and land management across land uses and countries, the details on how that would be done hadn't been defined. Before the first workshop, WP3 leaders (ZALF) provided online training to the Regional Node partners on how to use the DPSIR framework as a participatory diagnosis tool in soil health analysis (Chowdhury et al., 2025). As the drivers that were identified in that same first round of workshops were shared with WP3, the idea emerged for the Regional Nodes to be used as case studies for WP3's literature review methodology. As a result, WP3 brought together the land uses, drivers and soil health objectives per country, as found in literature (example in Figure 2). This data was then validated in the second round of workshops with the respective Regional Node stakeholders. WP3 will further continue this analysis in collaboration with the Regional Nodes coordinator; the results will be initially communicated with SOLO partners in future SOLO general assemblies, and finally communicated with the wider audience in a peer-reviewed scientific publication.

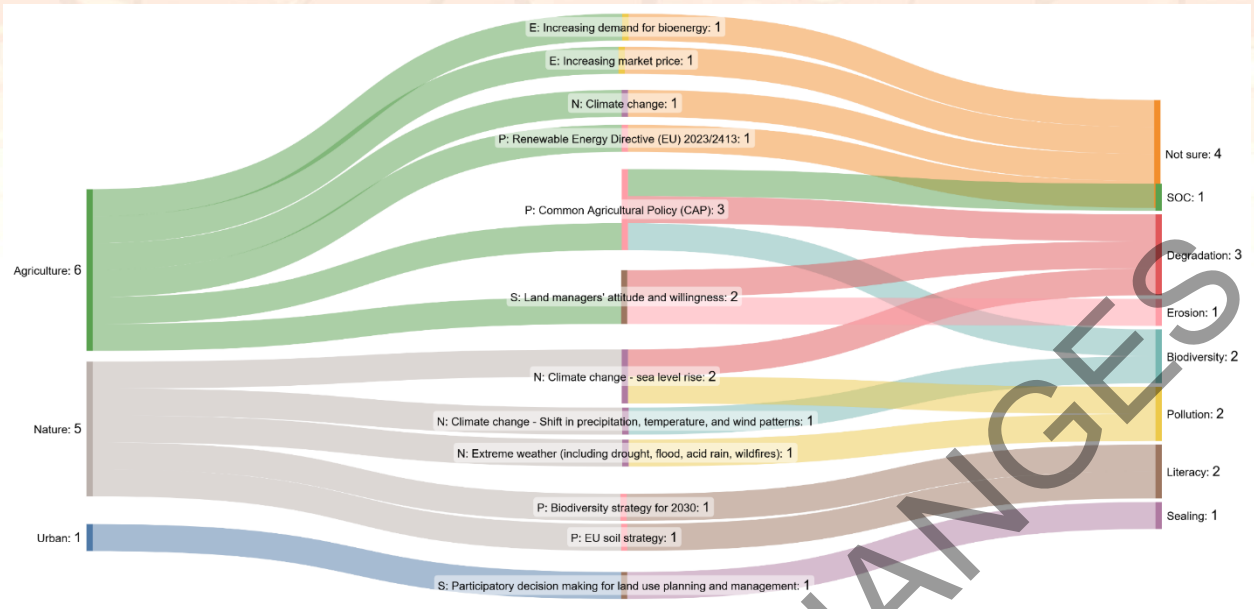

Figure 2 - Example of the data provided by WP3 to the Regional Nodes. Drivers of soil health for the Netherlands. On the left are the land uses, middle are the different drivers, and on the right are the soil health objectives. The numbers refer to the number of citations associated with each. One citation can be associated with several drivers and a particular driver can be associated with more than one soil health objective. Figure created by Shaswati Chowdhury (Chowdhury et al. 2024a; Chowdhury et al. 2024b).

A final note is due on the Regional Nodes' timeline. Although there were some slight deviations from the initially planned timeline, none had a significant impact on the work that was developed. However, the third round of workshops hasn't been fully concluded yet: one partner (NIOO) will only be able to hold the third workshop in January 2026. The updated common timeline is presented in Table 1.

Table 1 - Regional Nodes' timeline for 2024, 2025 and 2026. Activities marked in green have been finalised; activities in blue are ongoing; activities in grey are planned.

2.2 Overview of the Regional Nodes' preliminary results

A total of 11 workshops have taken place, over 3 rounds. All Regional Nodes have organised 3 workshops each, except for the Netherlands' mixed farming, which has held 2 workshops (the third is planned in January 2026).

Table 2 – Workshop details (round, date and number of participants) per Regional Node (tbh means to be held).

Regional Node	Workshop round	Date of the event	Nr. Of participants
Portuguese Montado	Workshop 1	20/09/2024	20
	Workshop 2	13/02/2025	18
	Workshop 3	15/09/2025	15
Netherlands mixed farming	Workshop 1	10/09/2024	10
	Workshop 2	19/03/2025	11
	Workshop 3	tbh	tbh
Hungarian forests	Workshop 1	10/09/2024	5
	Workshop 2	06/03/2025	14
	Workshop 3	23/09/2025	17
Swedish urban-rural gradient	Workshop 1	22/01/2025	11
	Workshop 2	28/03/2025	20
	Workshop 3	20/10/2025	20

A total of 117 stakeholders have been engaged across all the Regional Nodes, distributed per region as presented in Tables 2 and 3. The discrepancy in stakeholder numbers reflects two aspects: i) the partners' diverse strategies to engage stakeholders, and ii) the challenge to keep stakeholders engaged from workshop to workshop.

Concerning the first point, although most partners have adopted a similar strategy (described in the Deliverable D4.6), the Swedish Node has opted for an approach which is more suitable to the regional context. Given the partners' (LUND) previous experience with analogous activities, it was known that presenting the set of 4 workshops as a continuum would hamper stakeholder participation and engagement: it would be received as a time-consuming commitment, particularly considering that the stakeholders' participation is voluntary and therefore not subject to monetary compensation. As a solution, each workshop was given a different topic, lecturers were invited to address it, and the necessary information for the Regional Nodes was collected during the discussion. Not only has this strategy resulted in a larger number of stakeholders involved, but stakeholder feedback indicates that there is considerable interest in attending the fourth and last workshop.

As for the point regarding stakeholder attendance frequency, the majority have, indeed, participated in only one workshop. Although that does point to the difficulty in keeping stakeholders engaged, a closer look at the Node's stakeholder list (found in the following subsections) shows that the vast majority of stakeholders who attended two or three workshops

are core stakeholders. This means that continuity is ensured by the stakeholders with the highest knowledge and engagement with soil related issues, with the most influence, and who are the most available (Deliverable D4.6). This data solidifies the importance of categorising stakeholders according to their knowledge and engagement. It also indicates that active and associated stakeholders should be considered for one-off, yet diversified, input.

Table 3 - Number of stakeholders and frequency of attendance per Regional Node (tbh means to be held).

Regional Node	Total stakeholders	No. of workshops attended		
		1	2	3
Portuguese Montado	34	21	7	6
Netherlands mixed farming	16	11	5	tbh
Hungarian forests	26	17	8	1
Swedish urban-rural gradient	41	32	8	1

Overall, practitioners and sector organizations appear as the most represented type of stakeholder (50, including advisory services, training entities and spatial planners), followed by policy makers and administration (36) and scientists (19); civil society and industry are residual (8 and 4, respectively) (Figure 3). When interpreting the numbers, it is worth mentioning that one person may belong to more than one category (e.g. farmer and advisor, or farmer and representative of a civil society organisation). Stakeholder diversity is evident not only through these numbers, but also through the Regional Node partners' perceptions. The latter indicate a general satisfaction not only with the variety of sectors represented, but also with the high level of interest and engagement of the stakeholders. On the down side, and in spite of the numbers, two partners mention the difficulty of getting farmer representativity, both in terms of quantity (Portugal) and more conservative practices (Netherlands).

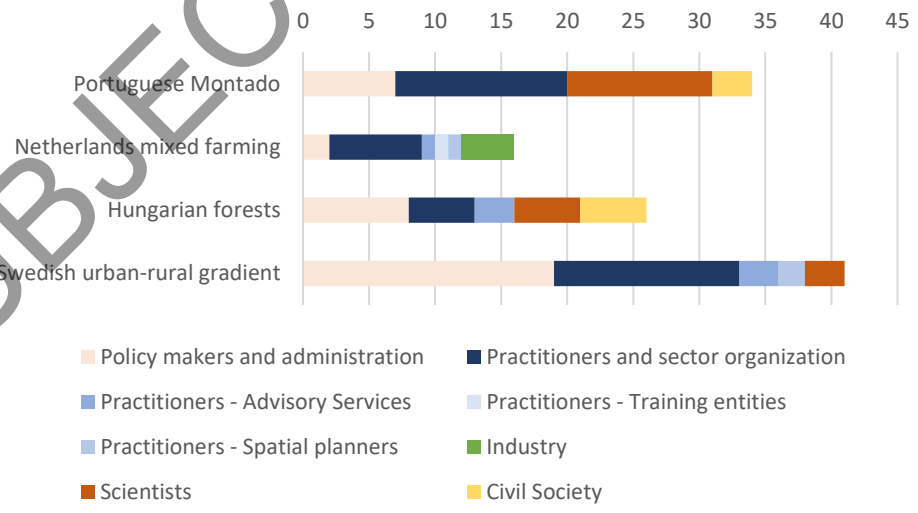

Figure 3 - Type of stakeholders per Regional Node.

As for the results of the workshops, the following have been achieved across Regional Nodes:

- Regional diagnosis of the drivers, pressures, state, impact and responses of soil health (using the DPSIR framework; see Deliverable D4.6);
- Identification of the 3 most relevant Mission Objectives for each region;
- Identification and prioritization of the knowledge gaps associated with the selected Mission Objectives;
- Identification of actions (at least partially implementable at the regional scale) that respond to the top 3 knowledge gaps (except for the Dutch Node).

Detailed results are presented in the following subsections of this document and in Annex 1, and an analysis of the Regional Nodes' contribution to the regionalization of the overarching roadmaps is carried out in Deliverable D4.2.

Nonetheless, and as an introduction to what can be found in the detailed Node subsections, Table 4 provides an overview of the Mission Objectives that were selected by the regional stakeholders as the most relevant in each region. Interestingly, across Regional Nodes, all Mission Objectives are covered, except for Footprint on soils, which is understandable given the Nodes' regional focus. Nonetheless, footprint was mentioned in the knowledge gap discussions in at least two Regional Nodes.

Table 4 also compares the workshop results with the Mission Objectives' distribution initially predicted (as stated in the Grant Agreement). Even though, on all accounts, there is one match, the discrepancies support the relevance of the Regional Nodes as a platform to co-construct knowledge with regional stakeholders.

Table 4 - Priority Mission Objectives per Regional Node. Comparison between what was predicted at the beginning of the project (as stated in the Grant Agreement) and the selection by the regional stakeholders.

Priority Mission Objective	Regional Node							
	Portuguese Montado		Netherlands mixed-farming		Hungarian forests		Swedish urban-rural gradient	
	GA	Workshops	GA	Workshops	GA	Workshops	GA	Workshops
Land degradation and desertification								
Soil organic carbon stocks								
Soil sealing and urban soils								
Pollution and restoration								
Erosion prevention								
Soil structure								
Footprint on soils								
Soil literacy								
Nature conservation of soil biodiversity								

2.3 Mid-term evaluation of the Regional Nodes

This section results from the analysis of the Regional Node partners' mid-term evaluation narratives, as well as of the conducted semi-structured interviews.

The Regional Nodes' goals are being successfully achieved: as planned, regional R&I priorities are being identified through a process of co-construction of knowledge with diverse groups of regional stakeholders. But accomplishing such satisfying results comes with challenges, and entails continuous reflection, which is fundamental not only to steer the activity of the Nodes into the future, but also to pinpoint lessons learned that might be useful to other research projects.

Given SOLO's focus on R&I activities and priorities, it may appear academic and theoretical to the Regional Node stakeholders. Although the project's transdisciplinary approach is an effective and beneficial strategy to counteract the tendency to limit the discussion to the academic silo, it is challenging to make the project relatable to non-academic stakeholders. This translates into the difficulty of focusing the Nodes' discussion on soil-related R&I instead of soil health itself, for instance what is missing in research and innovation vs. what practices need to be implemented to achieve better soil health. Another challenge is to make complex and abstract concepts, such as 'knowledge gap' or 'focus land use', easily understandable and operational to the participants of the Nodes. Overcoming these challenges required the Regional Node partners' capacity and skills to adapt concepts, exercises and results to the specificities of their stakeholders.

Even so, after two rounds of workshops, it was consensual that the following discussions needed to be more practice-oriented: it was paramount that stakeholders understood the value of their contributions, and that they directly benefitted from their engagement with the Regional Nodes. The solution was to better define the scope of the Regional Nodes' main output, the regional roadmaps, as actionable briefs applicable at least partially by regional stakeholders, at the regional scale. And, once this was established, the remaining workshops were planned to accomplish that goal, focusing the discussion on actions that are both relevant and applicable to the region, and on the distribution of responsibilities to implement them. In a nutshell, workshops are now clearly planned to turn abstract discussions into actionable R&I ideas. This is expected to further engage the stakeholders, and to promote ownership and responsibility over the regional roadmaps, also as a way to foster the Nodes' continuity after SOLO has come to an end.

Another aspect that might support continuity is the Nodes' fundamental contribution to creating and/or solidifying regional networks of stakeholders engaged with soil health. This point has been mentioned by all Regional Node partners as one of the biggest impacts of the Nodes: creating a platform for stakeholders to feel heard, to dialogue and to engage with each other. In some instances, the absence of such a stage for dialogue has even been identified by the stakeholders as an existing gap in the region. This platform consequentially facilitates knowledge exchange, and some partners go further in saying that the Nodes are actively contributing to raise awareness and to transfer knowledge to the involved stakeholders. This is particularly valuable considering that the lack of soil literacy has been addressed across Regional Nodes as a transversal subject to be tackled.

The fundamental role of the Regional Nodes as network creators and facilitators is testified by the already achieved outcomes of the Netherlands' Node: NIOO has been invited to update soil education material for secondary schools, and an MSc student is directly collaborating with three Regional Node stakeholders for their thesis project.

Several of the points mentioned above – from making the project activities more relatable and useful to kick-starting regional networks that bring clear benefits to the stakeholders – indicate the need for the Regional Nodes (and akin regional structures) to be tailored to the human scale. In spite of the research projects' ambitions, level of abstraction or territorial scope, transdisciplinary regional networks need to put the stakeholders' needs and characteristics first. In this line of thought, some Regional Node partners mentioned the importance of fostering a sense of fun and beauty among the stakeholders – and how the Nodes were eye opening opportunities for the partners themselves to understand this importance when interacting with stakeholders.

All partners implemented, from the beginning, one practice that contributed to putting the stakeholders at the centre, which was to always give something back during the workshops. In most cases this translated into providing lectures on relevant topics but, in one instance (Portugal), partners facilitated workshops to co-create a regional landscape strategy, which was a bottom-up initiative, requested by some of the stakeholders previous to the establishment of the Regional Node.

Maintaining a human scale would not have been possible with strict and rigid protocols designed to cover such disparate realities like Sweden, Portugal, the Netherlands and Hungary. Cultural differences had to be acknowledged and respected. Providing broad but clear guidelines, particularly regarding the intended results, was important to align the results of the workshops, but the flexibility in the process of engaging stakeholders and collecting information was equally important to ensure the success of the Regional Nodes. This balance between flexibility and guidance, which partners perceive as having been achieved, is at the root of the Regional Nodes' success.

2.4 Moving forward

In the scope of SOLO, the Regional Nodes will be active until November 2026 (M48). Within the next year, a fourth and final round of workshops will be held (between January and June 2026), the regional roadmaps will be produced, and Deliverable D4.5 "Synthesis of the lessons learned from the regional nodes and soil week events including future steps" will be submitted (M48).

In order to prepare all these steps, the activity coordinator (Evora) will elaborate, in the upcoming months, the proposed workshop structure and reporting template, as well as the regional roadmap template. Evora will also work on a structure draft for D4.5, which will be discussed with all Regional Node and Soil Week partners in SOLO's Spring general meeting.

As mentioned before, the fourth round of workshops will be dedicated to the discussion of the regional roadmap's implementation and/or the prospect for the Regional Nodes' continuity. The main goal is to bring together all of the information gathered so far and to transform it into an actionable roadmap that is applicable at the regional scale, at least partially. Achieving this will entail establishing connections between knowledge gaps and actions, setting priorities for the actual implementation of the roadmap, distributing responsibilities to do so, discussing the roadmap's governance and, ultimately, the prospect for the Regional Nodes' continuity.

Concerning the Nodes' continuity, SOLO partners' perceptions are encouraging. Although the shape of the Nodes' future is uncertain, partners believe that the created stakeholder networks are likely to last. The latest discussions on concrete actions point in that direction; just as they point, once again, to the importance of keeping project activities relevant for the regional stakeholders.

Some partners have reported a high potential for the municipalities, in particular, to up take the Nodes' results. As an example, a proposal has emerged from the Portuguese Node to create a result-based agri-environmental measure, supported by the municipality, with the Node region as the potential pilot territory.

Fruitful research collaborations are also already in place or in the pipeline. Besides the already mentioned initiatives within the Netherlands' Node, another transdisciplinary MSc thesis is being prepared involving Node stakeholders that integrate the Water Board, specifically about the effect of regenerative grazing on water and soil health. The Portuguese Node, in its connection to the already referred regional landscape strategy, has facilitated the creation of a PhD position on participatory landscape strategy making to work in the region.

Indeed, the association with other initiatives may be a path for the Nodes' continuity. Alongside the Portuguese Node's connection to the bottom-up landscape project, the Netherlands' Node may come to develop further links with the Soil Valley Living Lab.

Once SOLO comes to an end, the fate of the Regional Nodes is uncertain: they may continue, lose their current official format, they may be absorbed into other existing structures, or they may decrease in size and be limited to a few core stakeholders. Undoubtedly, however, the regional networks that have been created are expected to survive.

2.5 Regional Nodes' preliminary results

2.5.1 Node 1 – Portuguese Montado (agroforestry)

General description of the workshops

Workshop 1: Prioritization of soil health objectives for the focus land use and the wider landscape

Location: Mértola, Pavilhão Multiusos

Date: 20/09/2024

The first workshop of the Mértola Regional Node was held over a morning session, it included coffee, individual reflection, group and plenary discussions, and ended with a shared lunch. The workshop introduced the Mission Soil objectives, the SOLO project, and the specific goals of the Regional Node related to soil regeneration. Activities encouraged active stakeholder participation

in a constructive atmosphere. In the afternoon, the event continued to integrate soil regeneration with the development of a territorial strategy for Mértola. Presentations by soil and regional experts were followed by additional participatory sessions.

The initial individual reflections, part of the planned activities, helped participants organize their thoughts independently, enriching group discussions with diverse viewpoints. Consensus was reached easily to choose the top three priorities: Erosion prevention, Conserving Carbon Stocks and Conserving Soil Biodiversity. However, one key outcome, the selection of “Conserving Soil Biodiversity” as one of the top regional objectives emerged only after collective dialogue, considering it as a basis to achieve further objectives.

A challenge faced was maintaining focus on the Montado land use system, due to its complex, multifunctional nature and overlap with other land uses. However, using the Mértola region as a common reference proved more effective, as it was easier for participants to relate to and understand.

Workshop 2: Prioritization of knowledge gaps for focus land use and wider landscape

Location: Mértola, Pavilhão Multiusos

Date: 13/02/2025

Similarly to the first workshop, the second workshop lasted four hours in the morning and included coffee, individual and group work, and ended with a shared lunch. The two main goals were: (1) validating results from the first workshop, particularly regarding key drivers for soil health; and (2) identifying knowledge gaps related to the prioritized Mission Soil objectives for the Montado system namely: Erosion prevention, Soil organic carbon stocks and Nature conservation of soil biodiversity.

In the afternoon discussions were extended to link soil regeneration with Mértola’s broader territorial strategy, focusing on mapping both specific and generalized soil problems. While some participants (11 of 18) attended the first workshop, which helped guide discussions, challenges remained in maintaining focus on the Montado (as the focus land use). Difficulties also arose in regionalizing knowledge gaps, many of which had global dimensions.

The concept of knowledge gaps itself proved complex. It was at times difficult for stakeholders to distinguish knowledge gaps from the description of existing conditions or the identification of needed actions. The lack of efficient and universal mechanisms of knowledge transfer and technical support to farmers and other land managers (advisory services) arose as a topic of discussion during this workshop. It was considered by the team that this problem should deserve attention when addressing the knowledge gaps in achieving soil regenerative practices in Mértola region and on a larger scale (southern and eastern Europe). The team recommended future workshops should include more practical engagement, such as field demonstrations.

Workshop 3: Assess actions' synergies and trade-offs on Mission Objectives within the focus land use and wider landscape

Location: Mértola, Pavilhão Multiusos and Centro Experimental de Erosão do Solo de Vale Formoso

Date: 15/09/2025

The third workshop was preceded by a public visit to the Vale Formoso Experimental Centre for Soil Erosion. Most stakeholders attended this guided visit, which was part of Soil Week, and the workshop began after a shared lunch.

The workshop focused on three objectives: (1) validating and refining previously identified knowledge gaps (KGs), (2) validating ideal future scenarios where the top three KGs had been addressed, and (3) identifying concrete actions needed to achieve those scenarios. A back-casting exercise was used to help stimulate discussions and identify concrete actions. For this exercise different scenarios were created by the team based on the top three identified KGs for Erosion prevention, Conserving Soil Biodiversity and Conserving Carbon Stocks. While the focus was meant to remain on the top three knowledge gaps, the group working on Nature conservation of soil biodiversity chose to create a new scenario based on the fourth-ranked knowledge gap. This unexpected option led to greater engagement, with one key stakeholder committing to implementing a result-based agri-environmental measure to protect and improve soils in semi-arid areas vulnerable to desertification. To avoid earlier difficulties in keeping discussions centered on the Montado system, this workshop focused instead on Mértola's regional soil challenges. Many proposed actions showed clear synergies across the different priorities, reflecting their interconnected nature, namely the need to create an efficient network of advisory services.

Stakeholder characterisation and participation

Institution / Organisation	Type of stakeholder		Scale of action (L, R, N)***	Main activity connected to focus land use? (Y/N)	Workshops attended (1, 2 and/or 3)	Observations (inc. justification of level, participation in other projects, etc.)
	Category*	Level (C, Ac, As)**				
C.M.Mértola	*Policy makers and administration – other*	Ac	L	N	1	
Assoc. Agr. Campo Branco	*Practitioners and Sector organization – focus land use*	Ac	L	Y	1, 2	
Terra Sintrópica	*Practitioners and Sector organization – focus land use*	Ac	L	Y	2	
Ualgarve	*Scientists – Soil*	C	R	Y	1	
-------	*Other – Civil society*	As	L	N	3	Former connection to Campo arqueológico de Mértola

CMMértola – sector cinegético	*Policy makers and administration – other*	Ac	L	Y	2	
ICNF	*Policy makers and administration – environment*	C	R	Y	1, 2	
Empresa em nome individual	*Practitioners and Sector organization – focus land use*	Ac	L	Y	1	
Biopolis/CIBIO	*Scientists – Environment and Biodiversity*	Ac	L	Y	1, 2	
Unova de Lisboa	*Scientists – Soil*	Ac	L	N	3	PhD student and contributed to the guided visit to experimental station
E.B.Mértola	*Scientists – Environment and Biodiversity*	Ac	L	Y	3	
CMMértola – sector cinegético	*Policy makers and administration – other*	Ac	L	Y	2	
Coop. Agri. Guadiana	*Practitioners and Sector organization – focus land use*		L	Y	1, 2, 3	
E.B.Mértola	*Scientists – Environment and Biodiversity*	Ac	L	Y	1, 2	
Terra Sintrópica	*Practitioners and Sector organization – focus land use*	Ac	L	Y	2	
Alentejo xxi	*Practitioners and Sector organization – other*	Ac	L	N	2	
CCDR Alentejo	*Policy makers and administration – other*	C	R	Y	1, 2, 3	
Individual	*Practitioners and Sector organization – focus land use*	Ac	L	Y	1	
CCDR Alentejo	*Policy makers and administration – other*	C	R	N	1, 2	
Campo Arqueológico de Mértola	*Scientists – other (regional context)*	Ass	L	N	1	
ADPM	*Practitioners and Sector organization – other*	Ac	L	Y	1, 2, 3	

Unova de Lisboa	*Scientists – Soil*	Ac	L	N	3	Responsible for guiding the visit to experimental station
Soc. Agr. Casa Amendoeira	*Practitioners and Sector organization – focus land use*	Ac	L	Y	1	
IPBeja	*Scientists – Soil*	C	R	Y	1	
ADPM	*Practitioners and Sector organization – other*	C	L	Y	2, 3	
Ualg	*Scientists – Environment and Biodiversity*	As	R	Y	3	
School Group of Mértola	*Other – Civil society*	Ac	L	N	3	
ACOS	*Practitioners and Sector organization – focus land use*	C	L	Y	1, 3	
Casa Cravinho	*Practitioners and Sector organization – focus land use*	Ac	L	Y	1	
MED Uévora	*Scientists – Focus land use; soil*	Ac	R	Y	1, 2, 3	
School Group of Mértola	*Other – Civil society*	Ac	L	N	3	
Monte do Troviscal	*Practitioners and Sector organization – focus land use*	C	L	Y	2	
E.B.Mértola	*Scientists – Environment and Biodiversity*	Ac	L	Y	1,2,3	
C.M.Mértola	*Policy makers and administration – other*	C	L	N	1,2,3	

Complete preliminary results of the workshops: Annex 1

Mid-term evaluation narrative

The Mértola Regional Node has, throughout the three workshops held so far, succeeded in maintaining a consistent and active level of participation, demonstrating local interest in the topic of soil health. The initiative has engaged a diverse group of stakeholders, including local associations, technicians, researchers, NGOs, and municipal representatives. However, one important gap became evident: the limited participation of local farmers. This group is crucial to the discussion of soil health regeneration, as they are directly involved through their land management practices, many of which are recognized as drivers of soil health. Their absence stresses the importance of finding more effective ways to include them in future participatory processes.

Initially, the regional node was expected to serve as a representative case study for a specific land-use type, namely the Montado. As the workshops progressed, however, participants and the facilitating team found that this focus was difficult to maintain within the discussions. It proved easier and more objective to reflect collectively on the broader regional reality of Mértola, which allowed for more concrete consideration of soil-related challenges and the Soil Mission priorities identified as most relevant to regional soil regeneration: erosion prevention, conserving soil organic carbon stocks, and conserving soil biodiversity.

The workshops led to the identification of several common actions needed to work towards the regeneration of soil in the region. One key issue was the lack of an efficient structure to provide technical and advisory services adapted to local conditions. Participants stressed the importance of establishing a network of professionals with adequate knowledge of Mértola's specific biophysical and socio-economic context, capable of directly supporting farmers and land managers.

In addition, stakeholders emphasized the need to invest in education and awareness-raising across different parts of society, such as students, farmers, and businesses, on the importance of soil and its central role in ecosystem functioning and human livelihood and well-being. This shared understanding was seen as a base for encouraging behavioural change and stronger local commitment to soil protection.

An important outcome from the process was the proposal to create a result-based agri-environmental measure, with Mértola as a potential pilot territory. The aim of this measure would be to protect and improve soils in semi-arid regions at risk of desertification. While the proposal is based on the specific biophysical and socio-economic characteristics of Mértola, participants considered that it could also be relevant to other territories facing similar challenges. During the third workshop, one stakeholder expressed willingness to involve the Municipality of Mértola in further developing this measure.

Overall, the experience of the Mértola Regional Node has contributed to a clearer understanding of local priorities regarding soil health and highlighted opportunities for collaboration among different actors. The discussions have provided a foundation for continued dialogue on how to improve soil management practices and develop context-specific guidelines that respond to both regional needs and broader mission objectives.

2.5.2 Node 2 – Netherlands mixed farming

General description of the workshops

Workshop 1: Prioritization of soil health objectives for the focus land use and the wider landscape

Location: Lighthouse farm "Agro-innovatiecentrum de Marke", Hengelo, Gelderland

Date: 10/09/2024

Much of the preparation of the first regional node meeting included finding relevant stakeholders in the region that were willing to participate. We only got people on board once we included an expert lecture for the RN stakeholders in return for their knowledge besides the workshop in the program. We confirmed with a network organization that we found all relevant key stakeholders, and shared the Dutch reports and advertisements for upcoming workshops with all these ever since. The RN workshop lasted an afternoon (lunch – workshop – lecture – drinks). We spent 1 hour introducing each other and the project, identified the 3 most important themes and were able to perform 2 DPSIR analyses. Everything was discussed in plenary as the group was small and constructive. The caterer at the lighthouse told us afterwards that she rarely had seen participants so genuinely interested and engaged as in our workshop. So except for 1 DSPIR analysis, the goals of the workshop were fulfilled. Time limitation was the biggest challenge, but since most participants are pioneers and many projects are happening in the respective region, they are very busy. So we stuck to the advice of the lighthouse farm leader and did (and will) not increase the duration.

Workshop 2: Prioritization of knowledge gaps for focus land use and wider landscape

Location: Living Lab 'Soil Valley', Giesbeek, Gelderland

Date: 19/03/2025

The meeting format was the same as the first regional node workshop: lunch – workshop – lecture – drinks. The topic of the lecture aligned to the prioritized mission objectives. The group of stakeholders was a mix of people who also had attended the first workshop plus new stakeholders. We therefore introduced stakeholders and SOLO, and recapped the first workshop. We then discussed which drivers identified for the Netherlands and agricultural soils in literature applied to the region (work WP3). Drivers from literature were often indicated to apply to the Achterhoek because they were generally applicable to the Netherlands, but not because they were necessarily unique for the region. We also conducted the DPSIR analysis for the third theme during this discussion. Then, we collected all individual prioritizations with a google survey. We discussed the results immediately once all responses came in, was very appreciated by the stakeholders and led to engaging discussions. We then prioritized knowledge gaps per theme similarly to the exercise done in Sofia. During the drink, we demonstrated the visual summary that a scientific artist created of all discussions. Time was a challenge, but all goals were accomplished. It was difficult to distinguish between the actions, knowledge gaps, and bottlenecks, and knowledge gap types.

Workshop 3: Assess actions' synergies and trade-offs on Mission Objectives within the focus land use and wider landscape

Location: To be defined (probably at the farm of Jan Willem Breukinkg)

Date: Proposed date is 21/01/2026

This workshop will focus on the regional actions that can be taken to solve the identified knowledge gaps, and be set in such a way that the workshop results in the required information for the third reporting template of the Regional Nodes.

Stakeholder characterisation and participation

Institution / Organisation	Type of stakeholder		Scale of action (L, R, N)***	Main activity connected to focus land use? (Y/N)	Workshops attended (1, 2 and/or 3)	Observations (inc. justification of level, participation in other projects, etc.)
	Category*	Level (C, Ac, As)**				
Employee at municipality Montferland, in the Achterhoek	Policy makers and administration – focus land use	C	R	Yes	1,2	Anneke is involved in all soil, water and sustainability projects in the municipality of Montferland (Achterhoek), and has a strong network with other municipalities in the Achterhoek. She is interested to learn more about soil health besides the chemical aspects.
Regenerative livestock farmer, keeping beef cattle, pigs, laying hens and broiler chickens	Practitioners and Sector organization – focus land use	C	L – R	Yes	1,2	The innovative farm of Martine and Arjan Bisschop in neighborhood of Zevenaar can be considered a lighthouse farm. Martine and Arjan experiment how livestock can be used to improve soil health, and they exchange this knowledge with other farmers. Their mission is to create more life in soils. https://agrarischwaterbeheer.nl/demobedrijf/arjan-en-martine-bisschop-de-houberg/
Royal Eijkelkamp BV and Soil Valley living lab	Industry – production factors; and Practitioners – Advisory Services	C	R – L – N	Yes	1,2	Eijkelkamp is a big international company for soil and agronomic equipment and tools for practitioners and scientists. Bob is involved in multiple scientific projects, such as how to measure soil life more efficiently and cheaply using AI. He is co-initiator of Soil Valley, a foundation that is setting up a living lab on soils and agriculture in the Achterhoek. Soil Valley has elements of a Living Lab and a Lighthouse farm. Also involved in HAL24 Agri project. https://soilvalley.eu/over-soil-valley/
Royal Eijkelkamp BV and Soil Valley living lab	Industry – production factors; and Practitioners – Advisory Services	C	R – L – N	Yes	2	Same involvement as Bob Kleijn Lankhorst. Jochen is also researcher at Wageningen Environmental Research and forms the bridge between science and industry https://soilvalley.eu/over-soil-valley/
Former dairy farmer, and now grower of grass and forage crops.	Practitioners and Sector organization – focus land use	C	L	Yes	1,2	Jan is a former dairy farmer, and now only grows grass and forage crops for rearing young cattle. He also rents out part of the soil. He experiments with

						new Nxt fertilizers of Healthy Soil BV, which are artificial fertilizers (ureum) that due to a different production process result in less leaching and higher plant uptake.
Innovative diary farmer	Practitioners and Sector organization – focus land use	C	L	Yes	1,2	Innovative dairy farmer that experiments with 3 types of manure processors and composting techniques. He has not used any artificial fertilizer for over 2 years.
Teacher chemistry at Panora lyceum in Doetinchem	Practitioners – Training entities	Ac	L, R	No	2	Bas contacted Guusje for a guest lecture at his class, and for educational materials about soil health. He was interested to join the workshop to learn more about soils. Bas is quite aware of local initiatives regarding soil education, and also involved in organising the 'klimaatexamen' (EN: climate exam) at his school.
Stichting in de Goede Aarde (EN: Foundation "In the good earth").	Practitioners – Advisory Services	Ac	L, R	Yes	2	This foundation aims to gather and disseminate information on ecological processes to support sustainable soil and plant management. They perform research on experimental field sites and give workshops and advice to farmers. Jonathan also shared that he is mainly present to understand hoe the soil works. https://www.ingoedeaarde.org/project-regeneratieve-achterhoek-2025/
Arable farmer, primarily various cereals of high baking quality, and several beans. Also keeps poultry	Practitioners and Sector organization – focus land use	C	L	Yes	2	Jan is a conventional and innovative farmer that uses as little chemistry as possible. He experiments with mycorrhiza, rhizobia, white clover under wheat, micro nutrients, compost tea. Jan also grows old cereal species (spelt, emmerkoren, eenkoorn) is involved in the processing of cereals up till baking bread, except for the baking process itself that is done by a local bakery. His flours are of such high quality that they have won prices. Works together with foundation In good earth. https://www.slaege.nl/
Healthy Soil B.V.	Industry – production factors; and Practitioners – Advisory Services	Ac	L, R, N	Yes	2	Healthy Soil BV is a company that works with the Albrecht method. They perform soil analyses, advice farmers, and sell innovative fertilizer ("Ntx-fertilizers) that are by law artificial fertilizers, but in fact consists of ureum and are also

						partly organic fertilizers that are less prone to leaching. They promote a holistic view on agriculture and soil management, and their products, advices and other services are based on that. Jan Abbink is client of healthy Soil BV, Marco is manager of Cora. https://www.vruchtbarebodem.nl/nl/
Healthy Soil BV	Industry – production factors; and Practitioners – Advisory Services	Ac	L, R, N	Yes	2	Works at Healthy Soil BV, see description Marco. Cora recently finished her MSc thesis in which she interviewed 8 farmers about their perception on soil health in relation to soil management.
Representative of nature organisation "Natuurmonumenten"	Practitioners and Sector organization – environment	C	L	Yes	1	Egbert is a farmer that rents land located next to a touristic land estate in Vorden (Achterhoek), owned by nature organization Natuurmonumenten. 50% of his land is for organic dairy farming, the other 50% is for natural grassland with a high biodiversity. He was proposed as participant by the nature organization Natuurmonumenten, as they work closely together. Egbert works daily with the interaction between farming and nature conservation and is therefore considered a core stakeholder.
Farmer of an innovative walnut orchard	Practitioners and Sector organization – other	Ac	L	Yes	1	Due to climate change, walnut can now grow in the Netherlands. Anita has planted 3 years ago 5 ha with 380 walnut trees, consisting of around 30 different species obtained from various growers. Cultivating walnuts is very new in the Netherlands, and Anita encounters all kinds of different challenges. Mixed farming usually comprises arable and livestock farming, but we often talked in the regional nodes simply about "agricultural lands", and we therefore considered soils in walnut orchards not part of the focus land use, but nevertheless very closely connected.
Organic and innovative farmer in Didam	Practitioners and Sector organization – focus land use	C	L	Yes	1	Theo is an organic farmer, who is experimenting with making compost tea in collaboration with Royal Eijkelkamp BV, is involved in over 25 projects and provides advice to other farmers.

Waterschap (waterboard) Rijn en Ijssel	Practitioners – spatial planners; and Policy makers and administration – environment	C	R	Yes	1	The water board may issue regulations that are necessary to improve water quality, for instance by designating areas where certain activities that affect water quality may not take place, or prohibiting farmers to use pesticides if the farmers are located in an infiltration area. Ellen is involved in many projects related to soil and water, and has obtained her doctoral degree at Wageningen UR. She indicates that in order to improve water quality, the water board strongly focuses on improving soil health
Employee of Province Gelderland	Policy makers and administration – focus land use	C	R	Yes	1	Leon works 4 days a week at province Gelderland, and has many projects on sustainable use of soils. Leon works 1 day a week at an organic farm, to remain closely connected to practice.

Complete preliminary results of the workshops: Annex 1

Mid-term evaluation narrative

The regional node workshops attracted a highly diverse group of stakeholders, consisting of innovative dairy, arable and orchard farmers, and employees from the municipality, province, water board, industry, consultancies, NGOs, and a secondary school teacher. All stakeholders were highly engaged in the discussion, and everyone contributed pro-actively and openly to the discussion. This positive engagement was observed both by the SOLO researchers, by the head of catering of the first workshop (mentioning the high level of engagement in this, compared to other organizations that have used their facility for group work), and the visual artist during the second workshop. Almost all participants of the first workshop continued with the workshop series, although some people could not attend the second workshop due to circumstances for reasons related to private or work circumstances. We confirmed with the innovation network organization of the region that we included the key stakeholders. We also shared the reports in Dutch of the workshop results and invitations for upcoming workshops with them, which resulted in two new stakeholders for the second workshop. We would like to see stakeholders included that have a more conservative attitude to mainstream agriculture in our workshops to be fully representative for the region. However, this omission is not critical for reaching the aims of SOLO.

The workshop contributed to network building, as the group of stakeholders consisted of subgroups of 2-3 people that knew each other, but the subgroups did not yet know each other. The need to connect with others pioneering with innovative sustainable land use was also expressed in both workshops by the participants. Clearly, SOLO contributed to this need. So far, we are not aware that regional node participants changed their behaviour or practices because of the regional node discussions, potentially because the two workshops mostly focused on

making an inventory and prioritizing knowledge gaps rather than proposing concrete actions. The regional nodes nevertheless did result in two collaborations between NIOO researchers and participants: an update of soil education material for secondary schools; and a transdisciplinary MSc thesis project on compost tea, directly collaborating with three regional node stakeholders (farmers and agro-industry), amongst many others, with regular feedback to the participants.

Another transdisciplinary MSc thesis about the effect of regenerative grazing on water and soil health is in the pipeline at the moment of writing, in collaboration with the regional node stakeholders of the water board. The expert lectures by researchers at each regional node workshop are a direct example of knowledge exchange between science and societal stakeholders. All in all, we conclude that the regional node workshops contributed to increased soil literacy, knowledge co-creation and network building within the group of regional node participants, as well as between the participants and the researchers.

2.5.3 Node 3 – Hungarian forests

General description of the workshops

Workshop 1: Prioritization of soil health objectives for the focus land use and the wider landscape

Location: Keszthely, Forestry Department

Date: 10/09/2024

The workshop highlighted the importance of collaborative, interdisciplinary approaches to environmental management. The combination of scientific insights and practical forestry knowledge facilitated a consensus on regional priorities, paving the way for targeted actions to combat land degradation, reduce soil pollution, and conserve biodiversity. During the initial individual reflection phase, participants were asked to rank regional environmental issues and propose actions to address them. The participants agreed on the significance of conserving biodiversity and the urgent need to address land degradation. Both were frequently listed as top priorities, reflecting a shared concern about the decline of ecosystems and the impact of land degradation on forest health and productivity. The group emphasized the long-term consequences of soil pollution on forest health, soil fertility. Participants shared their views openly, with each member explaining the reasoning behind their rankings. This fostered an understanding of different perspectives, particularly between the scientific and forestry-focused participants. The foresters described their views on the problems of the case study area supported by scientific data, case studies, and field experiences. For example, foresters highlighted practical examples of land degradation impacts on timber and wildlife, while scientists brought attention to studies on soil contamination's impact on ecosystem services.

Workshop 2: Prioritization of knowledge gaps for focus land use and wider landscape

Location: Keszthely, West Transdanubian Water Management Directorate Kis-Balaton Operations Engineering

Date: 06/03/2025

The workshop was an important forum for the regional stakeholders to address the regional issues relevant to the Knowledge Gaps (KGs). The number of participants increased from 5 to 14. First each stakeholder gave a brief introduction of their organisation, then the results of the previous workshop were introduced by iASK. The discussion was organised around the KGs of the three Mos chosen during the first workshop. Participants were asked about their opinion on the regional relevance of the KGs. The discussion took place in a plenary session format allowing each stakeholder to learn about the other's view and to reflect on it. All participants were asked directly which KG they found relevant, and whether there was any KG missing from the list. While no special exercise was done to validate the drivers, participants indirectly validated all of them. The discussion on the KGs showed the different approaches of the stakeholders that reflected on their organisational affiliations and underlined the importance of the natural environment as being the basis of regional specificities. The stakeholders' intervention proved the intertwined nature of the 3 topics. The four hours were not enough to go through all the KGs and to make the prioritization exercise.

Workshop 3: Assess actions' synergies and trade-offs on Mission Objectives within the focus land use and wider landscape

Location: Keszthely, West Transdanubian Water Management Directorate Kis-Balaton Operations Engineering

Date: 23/09/2025

Prior to the workshop the prioritization exercise was done. Invited participants were asked to fill in a questionnaire and indicate which KGs (biodiversity 16, pollution 16, land degradation 21) discussed during the 2nd workshop present a problem for their organization and/or may hinder the fulfilment of their task within the scope of their role and/or jurisdiction. The number of participants increased to 17 and they presented 14 different organisational affiliation. 11 questionnaires were filled in. The workshop started with the introduction of the results of the questionnaires. Actions were identified for the KGs that received the most votes in the groups. For each MO, a group was formed. Participants were rotated three times and mixed. Each participant met with each topic and all other participants. Each group had a notetaker of the discussion of the actions relevant to the top KGs. The discussions were summarized and introduced during a plenary session by iASK. Each participant was asked about their opinion on the format of the discussion and the most important takeaways. The overall opinion about the format was positive. All participants underlined the importance of the workshop and the need to further discuss the KGs and identify actions with regional relevance.

Stakeholder characterisation and participation

Institution / Organisation	Type of stakeholder		Scale of action (L, R, N)***	Main activity connected to focus land use? (Y/N)	Workshops attended (1, 2 and/or 3)	Observations (inc. justification of level, participation in other projects, etc.)
	Category*	Level (C, Ac, As)**				
State forestry of Bakonyerdő Zrt.	Practitioner, state-owned forest management	C	L, R	Y	1, 3	
State forestry of Bakonyerdő Zrt.	Practitioner, state-owned forest management	C	L, R	Y	2	
Bakonyerdő Ltd. Forestry Department of Keszthely	Practitioner state-owned forest management	As	L	Y	1	
Vino Pelso – Pelso Wine Culture Foundation	Practitioner Advisory Services and wine maker	C	L	Y	1, 2, 3	
Institute for Soil Science HUN-REN TAKI	Scientist (soil)	C	N	Y	1, 2	
University of Pécs, Department of Public Administration	Scientist (social science public administration, agricultural and environmental law	As	N	Y	1	
WWF	Civil Society	C	L, R, N	Y	2,3	
BirdLife Hungary	Civil Society	A	L, R, N	Y	2	
West-Balaton LEADER Association	Policy makers and administration, rural development	C	R	Y	2, 3	
Hungarian National Chamber of Agriculture	Practitioner – Advisory Services	C	R, N	Y	2	
Hungarian National Chamber of Agriculture	Practitioner – Advisory Services	C	R, N	Y	3	
Ministry of Agriculture/Herman Ottó Institute	Policy makers and administration – focus land use, environment,	C	N	Y	2, 3	
West Transdanubian Water Management Directorate	Water management of state-owned water resources	C	L, R	Y	2	OPTAIN

Institute for Soil Science HUN-REN TAKI	Scientist (soil)	C	L, R, N	Y	2, 3	OPTAIN
iASK	Scientist (social science, legal expertise on regulatory frameworks)	C	L, R, N	Y	2, 3	
Municipality of Keszthely	Municipal management, urban soil, and environment related service issues	C	L	Y	2	
Balaton-Uplands National Park	Nature conservation management including managing state-owned conservation areas	A	L, R	Y	2	
Balaton-Uplands National Park	Nature conservation management including managing state-owned conservation areas	C	L, R	Y	3	
Hungarian University of Agriculture and Life Sciences	Scientist (soil)	C	L, R, N	Y	2, 3	
Bakony Balaton Geopark	Nature conservation management and tourism	C	L, R	Y	3	
Association of Pannon Cities at iASK	Background research institution of policy makers, rural development advisors	A	R	Y	3	
Association of Pannon Cities at iASK	Background research institution of policy makers, rural development advisors	A	R	Y	3	
Association of Pannon Cities at iASK	Background research institution of policy makers, rural development advisors	A	R	Y	3	
BioVitis Winery	Practitioner/Industry, farmer, and wine maker	C	L	Y	3	

Zala County Government Office	Policy and administration – public authority focus on land use and environment	C	L, R	Y	3	
4iG IT	Practitioners and Sector organisation IT sector	C	L, R, N	Y	3	

Complete preliminary results of the workshops: Annex 1

Mid-term evaluation narrative

The number of participants attending the workshops increased each time. The growing variety of stakeholder types and spatial distribution represented (e.g. the LEADER group promotes the rural development of 35 settlements in the region with 35000 inhabitants.) made the discussion colourful and practice-oriented. All stakeholders have a direct interest in restoring soil health in the region; however, their interest is determined by the various organisational aims, tasks, and jurisdictions. Stakeholders appreciated the chance to meet and discuss local and regional soil health relevant issues, to participate in the identification and prioritization process of knowledge gaps and actions that are beneficial to most of them.

All stakeholders expressed the willingness to participate in future workshops.

The discussions on the knowledge gaps and actions helped stakeholders to share information on their experiments, their successes. The experiment regarding the agricultural utilization of the sediment of the Kis-Balaton and its potentials in improving soil health was well-received. As the experiments of the forest management to find resilient species to the negative impact of climate change by observing the behaviour and status of the trees and bushes under different circumstances and soil conditions. The observation of the forest managers proved that the first step in integrated pest management should be restoring soil health, and there is a limitation to the bearing capacity of soil (tree/hectare). These findings may have implications to agriculture land and soil management and the rules on the CAP.

The workshops proved to be good knowledge transfers and quasi training sessions due to the various aspects, and practical issues raised by the stakeholders. The result of the prioritization exercise showed the differences in approaches and interest and there were only a few knowledge gaps that earned six or more votes out of the 11 answers. However, during the discussion it became clear that there is an overall agreement that the development and implementation of effective education and training programmes, awareness raising events tailored to the special needs of the various stakeholders are key to reach behavioural change, and all stakeholders were ready to contribute to such actions. Most of the stakeholders underlined that some data gaps could be overcome by compilation and organisation of existing data from various local and regional sources including different documents of procedures before public authorities requiring various impact assessments.

During the workshops stakeholders started to review how their specific work could contribute to soil health. One of the suggestions was to integrate information on soil health issues during the guided tours in the national park, drawing the attention to soil functions, the beauty and the variety

of soils ecosystem services provided, and pointing to the historical background and causes behind soil degradation, and its negative cultural, social, economic consequences for the population.

The prioritization process asking stakeholders to focus on organisational needs proved the fragmented interest in soil health, the urgency for developing a holistic framework that is capable of integrating all interests while simultaneously acknowledging and highlighting conflicts and trade-offs.

2.5.4 Node 4 – Swedish urban-rural gradient

General description of the workshops

Workshop 1: Prioritization of soil health objectives for the focus land use and the wider landscape

Location: Lund University Ecology building, but also online.

Date: 22/01/2025

The first regional node workshop was held as an afternoon session. It included coffee and networking, presentations and discussions. This was our third attempt to organize the workshop, as it was difficult to get stakeholders willing to participate. When we clearly specified a topic for the workshop, soil pollution, stakeholders signed up. Eleven stakeholders participated in the workshop, eight participated physically and three virtually. They were very interested and thankful for the opportunity to share their experiences, ask questions related to their work, the problems they face, and receive feedback from others.

The main objective of the workshop was to select the top 3 regional priorities for soil regeneration in the focus land use and analyse these. Two mission objectives were clearly a prioritisation; i.e. Stopping soil sealing and the increase re-use of urban soils and Reducing soil pollution and enhancing restoration. Other mission objectives, like Reducing footprint on soils, Reducing land degradation, Conserving soil organic carbon stocks, and Conserving soil biodiversity were equal in importance. The organisers suggested that 'Conserving soil organic carbon stocks' would be chosen as the 3rd prioritised objective, because it resembled the discussion at the workshop very well. We also discussed the state of knowledge, when it comes to soil pollution and management of soil masses in the region of Skåne, and together concluded on knowledge gaps. These knowledge gaps were brought to the second regional node meeting.

Workshop 2: Prioritization of knowledge gaps for focus land use and wider landscape

Location: Gamla Biskopshuset in Lund

Date: 28/03/2025

The workshop was in the afternoon and included coffee and networking, presentations and discussions, both in group and plenary. We started with a presentation of SOLO and the workshop, and presentations from two different municipalities in Skåne on how they manage soil masses. Soil masses are the result from excavation, such as road and building construction. The management of these soils (that may be e.g. lightly or heavily polluted, containing invasive species, or excellent agricultural soil) and how to reuse them is a major challenge and touches upon many of the soil mission objectives.

For discussions, we divided the stakeholders into three groups. First they brainstormed on knowledge gaps (and actions) in terms of management of soil masses, then they assessed which of the knowledge gaps, identified by the Think tanks, apply to the region of Skåne. Then they prioritised their Knowledge gaps. The workshop ended in plenary with a presentation of each group's knowledge gaps.

20 stakeholders participated in the workshop. All the stakeholders were very enthusiastic. The main motivation for coming to the workshop seemed to be to meet others, get new contacts and re-establish old ones, speak out about problems and frustration, and get new ideas.

Workshop 3: Assess actions' synergies and trade-offs on Mission Objectives within the focus land use and wider landscape

Location: Gamla Biskopshuset in Lund

Date: 20/10/2025

The meeting format was the same as in the second workshop, with coffee and networking, presentations and both group- and plenary discussions. The first two workshops mainly focused on stakeholders that are working directly with soil. We were therefore missing the planning aspects for the focus land use, i.e. the Urban-Rural gradient. This workshop thus focused on the planning issues, and started with presentations on 1) Development on agricultural land from a socioeconomic perspective, and 2) City densification.

For discussions, we divided the stakeholders into three groups. First, they brainstormed on knowledge gaps and actions in terms of land use/city planning. Then they prioritised their Knowledge gaps. The workshop ended in plenary with a presentation of each group's knowledge gaps together with discussions.

20 stakeholders participated in the workshop. They came from municipalities, public sector organisations, NGO's and also farmers and consultants. Many were very enthusiastic as development of agricultural land is a heavily debated topic in the region.

Stakeholder characterisation and participation

Institution / Organisation	Type of stakeholder		Scale of action (L, R, N)***	Main activity connected to focus land use? (Y/N)	Workshops attended (1, 2 and/or 3)	Observations (inc. justification of level, participation in other projects, etc.)
	Category*	Level (C, Ac, As)**				
Stiftelsen Akademihemman /Lund University	Practitioners and sector organisations – focus land use Farmer	C	L	Y	1,2,3	
Arbetssökande samhällsplanerare	Practitioners – spatial planners	As	-	N	1	
Malmö City, fastighets- och gatukontoret	Municipality	As	L	Y	1	
COWI AB	Practitioners and sector organisations – focus environment	Ac	R	Y	1	
Lund University/SGI	Scientist/sector organisation – focus environment	C	R	Y	1	
Malmö City, Stadsfastigheter	Municipality – focus land use	C	L	Y	1,2	
Malmö City, fastighets- och gatukontoret	Municipality – focus environment	C	L	Y	1,2	
VA SYD	Practitioners and sector organisations – focus environment	C	R	Y	1,2	
COWI AB	Practitioners and sector organisations – focus environment	C	R	Y	1,2	
Helsingborg City, Stadsbyggnadsförvaltningen	Municipality – focus environment	C	L	Y	1,2	
Helsingborg City, Stadsbyggnadsförvaltningen	Municipality – focus land use	C	L	Y	1,2	
Helsingborg City, Miljöförvaltningen	Municipality – focus environment	C	L	Y	2	
Lund Municipality, tillsyn	Practitioners – advisory services	C	L	Y	2	
Länsstyrelsen Skåne	Practitioners – advisory services	C	R	Y	2	

Malmö City, Miljöförvaltningen	Municipality – focus environment	C	L	Y	2	
Malmö City	Municipality – focus environment	C	L	Y	2	
Malmö city, miljöförvaltningen	Municipality – focus environment	C	L	Y	2	
Lund Municipality	Municipality – focus environment	C	L	Y	2	
Malmö city, fastighets och gatukontoret	Municipality – focus land use	C	L	Y	2	
Malmö city, fastighets och gatukontoret	Municipality – focus land use	C	L	Y	2	
Malmö city, fastighets och gatukontoret	Municipality – focus land use	C	L	Y	2	
Lund Municipality	Municipality – focus land use	C	L	Y	2	
Svarteåns Vattenråd and Den Goda Jorden	Practitioners and sector organisations – focus land use	Ac	R	Y	2,3	
Jordvetaren	Practitioners and sector organisations – focus land use	C	R	Y	2,3	
Swedish University of Agricultural Sciences	Scientist – focus land use	C	N	Y	3	
Lund University/Agrifood	Scientist – focus land use	C	N	Y	3	
Kävlinge Municipality	Municipality – focus land use	C	L	Y	3	
Ekologigruppen	Practitioners and sector organisations – focus land use	Ac	R	Y	3	
Kävlinge Municipality	Municipality – focus land use	C	L	Y	3	
Länsstyrelsen Skåne	Practitioners – advisory services	As	R	Y	3	
Ekologigruppen AB	Practitioners and sector organisations – focus land use	Ac	R	Y	3	
Lunds Municipality	Municipality – focus land use	As	L	Y	3	
Lunds Municipality	Municipality – focus land use	C	L	Y	3	
HUT Skåne	Practitioners and sector organisations – focus land use	Ac	R	Y	3	

Lunds Municipality	Municipality – focus land use	C	L	Y	3	
VA Syd	Practitioners and sector organisations – focus land use	C	R	Y	3	
Den Goda Jorden	Practitioners and sector organisations – focus land use Farmer	Ac	R	Y	3	
Den Goda Jorden	Practitioners and sector organisations – focus land use Farmer	Ac	R	Y	3	
Den Goda Jorden	Practitioners and sector organisations – focus land use	Ac	R	Y	3	
Den Goda jorden	Practitioners and sector organisations – focus land use	Ac	R	Y	3	
VattenAtlas	Practitioners – spatial planners	C	R	Y	3	

Complete preliminary results of the workshops: Annex 1

Mid-term evaluation narrative

During the years 2024-2025, Lund University has organised three regional node workshops. Our expected outcomes were to pick up the knowledge gaps in urban-rural land use context, that would we be across the selected Think Tank objectives, i.e. Soil sealing and reuse of urban soils, Soil pollution and Soil organic carbon stocks. We have followed the lead instructions to receive the type of outcome needed from each workshop (drivers, knowledge gaps, actions) but with modifications to best suit the needs of stakeholders working in the Urban-Rural gradient. While organising the 1st workshop we learned that stakeholders are more willing to participate if the topic of the workshop is not too broad. Thus, we organised the two first regional node workshops for stakeholders who work directly with soils and the third workshop with stakeholders who work with or are interested in city/land use planning. By doing this we got relevant stakeholders from a large range of land use issues and decision making. Each workshop started with presentation/s from municipalities and researchers related to the subject, that both attracted stakeholders and could be used as inspiration for the discussions.

The regional node workshops have reached a variety of stakeholders. People from municipalities, public sector organisations, NGO's, farmers and consultants have participated in the workshops. We had 11 stakeholders participating in the 1st workshop and 20 stakeholders in both the 2nd and 3rd workshop, in total 41 stakeholders. Together, we have identified knowledge gaps for the urban-rural gradient in the region and potential actions that could fill the knowledge gaps.

One major issue that was brought up at the workshops as a source of knowledge gaps was lack of collaboration between and among companies and municipalities that are working with related topics. These workshops were a step in the right direction to fill that gap. The main motivation for coming to the workshops, especially the 1st and 2nd one, seemed to be to meet others, network and get new contacts, speak out about problems and frustration, and get new ideas. Forming more networks increases the interactions among stakeholders. Discussions on best practices were appreciated and potential uptake by municipalities was increased.

3 Soil Week events

3.1 Introduction: common methodology

Soil Weeks' common methodology was initially established through internal guidelines in November 2023 (M12). As the events started being implemented and the methodology tested, the guidelines were updated in April 2024 (M17) and in September 2024 (M22). The newest version of the document includes the then recently developed workflow of all SOLO activities, as well as an event protocol.

Whereas the need for flexibility with the Regional Nodes was identified once the workshops started being planned, with the Soil Weeks this required flexibility was evident from the start. The initial idea was for all Soil Week events to take place in the first week of December, to mark World Soil Day (5th of December). However, this was likely to hinder stakeholder participation in cold, Northern countries like Sweden, Finland and Norway where soils are frozen and/or snow-covered in that time of the year. Likewise, holding all the events in Summer would be problematic in Southern Europe due to the heat and dried-out state of the soils. It was therefore decided that partners would be free to organise their events at any time of the year, as long as they were held annually. The 2023 event constituted an exception, as some partners ended up postponing their event to the first semester of 2024. It hence became clear that a flexible approach was needed, so that it would be inclusive of the particularities of the 12 different countries in which Soil Week events take place. This is reflected onto the broad, yet clear guidelines that were produced, and which were meant for general guidance rather than strict following. The document was nevertheless essential to ensure a certain uniformity of the results, to align the results of the Soil Week events to the work being produced by the Think Tanks, and to establish a mechanism to monitor and evaluate the progress of the Soil Week events through systematic reporting.

Bearing in mind a general need for flexibility, a common approach to the Soil Weeks was then built around four main axes, shortly described below: i) topics of the events, ii) types of events, iii) typology of engaged stakeholders, and iv) a common reporting template.

Topics: Think Tank topics

Soil Week events are thematic, so that all Think Tank topics (Mission Objectives plus Nature conservation of soil biodiversity) are covered. Topics rotate yearly from country to country to diversify input on context-specific knowledge, and to raise awareness about a wider variety of subjects per country.

Every year, all the topics are covered across the various participating countries, which is ensured by a distribution process facilitated by the activity coordinator (Evora): Soil Week partners propose the topics they would like to cover; WP3 checks whether the selected topics match the priorities found in the Drivers' analysis for each regional context, and validates or makes recommendations to change the topics. Evora then confirms if all the topics have been covered and finalizes the distribution of topics across countries.

Types of events

Soil Week partners may choose the type of event that best suits their yearly objective, keeping in mind, however, that event typology is directly linked to the type of stakeholders who are targeted – and that a wide participation, including of diverse stakeholders, is desirable. Collaboration with initiatives, projects and partners outside the SOLO network is not only possible, but also desirable, as it contributes to avoid stakeholder fatigue, and to amplify the impact and outreach of Soil Week events.

Different types of events are not limited to, but may include: lectures, conferences, workshops, participatory discussions, national or regional scale dissemination events, field visits and field demonstration events, among others.

Typology of stakeholders

Soil week events should engage stakeholders that:

i. Cover different domains related to soil management and soil ecosystems services;
ii. Represent different socio-economic sectors;
iii. Are as much as possible categorized as "core" stakeholders, in terms of their knowledge and influence.

Table 5 shows a possible distribution of stakeholder types, respecting the broad types considered by WP2, but with a more detailed classification. Not all types need to be included but it is important that different types of stakeholders are involved.

Table 5 – Stakeholder typology to guide a wide distribution of stakeholders to be involved in each Soil Week event and along the different events.

	CORE stakeholders	ACTIVE stakeholders	ASSOCIATED stakeholders
Policy makers and administration - agriculture			
Policy makers and administration – environment			
Policy makers and administration – other			
Practitioners and Sector organization – agriculture			
Practitioners and Sector organization – forest			
Practitioners and Sector organizations – other			
Practitioners – Advisory Services			
Practitioners – Training entities			
Practitioners – Spatial planners			
Industry- production factors			
Industry – Agri-food Companies			
Scientists – Soil			
Scientists – Agronomy and Forestry			
Scientists – Environment and Biodiversity			
Other – Civil Society			

Common reporting template

A common Soil Week reporting template was created with the purpose of ensuring a certain level of uniformity and comparability of the results achieved in very diverse events. The reporting template was also designed to mimic the elements and structure of the Think Tanks' roadmaps to facilitate the two-way integration of knowledge (Soil Weeks -» Think Tanks and vice-versa) and, ultimately, the regionalization of the overarching roadmap.

As such, the common reporting template includes the following sections:

- General description of the event;
- Quantification and characterisation of the involved stakeholders (if not possible to follow Table 5, at least a general characterisation of the targeted participants [e.g., policy makers, or researchers];
- Identification of potential revisors of the Think Tank roadmaps;
- Identified Knowledge Development Gaps and Knowledge Application Gaps;
- Identified actions;
- Identified bottlenecks;
- Identified expected outcomes resulting from the proposed actions;
- Remarks concerning the priority question/topic provided by the Think Tank or Regional Node;
- Brief narrative around the main impressions collected during that event, regarding stakeholders' interest and motivations, gaps and bottlenecks, solutions and outcomes, particularities resulting from the national or regional context where the event took place;
- Photographic evidence.

To clarify how to bring all of these elements together, therefore rendering them operational, an event protocol was produced.

Protocol for Soil Week events

1. **Aim of the Soil Week events:** Soils Weeks' ultimate goals are to contribute to the regionalisation of the SOLO's European roadmaps and to raise awareness on the vital role of soils by:
    a. Having yearly events across the 12 European countries where there are SOLO partners, and if possible, also even in neighbour countries;
    b. Widening and diversifying SOLO's network of local stakeholders;
    c. Collecting region-specific knowledge and perspectives from local stakeholders;
    d. Complementing and validating information produced within the SOLO activities by broadening the audience.
2. **Soil Week events**: Soil Week events are held yearly in the following 12 European countries – Portugal, Spain, Belgium, The Netherlands, Italy, Greece, Bulgaria, Hungary, Germany, Norway, Sweden, Finland.
3. **Duration**: Soil Weeks are held yearly in each country between M7 (June 2023) and M48 (November 2026).
4. **Criteria for stakeholder selection:** Stakeholders to be involved should cover different domains related to soil management and soil ecosystems services. Table 5 shows a possible distribution of stakeholder types; not all types need to be included but it is

important that different types of stakeholders are involved. Stakeholders also should be characterised as “core”, “active” and associated”, depending on their level of influence and engagement in soil management decisions and advisory, particularly if they are identified as being potential reviewers of SOLO’s outputs.

5. **Number of stakeholders:** Considering that Soil Week events are also dissemination and awareness-raising activities, there is no limit to the number of participants/stakeholders.
6. **Proposals for Soil Week events:** Soil Week partners are responsible for submitting their event proposal to the Task leader (Evora). Proposals must include i) the selected Think Tank topic(s) / Mission Objective(s), ii) information about the type of event, iii) expected date. The submission process is as follows:
    a. Evora creates and shares an online document for partners to register their proposals;
    b. SW partners fill in the document with their proposal’s details;
    c. WP3 checks the document and evaluates whether the proposals match the respective regional analysis on the Drivers for soil health;
    d. If relevant, Evora contacts SW partners to inform them of WP3’s suggestions, allowing time for changes to the initial proposal;
    e. Evora validates the proposals by reaching out to SW partners individually.
7. **Priority question or topic for *Independent Soil Weeks*:** Think Tanks must provide a priority question or topic for the SW partners to explore in their Soil Week event, not only to ensure the workflow within SOLO, but also to receive regionalised input to their roadmaps. The priority question or topic should be decided upon once the Think Tank topic(s) / Mission Objective(s) have been distributed, so that the Think Tanks are aware of the region(s) which they should address. SW partners and Think Tank leaders should consider the following:
    a. To determine the priority question or topic, SW partners and Think Tank leaders should communicate directly;
    b. SW partners reach out to the respective Think Tank leader(s) to i) inform them that they will tackle their priority question; ii) ask for their collaboration in providing the priority question or topic; iii) determine the level of engagement / discussion (e.g., is the TT only expected to provide the priority question/topic, or are both parties willing to collectively discuss what that question should be and/or how it could be integrated in the event?);
    c. SW partners are free to decide how the priority question or topic will be addressed at their events (e.g., main topic of the event, topic of a session within the event, question included in a questionnaire or evaluation form, etc.);
    d. Reporting: the Reporting Template includes a field for SW partners to report on their findings regarding the priority question or topic.
8. **Priority question or topic for *Node Soil Weeks*:** Node Soil Week events are organised by the respective Regional Node partners. Therefore, the priority question or topic is decided upon internally within the team. To determine the question or topic, Regional Node partners should consider the following:
    a. The Node Soil Week event is an opportunity to focus on a priority question / topic that arose from the Regional Node workshop, while broadening the audience beyond the Regional Node’s stakeholders;
    b. Node Soil Week events do not have to be limited to the Regional Nodes’ case-study area. Instead, Node Soil Week events may be held in other regions within the country (also for comparison purposes) or at the national level;
    c. Consequently, priority questions or topics must be relevant not only to the case-study area, but also to the context in which the Node Soil Week events will be held;

d. Node Soil Week partners are free to decide how the priority question or topic will be addressed at their events (e.g., main topic of the event, topic of a session within the event, question included in a questionnaire or evaluation form, etc.);
e. Reporting: the Reporting Template includes a field for SW partners to report on their findings regarding the priority question or topic.

9. **Reporting Soil Week events:**
    a. Soil Weeks Report: until 1 month after the event, SW partners should submit the Report to Evora, the respective Think Tank(s) or Regional Node, and WP4. SW partners may either send the Report by email to all the above-mentioned, or upload it to SOLO's Internal Repository and inform the referenced partners by email. Considering that the Soil Weeks Report is the main output of this activity, SW partners are encouraged to analyse the Reporting Template while planning their event, to make sure that collect all the relevant information;
    b. SOLO Dissemination Activities Form: until 1 month after the event, SW partners should fill in the SOLO Dissemination Activities Form. If necessary, Pensoft will request further information;
    c. Report in national language: although not mandatory, it is suggested that SW partners produce a report in the national language, to disseminate the event's results locally. It may be a translation of the Soil Weeks Report or a simpler document, specifically bearing in mind the local/regional/national audience.
10. **Governance:**
    a. Evora is the Soil Weeks leader and, as such, is responsible for the general coordination of the task, namely i) keeping track of the timeline, ii) ensuring that partners are duly informed of all relevant information, iii) ensuring communication among partners, iv) centralising, managing and sharing the results of the Soil Week events with SOLO;
    b. Soil Week partners are responsible for proposing, organising and reporting on their yearly Soil Week events.

As the protocol indicates, regular communication took place via email, mostly between the activity coordinator (Evora) and the Soil Week partners. Equally important were the in-person sessions, dedicated to the Soil Week events, which took place during every SOLO general meeting. These sessions were paramount for experience exchange among partners and, as a consequence, for good examples to be a source of inspiration. They were also important moments for collective reflection and to take learned lessons into the planning of the future Soil Week events. The 2025 Spring general meeting, in particular, was an opportunity to reflect on the impact of the Soil Weeks, especially as the meeting took place exactly half way through the implementation period of the Soil Weeks. The presentation of a simple impact assessment of the past 2 Soil Weeks (2023 and 2024), prompted a lively debate about the intended impact of the events and the strategy to achieve it. As some partners had already organised their yearly event, or had already planned it in detail, the guidelines were kept in place for that year's events. However, partners were encouraged to take action and increase the impact as much as possible, namely by reflecting on the following questions:

- Will the event's format contribute to the Soil Week's diversity?
- Will the event's target audience contribute to the Soil Week's diversity?
- Does the number of expected participants seem adequate to your target?
- Will the event foster the active participation of stakeholders?

- Will the event foster the creation or the strengthening of SOLO's network?

In that same meeting, however, it was agreed that the final Soil Week, in 2026, should take a different form to increase its impact exponentially. Therefore, the 2026 Soil Week events will all be held within the same period, in Spring, and, instead of focusing on the Mission Objectives / Think Tank topics, will be dedicated to transversal subjects. The main purpose of this shift in content is to obtain harmonized country-specific input to support the regionalization of SOLO's overarching roadmap. At the time of submission of this Deliverable, not all details have been defined, but the 2026 Soil Week events will likely cover the overarching themes of the knowledge gaps that have been detailed in the first synthesis Deliverable D4.2.

Finally, the Soil Weeks' common timeline for 2023-2026 is in Table 6.

Table 6 – Soil Weeks' timeline for the period 2023-2026. Activities marked in green have been finalised; activities in blue are ongoing; activities in grey are planned.

	2023											
	1	2	3	4	5	6	7	8	9	10	11	12
SW internal guidelines												
Deliverable D4.7												
Deliverable D4.5												
2023 SW												
2024 SW												
2025 SW												
2026 SW												
Reporting (to Think Tanks, WP3, RNs, WP4)												

	2024											
	1	2	3	4	5	6	7	8	9	10	11	12
SW internal guidelines												
Deliverable D4.7												
Deliverable D4.5												
2023 SW												
2024 SW												
2025 SW												
2026 SW												
Reporting (to Think Tanks, WP3, RNs, WP4)												

	2025											
	1	2	3	4	5	6	7	8	9	10	11	12
SW internal guidelines												
Deliverable D4.7												
Deliverable D4.5												
2023 SW												
2024 SW												
2025 SW												
2026 SW												
Reporting (to Think Tanks, WP3, RNs, WP4)												

	2026											
	1	2	3	4	5	6	7	8	9	10	11	12
SW internal guidelines												
Deliverable D4.7												
Deliverable D4.5												
2023 SW												
2024 SW												
2025 SW												
2026 SW												
Reporting (to Think Tanks, WP3, RNs, WP4)												

3.2 Overview of the Soil Weeks' preliminary results

Three Soil Weeks have taken place so far (in 2023, 2024 and 2025), resulting in a total of 34 Soil Week events across 12 countries. All of the 2023 and 2024 events have been concluded and, as for the 2025 events, two are not considered in this report: Finland's event happened in mid-November, which did not allow sufficient time for reporting and result integration, and Spain's event will be held in mid-December. The overview of the Soil Weeks is presented in Table 7.

Table 7 – Summary of the Soil Week events that took place between 2023 and 2025.

Partner	Mission Objective		Type of event	Date of the event	Duration of the event	Nr. Of participants
	Main	Secondary				
Spain	Nature conservation of soil biodiversity	Soil literacy	Seminar	04/12/2023	0,5 day	3
	Pollution and restoration	Nature conservation of soil biodiversity	Technical day	11/12/2024	1 day	52
	Soil sealing and urban soils	-	Seminar and workshop	12/12/2025 (TBC)	0,5 day	tbh
The Netherlands	Soil literacy	-	Citizen Science	22/09/2023 – 08/10/2024	14 days	1500
	Soil literacy	Nature conservation of soil biodiversity	Surveys, Soil safari	20/09/2024 – 07/10/2024	2 weeks	2873
	Soil sealing and urban soils	Nature conservation of soil biodiversity	Surveys, Soil safari	26/09/2025 – 08/10/2025	2 weeks	1750
Germany	Soil literacy	Land degradation and desertification; Soil biodiversity	Workshop	25/10/2023	1 day	29
	Soil literacy	-	Session in Conference	18/09/2024	0,5 day	4
	Land degradation and desertification	Soil organic carbon stocks	Field visit	04/09/2025	1 day	150
Bulgaria	Nature conservation of soil biodiversity	Soil literacy	One-day conference	January 2024	0,5 day	30
	Pollution and restoration	Erosion prevention	Scientific symposium	03/12/2024	0,5 day	20
	Soil sealing and urban soils	Footprint on soils	Webinar	28/10/2025	1,5 hours	5

	Soil sealing and urban soils	-	Breakfast seminar	17/01/2024	0,5 day	85
	Soil sealing and urban soils	Footprint on soils	Seminar	04/09/2024	0,5 day	80
Sweden	Soil literacy	Nature conservation of soil biodiversity	Outreach family event	10/05/2025	1 day	125
	Land degradation and desertification	-	Conference	14/12/2023	1 day	135
	Nature conservation of soil biodiversity	-	Seminar	30/10/2024	0,5 day	150
Portugal	Erosion prevention	Soil structure	Field visit	15/09/2025	0,5 day	21
	Soil structure	Nature conservation of soil biodiversity	Workshop	07/05/2024	1 day	25
	Nature conservation of soil biodiversity	Soil structure	Flash talk + poster in conference, survey	07/01/2025 – 08/01/2025	2 days	200
Finland	Soil literacy	-	Seminar, survey	15/11/2025	1 days	-
	Pollution and restoration	-	Workshop	14/12/2023	1 day	17
	Soil organic carbon stocks	-	Hybrid workshop	4/12/2024	0,5 day	56
Hungary	Erosion prevention	-	Hybrid workshop	10/10/2025	0,5 day	46
	Land degradation and desertification	Erosion prevention	Conference	13/05/2024	0,5 day	30
	Land degradation and desertification	Pollution and restoration, Nature conservation of soil biodiversity	Webinar	25/02/2025	0,5 day	30
Greece	Soil organic carbon stocks	Soil sealing and urban soils	Webinar	21/10/2025	0,5 day	25
	Soil organic carbon stocks	-	Webinar	01/02/2024	0,5 day	60
Norway	Soil organic carbon stocks	Land degradation and desertification, Erosion prevention	Seminar, workshop, round table	29/10/2024 – 30/10/2024	2 days	50

	Soil structure	Pollution and restoration, Soil organic carbon stocks	Seminar	28/10/2025 – 29/10/2025	2 days	70
Belgium	Footprint on soils	Soil literacy	Workshops	Year-round	Year-round	650
	Footprint on soils	Soil organic carbon stocks	Forum	05/12/2024	1 day	200
	Soil sealing and urban soils	Nature conservation of soil biodiversity, Soil literacy	Field visit	23/09/2025	0,5	45
Italy	Soil sealing and urban soils	-	Open seminar	18/12/2023	1 day	38
	Pollution and restoration	Soil sealing and urban soils	One-day workshop	11/12/2024	1 day	11
	Land degradation and desertification	Soil literacy	Seminar	20/2/2025	0,5 day	90

Tracing stakeholder participation in Soil Week events is not as straightforward as in the Regional Node workshops. Regional nodes have smaller dimensions and engage stakeholders through direct invitation. By contrast, Soil Week events are more diverse, which makes it more difficult to characterize the participants and track their exact numbers and whether or not they have participated in more than one event. While some Soil Week events have engaged a lower number of participants than the Regional Node workshops, others have reached hundreds of people, mostly in outreach-oriented activities like open days, or sessions which are integrated in larger initiatives, such as conferences or forums. This diversity translates directly into the partners' capacity to register information about the stakeholders: in some cases, the number of stakeholders is precise and it was possible to characterise each participant; in other cases, the number is approximate and it was only possible to indicate which sectors were present. In this Deliverable, the number of involved stakeholders corresponds to the information that was reported by each partner. The typologies of stakeholders were narrowed down to WP2's broader categories to ensure that the results were comparable. However, in the subsections dedicated to the countries' results, the level of detail in stakeholder characterisation varies according to what was reported by each partner.

A total of 8655 stakeholders have participated in the Soil Week events, and the 2024 Soil Week was the most attended (Figure 4). It should be noted, however, that the numbers of the 2025 Soil Week do not yet include two events (Spain and Finland).

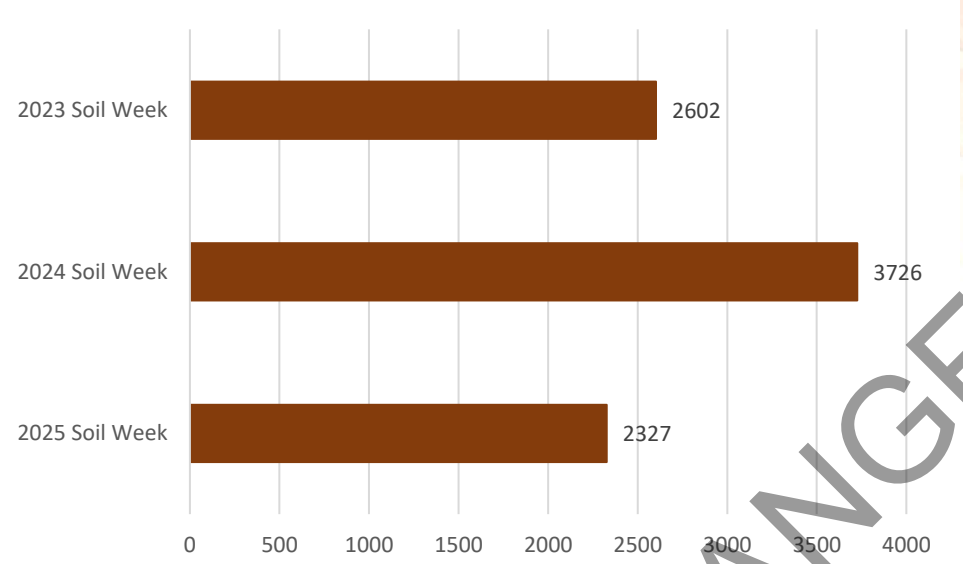

Figure 4 – Number of stakeholders involved in the Soil Weeks, per year.

As for stakeholder typologies, the already mentioned disparities in the data collected hinders a detailed characterisation and does not allow to assess how many stakeholders were present per type. It was possible, however, to have an overview of the representation of stakeholder typologies by counting every reference of the reached audiences per Soil Week event. By analysing Figure 5 it is evident that all sectors have been reached. The most involved types of stakeholders were scientists and those in the public sector. The least represented types of stakeholders were the private sector and industry.

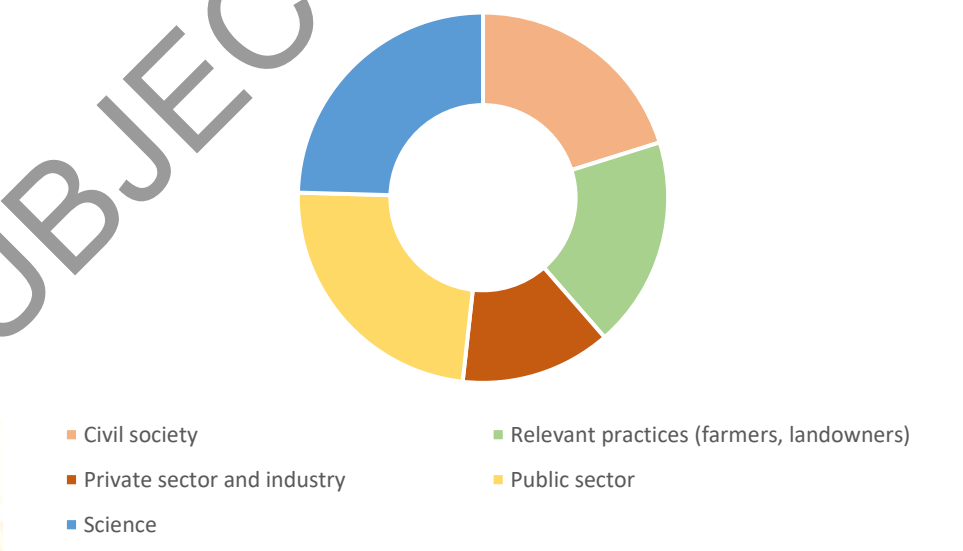

Figure 5 – General representation of stakeholder typologies that participated in the 2023-2025 Soil Weeks (reference count per Soil Week events).

Considering the Soil Weeks' aim at raising awareness about the importance of soil health, engaging a wide and diverse range of stakeholders across 12 countries is, in itself, a positive result. As for the outcomes in terms of content, Soil Week events allowed for the collection of input on the regionally relevant knowledge gaps, bottlenecks and actions. In total, more than 200 knowledge gaps, 190 bottlenecks and 155 actions were identified across countries and topics. A note is due, however, on the quality of the information gathered, again by comparison to the Regional Nodes: while the outcomes of the latter result from a continuous process of co-construction of knowledge with selected stakeholders, the extremely diverse Soil Week events necessarily produce results with varying degrees of detail and depth. Even though this fact is not problematic, it should be considered.

All Mission Objectives were covered, at least by 4 different countries (Table 8). The least addressed topics were Footprint on soils and Soil structure; and the most addressed, by 7 countries, were Soil literacy, Nature conservation of soil biodiversity and Soil organic carbon stocks. In the context of the Soil Weeks, comparing the least and the most covered topics does not necessarily point to their relevance or urgency for the various countries, but rather to their relatability to wider audiences. Although this could be perceived as a challenge to capture the regional priorities, it actually provides valuable insights into the topics that are more likely to succeed in raising awareness about soil health and, consequentially, to be used as entry points to capture the attention of wider audiences.

Table 8 – Mission Objectives covered by each country in the course of the 3 Soil Weeks.

Topic/ Mission Objective	SP	NL	DE	BL	SW	PT	FI	HU	GR	NO	BE	IT
Pollution and restoration												
Soil literacy												
Land degradation and desertification												
Erosion prevention												
Soil sealing and urban soils												
Nature conservation of soil biodiversity												
Soil structure												
Soil organic carbon stocks												
Footprint on soils												

Detailed results are presented in the following subsections of this document and in Annex 2, and an analysis of the Soil Weeks' contribution to the regionalization of the overarching roadmaps is carried out in Deliverable D4.2.

3.3 Mid-term evaluation of the Soil Weeks

This section results from the analysis of the Soil Week partners' mid-term evaluation narratives, as well as of the conducted semi-structured talks.

Soil Weeks are an ambitious initiative. Succeeding to mobilize 12 SOLO partners, across 12 different countries, to organise yearly events, is in itself a noteworthy achievement. Managing to raise awareness about soil health among different types of stakeholders while collecting input about regional needs and priorities at the same time, adds a layer of complexity. This twofold goal came with challenges, but it was accomplished.

A bigger challenge than initially expected resulted from balancing these two dimensions of the Soil Weeks, namely raising awareness about soil health and collecting sound inputs to support the regionalization of SOLO's roadmap. At first, the translation of these two dimensions into practice could seem paradoxical: reaching large numbers of people from different backgrounds is more easily achieved in generalist-type events that are less likely to promote in-depth discussions (although there have been many discussions with visitors that enabled SOLO partners to explain in a more in-depth manner why soils are so essential for humans). Secondly, the format of the event reflects directly on the type of information that is gathered: whereas some smaller-scale events engaged key stakeholders (e.g., workshops with soil scientists), producing specialized knowledge; other larger-scale events engaged multiple types of non-specialized stakeholders (e.g., children, students, policy makers), providing insights about their level of awareness.

It is paramount that the diversity of the collected information is acknowledged and taken into consideration, particularly when analysing and integrating the results. Rather than robust and final, Soil Week results, so far, are indicative of the countries' R&I needs and priorities. To ensure more representative, uniform and comparable results across countries, the 2026 events will take on a different format, covering transversal topics and engaging similar stakeholder typologies across the 12 countries.

Nonetheless, previous Soil Week events have provided various meaningful results. They were valuable opportunities to gather a wide range of knowledge, even if not necessarily in-depth. In fact, some partners consider that the Soil Week events – particularly the outreach activities – were one of the most interesting and stimulating activities of the SOLO project. This perception is mostly connected to the direct contact, dialogue, exchange and engagement with a vast variety of non-academic researchers, and how this interaction promoted access to real-world concerns and priorities. The impact of this encounter is manifold.

Soil Week events allowed for a large-scale validation of the importance to perceive and address soil health through a systems-approach. In every country, cross-cutting concerns emerged, in spite of the topical focus of the events. Examples of such concerns are the need to develop and integrate the economical dimension of soil health, to bridge the gap between science and policy, and to invest in soil literacy, namely by creating contents, materials and policy programmes. Understanding and integrating not only the environmental, but also the economic, social and political dimensions of soil health demands an inter- and transdisciplinary approach, and the creation of spaces for dialogue and network creation. Soil Week events have both identified these needs and provided a platform to address them.

Furthermore, Soil Week events seem to have been invaluable learning tools, not only for the participants, but also for the Soil Week partners. Apart from getting in touch with the stakeholders' general concerns, SOLO partners learnt lessons that are likely to have future ramifications in their activities beyond SOLO. One of the mentioned aspects was the usefulness and efficiency of combining the Soil Week events with other initiatives, platforms or projects, as it contributes to avoid stakeholder fatigue, increases visibility and outreach, promotes the solidification of existing networks and fosters cross-fertilization, namely among Mission Soil projects.

Another lesson is related to engagement strategies, partly in line with the Regional Nodes' conclusions. It appeared that stakeholders responded particularly well to events that address their direct interests and needs, which means that in some instances it may be more beneficial to introduce soil health in an event that is dedicated to a different topic (e.g., a specific land use, or transversal issues), than to place it front and centre. Moreover, activities that foster a sense of fun tend to be the most engaging. In this regard, one of the partners wrote a particularly meaningful line, which is useful for all future soil-related activities: "all agents involved must build a new narrative about soils far beyond the environment".

In spite of the challenges that are inherent to the Soil Weeks' two-fold goal, the results achieved so far are very encouraging. Alongside wide-ranging, yet regionally-specific data, the events have been able to raise awareness among thousands of stakeholders, to contribute to SOLO's partners learning process and to create perspectives into the future.

3.4 Moving forward

Within SOLO's timeframe, Soil Weeks will be active until November 2026 (M48). Until then, the fourth and final Soil Week will take place between March and June (in a shorter period to be defined), results will be processed, and Deliverable D4.5 "Synthesis of the lessons learned from the regional nodes and soil week events including future steps" will be submitted (M48). Later on, in November 2027 (M60), a final report will be submitted on the "Evaluation of the soil week events and future steps" (Milestone M20).

Evora, in collaboration with WP4 leaders (NIOO) and SOLO's coordination team, will draft the structure, guidelines and reporting template of the 2026 Soil Week in the upcoming months. Evora will also elaborate a structure draft for D4.5, to be jointly discussed in the next SOLO general meeting (in Spring 2026).

As mentioned in the previous section, the final Soil Week to be held in 2026 will have a different format, in order to obtain more uniform results across the 12 countries that allow comparison across European main regions. Details are still being defined, but this shift will likely come about on the following aspects:

- Topic: dedicating the events to cross-cutting topics instead of the Mission Objectives. This approach has been discussed with respect to WP4's synthesis that also leads to a focus

on main (cross-cutting) knowledge gaps that are relevant for most Mission Objectives. Therefore, the approach for the Soil Week in 2026 will harmonize with WP4's synthesis developments that lead to overarching themes in the knowledge gaps (see further D4.2);
- Type of event: narrowing down the range of possibilities to types of events that foster in-depth discussions (e.g., workshop, round table, seminar);
- Stakeholder typologies: defining guidelines about the stakeholders that must be involved, in terms of sector represented, level of influence, and scale of action;
- Date: setting a narrower period for all the events to take place (in Spring, exact dates to be defined), as a strategy to increase visibility and, ultimately, impact.

Finally, most academic Soil Week partners consider continuing this type of event after SOLO ends, even though there is uncertainty in terms of their shape: without specific funding, they may be integrated in other projects or initiatives, therefore losing the Soil Week label.

In any case, the networks that have been created in the scope of the Soil Weeks are perceived as a long-lasting legacy. Alongside the bridges that have been built among stakeholders, the seedlings of concrete collaborative initiatives emerged: a soil-related "matchmaking platform" is being discussed in Flanders (Belgium), as well as the creation of a Greek soil data hub, and an informal network has already resulted in a meeting in Portugal to discuss the transposition of the Soil Monitoring and Resilience Law. In spite of it being unsure whether these initiatives will flourish, the fact that discussions were initiated within the scope of the Soil Weeks is a very positive outcome.

3.5 Soil Weeks' preliminary results per country

3.5.1 Portugal

Soil Week event 2023

Title of the event: Agenda Solo – Regeneration pays off

Location: Oeiras

Date: 14/12/2023

Scale of the discussion: National and EU level

Mission Objectives / Think Tank topics covered: Land degradation and desertification

Number of stakeholders involved: 135

Typology of stakeholders involved: Civil society: 1; Relevant practices: 18; Public sector: 40; Science: 58; Unspecified: 18

EVORA's 2023 Soil Week Event was entitled Agenda Solo and it was coupled with the launching of another soil-related project, Solo & Água 2030. The conference gathered key national and European stakeholders from all sectors, both as speakers and audience. It was co-organised by the Associated Lab CHANGE, the Competence Centre for Planning, Policy and Foresight, the General Directorate for Agriculture and Rural Development) and the National Institute for Agriculture and Veterinary Research.

The event intended to raise awareness, particularly among technicians, managers and policy makers, to the importance of sustainable, adequate and adaptive management of both Soil and Water. For that purpose, the conference covered several topics, from funding ecosystem services of soil and landscape structures (in which Slovakia's strategic approach was presented as a good practice), to the binomials "soil and agriculture", "soil and regional perspectives", and "soil and policy making". It was commonly found that the most prominent knowledge gaps are related to insufficient acknowledgement and, consequently, existing research, on the soil and water nexus; coordination among decision makers, research community, private sector and civil society to co-create evidence-based public policy; harmonization of public policy instruments; and knowledge transfer to producers, landowners and land managers.

Soil Week event 2024

Title of the event: Lecture at the V Iberian Congress on Dehesas and Montado

Location: Montemor-o-Novo

Date: 30/10/2024

Scale of the discussion: Regional (Alentejo) and Iberian

Mission Objectives / Think Tank topics covered: Nature conservation of soil biodiversity

Number of stakeholders involved: 150

Typology of stakeholders involved: Most of the participants were public administration representatives, followed by producers / farmers and researchers

The event was held during the V Iberian Congress on Dehesas and Montado, and the latter's aim was to reflect on business models and solutions that could open up new paths for the agro-silvo-pastoral systems of the Montado and Dehesa, threatened by climate change and low profitability. The Soil Week event was meant to be a field demonstration at a local farm but, due to bad weather, it was adapted to an indoors, on-site lecture. A presentation on soil microbiology and a practical demonstration of soil sampling had been planned; instead, professors Isabel Brito and Pedro Lynce gave lectures on the importance of soil health for the Montado's ecological and economic sustainability, with particular focus on soil microbiology.

While "soil champions" were present, part of the audience seemed to receive the lectures on soil health and microbiology as novel. The event was, hence, an opportunity to raise awareness and provide training. It was also possible to gather the producers' and researchers' assessment and main concerns regarding soil biodiversity in Montado systems. It was connected to the Portuguese Regional Node as it focused on the same type of land use, and on one of the priority Mission Objectives in the region.

Soil Week event 2025

Title of the event: Field visit – Experimental Centre for Soil Erosion of Vale Formoso

Location: Mértola

Date: 15/09/2025

Scale of the discussion: Regional (Mértola, Alentejo)

Mission Objectives / Think Tank topics covered: Erosion prevention, Soil structure

Number of stakeholders involved: 21

Typology of stakeholders involved: Most of the participants were public administration representatives, followed by researchers, and members of civil society (individuals and NGO representatives). Two farmers and representatives of farmers' associations participated as well.

The event consisted of a guided visit to Centro Experimental de Erosão de Solo de Vale Formoso (Experimental Centre for Soil Erosion of Vale Formoso), which was led by the Scientific Coordinator of the Centre, the geographer and soil erosion specialist Maria José Roxo. The first part of the event took place at the Centre's laboratory and, on the second part, participants walked by the experimentation plots. The main topics addressed were the long history of the Centre, the rich amount of data it produced over the course of more than 50 years, the functioning of the sediment tanks, previous management of the experimental plots, and, finally, the regional challenges concerning soil erosion.

The event was an opportunity for regional stakeholders to get acquainted with a local structure and resource that is usually closed to the public. Facilitating this visit was an opportunity not only to acknowledge the Centre's value and potential for the region, but also to raise awareness and shorten the distance between civil society and both science and soil health. The event was held on the same day as the 3rd Regional Node workshop, and all Regional Node stakeholders were invited to participate.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

In Portugal, soil health has been mostly addressed by researchers and practitioners (farmers, foresters), lying far from the priority list of policy makers and civil society. This much has become clear from engaging with stakeholders in SOLO activities. In this context, every opportunity to raise awareness and to reach underinformed sectors of society is potentially impactful. And, indeed, Soil Week events have proven to be privileged moments to inform, share experiences and promote good practices.

The first event has been particularly relevant to engage policy makers and public administration representatives. In fact, it has gathered relevant stakeholders who have since constituted an informal network, facilitated by the Portuguese Soil Partnership, which has been engaging the

scientific community in the discussion around the transposition of the Soil Monitoring and Resilience Directive. As for the second and third events, they reached a diverse group of stakeholders, mostly motivated by reasons other than soil health (the Montado and Dehesa land use, and visiting a regional scientific infrastructure usually closed to the public, respectively). This indicates that decentring the discussion from soil health – while, however, addressing its importance – may be a successful strategy to engage stakeholders beyond "the usual suspects". It also points to the usefulness of combining Soil Week events with other initiatives.

Another important aspect of the Soil Weeks' impact is their contribution to gather and synthesize information and knowledge about soil health which is relevant for the country. Considering the general context described above, information – and stakeholders that work – on soil tends to be scattered. Soil Week events have served as platforms to bring together knowledge, needs and concerns not only of different stakeholders, but also related to cross-sectoral topics. The second Soil Week event, for example, has established the importance of soil biodiversity to the economic sustainability of the threatened agro-silvo-pastoral system of the Montado. Through a concrete example, which is furthermore of the utmost relevance to the audience, it was possible to address several of the societal dimensions that are dependent on soil health.

This multifaceted approach to the Soil Week events has therefore been successful in engaging diverse and new stakeholders, leveraging networks and initiatives, covering cross-sectoral topics, and aggregating regionally-relevant knowledge.

3.5.2 Spain

Soil Week event 2023

Title of the event: Introducing SOLO

Location: Spain

Date: 04/12/2023

Scale of the discussion: Regional (Catalunya)

Mission Objectives / Think Tank topics covered: This session covered all the TTs.

Number of stakeholders involved: 3

Typology of stakeholders involved: WP4: Associate Stakeholder. WP2: Public sector (3 policymakers)

The stakeholders approached for this event have very relevant positions in the department of climate action, food and rural agenda at the Generalitat de Catalunya. They are very interested in soil research and how this research can be transferred to practitioners to increase sustainability and resilience. However, they are worried about some resistance, especially after the demonstrations and complaints by farmers, so they think that increased literacy and science-

policy-sector collaboration is required. They are also unsure on how the Soil Monitoring Law will affect the practitioners. Due to all these uncertainties, they are very interested in following the development of SOLO and other Horizon Europe projects related to soils.

Soil Week event 2024

Title of the event: Living Soils: Biodiversity and Pollution

Location: The event took place at the Agrorural Training and Studies Center of the Catalan Ministry of Agriculture, Livestock, Fisheries and Food (Spain).

Date: 11/12/2024

Scale of the discussion: Regional (Catalunya)

Mission Objectives / Think Tank topics covered: Nature Conservation of Soil Biodiversity and Pollution and restoration

Number of stakeholders involved: 52

Typology of stakeholders involved: -

Together with Universitat de Barcelona (UB), Leitat organised on December 11th a technical day in collaboration with the Catalan Ministry of Agriculture, Livestock, Fisheries and Food. Under the title Living Soils: Biodiversity and Pollution, the event presented SOLO to the audience and hosted two roundtable discussions: one about practices that promote soil biodiversity, and another one about current challenges of soil pollution in Catalonia and biological solutions to be applied. The event finished with an open session about how the Ministry is implementing a Living Lab about soils across the country as a first step to define sustainable soil management practices.

The event aimed to spread the boundaries of the SOLO project while sparking an intense debate about the role soils play not only in our food systems but also in our societies. Although the initial debate focused on two main objectives – Biodiversity and Pollution – the diversity of attendees drove the discussion to other Mission objectives such as Degradation, Literacy, Structure or Restoration while adding topics and questions about management, farming, consumer demand and marketing.

This technical day took place at the Agrorural Training and Studies Center of the Catalan Ministry of Agriculture, Livestock, Fisheries and Food.

Soil Week event 2025

Title of the event: JORNADA SÒLS

Location: Barcelona

Date: 12/12/2025

Scale of the discussion: Regional (Catalunya)

Mission Objectives / Think Tank topics covered: Soil sealing and urban soils

Number of stakeholders involved: TBD

Typology of stakeholders involved: TBD

It wasn't possible to hold the event in early November, as planned, due to logistical constraints. It has therefore been postponed to the first half of December. The event will cover the topic of Soil Sealing and it will involve stakeholders from diverse backgrounds and expertise (this information will be validated once the event takes place). The event will be structured in the following manner:

Activity	Time	Aim	Lead
1. Welcoming	10 min	Presentation of the event	AMB
2. Soils For Europe project presentation	20 min	Presentation of *"Soils For Europe"* Project and current status	Leitat
3. Think Tank Presentation "*No net soil sealing and increase reuse of urban soils*	25 min	Explanation of the main advances, existing knowledge gaps and examples	Trento University
4. Q&A session	15 min	Question session focusing on addressing the inquiries of the participants	Leitat / UB / Trento University
20 MIN COFFEE BREAK			
5. World Café: Brainstorming session	35 min	The session revolves around: 1) brainstorming on existing and current issues related to the topic presented in the territory, 2) cases or examples, Objective: to listen to and highlight the different perspectives in each table. Format: Each table will have the required materials to carry out the activity. The group will have 5 minutes to decide on the roles (e.g. notetaker, host, etc). Then, 5 minutes will be allocated for brainstorming, and the ideas will be captured in post-its. After that, they will have 10 minutes to share this information. Another 10 min will be allocated to write examples and share these and lastly 5 min to vote for the most relevant ones.	Leitat / UB
6. World Café: Proposals for actions	30 min	The session will focus on 1) deepening on the identified issues and provide examples, if necessary, 2) possible actions that can be taken to address the identified issues.	Leitat / UB

		Objective: to delve deeper into the problem previously described, including the different perspectives by mixing participants. Format: 2 minutes to define the roles. Then, 10 minutes will be provided to explain the issues and examples from the previous session (including questions). After, 5 minutes will be allocated for individual brainstorming on Post-it notes. 10 minutes for sharing these ideas. Lastly, 3 minutes to vote on the most appropriate, innovative or case-specific solutions.	
7. Finding common ground	45 min	1. Share the insights and main matters identified 2. Presentation of the main points and links to the previous session and the project, if applicable. Maximum 8 minutes.	Leitat / UB
8. Closing session	5 min		AMB

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

The Soil Week Event of 2023 focused on having a dialogue with stakeholders with a relevant role in the department of climate action, food and rural agenda at the Generalitat de Catalunya. The aim of the event was to introduce the project to these types of stakeholders since they are quite interested in conducting and promoting soil research and to create awareness of the project for further collaboration.

Furthermore, the Soil Week of 2024 was framed as a wider event, involving a diversity of stakeholders. In this regard, three remarks are worth making in terms of the impact achieved.

First, it seems there is a growing interest among different actors (especially farmers) in soils. Attendees are interested in practices, knowledge and awareness about soil-related topics and farming.

Second, in terms of the identified knowledge gaps and bottlenecks, there is a general lack of knowledge among first-level actors such as farmers and agri-food representatives, and there is a demand for bridging science findings with day-to-day practical activity. Also, the required shift in soil management requires a whole cultural change in farming. Cultural background arose as a heavy gap/bottleneck: how to change farmers' approach to soil management? It has also been noted that more tools are required to assess and understand soils and quantify pollution, and that bureaucracy is a main problem to speed up the application of bio-improvers/bio-products.

Finally, solutions need to fit a business/yield/expected income point of view. Farmers are willing to introduce and implement improvements and new practices but without forgetting their monetary return. In that sense, several voices exposed how to translate sustainable practices into value for farmers' products and how to market them among consumers. It also became apparent that farmers feel too much pressure: they must act as food makers, landscape guardians, health providers, environment keepers, etc. They ask for more recognition through what they produce.

All agents involved must build a new narrative about soils far beyond the environment.

3.5.3 Belgium

Soil Week event 2023

Title of the event: 1) Towards a better literacy on soil, with focus on school pupils and teachers (year-round workshops); 2) Presenting soil restoration research, and the importance of scientific infrastructure, to the general public

Location: Province of Antwerp

Date: 30 workshops year-round + 10/02/2023

Scale of the discussion: Flanders

Mission Objectives / Think Tank topics covered: Soil literacy, Footprint on soils

Number of stakeholders involved:

- Workshops: 650 participants in 30 workshops, school children aged 10-14.
- Guided tour: 35 participants, stakeholders from Natuurpunt, Province of Antwerp, Department of Environment, general public.

Typology of stakeholders involved:

- Policy makers and administration – focus land use
- Policy makers and administration – environment
- Practitioners and Sector organization – focus land use
- Practitioners and Sector organization – environment
- Practitioners – Advisory Services
- Practitioners – Spatial planners
- Scientists – Soil
- Scientists – Environment and Biodiversity
- Other – Civil Society

We organised, in the framework of SOLO and our KLIMAATLINK initiative at University of Antwerp, multiple workshops with school children where they are playfully introduced to climate change and its impact, both on soils and on ecosystems in general. In total, in 2023, we organised 30 such workshops, in 15 schools across Flanders, each lasting 3 hours.

We would like to pinpoint that also a specific teaching package on soils and climate is available, that teachers can use to do practical workshops on soil functioning in their scientific classes. This teaching package was also specifically presented to teachers in a teachers' workshop in February 2024.

On February 10th, 2024, we organised a guided tour to our 'on campus facilities', where we showcase the potential to use biochar, mineral and organic matter based restoration techniques, to reactivate and re-cultivate degraded soils. We used this guided tour to highlight the need for soil restoration, specifically also in countries outside the EU, in the framework of climate change impact on soils, and considering a shift towards more sustainable land use that prevents future soil degradation. The tour was organised in the framework of the 'ANKONA studiedag', which specifically targets stakeholders and the general public interested in nature conservation and environmental science activities, with focus on stakeholders in the Province of Antwerp.

Soil Week event 2024

Title of the event: Tweede bodemforum

Location: Brussels

Date: 05/12/2024

Scale of the discussion: Flanders, Belgium

Mission Objectives / Think Tank topics covered: all Think Tanks were presented in presentation Eric Struyf, specific emphasis was put on the Footprint on soils. In the afternoon, a break-out session was organized, to encourage stakeholders to actively engage in reviewing the SOLO roadmap documents. Specific emphasis was also put on the importance of soils in conserving organic carbon stocks, with a specific breakout-session on healthy and living soils, and how to tackle soil care efficiently and area-oriented.

Number of stakeholders involved: 175

The event attracted a diverse range of participants, reflecting the interdisciplinary approach needed for effective soil policy and management. Attendees included policymakers, responsible for shaping soil and environmental regulations in Flanders, alongside scientists and researchers focused on soil health, monitoring, and sustainable land use. Local authorities from municipalities and regional governance bodies engaged in discussions on soil policy implementation, while soil-conscious citizens, farmers, and agricultural stakeholders shared their perspectives on real-world challenges. The forum also welcomed food cooperatives, compost enthusiasts, and nature and green space managers, all working towards sustainable land management. Additionally, educators and students participated, ensuring that future generations remain engaged in soil science and sustainability efforts.

Typology of stakeholders involved:

- Policy makers and administration – focus land use
- Policy makers and administration – environment
- Policy makers and administration – other
- Practitioners and Sector organization – focus land use

- Practitioners and Sector organization – environment
- Practitioners and Sector organizations – other
- Practitioners – Advisory Services
- Practitioners – Spatial planners
- Industry – Agri-food Companies
- Scientists – Soil
- Scientists – focus land use
- Scientists – Environment and Biodiversity
- Other – Civil Society

The Tweede Bodemforum, held on December 5, 2024—coinciding with World Soil Day—was organized by the Grond+Zaken program to explore the findings of a comprehensive system analysis of Flemish soil policy. The event aimed to identify practical obstacles faced by soil caretakers and develop policy-driven solutions, structured around three key pillars: action (doen), reflection (denken), and intention (willen).

A significant contribution came from Eric Struyf, who represented the SOLO project and engaged with Flemish stakeholders, encouraging them to participate in the review of the outlook chapters. A dedicated session addressed the importance of measurement in soil health, highlighting the EU Soil Monitoring Law and a study on soil health indicators. In another key session, Louis De Jaeger from Commensalist emphasized the need to bridge the gap between policy frameworks and practical soil management.

In the afternoon, participants took part in parallel sessions to collaboratively develop recommendations based on the exploratory analysis, focusing on aligning research, implementing area-specific soil care, and shifting perspectives—from viewing soil as a mere substrate to recognizing it as a living entity. Eric Struyf contributed to a session dedicated to closing the gap between perceived knowledge gaps among stakeholders and the actual knowledge (implementation) gaps currently prioritized by the research sector, including academia.

The Tweede Bodemforum underscored the urgent need for collaboration between research, policy, and practice to support soil health and sustainable land use. By integrating perspectives from multiple sectors, the event directly aligned with the SOLO project's mission to bridge the gap between knowledge creation and real-world implementation, fostering a more sustainable future for European soils.

Soil Week event 2025

Title of the event: Excursion Green City Nature Borgerhout (city of Antwerp)

Location: Antwerp

Date: 23/09/2025

Scale of the discussion: National, including international experts

Mission Objectives / Think Tank topics covered: Soil sealing and urban soils, Nature conservation of soil biodiversity, Soil literacy

Number of stakeholders involved: 45

Typology of stakeholders involved:

- Policy makers and administration – environment
- Policy makers and administration – other
- Practitioners and Sector organization – environment
- Practitioners and Sector organizations – other
- Practitioners – Spatial planners
- Scientists – Soil
- Scientists – Environment and Biodiversity
- Other – Civil Society

The Green City Nature Borgerhout excursion brought together architects, NGO representatives, city planners, and soil scientists from across Europe and Flanders. The event was organized in collaboration with the Horizon Europe InNature project and focused on how urban nature, soil health, and biodiversity can be supported in densely built environments.

The visit took place in the “Green Delta” of Borgerhout (City of Antwerp) and included several urban green sites, such as community gardens, pocket parks, and green corridors of varying design and success. Participants examined practical approaches to reduce soil sealing, including permeable paving, green streets and vegetated terraces, and discussed how these measures contribute to soil functionality, biodiversity, and stormwater infiltration.

Discussions also addressed social dimensions of urban greening, such as inclusivity in access to green spaces, citizen participation, and integration of ecological and social objectives in city planning.

The excursion facilitated exchange between research, policy, and practice, creating new professional connections and informing ongoing and future activities within the InNature project, particularly concerning soil-related aspects of urban green infrastructure.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

Between 2023 and 2025, the University of Antwerp organized a series of Soil Week events aimed at engaging stakeholders beyond academia and project partners. These events brought together teachers, students, policymakers, scientists, practitioners, architects, planners, and NGOs.

Key challenges for achieving sustainable impact were identified. Although teachers and pupils expressed enthusiasm for soil-related learning, a general lack of accessible educational materials was noted. Discussions on global soil issues revealed limited public awareness of soils as vital resources, particularly outside the EU context, indicating a persistent communication gap between societal perception and the objectives of the Soil Mission.

At the Bodemforum, discrepancies between research outputs and practitioners’ needs were highlighted, emphasizing the necessity for structured matchmaking platforms. Similarly, the third event demonstrated that the application of soil knowledge in urban environments remains

constrained by knowledge gaps, particularly regarding long-term impacts of nature-based solutions on soil health.

Overall, while maintaining engagement and translating dialogue into sustained action remain key challenges, the Soil Week series proved effective in fostering awareness, cross-sectoral collaboration, and knowledge exchange on soil-related issues.

3.5.4 The Netherlands

Soil Week event 2023

Title of the event: Soil Animal Days – general version

Location: Citizen science project taking place in 500 locations across the Netherlands

Date: 22/09/2023 – 08/10/2023

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Nature conservation of soil biodiversity

Number of stakeholders involved: 1500 participants participated to the Soil Animal Days

Typology of stakeholders involved: Civil society

The Soil Animal Days (Bodemdierendagen) is a national Citizen Science project in the Netherlands. During these days, people across the whole of the Netherlands go on “soil animal safari” and count multiple groups of soil animals. Their observations are uploaded on the website of soil animal days, and based on this data, the abundance of diverse groups of soil animals are recorded. The counting of soil animals can occur throughout the whole year, but during the 2 weeks of soil animal days, there is much media attention for this event. Moreover, multiple side events are organised to highlight the soil animal days, and many (primary and secondary) school classes plan the animal counting days within this period. These side-events are a win-win for SOLO and the soil animal days, as these events give more backbone to the Soil Animal Days, and the Soil Animal Days facilitate reaching a broad audience for the events. The response to the Soil Animal days has been very positive, especially in schools and municipalities, and some participants have even become volunteers at organizing side-events. In 2023, the Dutch regional node was not yet established, so that in that year there was no connection yet.

Soil Week event 2024

Title of the event: 10th year anniversary of the Soil Animal Days

Location: Citizen science project taking place at 668 locations across the Netherlands where soil animals have been identified and counted. Live side-events took place in the cities of Zutphen and Wageningen.

Date:

- Soil Animal Days: 20/09/2024 - 07/10/2024
- Science festival for children: 01/05/2024
- Soil Animal safari: 20/09/2024
- Science café: 03/12/2024

Scale of the discussion:

- National: citizen science project itself
- Regional: survey on knowledge gaps at science festival for kids in city Zutphen, giving some ten soil animal safaris in city Wageningen, and science café in Wageningen

Mission Objectives / Think Tank topics covered: Soil literacy and Nature conservation of soil biodiversity

Number of stakeholders involved:

- 2873 people participated in counting soil animals during the Soil Animal Days
- 91 people filled in survey at science festival for kids but mostly parents filled the survey in with one or multiple kids, so the survey has reached at least 200 people
- SOLO researchers involved 80 participants during soil animal safaris
- The website prompt yielded 131 responses
- Science café attracted 50-60 visitors

Typology of stakeholders involved: Civil Society, with a relatively high share of scientists – soil and scientists – Environment and biodiversity during the soil animal safari live and science I event.

In the live events with direct interactions between citizens and SOLO researchers, both children and adults were very interested and enthusiastic to know more about soil animals. It helped that all live events were organized in a playful manner, e.g., by searching for soil animals in an arboretum at night (soil animal safari), having the provocative message to be more lazy to help soil animals that goes directly against the Dutch culture to be ‘efficient’ in the national TV news. and by touching upon the playful rivalry between Rotterdam and Amsterdam by announcing that Rotterdam should really start counting as Amsterdam was ahead in their participation to the Soil Animal Days in the local radio show. This positive and joyful atmosphere helped motivating people to take care of soil animals while avoiding complicated discussions, which contributes to an important goal of the Soil Animal Days. We also created a prompt at the website of the Soil Animal Days amongst participants on the Soil Animal Days and conducted a survey in the waiting queue at the Soil Animal Days stand at a science festival for kids, to collect knowledge gaps about soil animals. We presented the collected knowledge gaps in two news items on the Soil Animal Days website, and during science cafe about the Soil Animal Days in Wageningen. In the regional node discussion on soil biodiversity, the recommendation emerged to spread the message “healthy soils, healthy people” to motivate people to care for soils. During the soil animal safari, both SOLO researchers intended asking participants on what knowledge they need for starting taking care of soils, but this appeared to be difficult as much background knowledge on soils was first needed before this question could be asked, and then time was up and the next safari group already started.

Soil Week event 2025

Title of the event: Soil Animal Days – 11th special edition

Location: Central Library of Amsterdam, Netherlands; and online.

Date:

- Soil Animal Days: 26/09/2025 – 08/10/2025
- Live event at Citizen Science Expo: 02/10/2025

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Soil sealing and urban soils, and Nature conservation of soil biodiversity

Number of stakeholders involved:

- Between 1500-2000 people participated actively to the Soil Animal Days of 2025;
- The prompt was filled in by 116 people of the general public;
- The citizen science expo was fully booked out, and attracted between 200-300 participants, of which approximately 30 people specifically joined the world record attempt to count soil animals with as many people as possible.

Typology of stakeholders involved: Civil society, and in case of Citizen Science Expo event also Public sector, Environmental Organizations and Science

Various events were (co-)organized by NIOO in the 1.5 weeks in which the Soil Animal Days take place. We created a prompt at the website of the Soil Animal Days to collect knowledge gaps about soil animals amongst participants on the Soil Animal Days, about which a news item will be written for the web page of the Soil Animal Days in December. We also collaborated with SOB4ES to illustrate the vast numbers and diversity of visible and invisible soil organisms, and underline the importance of de-sealing, using a tile and colouring plates. We published a news item on this, and also brought these materials to the citizen science expo event in Amsterdam. NIOO also organized a stand about the Soil Animal Days and a world record attempt was executed to search with as many people as possible for soil animals. Due to inconvenient planning of our activities within the overall planning of the citizen science expo, the number of participants was lower than expected. Nevertheless, around 30 people participated, and these participants were super enthusiastic and engaged! Multiple adults even filled in the colouring plates. There was no active connection to the regional node due to the lack of a third workshop.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

The Soil Animal Days reach a national audience. On average some 2000 participants count soil animals in private gardens, school gardens, municipal green, and other types of ecosystems. Every year, there are 10000-15000 unique visitors of the website and side-events, such as soil animal safaris. Outreach via interviews on regional and national radio and TV had an even greater

audience, with over 1.5 million people watching the 20.00h news. The organized live events such as searching and counting soil animals at various locations (planters, gardens, urban green) sparked much enthusiasm from children to adults, namely by the playful and game-like approach. Each search yields various species of soil animals, even in densely paved city centres. The online communication events give indirect rewards, for example our item in the national news about counting soil animals ended up as a cartoon in all regional newspapers. Another example is that more than 250 people have responded to the website to express their interest and knowledge needs about soil animals. We also carried out dissemination activities by in-depth and meaningful exchanges about the importance of soil health, for example at the stand of the citizens science expo and during the science festival for kids, where we conducted a survey on knowledge about soil animals. While some citizen scientists have become structural volunteering organizers of the Soil Animal Days, none of them participated as reviewer or Think Tank member for SOLO. Conversation time is often limited when targeting larger audiences, making these events more generally raising awareness about soils and soil biodiversity without reaching much depth. We have not yet found a way to track behavioural changes of participants in the Soil Week events, with one exception: several people asked for tips to make their garden more soil animal friendly, both during the live events and via the internet prompt. This points at the potential of the Soil Week events to inspire people to improve their soil care. A major advantage of the Soil Animals is that we reach people living in urban areas. Urban soils are difficult to monitor, because of access and the huge variability. Therefore, besides raising awareness, the Soil Animals Days provide data on the abundance of soil life in this understudied land use type.

3.5.5 Italy

Soil Week event 2023

Title of the event: Planning strategies and nature-based solutions to reduce soil sealing

Location: Trento

Date: 18/12/2023

Scale of the discussion: Regional (the Alpine region, including the region of Trento and neighbouring regions in Italy, Austria, and Switzerland)

Mission Objectives / Think Tank topics covered: Soil sealing and urban soils

Number of stakeholders involved: 38 people (22 in person and 16 online)

Typology of stakeholders involved:

- Arch. Stefano Bazzocchi, Policy makers and administration;
- Prof. Enzo Falco, Scientists – Spatial planners (As);
- Dr. Gundula Prokop, Scientists – Soil;
- Dr. Sabine Rabl-Berger, Scientists – Environment and Biodiversity (As);
- Dr. Silvia Ronchi, Scientists – Environment and Biodiversity (As);
- Dr. Silvia Tobias, Scientists – Environment and Biodiversity.

- Prof. Davide Geneletti, Dr. Chiara Cortinovis and Silvia Frezzi (University of Trento), Scientists – Environment and soil, organizers and discussants
- Students (University of Trento), others civil society (As)

The event organized by the UniTrento team for the Soil Week 2023 was a seminar focused on the third specific objective of the Soil Mission "No net soil sealing and increase the reuse of urban soils". The seminar was held on December 18 at the University of Trento and it targeted primarily master's students in Environmental Engineering, but was also open to academics and practitioners who had the possibility to attend online. The title of the event was "Planning strategies and nature-based solutions to reduce soil sealing". It featured contributions by five invited speakers: Dr Silvia Ronchi (Polytechnic University of Milan – Italy), Dr Silvia Tobias (Swiss Federal Institute for Forest, Snow and Landscape Research WSL – Switzerland), Arch. Stefano Bazzocchi (Comune di Forli – Italy), Dr. Gundula Prokop (Umweltbundesamt – Austria), Dr. Sabine Rabl-Berger (Umweltbundesamt – Austria) and Prof. Enzo Falco (University of Trento – Italy). Speakers and participants were international, but the case studies presented and discussed were mostly from the region of Trento and neighbouring regions in Italy, Austria, and Switzerland.

Soil Week event 2024

Title of the event: The Contribution of Soil Restoration in Urban Areas to Achieving the Targets of the Nature Restoration Regulation

Location: Trento

Date: 11/12/2024

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Soil sealing and urban soils, and Pollution and restoration

Number of stakeholders involved: 6 people in person and 5 online

Typology of stakeholders involved:

- Buke Chen, Scientists – Spatial planners I;
- Prof. Gianni Mastrolonardo, Scientists – Soil (As);
- Dr. Stefano Salata, Scientists – Spatial planners (As);
- Prof. Dagmar Haase, Scientists – Environment and Biodiversity I;
- Dr. Paul Drenning, Scientists – Soil I;
- Antonella Perretta, Policy makers and administration (As).

Prof. Davide Geneletti, Dr. Chiara Cortinovis, and Silvia Frezzi are the organizers of the event, contributing to the discussion, while the individuals previously listed are the speakers and discussants.

The Soil Week event organized in 2024 by the University of Trento team was a one-day workshop held in Trento, Italy, on December 11. The workshop was titled "The Contribution of Soil Restoration in Urban Areas to Achieving the Targets of the Nature Restoration Regulation" and addressed topics relevant for both the Soil Sealing and the Soil Pollution and Restoration Think Tanks. The primary objective of the event was to explore the relationship between nature

restoration and soil restoration in urban areas, focusing specifically on soil de-sealing and nature-based approaches for the regeneration of brownfield sites. The discussion addressed the following questions:

1. What contribution can soil restoration in urban areas (including de-sealing and the reclamation of contaminated soils) make toward achieving the targets set by the Nature Restoration Regulation?
2. How can policies and strategies that address soil health and nature restoration in urban environments be interconnected, and what benefits would this bring?
3. Can nature-based solutions serve as a unifying concept for soil and nature restoration approaches, providing multiple ecological and socio-economic benefits in urban areas?

The workshop agenda included presentations from four international speakers who framed the topic from different disciplinary perspectives, setting the broader context. The presentations were then followed by an open discussion involving the speakers and invited Italian participants, who were asked to reflect on the inputs from the presentations and link them to local experiences and initiatives (mainly from Northern and Central Italy).

Soil Week event 2025

Title of the event: “Pianificare con la natura per città più sostenibili” (in English: “Planning with Nature for More Sustainable Cities”)

Location: Trento

Date: 20/02/2025

Scale of the discussion: Regional (Trentino – Alto Adige)

Mission Objectives / Think Tank topics covered: Land degradation and desertification, Erosion prevention, Soil sealing and urban soils

Number of stakeholders involved: 90 people in person

Typology of stakeholders involved:

- Dr. Chiara Cortinovis (organizer and speaker), Scientists – Environment and Biodiversity
- Silvia Frezzi (organizer and speaker), Scientists – Soil
- Simone Caridi (organizer and speaker), Scientists – Environment and Biodiversity
- Students and professors, others civil society (As)

The event was a seminar lasting about three hours organized by the University of Trento team in collaboration with teachers at the Buonarroti High School. It was held at the auditorium of the school in Trento on February 20. The seminar was titled “Pianificare con la natura per città più sostenibili” (in English: Planning with Nature for More Sustainable Cities), and conducted in Italian.

The target audience included students and teachers. The primary objective was to inform and raise awareness about the benefits of nature and ecosystems in cities, and how these can be enhanced through urban planning and design. Among the topics, we highlighted the role of soil in supporting the provision of multiple ecosystem services and discussed related issues, including degradation, erosion, soil sealing and land take, with a special focus on the Italian context. The seminar featured Chiara Cortinovis, Silvia Frezzi, and Simone Caridi (members of the Planes Lab at the University of Trento). Interactive tools such as online polls, word clouds, and an interactive

map of the city were utilized during the presentation to actively engage the participants. This event aligns with the mission of increasing soil literacy in Member States, addressed by the Soil Literacy Think Tank.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

Between 2023 and 2025, the University of Trento organized three Soil Week events, engaging a diverse range of stakeholders, including university and high school students, academics, policymakers, and practitioners. Each event was tailored to its audience, combining advanced discussions on soil sealing, restoration, and urban planning (2023–2024) with awareness-raising and educational activities for younger participants (2025).

The events facilitated knowledge exchange and capacity-building. Participants gained insights into nature-based solutions, soil restoration, desealing, and the integration of soils into urban planning. Case studies and interactive tools, such as maps and polls, enhanced engagement and supported practical learning. Beneficiaries ranged from high-level policymakers and researchers to secondary school students, reflecting a broad societal impact.

Key outcomes included the identification of knowledge gaps (e.g., integrating soil functions into urban planning, soil biodiversity), recognition of bottlenecks (e.g., policy barriers, low awareness), and the proposal of actionable solutions, such as monitoring initiatives, guidelines, and case study dissemination. Impacts included increased awareness, strengthened networks, and exposure to innovative practices.

By involving the younger generations of future technicians in the planning and construction sectors (engineers and surveyors) and exposing them to innovative solutions to address soil health, the events contributed to gradual shifts in practice.

Real-world examples presented to the audiences include the Lombardy region's incorporation of soil ecosystem services assessment into urban planning, desealing initiatives in Forlì and Prato (two Italian cities), and Austrian brownfield dialogues.

Overall, the events advanced the objectives of the Soil Mission and European Green Deal priorities linking soil health to sustainable urban development, ecosystem services, and climate resilience.

3.5.6 Greece

Soil Week event 2023

Title of the event: Soil Week event of the Land Degradation Think Tank on SO1 – Reduce Land Degradation Related to Desertification & SO5 – Prevent Erosion.

Location: Online

Date: 13/05/2024

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: SO1 – Reduce Land Degradation Related to Desertification & SO5 – Prevent Erosion.

Number of stakeholders involved: 29

Typology of stakeholders involved: The typology of the stakeholders that participated in the Soil Week event of Greece (Table 1) is divided into three categories based on the degree of their involvement in soil management decisions and advisory.

	CORE stakeholders	ACTIVE stakeholders	ASSOCIATED stakeholders
Administration – Economy			2
Practitioners and Sector organization – agriculture		3	
Practitioners – Spatial planners		1	
Industry – Agri-food Companies			2
Scientists – Soil	2	5	1
Scientists – Agronomy and Forestry	1	3	
Scientists – Environment, Geology and Biodiversity	3	3	3

The Land Degradation Think Tank held its first Soil Week event on May 13, 2024, as an online webinar/workshop focused on the Soil Mission objectives: reducing land degradation linked to desertification (SO1) and preventing erosion (SO5). Around 30 participants from diverse academic backgrounds attended. The event opened with Dr. Nikolaos Stathopoulos and Melpomeni Zoka (National Observatory of Athens) presenting the Soils for Europe (SOLO) project, followed by four expert talks:

- Dr. Eleni Vasileiou on geological influences on soil and groundwater pollution,
- Dr. Christos Noulas on organic carbon, erosion, and sustainable agriculture,
- Dr. Konstantinos Loupasakis on landslides and soil subsidence, and
- Dr. Maria Tsiafouli on soil biodiversity and ecosystem health.

These presentations triggered valuable discussions that identified knowledge gaps, actions, and bottlenecks related to the Soil Mission objectives. A Jamboard workshop further refined these insights and added new elements to the Think Tanks' roadmaps. Participants expressed strong interest in ongoing collaboration, leading to the proposal of a Greek hub for the Soils for Europe project. Overall, the event was highly engaging, fostering interdisciplinary dialogue, new partnerships, and constructive feedback for future initiatives.

Soil Week event 2024

Title of the event: Soil Week of the Land Degradation Think Tank on SO1 – Reduce Land Degradation Related to Desertification & SO4 – Reduce soil pollution and enhance restoration, as well as on soil biodiversity

Location: Online

Date: 26/02/2025

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: SO1 – Reduce Land Degradation Related to Desertification & SO4 – Reduce soil pollution and enhance restoration, as well as on soil biodiversity

Number of stakeholders involved: 30

Typology of stakeholders involved: The typology of the stakeholders that participated in the Soil Week event of Greece (Table 1) is divided into three categories based on the degree of their involvement in soil management decisions and advisory.

	CORE stakeholders	**ACTIVE stakeholders**	**ASSOCIATED stakeholders**
Administration – Economy			2
Practitioners and Sector organization – agriculture		2	
Practitioners – Spatial planners		1	
Industry – Agri-food Companies			3
Scientists – Soil	3	7	1
Scientists – Agronomy and Forestry	1	2	2
Scientists – Environment, Geology and Biodiversity	3	1	1

The Land Degradation Think Tank hosted its second Soil Week event on February 24, 2025, focusing on soil biodiversity, soil pollution, and land degradation, addressing Soil Mission objectives SO1 (reduce land degradation and desertification) and SO4 (reduce soil pollution and enhance restoration). Although not part of the official Soil Mission objectives, soil biodiversity, a core component of the SOLO project, was emphasized as essential for soil health. About 30 participants from diverse scientific fields attended.

The event opened with Melpomeni Zoka and Dr. Nikolaos Stathopoulos (National Observatory of Athens), presenting the SOLO and SOILGUARD projects, followed by six expert talks:

- Dr. Maria Tsiafouli (Aristotle University of Thessaloniki): Threats, conservation, and monitoring of soil biodiversity.

- Dr. Spyros Theodoridis & Dr. Dimitrios Borboudakis (National Observatory of Athens): Role of Earth Observation in soil biodiversity monitoring.
- Dr. Dimitrios Tsesmelis (University of Patras): Drought and desertification vulnerability using ESA and SDVI indices.
- Dr. Ioannis Daliakopoulos (Hellenic Mediterranean University): Restoration of Mediterranean agro-ecosystems through the React4Med project.
- Stratos Kokolakis & Eleni Kokkinou (Hellenic Mediterranean University): Techniques for soil health monitoring.
- Dr. Eleni Vasileiou & Dr. Maria Perraki (NTUA & University of the Aegean): Post-lignite mining impacts on soil and water in Kozani.

Discussions refined the Top 10 Knowledge Gaps, inspired collaborations, and reinforced participation on Soils for Europe events and endeavours.

Soil Week event 2025

Title of the event: Soil Week of the Land Degradation Think Tank on SO2 – Conserve and increase soil organic carbon stocks, on SO3 – No net soil sealing and increase the reuse of urban soils and on SO1 – Reduce Land Degradation Related to Desertification

Location: Online

Date: 21/10/2025

Scale of the discussion: European

Mission Objectives / Think Tank topics covered: SO2 – Conserve and increase soil organic carbon stocks, on SO3 – No net soil sealing and increase the reuse of urban soils and on SO1 – Reduce Land Degradation Related to Desertification

Number of stakeholders involved: 25

Typology of stakeholders involved: The typology of the stakeholders that participated in the Soil Week event of Greece (Table 1) is divided into three categories based on the degree of their involvement in soil management decisions and advisory.

	CORE stakeholders	**ACTIVE stakeholders**	**ASSOCIATED stakeholders**
Administration – Economy			2
Practitioners and Sector organization – agriculture		1	
Practitioners – Spatial planners		6	1
Industry – Agri-food Companies			1
Scientists – Soil	2	2	1
Scientists – Agronomy and Forestry	2	1	1

Scientists – Environment, Geology and Biodiversity	2	1	1

The Land Degradation Think Tank with the support of the Soil Organic Carbon Think Tank & the Soil Sealing Think Tank hosted its third Soil Week event on October 21st, 2025, focusing on soil organic carbon, soil sealing, and land degradation, addressing Soil Mission objectives SO2 – Conserve and increase soil organic carbon stocks, on SO3 – No net soil sealing and increase the reuse of urban soils and on SO1 – Reduce Land Degradation Related to Desertification

About 25 participants from diverse scientific fields around Europe (mostly Greece, Italy, Norway, Portugal, Cyprus, Denmark) attended.

The event opened with Melpomeni Zoka and Dr. Nikolaos Stathopoulos (National Observatory of Athens), presenting the SOLO Project and the Land Degradation Think Tank followed by 8 expert talks in 3 sessions:

1) Land Degradation & Soil Health

- Prof. Athanasios Kizos (University of the Aegean): Drivers of soil health of olive groves and their impact on the sustainable production of olive in the Mediterranean.

2) Soil Organic Carbon & Soil Reuse

- Dr. Åsgeir R. Almås (Norwegian University of Life Sciences): Soil Organic Carbon Think Tank, situation description and prioritizations.
- Dr. Susanne Eich-Greatorex (Norwegian University of Life Sciences): Sustainable movement and restoration of natural and productive soils in important infrastructure projects
- Athanasios Askitopoulos (National Observatory of Athens): Comparing farmer-collected and scientifically collected data for local-scale digital soil mapping.

3) Soil Sealing, Urbanization & Land Take

- Dr. Chiara Cortinovis (University of Trento): Soil sealing and land take: a European perspective.
- Prof. Dimitrios Stathakis (University of Thessaly): Recent urbanization trends in Greece and subsequent land degradation via increased soil sealing.
- Dr. Evangelia – Theodora Derdemezi (University of Aegean): Is the impact of soil sealing on island landscapes reversible?
- Dimitrios Koumoulidis (Eratosthenes Center of Excellence): Land vulnerability and soil sealing under urbanization in Limassol, Cyprus. Indicators towards the city's 2030 climate neutrality.

Discussions provided feedback on knowledge gaps, bottlenecks and actions, as well as inspired collaborations, and reinforced participation on Soils for Europe events and endeavours.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

Across the three Soil Week events (2023–2025), approximately 85 stakeholders were engaged, from academia, public administration, industry, agriculture, and spatial planning. Participants included soil scientists, agronomists, engineers, policymakers, and practitioners from Greece and other European countries (Italy, Norway, Portugal, Cyprus, Denmark). Stakeholders experienced meaningful change through exposure to interdisciplinary knowledge, cross-sectoral dialogue, and the co-creation of actionable roadmaps addressing Soil Mission objectives SO1–SO5.

The Soil Weeks fostered significant progress toward shared understanding and cooperation. Key results include i) the identification of core knowledge gaps (e.g., soil monitoring systems, data harmonization, biodiversity–desertification correlation, urban soil reuse).; ii) development of Roadmaps for land degradation, erosion prevention, and soil health monitoring; iii) new collaborations among institutions (e.g., linking soil biodiversity and desertification maps; integrating Mediterranean soil data); and iv) expansion of the stakeholder base, including new scientific contributors and practitioners, strengthening Greece's and Europe's soil research networks. Participants consistently requested broader inclusion of decision-makers, recognizing the need for stronger policy integration.

These events shifted participants' perspectives toward systems-based soil management, linking ecological, social, and economic aspects. Researchers and practitioners committed to data-sharing, policy alignment, and behavioural change among land users. The inclusion of Earth Observation, biodiversity mapping, and socio-economic indicators illustrated a growing adoption of integrated soil governance approaches.

Collaborations were initiated to merge Greece's soil biodiversity map (A.U. Thessaloniki) with the desertification index map (University of Patras), demonstrating applied scientific synergy. The React4Med project presented practical restoration models for Mediterranean agro-ecosystems, while studies on urban soil sealing in Limassol and Greece informed regional planning strategies aligned with EU sustainability targets.

The Soil Weeks have contributed to advancing the EU Soil Mission by enhancing awareness, generating actionable insights, and promoting innovation in soil conservation. The events strengthened national and European cooperation, bridging science and policy to address pressing challenges such as desertification, pollution, soil sealing, and carbon loss.

3.5.7 Bulgaria

Soil Week event 2023

Title of the event: Scientific symposium "Soils and their biodiversity"

Location: Sofia, Bulgaria

Date: 30/01/2024

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Nature conservation of soil biodiversity and Soil literacy

Number of stakeholders involved: 30

Typology of stakeholders involved: Soil experts, researchers, university lecturers, farmers, NGOs, SME, media

One-day event held at the Bulgarian Academy of Sciences. The local stakeholders that participated in the Soil Week in Bulgaria were mainly concerned with the lack of contemporary learning tools, educational materials, and communication between the industry, researchers and policymakers, as well as a lack of proper research on the endangerment of soil organisms and invasive species. The main bottlenecks that cause these issues are outdated education materials, non-existent early detection systems for invasive species, non-digitised scientific publications and a lack of policy recommendations to national and regional policymakers. Changes in the environmental conditions were identified as the reason for the arrival of new invasive species. To overcome this obstacle, long-term decisions such as research on changing environmental conditions must be made, rather than short-term decisions such as treatment with chemicals that damage plants. To improve on these issues, the participants in the event recommended the creation of manuals, created by researchers, including contemporary guidance, recommendations from researchers to the educational institutions, the creation of a network composed of researchers, farmers and practitioners, to issue policy recommendations and the digitalisation of scientific publications.

Soil Week event 2024

Title of the event: Problems with Soil Erosion and Pollution in Bulgaria

Location: Sofia

Date: 03/12/2024

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Erosion prevention and Pollution and restoration

Number of stakeholders involved: 20

Typology of stakeholders involved: Researchers, government officials, industry representatives

One-day event, held at the Bulgarian Academy of Sciences. The event was attended by around 20 national stakeholders from various backgrounds – researchers, industry representatives, government officials and civil society. Most of the participants were also part of the first “Soil Week” event, which established a “soil stakeholder network” in Bulgaria, gathering knowledge and expertise from the various interested parties. The main knowledge gaps and bottlenecks identified include an overall lack of a national database holding information and data about scientific research related to soils and their health and quality, a lack of proper education on soil

pollution and a lack of clear government policies to address these issues. The actions that were identified to resolve these issues include new educational programs, the creation of a public database with information on soil quality, and the development of new policies.

Soil Week event 2025

Title of the event: The Sealing of Soils and Our Footprint on Them

Location: Online

Date: 28/10/2025

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Soil sealing and urban soils and Footprint on soils

Number of stakeholders involved: 5

Typology of stakeholders involved: Academics, Researchers, Policy advisors, Technical experts

The event was a 1.5-hour-long webinar, welcoming stakeholders from various sectors, including academia, research, and industry experts. The lecturers, a PhD from the Soil Institute 'Nikola Pushkarov' in Sofia, and an expert from Agrovar, a cutting-edge software company leading the shift to regenerative farming, which has previously been nominated for the EIT Ventura Awards, each gave a presentation followed by discussions. The main knowledge gaps and bottlenecks identified overall surround an absence of a unified national framework for soil management in urban areas, poor enforcement of existing environmental obligations, limited spatial data, and weak awareness and compliance among developers.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

The three Soil Week events organised by Pensoft have predominantly welcomed stakeholders from across audiences, including soil experts, researchers, academics, farmers, NGOs, SMEs, media, government officials, industry representatives, policy advisors, and technical experts.

Stakeholders not only interacted with the lecturers and presentations but also formed meaningful connections amongst themselves, some exchanging contact information and planning future collaborations. The fact that the audience was composed of participants from different backgrounds allowed for knowledge exchange, with stakeholders influencing each other's positions by offering novel perspectives to one another. For example, during the last edition of the event, several participants exchanged contacts both amongst themselves and with lecturers,

especially interested in cross-sectoral collaboration. Academics and practitioners were interested in finding out more from representatives of businesses, for example.

It seems the main knowledge gaps and bottlenecks identified throughout all Soil Week events are somewhat similar in nature, pointing towards a predominant lack of systemic national monitoring and guidelines, a lack of resources, a gap in soil literacy, and a lack of implementation of existing guidelines or environmental commitments. It seems leading actions that have been proposed are often around the establishment of education programs, workshops, and connections amongst different governmental and non-governmental bodies.

At several events, the creation of networks, working groups and Lighthouse initiatives was discussed amongst participants and lecturers, with some expressing interest in brainstorming actionable steps together.

Research and Innovation (R&I) remain fundamental in addressing the different challenges of the Soil Mission, with the Soil Week events being a key driver in assessing the framework on a national level. As seen in the reporting from the events, some knowledge gaps and bottlenecks persist independent of the objective, signifying underlying areas that need attention on a national level. At a practical level, R&I fosters collaboration between stakeholders, encouraging the co-creation of innovations.

3.5.8 Hungary

Soil Week event 2023

Title of the event: SOIL MONITORING AND SOIL CONTAMINATION – Options and means to achieve soil health objectives

Location: Ministry of Agriculture, Budapest

Date: 14/12/2023

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Pollution and restoration

Number of stakeholders involved: 25

Typology of stakeholders involved: Public sector: Ministry of Agriculture and background public institutions on public health, spatial planning, water management, project financing and the secretariat of the Ombudsman for Future Generations; Science: researchers of HUN-REN and universities; Private sector and industry: associations of business organisations, and businesses; Relevant practices: farmers represented by the National Chamber of Agriculture

A workshop with two discussion sessions was organised with EJP Soil hosted by the Ministry of Agriculture. The aim of the workshop was to introduce the Horizon R/I programs and to discuss the Soil Mission, the initiatives under the EJP Soil and the SOLO project. The discussion of the first session addressed the EJP soil assessed knowledge, tools and methods; how they provide

scientific basis for the development of management policies for climate-smart, sustainable agricultural soil use and management; the definition of soil health that covers soil's multifunctionality, and the applicability of some of the soil health indicators used in the draft EU "Soil Monitoring" law published in summer 2023 was presented and the feasibility of meeting the data needs from domestic databases; the need to develop soil health indicators with threshold values based on a complex analysis and interpretation of soil biological, physical and chemical properties. During the second session the nexus between human health and soil pollution and remediation technologies, limit values, data needs were discussed in more detail in the context of the analytical framework developed by SOLO PRTT. The workshop was a good example of cross-fertilization between projects, and knowledge transfer promoting science-policy-practice interface.

Soil Week event 2024

Title of the event: Soil Organic Carbon and Soil Health workshop of the Budapest Soil Health Forum

Location: Kossuth Club, Budapest

Date: 04/12/2024

Scale of the discussion: National (with international participants)

Mission Objectives / Think Tank topics covered: Soil organic carbon stocks

Number of stakeholders involved: Number of participants: on-line, 20; on-site, 36. There was a high registration for the workshop: on-line (59 persons) and on-site (66 persons) including those registered for the panel discussion (Soil-X-Change: Soil Management innovations : 50-16 respectively) and/or indicated their interest in participating in the workshop in other ways. While the actual attendance was lower, the on-site participants were very active in discussing the various issues.

Typology of stakeholders involved: Academia (19), stakeholder (10), NGO (4), farmer (3). BSHF identified categories during registration.

The aim of the workshop was to discuss the knowledge gaps relevant to soil organic carbon and soil health. The hybrid workshop was organised jointly with PPPKE as one of the four events of the BSHF (https://www.soilhealthforum.hu/) linked to the Hungarian EU Presidency. The workshop had two sessions. Each session started with two introductory speeches, followed by discussion.

The workshop fulfilled its goals by having vivid discussion on issues regarding the KGs on soil organic carbon, both in terms of scientific knowledge and the availability of knowledge for implementing best practices to protect and improve soil conditions. Consideration was given to social and economic factors, governance, institutional arrangements, markets, environmental and ecological factors, and legal aspects that may prevent the effective implementation of science-based solutions for maintaining and increasing soil organic carbon, and protection of soil health. Participants from other countries shared good and bad experiences. The introduction of the results of PPKE's research on issues addressing the impact of the CAP on soil health as part of

protection of natural resources opened the forum to discuss new aspects of soil health. From this point of view the workshop was a good example of cross-fertilization of knowledge between research projects.

Soil Week event 2025

Title of the event: Is it possible to stop soil erosion? – the soil week event of the SOLO project

Location: Kossuth Club, Budapest

Date: 10/10/2025

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Erosion prevention

Number of stakeholders involved: 83 persons registered for the event; however, the final number of participants were 46 (27 in-person and 19 online)

Typology of stakeholders involved: Policy makers and administration (12), Practitioners (14), Industry (2), Scientists (7), Civil society (11)

The aim of the workshop was to discuss the KGs relevant to soil erosion. The hybrid workshop was organised jointly with PPPKE and Ökopresszó at the same place as last year with the aim to establish regularity in organising such Soil Week event yearly. The workshop started with the welcoming speech of the Ombudsman for Future Generations and had two sessions (agriculture and urban erosion). The workshop started with the introduction of the KGs and was followed by introductions of erosion issues relevant to Hungary. During the discussion new aspects of the KGs were brought up that might affect the rephrasing of the KGs and/or the actions. E.g. the importance of the nexus between air pollution related public health issues and erosion (including erosion prevention) were highlighted; the impact of the political decision regarding land compensation following the regime change of 1989, that did not consider water erosion issues in decisions on where to draw the borders of and how to shape the land parcels. Issues discussed included: measuring erosion, the importance of information transfers (field studies and peer-to-peer exchange), state interventions, implementation/enforcement of laws, the need for change in behaviour. The workshop proved the importance of stakeholder engagement.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

All three events were organised as a workshop allowing enough time for discussion and ended with lunch. All workshops had two or more organisers making it possible to reach more stakeholders (number, types). Stakeholder participation was improved by organising the event as a hybrid. Each time the short introductory speeches and the facilitation by iASK helped to have a focused discussion. Stakeholders were not intimidated by the introduction of the KGs and the Hungarian issues. On the contrary, because they showed the relevance of soil health to everyday

life and decisions, they actually encouraged participants to express their opinions and views. All participants actively discussed soil health issues, though some of them only during the coffee and lunch break.

All workshops served as a quasi-training session on various aspects of soil health, promoted science-policy-practice interface and the dialogue between different fields of science, regions (and countries). Best practices of regions and countries were introduced, knowledge gaps confirmed and validated. The discussion proved the importance of dialogue, and stakeholder engagement, e.g. it highlighted that farmers' behaviours are often misinterpreted as a lack of knowledge and motivation. Instead, they are the result of objective conditions. One of the farmers shared the experience of turning upside-down with the tractor when tried contour ploughing. Another underlined the political mistake of not considering natural erosion patterns in the provisions of the Compensation Law, leading to strips of lands and inadequate size and shapes. Participants shared their negative and positive experience (referring to CAP rules, and bad regulations leading to inefficient implementation of preventive measures as negative experience and field training, peer-to-peer information exchanges, networking, as positive examples).

Cross-fertilization between research projects was the result of two workshops. The workshop organised as part of the Budapest Soil Health Forum got international attention, since a short video of the BSHF was played during the breaks of the closing conferences of BIOEAST and the Hungarian EU Presidency. Under the umbrella of the SOLO project, partnerships developed between iASK and BIOEAST and the workshop organisers. An informal agreement was made to turn it into a yearly event addressing different soil health issues.

Participants expressed their satisfaction, and their willingness to participate in future events and to share the gained information with other stakeholders. The workshops proved to be an effective way of networking; however, it is a challenge to formalize it beyond the project's life.

3.5.9 Germany

Soil Week event 2023

Title of the event: "Welche Zukunft? Böden und Agroforstsysteme" Stakeholder workshop for identifying soil health challenges related to land management and how to tackle them (Land use – Agroforestry)

Location: Müncheberg

Date: 25/10/2023

Scale of the discussion: regional (Berlin-Brandenburg, DE)

Mission Objectives / Think Tank topics covered: Soil literacy (Primary), Land degradation and desertification (Secondary)

Number of stakeholders involved: 29 (except the 6 organisers and facilitators)

Typology of stakeholders involved:

Relevant practices (Farmers) – 13 (among them, Farmers association – 3, Agricultural consultant – 2), Civil society – 9 (among them, Landscape preservation association – 3, Journalist – 1), Public sector (Government) – 2, Science (Research) – 5

(Microsoft Co-Pilot was used to summarise the presentation material)

The workshop, titled “Welche Zukunft? Böden und Agroforstsysteme” (Which future? Soil and agroforestry), brought together researchers, practitioners, and stakeholders to explore the future of soil health and the potential of agroforestry for mitigating negative impacts of climate change on soil health in Brandenburg. It was organised within the framework of one national research project, BonaRes-SIGNAL, which investigates agroforestry as a sustainable soil management strategy, and one EU Soil Mission funded projects, BENCHMARKS, charged with developing adaptable soil health indicators. The results feed into SOLO. The group activities and discussion in the workshop led to insights into societal, political, environmental, and technological barriers. Participants also discussed how soil health is monitored and promoted in their contexts. The workshop concluded with a feedback session, emphasising the importance of collaboration between science and practice, and the need for tailored tools and knowledge-sharing platforms to support soil health and sustainable land use.

Soil Week event 2024

Title of the event: The Role of Science Policy Interactions: Visions for Transformation Pathways in the Living Labs (Session at the Landscape Conference 2024, around 350 participants)

Location: Berlin

Date: 17-19/09/2024, day of the session, 18/09/2024

Scale of the discussion: EU level

Mission Objectives / Think Tank topics covered: Soil literacy

Number of stakeholders involved: 4 Presenters, Audience number was not accounted for, but around 12

Typology of stakeholders involved: Science (Research) (Students, researchers, scientists), civil society

The EU mission “Soil health for Europe” aims to establish 100 living labs across Europe to co-design and implement sustainable soil management transformations. Such transformations include all land use types: agriculture, forestry, natural areas, urban and industrial. The transformation requires science policy interactions to design the long-term visions to prepare the political frameworks, starting at the living lab level involving different actors (land users, policy, CSOs) and addressing socio-economic conditions, bio-physical characteristics, institutions, and policies. Furthermore, feedback mechanisms from the living labs to regional, national, and EU-level policy-making need to be strengthened for the effective implementation of soil health transformations. To address these challenges, the session invited papers that identify the conditions (methods and tools, visions for the science policy interactions) for establishing the

science policy interactions at the living labs level. The participants further discussed the future challenges, success factors and governance of implementing science policy interaction.

Soil Week event 2025

Title of the event: Feldtag Boden 2025 - ´Boden.Wissen.Handeln – 30 Jahre Praxisversuch Lietzen“ – Field day with stakeholders

Location: Lietzen, Brandenburg

Date: 04/09/2025

Scale of the discussion: Local and National

Mission Objectives / Think Tank topics covered: Land degradation and desertification, Soil organic carbon stocks, Soil literacy

Number of stakeholders involved: Around 150 stakeholders were present at the event including the organisers and the presenters, among which 30 participated in the survey from which the information has been collected.

Typology of stakeholders involved: Majority unidentified: 17 respondents did not specify their stakeholder group, the rest grouped following: Scientists: 6, Relevant practices (Farmers): 4, Public sector (Administrative staff (Verwaltung)): 2, Civil society (NGO/Civil servant) 1

A field day to celebrate the 30 years of the long-term on farm experiment on conservation tillate at Lietzen consisting of interactive seminars, lectures, demonstrations, and field visits. The event explored sustainable soil management in the face of climate change, featuring expert panels, machine demonstrations, and interactive in-field stations. Topics included soil health, erosion prevention, humus formation, mechanical weed control, and digital soil mapping. The field day was open to farmers, students, companies, and the general public, the event aimed to bridge science and practice to promote resilient agricultural landscapes.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

Soil Week events not only provide the opportunity to engage with stakeholders beyond academia and project partners, but also provide the platform to collaborate with other Soil Mission-funded projects. Through the soil week events at ZALF, various groups of stakeholders were engaged, such as farmers, students, companies, civil organisations, scientists, and the general public. For the soil week events, we have collaborated with other Soil Mission-funded projects (i.e. Benchmarks, PREPSOIL) at ZALF as well as other projects (i.e. Patchcrop). This practice helped us to establish common grounds between Soil Mission projects and also tackle the issues with stakeholder fatigue by converging events together. The Soil Week events thus not only helped raise awareness among the broader public about soil health-related concerns but also brought scientists working on this topic together, providing opportunities for collaboration. The

communication of the last event was specifically designed with this collaboration opportunity in mind, and the survey output would soon be consolidated in a Benchmarks-SOLO collaboration paper. These events also provided the opportunity to engage in in-depth discussion that goes beyond identifying knowledge gaps and bottlenecks. Stakeholders were given a platform to communicate their personal experience (e.g. precision fertilising) and the difficulties of getting appropriate cost estimates to explore financial viability. The open format helps to explore and gather this information and establish venues for new research and innovation targeted towards expressed needs of engaged stakeholders.

3.5.10 Norway

Soil Week event 2023

Title of the event: Soil Health with focus on C

Location: Webinar (in Norwegian)

Date: 01/02/2023

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Soil organic carbon stocks, Nature conservation of soil biology

Number of stakeholders involved: 60

Typology of stakeholders involved:

This was a webinar, and hence the stakeholder involvement and influence (type and numbers) is only indicative. Moreover, this took place two years ago, and this information was not recorded at that time. The participants included advisers within agriculture and environment, farmers, representative from the Norwegian research council, researchers from agronomy and forestry research institutes and Universities, advisers from the Norwegian Agricultural adviser service (NLR), NGOs, and private companies such as BAMA (Vegetables and fruit) and YARA (fertilizer).

Stakeholders' characterisation	CORE stakeholders	ACTIVE stakeholders	ASSOCIATED stakeholders
Policy makers and administration – focus land use			
Policy makers and administration – environment			
Policy makers and administration – other			X
Practitioners and Sector organization – focus land use			
Practitioners and Sector organization – environment			
Practitioners and Sector organizations – other			
Practitioners – Advisory Services		X	
Practitioners – Training entities			
Practitioners – Spatial planners			

Industry – production factors			X
Industry – Agri-food Companies			X
Scientists – Soil	X		
Scientists – focus land use			
Scientists – Environment and Biodiversity		X	
Other – Civil Society			

As part of SOLO Soil Week, NMBU hosted a webinar to engage national stakeholders in exploring drivers and barriers to soil health, with a focus on soil organic carbon (SOC). The session began with an introduction to the SOLO project and SOC Think Tank, followed by presentations from four experts. Each talk was followed by 10–20 minutes of open discussion. The webinar concluded with a summary session highlighting key insights. Stakeholders expressed strong commitment to improving soil health and emphasized SOC's importance in sustainable agriculture and environmental stewardship. Several challenges were identified, including the lack of consensus on soil health parameters and limited access to validated tools for measuring them. Discussions explored potential solutions, such as increasing funding from the Norwegian Research Council to support foundational research on soil parameter analysis. The webinar was not linked to any regional node but served as a national platform for knowledge exchange and collaboration.

Soil Week event 2024

Title of the event: Soil week 2024

Location: NMBU

Date: 29-30/10/2024 (full day events)

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Soil organic carbon stocks, Erosion prevention and Land degradation and desertification

Number of stakeholders involved: 56

Typology of stakeholders involved: Participants included researchers, students, farmers, farmers' association representatives and NGO representatives, economists, policymakers and other stakeholders from the agriculture and soil-related industries.

Stakeholders' characterisation	CORE stakeholders	ACTIVE stakeholders	ASSOCIATED stakeholders
Policy makers and administration – focus land use			5
Policy makers and administration – environment			2
Policy makers and administration – other			2
Practitioners and Sector organization – focus land use			
Practitioners and Sector organization – environment			
Practitioners and Sector organizations – other			
Practitioners – Advisory Services		7	
Practitioners – Training entities			
Practitioners – Spatial planners			

Industry – production factors			2
Industry – Agri-food Companies			2
Scientists – Soil	28		
Scientists – focus land use			
Scientists – Environment and Biodiversity		3	
Other – Civil Society			5

The SOLO Think Tank on Soil organic carbon stocks, led by NMBU and Norwegian EJP Soil partner NIBIO, hosted a two-day Soil Week event on October 29–30 at the NMBU campus. The event focused on soil organic carbon stocks, soil degradation, and erosion control. Participants attended presentations on soil health, carbon sequestration, and structure, with updates on the SOLO project and EJP Soil findings. Interactive workshops allowed stakeholders to identify and prioritize knowledge gaps and bottlenecks. No actions suggested. Day 1 addressed erosion and degradation; Day 2 emphasized SOC. A concluding roundtable featured expert responses to participant questions. NIBIO shared key EJP Soil outcomes and SOLO's ongoing SOC-related activities. Feedback on findings was gathered through Mentimeter polling. A delegate from the Directorate of Agriculture enabled direct engagement with policymakers. Stakeholders identified challenges such as the lack of consensus on soil health indicators and limited access to validated measurement tools. These issues were relayed to the Think Tank teams, underscoring the need for enhanced knowledge exchange and targeted research. The event fostered cross-sector collaboration and advanced national dialogue on soil resilience and bioeconomy strategies. No formal connections to regional nodes were established during the event.

Soil Week event 2025

Title of the event: Soil Week 2025: Research, practice, innovation, and management

Location: NMBU

Date: 28-29/10/2025

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Soil structure, Pollution and restoration, Soil organic carbon stocks

Number of stakeholders involved: 70

Typology of stakeholders involved: Participants included researchers, students, farmers, farmers' association representatives and NGO representatives, economists, policymakers and other stakeholders from the agriculture and soil-related industries

Stakeholders' characterisation	CORE stakeholders	ACTIVE stakeholders	ASSOCIATED stakeholders
Policy makers and administration – focus land use			6
Policy makers and administration – environment			7
Policy makers and administration – other			5
Practitioners and Sector organization – focus land use			
Practitioners and Sector organization – environment			

Practitioners and Sector organizations – other			
Practitioners – Advisory Services		4	
Practitioners – Training entities		3	
Practitioners – Spatial planners			
Industry – production factors			3
Industry – Agri-food Companies			4
Scientists – Soil	28		
Scientists – focus land use			
Scientists – Environment and Biodiversity		5	
Other – Civil Society			5

The Norwegian University of Life Sciences (NMBU) and the Norwegian Institute for Bioeconomy Research (NIBIO) hosted a two-day Soil Week event on October 28–29 at the NMBU campus. The event focused on key Think Tank themes: soil structure, soil pollution, and soil organic carbon. Additional topics included regenerative agriculture (RA), soil life, and innovation. Each day concluded with open discussions: Day 1 explored farmers' research priorities, while Day 2 addressed policy makers' needs. Although responses were broad, a common theme emerged, enhancing knowledge exchange across sectors to better apply existing research. Regenerative agriculture received particular attention, with discussions highlighting its growing acceptance and alignment with soil mission objectives and Think Tank themes.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

Soil Weeks successfully brought together a wide range of stakeholders, including researchers, students, farmers and their organizations, NGO representatives, economists, advisors, and key decision-makers (such as delegates from the Norwegian Agriculture- and Environmental Agencies). These events fostered engagement around improving soil health and recognizing the critical role of soil organic carbon, soil structure, soil erosion and soil pollution. They highlighted the need for stronger multidirectional knowledge exchange to apply existing insights more effectively. Farmers and policymakers were given the opportunity to directly express their specific research needs and policy development.

Soil Weeks served as a vital forum for sharing project results from Prepsoil, the EJP Soil initiative and the SOLO project, particularly related to SOC, soil structure and soil erosion. And to a less degree soil degradation and pollution. A key outcome was the extensive identification of knowledge gaps and bottlenecks hindering progress. These included lack of consensus on soil health parameters, the need for long-term research funding, and constraints related to heavy machinery and farm economics. Expected outcomes include increased understanding of soil health's role in global carbon balances and the development of plausible, verified measurement methodologies. Feedback on findings was collected using interactive tools like Mentimeter.

The events helped highlight and promote changes in practice. Regenerative Agriculture (RA), which aligns with several soil mission goals, is gaining traction and was discussed from multiple perspectives. Participation from government agencies enabled direct political engagement.

Identified bottlenecks, such as poor rule implementation and sector-specific solutions, suggest that the dialogue is addressing necessary changes in governance and practice.

Farmers showcased practical RA methods such as crop rotation and reduced tillage, while emphasizing the challenge of scaling these efforts beyond idealist-driven trials. Innovations like "Winterleap," a technology using microwaves to combat pests in frozen soil, were presented. Simple remediation techniques for contaminated soil, such as liming, biochar, and compost, were discussed in light of new EU regulations.

The research and innovation activities address Norway's challenges related to industrialization, climate change, and agricultural recruitment. By focusing on SOC, soil contamination, and erosion, the events help connect research to critical societal goals such as global carbon balance, food production, and water quality. Emphasis was also placed on education and the importance of developing pedagogical programs to teach soil knowledge to children, ensuring future engagement.

3.5.11 Sweden

Soil Week event 2023

Title of the event: Går det att förtäta städer utan att äventyra markens viktiga ekosystemtjänster? [Is urban densification possible without risking important ecosystem services?].

Location: Online

Date: 17/01/2024

Scale of the discussion: National but with main focus on the Region of Skåne

Mission Objectives / Think Tank topics covered: Soil sealing and urban soils

Number of stakeholders involved: 85

Typology of stakeholders involved: About 150 persons registered interest for the seminar. Of those, 85 persons participated in the seminar online. The majority (ca 100) of the persons who registered interest in the seminar work for municipalities, counties or other public authorities (Public administration), 20 work at universities or research institutes, ca 10 are practitioners or from sector organisations, ca 10 from industry, and then a few from NGO's and a couple of students.

The soil event was a breakfast seminar (webinar), held in cooperation with LU Land. LU Land is a collaborative initiative at Lund University with the aim to identify, discuss and find solutions to challenges related to sustainable land use. After the seminar, it was published online and sent to everyone who had registered interest for the seminar. Moderator was Katarina Hedlund, professor at Lund University.

Speakers:

- Peter Olsson, researcher at Centre for Environmental and Climate Science, Lund University. Title: Jord och urbana ekosystemtjänster [Soil and urban ecosystem services].
- Christel Carlsson, research coordinator at the Swedish Geotechnical Institute (SGI). Title: Det ska vara säkert och hållbart att bo och färdas [Residence and transport has to be safe and sustainable].

The topic is strongly connected to the Regional Node of the Urban-rural gradient of Southern Sweden. Both speakers focused on research/examples from Malmö, Sweden.We discussed what we know and don't know about Nature Based Solutions and heard about a planning tool, Geokalkyl, that is being developed by SGI. Participants were very interested and had many pragmatic questions like what tree species to use in cities and request for tools for planning and evaluation of impact.

Soil Week event 2024

Title of the event: Att bygga på åkermark – ett hot mot framtida livsmedelsförsörjning? [Constructions on arable land – a threat to future food supply?].

Location: "Ystad summit" in Ystad, Sweden

Date: 04/09/2024

Scale of the discussion: Regional, Skåne.

Mission Objectives / Think Tank topics covered: Soil sealing and urban soils, and Footprint on soils

Number of stakeholders involved: About 80 persons attended the seminar, 40 attended in person and 40 online

Typology of stakeholders involved: As the event was open and no registration needed to participate, it is almost impossible to estimate the participants' characterisation. We know that participants were e.g. a teacher, person involved in politics, and persons from private companies.

This soil week event was in the form of a seminar at "Ystad summit" in Ystad, Sweden. Ystad summit is an open venue for people from different parts of society to meet and discuss social issues affecting the whole of southern Sweden and the Baltic Sea region. The SOLO seminar was a part of a section on how to protect the land's values and ecosystem services for our future food supply.

Title of presentation: Att bygga på åkermark – ett hot mot framtida livsmedelsförsörjning? [Constructions on arable land – a threat to future food supply?]. Speaker: Mark Brady, researcher at Centre for Environmental and Climate Science, Lund University and at AgriFood Economics Centre. The presentation is strongly connected to the Regional Node of the Urban-rural gradient of Southern Sweden.

Construction on arable land is a hot topic in Sweden and engages many people, which also was apparent at the event. Some people strongly believe that arable land should be saved for future food supplies while others believe that we can just as well build on it as it is not needed. Still others brought up problems (e.g. lack of national goals/guidelines) and potential solutions.

Soil Week event 2025

Title of the event: What are the soil organisms doing in the soil?

Location: Botanical garden in Lund, Sweden

Date: 10/05/2025

Scale of the discussion: Regional, Skåne/Lund

Mission Objectives / Think Tank topics covered: Soil literacy and Nature conservation of soil biodiversity

Number of stakeholders involved: 100-150

Typology of stakeholders involved: This was a family event, so the target group was civil society

This was a part of a family event at the Botanical garden in Lund. We had a stand with the name: Vad gör egentligen djuren under marken? (”What are the organisms doing in the soil?”). There, families could:

- look for soil organisms in compost from the botanical garden and from regular household,
- look at the organisms they (and we) had found in stereo microscope,
- look at microorganisms from water and soil taken from the botanical garden.
- colour drawings of invertebrates.

Some families came to the Botanical garden specifically to participate but many just stumbled upon us. They seemed happy and thankful for the opportunity to learn about soil and soil biodiversity and we were encouraged to have more activities like this one. Some adults expressed their surprise that they’d never heard about some of the common and diverse taxa (e.g. Collembola). Adults and older kids were mainly interested in microscoping, organisms’ names and functions as well as the methods we use. Many of the younger kids were interested in learning everything about earthworms, e.g. what’s the front and back, what they eat and how etc.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

During the years 2023-2025, Lund University has organised three Soil Week events. Those three events have been quite diverse, ranging from a family event on soil and soil biodiversity at the Botanical garden, to webinar and Ystad summit seminar with more pragmatic questions and discussion on city planning and soil health in and around cities. The Soil Week events have reached a variety of stakeholders, and at all ages. People from civil society and industry, practitioners and scientists have been able to get new ideas and ask questions on soil related issues.

All the soil events were open and no registration needed. It is therefore impossible to do a follow-up to assess the outcomes and impacts of the events. However, through discussions at the events on e.g. what we know and don't know about Nature Based Solutions in cities, the marketing value of arable land, and soil and soil biodiversity in general, we have outcomes in form of identified knowledge gaps, potential actions that could fill the knowledge gap, and bottlenecks.

Open events, like the soil events, lead to greater awareness of soil health and soil biodiversity in the civil society and among e.g. practitioners. At the Soil Week events, especially at the family event in the Botanical Garden, we witnessed quite a few eye-opening moments so we are confident that visitors went home knowing more about soil and soil organisms than when they arrived. Some adults expressed their surprise that they'd never heard about some of the common and diverse taxa (e.g. Collembola). Adults and older kids were interested in microscoping, organisms' names and functions as well as the methods we use. Many of the younger kids were interested in learning everything about earthworms, e.g. what's the front and back, what they eat and how etc. At the other two events that were targeted at practitioners, people learned about tools, they showed interest and had discussions, which can lead to changes in e.g. awareness and work practice.

3.5.12 Finland

Soil Week event 2023

Title of the event: Soil Health and Ecosystems Restoration

Location: Helsinki

Date: 07/05/2024 (needed to be rescheduled due to strike in Finland)

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Soil structure, Nature conservation of soil biodiversity

Number of stakeholders involved:25

Typology of stakeholders involved: Policy makers and administration, practitioners, industry representatives, scientists and civil society

We held a workshop with a broad title "Soil health" for the stakeholders in Finland and expanded the list of invited stakeholders to restoration of ecosystems. The event was held in Helsinki, Finland and we had participants mainly from the Helsinki metropolitan area but also from Southern Finland.

The working methodology of the workshop was World I dynamics. People were divided into 3 groups circulating between the three tables (topics: soil health, ecosystem restoration, forest soil health) so that all the participants were commenting on all the group tasks.

The event was a success. We had an extremely lively discussion already during the short introductory presentations given by scientists from LUKE (Jenni Hultman, Krista Peltoniemi and Taina Pennanen). The presentations were followed by a brief overall presentation on Soil Missions and Soil monitoring law by representatives from the Finnish ministries responsible for these actions. During the world I group work several themes regarding the topics were discussed and not only the gaps and bottlenecks. We also got at least 4 new stakeholders to the Soil structure TT. There was clearly a need for such an event and this kind of cross disciplinary forums for discussions will be held in the future.

This event was jointly organized with SOLO, Biodiversa project MiDiPEAT and HE project SOILGUARD. This was beneficial as the three different projects attracted diverse groups of stakeholders. The word I dynamics worked really well, and each round of discussions produced novel ideas to the discussion boards.

Soil Week event 2024

Title of the event: Soil Science Days

Location: Helsinki, Finland

Date: 07-08/01/2025

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Nature conservation of soil biodiversity, Soil structure, Soil organic carbon stocks

Number of stakeholders involved: Part of event with 200 participants

Typology of stakeholders involved: Policy makers and administration, practitioners, industry representatives, scientists and civil society.

Finnish Soil Sciences days (Maaperätieteenpäivät 2025). A two-day biannual event in Helsinki, Finland. SOLO was presented in a flash talks during the main session and we had a separate poster for SOLO which was presented on both days of the meeting.

There were over 200 participants to the event and of them 34 replied to our questionnaire on Soil Structure Knowledge gaps. In addition, we handed over 120 SOLO stickers soil enthusiastic and discussed the project and the specific TTs for hours. Participants were scientists, students, farmers, politicians, industry representatives, public administration and foundation representatives. There were 5 “official” stakeholders present.

SOLO and more specifically Think tanks of WP2 were discussed at the meeting and we got really good feedback on the prioritized Knowledge gaps of TT on Soil Structure. There was lively discussion linked to Soil structure, Soil carbon, Soil biodiversity and Soil literacy. We interacted with over 100 participants, and several were interested in joining SOLO stakeholder groups for different TTs. Soil monitoring law methods and knowledge gaps were discussed as well.

Finnish soil scientists voted on Soil structure knowledge gaps in Menti and SOLO stickers were distributed (they were really popular!). The TT Documents received a great interest, and we have a list to whom the Document should be shared.

The feeling was that the general aim of the SOLO project as well as the soil structure-related issues are of interest among the stakeholders and soil scientists.

Few stakeholders asked about how locally varying reasons for soil compaction can be considered in the documents.

Soil Week event 2025

Title of the event: Biology teachers annual meeting

Location: Helsinki

Date: 15/11/2025

Scale of the discussion: National

Mission Objectives / Think Tank topics covered: Soil Literacy

Number of stakeholders involved: Approximately 100 (expected)

Typology of stakeholders involved: Civil society (expected)

Annual meeting of the biology teachers in Finland. We will present the SOLO project and have a questionnaire for the teachers on what they would like to know on soil health to be able to teach Soil Literacy better.

Complete preliminary results of the events: Annex 2

Mid-term evaluation narrative

Between 2023 and 2025, the SOLO project actively engaged Finnish soil science and stakeholder communities through two major events in Helsinki.

The first event was a stakeholder workshop on “Soil Health”, which expanded the dialogue to include ecosystem restoration. Using the World Café methodology, participants rotated through three thematic tables — soil health, ecosystem restoration, and forest soil health — ensuring broad and inclusive discussions. The workshop began with presentations by Luke scientists and ministry representatives on Soil Missions and Soil Monitoring Law, sparking lively exchanges even before group work began. Conversations went beyond identifying gaps and bottlenecks, generating innovative ideas and actionable insights. Importantly, four new stakeholders joined the Soil Structure Think Tank. The event was jointly organized by SOLO, the Biodiversa project MiDiPEAT, and the Horizon Europe project SOILGUARD, attracting a diverse stakeholder group and reinforcing the value of cross-disciplinary collaboration. Feedback underscored the need for such forums, and plans are in place to continue hosting similar events in the future.

The second was the Finnish Soil Sciences Days (Maaperätieteenpäivät 2025), a two-day biannual meeting that brought together over 200 participants, including scientists, students, farmers, policymakers, industry representatives, and public administrators. SOLO was featured

prominently with a flash talk during the main session and a dedicated poster displayed throughout the event. Engagement was strong: more than 100 participants interacted with the team, 34 completed a questionnaire on soil structure knowledge gaps, and over 120 SOLO stickers were distributed — becoming a popular conversation starter. Discussions focused on WP2 Think Tanks, particularly Soil structure, and extended to Soil carbon, Biodiversity, and Soil literacy. A Menti voting session further involved Finnish soil scientists, and several attendees expressed interest in joining SOLO stakeholder groups. Feedback confirmed that SOLO's objectives resonate widely, with questions highlighting the need to address locally varying causes of soil compaction in future documents.

Together, these activities strengthened stakeholder engagement, increased visibility for SOLO, and confirmed the relevance of soil structure and soil health issues across scientific and policy communities. They also highlighted the importance of collaborative approaches and region-specific considerations in advancing soil-related knowledge and practices.

4 Closing remarks

The number of developed Regional Node and Soil Week activities since 2023 is according to plan, and so is the amount and diversity of stakeholders engaged. The regional inputs collected from the 12 countries in SOLO is invaluable, in spite of the different scales, levels of detail and expertise. Furthermore, both the Regional Nodes and Soil Weeks have proven to be privileged platforms for dialogue, network creation and boosting innovative, collaborative initiatives. Inter- and transdisciplinary knowledge exchange has been fruitful for stakeholders, SOLO partners and several Mission Soil projects.

The past three years of these regional activities have been a process that has delivered numerous learning elements to all involved. Although this Deliverable marks the formal mid-term evaluation, an internal and continuous reflection process was put in place, adjusting activities to the challenges and successes that were encountered along the way. Balancing flexibility with guidance has been an ever-present effort, and key to the results that were achieved.

The ultimate purpose of having the outputs of the Regional Nodes and Soil Weeks contribute to the regionalization of SOLO's R&I roadmap is in progress: the workflow between SOLO Work Packages and activities has been facilitating continuous knowledge integration; and the regional results have started to be analysed in D4.2.

Regional Nodes and Soil Weeks contribute to the regionalization process through different, yet complementary mechanisms. The Regional Nodes provide in-depth insights at a relatively small scale (specific land use type in a small region), and the Soil Week events provide less detailed input but at a wider scale (country, number and diversity of stakeholders).

Both of them have confirmed the indisputable importance of including regional activities in R&I projects to reach real-world people and to capture their needs and priorities.

5 Acknowledgements

We would like to thank all the stakeholders who have participated in the Regional Node workshops and in the Soil Week events for kindly sharing their knowledge, experience, perceptions and concerns.

We would also like to thank SOLO's Regional Node and Soil Week partners for their commitment, and for their direct contributions to this Deliverable.

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7 Annex 1: Complete preliminary results of the Regional Nodes

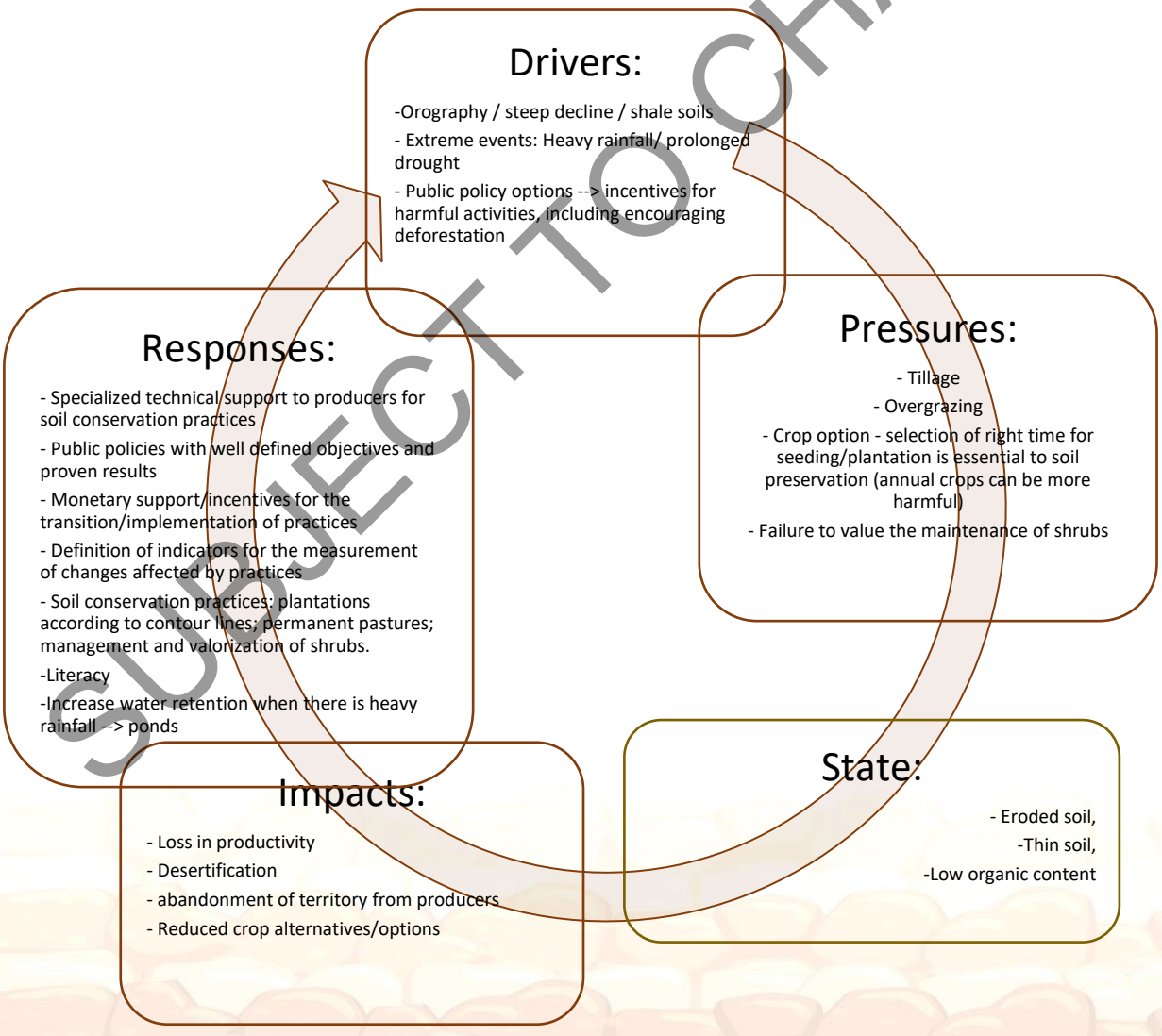
NODE 1 - Portuguese Montado (agroforestry)

i) Selected top 3 regional priorities for soil regeneration in the focus land use:

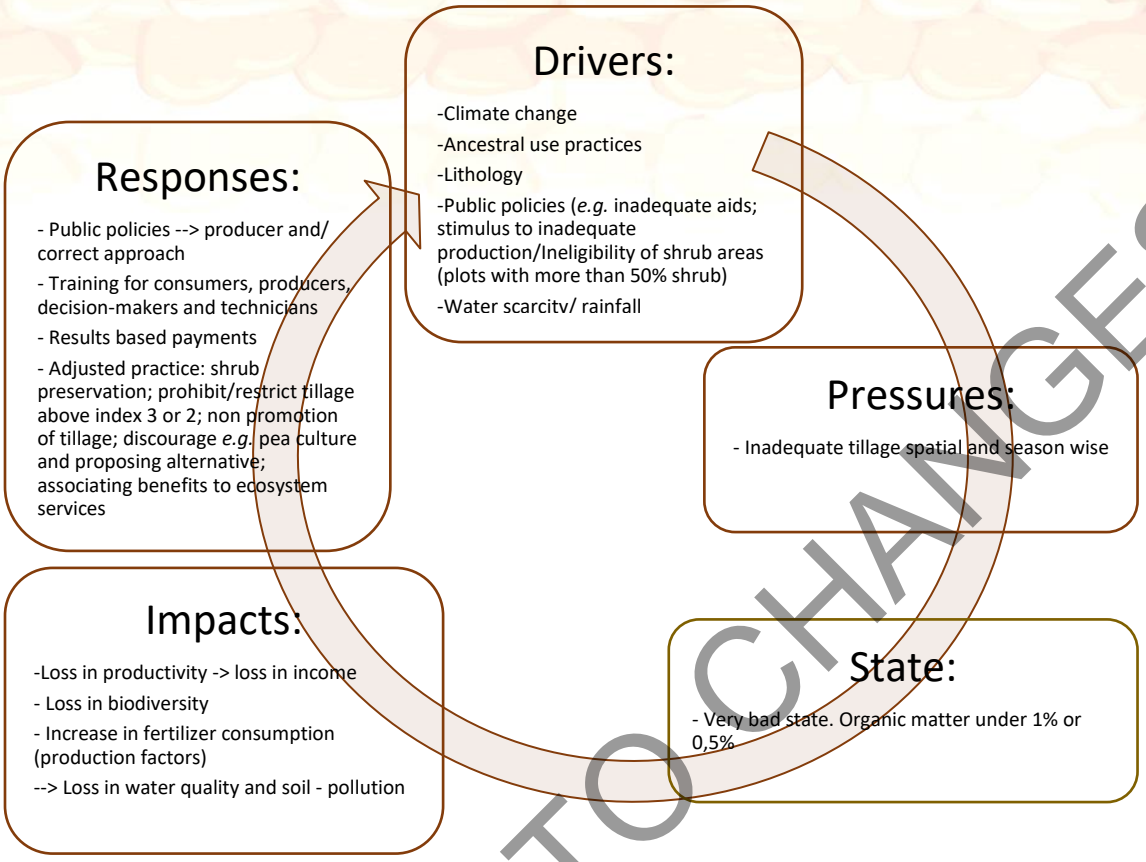
- Erosion prevention;
- Nature conservation of soil biodiversity;
- Soil organic carbon stocks.

ii) Schematic baseline assessment of what affects and is affected by the regional priorities for soil regeneration – DPSIR analysis

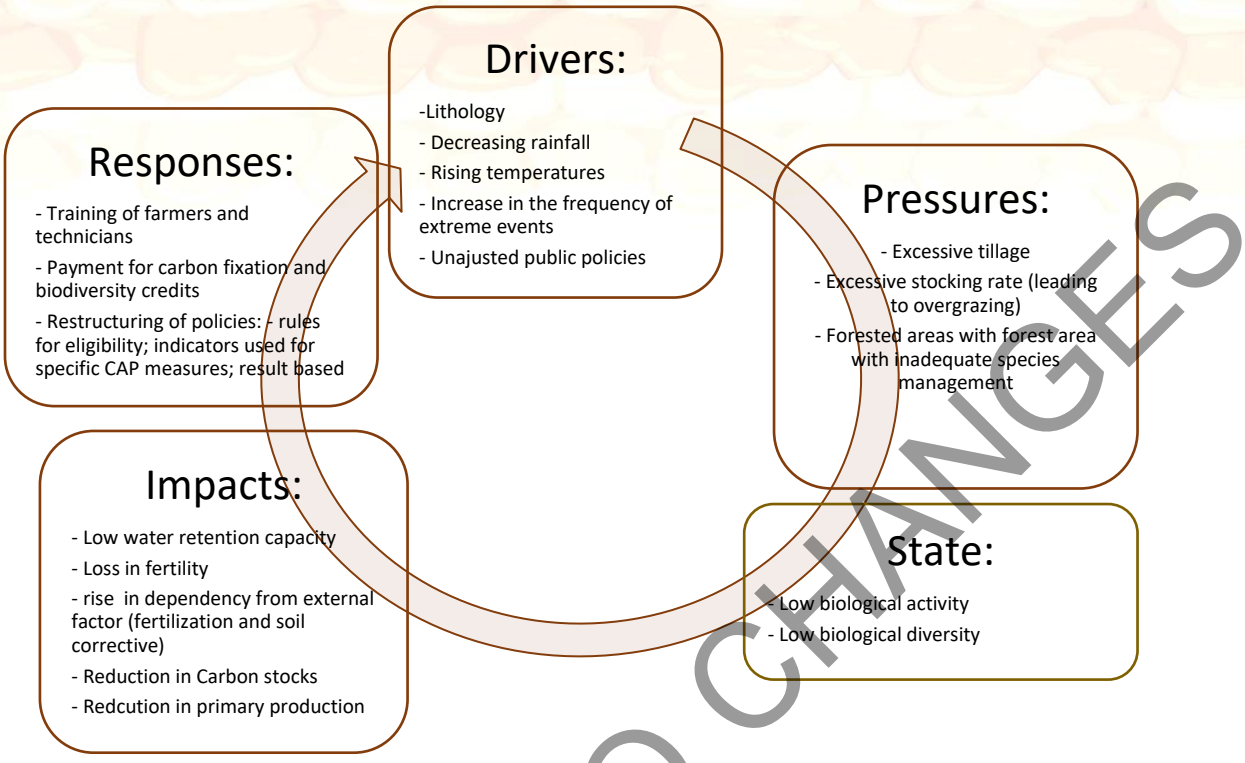
Mission Objective: **Erosion prevention**



Mission Objective: **Soil organic carbon stocks**



Mission Objective: **Nature conservation of soil biodiversity**



iii) Prioritization list of knowledge gaps relevant to the region, per soil Mission Objective

Erosion prevention					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1		*MO1-1*	Public advisory services (institutionalized and regionalized)	KD	*TMO1-2*
2		*MO1-9*	Mechanisms that ensure the connection between public policies and local realities, through more effective and transparent integration of knowledge	KA	*TMO1-1, TMO1-2*
3		*MO1-4*	Mechanisms for raising awareness among civil society and consumers about the importance of soil and the role of erosion	KD	*TMO1-7*
4		*MO1-2*	Data that allows for the assessment and monitoring of all soil health parameters: nutrients, ecosystem services, economic value	KD	*TMO1-3, TMO1-10*
5		*MO1-8*	Data and analysis providing evidence on the added value and cost-benefit ratio of applying soil regeneration practices in extreme and complex	KD	*TMO1-5, TMO1-7*

			biophysical contexts such as that of Mértola		
6		*MO1-6*	Long-term experimental plots, also aimed at knowledge transfer to disseminate erosion prevention and minimization practices	KD	*TMO1-1, TMO1-2*
7		*MO1-7*	Legislation appropriate to protection against soil erosion	KA	*TMO1-3, TMO1-4*
8		*MO1-3*	Economic incentive mechanisms for continuous learning by producers	KA	*MO1-3*
9		*MO1-5*	Competition for land use that destabilizes land values as payment for the installation of photovoltaic power plants vs. abandonment	KD	

Soil organic carbon stocks					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1		*MO2-2*	Life cycle analysis: cost-benefit economic benefit (change in practices), footprint outside the EU, territorial dimension	KD	*TMO2-5, TMO2-10*
2		*MO2-3*	Standardized measuring and modelling techniques	KD	*TMO2-4*
3		*MO2-4*	Education and accountability: promotion, communication, and training in soil regeneration practices appropriate to the context of Mértola, including adaptation to climate change	KA	*TMO2-1, TMO2-8*
4		*MO2-5*	Agroforestry management objectives and practices in which the two aspects are combined in a virtuous manner, considering soil health	KA	*TMO2-9*
5		*MO2-6*	Biodiversity: assessment of the interaction between microbiology and soil carbon	KD	*TMO2-2*
6		*MO2-1*	Identification and design of public policy instruments that best transpose current European objectives, guidelines, and requirements at the national and local levels	KD	*TMO2-3*
7		*MO2-7*	Biotechnological innovations associated with sustainable agricultural practices that promote carbon sequestration	KA	

Nature conservation of soil biodiversity					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1		*MO3-1*	Economic assessment of the functions provided by soil biodiversity and monitoring of the effects of agricultural practices on these functions	KD	*TMO3-2*
2		*MO3-2*	Methodologies and practices for training technicians from agricultural associations and agricultural companies and producers to increase their level of knowledge about soil and awareness of its importance in the production system	KA	
3		*MO3-5*	Methodologies and practices for training producers to increase their level of knowledge about soil and awareness of its importance in the production system	KA	*TMO3-5*
4		*MO3-6*	Identification and design of public policy instruments that best limit agricultural practices harmful to soil biodiversity and promote regenerative biodiversity and soil practices by producers	KA	*TMO3-6, TMO3-5*
5		*MO3-4*	Design and implementation of effective strategies for soil biodiversity conservation	KA	
6		*MO3-7*	Identification of methodologies for applying agricultural practices tailored to regional lithology and climate	KA	
7		*MO3-8*	Public training: mechanisms for training communities on the importance of soil.	KA	*TMO3-6*
8		*MO3-9*	Tools for communication between the scientific community and the general public and end users (e.g., producers).	KA	
9		*MO3-3*	Public awareness: training/education on the issue at different educational levels	KA	*TMO3-5*

iv) Relevant R&I Actions for the region, per soil Mission Objective

Erosion prevention							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
1	Creation of a municipal office. Responsible entities: CCDR Alentejo (Regional Coordination and Development Commission of	EC	*MO1-1*			X	

	Alentejo); University support through technical staff from the office.						
2	Creation of local offices – "anchors" for regional services of the Ministry of Agriculture.	EC	*MO1-1*			X	
3	Creation of a network of trust and knowledge.	EC	*MO1-1*				X
4	Creation of one local office (rural extension). Technicians have multidisciplinary individual skills and can call on specialists from central services (Ministry of Agriculture).	EC	*MO1-1*			X	
5	Creation of local offices with multidisciplinary training.	EC	*MO1-1*			X	
6	Technicians offer personalized/appropriate information when giving technical support.	EC	*MO1-1*			X	
7	Organization of monthly debates to clarify questions/doubts.	EC	*MO1-1*		X		
8	Creation of local experimentation networks to validate ecosystem regeneration solutions.	I	*MO1-1*			X	
9	Establishment of a network of farms/properties with successful case studies to disseminate good practices and actions.	I	*MO1-1*			X	
10	Inclusion of conservation and regenerative agriculture in higher education curricula.	I	*MO1-1*			X	
11	Mechanisms for disseminating results are created – Illustrated/visual language.	I	*MO1-1*		X		
12	Certification of farms and agricultural technicians/workers.	EC	*MO1-1*			X	
13	Creation of a municipal office for soil-related matters (Mértola City Council, ADPM, Universities)	EC	*MO1-4*			X	
14	Increasing societal awareness through coordinated actions between businesses and schools (field visits)	EC	*MO1-4*		X		
15	Training of technicians to provide education on the	EC	*MO1-4*		X		

	importance of soil, the ecosystem services it provides, and the processes of soil degradation and regeneration in this area and within this territory						
16	Finding creative ways to engage young people and the general population	I	*MO1-4*		X		
17	Environmental Fund financing: agreement established to support the implementation of the plan and the salary of a senior technician	EC	*MO1-4*		X		
18	Defining objectives for awareness raising according to different target audiences: 1) school population: regular education – adjustment of actions to school curricula; 2) general public: associating soil with consumer goods	I	*MO1-4*		X		
19	Increasing consumer literacy about natural resources (soil, water, vegetation)	EC	*MO1-4*		X		
20	Revision of school textbooks – integrated view of natural resources	I	*MO1-4*		X		
21	Ensuring continuity over time in training and knowledge of soil as a resource	EC	*MO1-4*		X		
22	Exploring new communication tools: videos, games, etc.	I	*MO1-4*		X		
23	1. The Portuguese Parliament was made aware by the SOLO team of the urgency of creating the SPAT → Audience request for 2026. 2. Installation commission for the Soil Recovery Agency and its regional branches created in 2026/27. 3. Organizational model of the agency discussed. A decision follows a Multi-agency Model involving: Intermunicipal		*MO1-4*				

	Communities (CIM) or local government; decentralized public services; Academia – 2027/28. 4. Technical, scientific, and material support provided to local offices: in Mértola, five senior technicians (with salaries from the State Budget) are allocated to meet the set objective. In 2029, Mértola will become the Pilot Project. 5. Selection criteria for technicians should prioritize knowledge of the local area to which candidates apply (2029) – Public application procedures opened. Installation of the 1st G2 → pilot project in 2030						

Soil organic carbon stocks							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
1	Identifying the local pivot to lead processes related to funding, recruitment, hiring, investment lines, dissemination strategies, etc. (Responsibility: Estação Biológica de Mértola; Municipality)	EC	*MO2-2*		X		
2	Identifying funding sources for hiring researchers (public or private)	EC	*MO2-2*		X		
3	Supporting the dissemination of the initiative to create the research team and the outreach team (Responsibility: Mértola Municipality)	EC	*MO2-2*		X		
4	Training of the research teams (composed of 4 researchers)	EC	*MO2-2*			X	

5	Identifying partner farms and formalize their involvement in the research line (Responsibility: Producers' Organization + Estação Biológica de Mértola)	EC	*MO2-2*		X		
6	Disseminating and technical support regarding the results to end users (farmers and students) (Responsibility: Producers' Organization)	EC	*MO2-2*		X		
7	Management of the Erosion Experimental Centre in Vale Formoso shared with the research team based at EBM	EC	*MO2-2*			X	
8	Securing funding, including from private sources	EC	*MO2-2*		X		
9	Coordination between structures ⇄ Define the entity responsible for the Technical Support Office: EBM, ADPM, or Montícola Association, assigned to Mértola Municipality	EC	*MO2-4*		X		
10	Interconnection between: communication strategy → Field – Production and other products; Vale Formoso's Experimental Center → Presentation of results and/or alternatives (alternative agroeconomic systems)	EC	*MO2-4*		X		
11	Joint management of Experimental Centre for Soil Erosion of Vale Formoso by a research team located at Estação Biológica de Mértola	EC	*MO2-3*			X	
12	Finding funding including private sources	EC	*MO2-3*		X		

Nature conservation of soil biodiversity							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
1	Municipal Council for Water and Soil Conservation established:1) Team identified	I	*MO3-1*			X	

	based on background in each specialty and/or new skill sets. Logistical and financial support for the team's work was secured; 2) Institutional support (team affiliated with an institution) provided to users, aiming to cover >75% of technicians and >30% of the area crop types						
2	Creating a living-lab type structure driven by the entities of the municipal council	I	*MO3-1*			X	
3	Establishing a network of experimental/demonstration farms for the main crops and other agricultural/forestry activities.	I	*MO3-1*			X	
4	Establishing a Soil research program with public-private funding	EC	*MO3-1*			X	
5	Forming partnerships with farmers to collect data for characterizing the baseline (protocols stabilized)	EC	*MO3-1*		X		
6	Development of a simulator to gather specific data from a given farm and calculate the potential economic gains from implementing soil improvement and protection measures	I	*MO3-1*			X	
7	Creation of soil data platform with two levels: scientific; producers	I	*MO3-1*			X	
8	Creation of an office that brings together current and new technicians from the territory	EC	*MO3-2*			X	
9	Knowledge transfer and capacity-building plan (community of practice network)	I	*MO3-2*		X		
10	Farm-level advisory plan	I	*MO3-2*		X		
11	Creation of volunteer programs (including volunteer training) to promote and integrate knowledge	I	*MO3-2*		X		
12	Development of a communication platform with information on available services, effectively reaching the target audience	I	*MO3-2*		X		
13	Agreement with universities to provide training for technicians → courses delivered through	EC	*MO3-2*		X		

	technical schools/vocational education						
14	Establishment of an entity to provide specialized services	I	*MO3-2*			X	
15	Working group established to design the public/private policy and its respective funding	EC	*MO3-6 (ranked 4th)*			X	
16	Municipal regulation created to govern soil management practices, incorporated into the Municipal Master Plan (PDM)	EC	*MO3-6 (ranked 4th)*			X	
17	Local awareness campaign on the measure (results-based agri-environmental measure for the protection and improvement of soils in semi-arid areas at risk of desertification)	EC	*MO3-6 (ranked 4th)*		X		
18	Creation of a Local Support Office (GLA) for the implementation of the measure	I	*MO3-6 (ranked 4th)*		X		

v) Evidence

Workshop 1


Workshop 2


Workshop 3

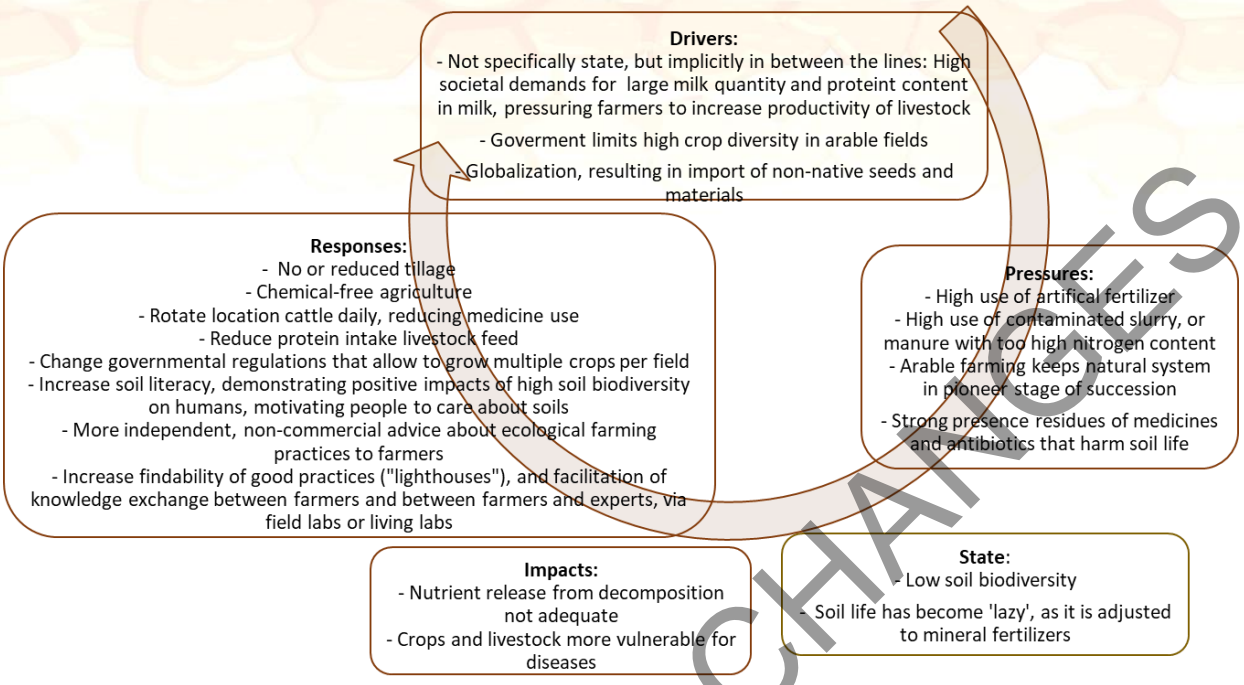
NODE 2 – Netherlands mixed farming

i) Selected top 3 regional priorities for soil regeneration in the focus land use:

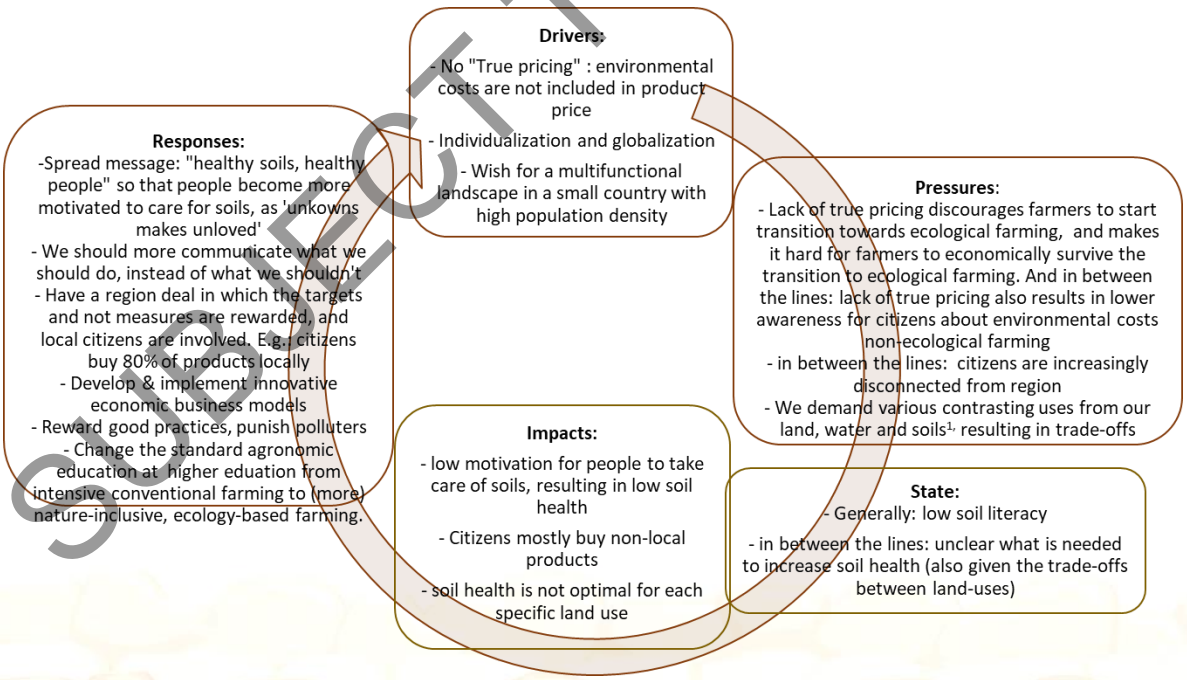
- Nature conservation of soil biodiversity
- Soil literacy
- Soil structure

ii) Schematic baseline assessment of what affects and is affected by the regional priorities for soil regeneration – DPSIR analysis

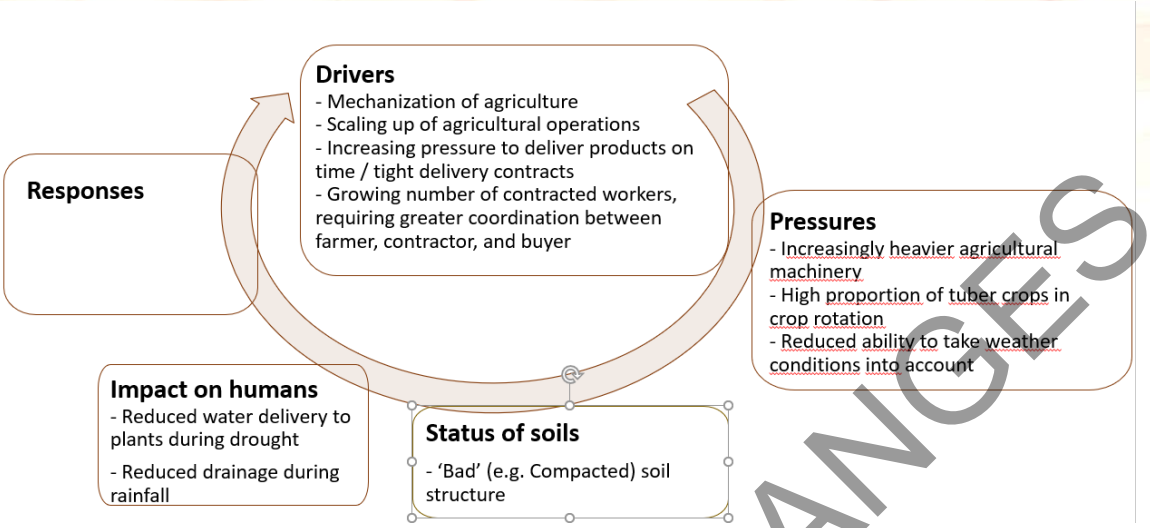
Mission Objective: **Nature conservation of soil biodiversity**



Mission Objective: **Soil literacy**



Mission Objective: **Soil structure**



iii) Prioritization list of knowledge gaps relevant to the region, per soil Mission Objective

Nature conservation of soil biodiversity					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1 +2	7	*MO1-1*	More knowledge about the functioning of ecosystems	KA	
1 +2	7	*MO1-7*	More knowledge and communication about the relationship between soil life and the health and quality of food	KD, KA	
3	4	*MO1-13*	Knowledge about existing soil life: nematode-based indicators, wat does a given composition of the soil community mean for its functioning	KD,KA	
4	3	*MO1-10*	Our thinking should evolve around the entire system instead of the problem(s)	KA	
5	2	*MO1-2*	More knowledge about the presence of toxins in manure	KD	
6+7+8+9+10+11+12	1	*MO1-3*	Increase awareness of people about the importance of soil biodiversity	KD,KA	
6+7+8+9+10+11+12	1	*MO1-9*	How can we use the soil for multiple uses (nature, houses, etcs)	KD,KA	
6+7+8+9+10+11+12	1	*MO1-11*	Which measures in arable and cattle farming support more soil biodiversity?	KD,KA	
6+7+8+9+10+11+12	1	*MO1-5*	Use educational network to spread knowledge	KA	

6+7+8+9+10+11+12	1	*TMO1-7*	A minimum dataset to index SB is lacking. Would it be possible to monitor soil for the conservation of SB with the concept of Minimum Dataset?	KD	
6+7+8+9+10+11+12	1	*TMO1-9*	Filling gaps in taxonomic and functional information on soil biota communities is needed to provide the foundation for monitoring and conserving soil biodiversity	KD	
6+7+8+9+10+11+12	1	*TMO1-10*	Critical information on the distribution of most soil taxa and what drives the distribution is lacking. This is needed for understanding of how and where conservation can be achieved for different taxonomic groups	KD	

Soil literacy					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1	12	*MO2-7*	How can we make consumers understand that there is a relationship between healthy soils, healthy food and healthy people? What then leads to tastier products and a healthier society with lower disease occurrence (e.g. less Parkinson because of pesticides), and less medical expenses.	KD,KA	
2	6	*MO2-2*	Focus in soil communication and knowledge dissemination on schools and future generations	KA	
3	3	*TMO2-9*	More research is needed in understanding the ecosystem services delivered by different soil types for key actor groups to improve targeted communication.	KD	
4	2	*TMO2-2*	More research is needed in fostering the connection between soil science knowledge and soil stewardship. Instead of focusing on why the gap exists (soil stewardship paradox), studies should explore how, where, and when soil knowledge contributes to responsible soil care.	KD	
5+6+7+8	1	*MO2-1*	Make a realtime display of soil life (e.g. put soil life in an aquarium), so visualize what is underground for the broader public	KA	
5+6+7+8	1	*MO2-5*	Do not transfer knowledge, but marvel about soil life	KA	
5+6+7+8	1	*TMO2-8*	More research is needed in improving soil health communication strategies that prioritise cultural and social aspects of soils significant to diverse actors.	KA	
5+6+7+8	1	*MO2-10*	Stimulate positive and healthy developments	KA	

Soil Structure					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1	8	*TMO3-3*	How do biological, physical, and chemical factors in soil interact to build and maintain its structure, and how can management practices harness these interactions to enhance soil structural resilience or restore it after deterioration?	NA	
2	6	*TMO3-7*	How to increase the interest towards soil structure and knowledge on the role of soil structure (especially sub soil) on water management among the land-managers? How to help farmers and land managers to avoid management-induced soil structure?	NA	
3	5	*TMO3-5*	Impact of circular economy and soil improvement materials in maintaining or improving soil structure in changing environment	KD,KA	
4 +5	3	*MO3-9*	Think in proportions: water/air balance, Ca/Mg balance, etc.	KA	
5 +5	3	*MO3-4*	Our thinking should evolve around the entire system instead of the problem(s)	KA	
6	2	*MO3-6*	Demonstrate the importance of soil structure for water holding capacity	KA	
7+8+9	1	*MO3-8*	Develop and spread knowledge about effective management practices (e.g. holistic grazing, undersowing, cover cropping,and alternative ways for tillage), and explain negative effects of tillage	KD,KA	
7+8+9	1	*TMO3-1*	How can we manage and adapt soil structure to support effective water regulation and habitat provision across scales—from microhabitats to catchment areas—in the face of climate change and evolving land-use practices?	KD,KA	
7+8+9	1	*TMO3-9*	Supply chain pressure: How to get better contracts for the farmers so that the contracts don't put you in the field at the wrong time?	NA	
10 till rest	0	rest	Rest		

iv) Relevant R&I Actions for the region, per soil Mission Objective

Actions will be identified in the 3rd workshop, which will be held in January 2026.

v) Evidence

Workshop 1. Figure to the left: plenary group discussion. Figure to the right: ranking the mission objectives for the Achterhoek region

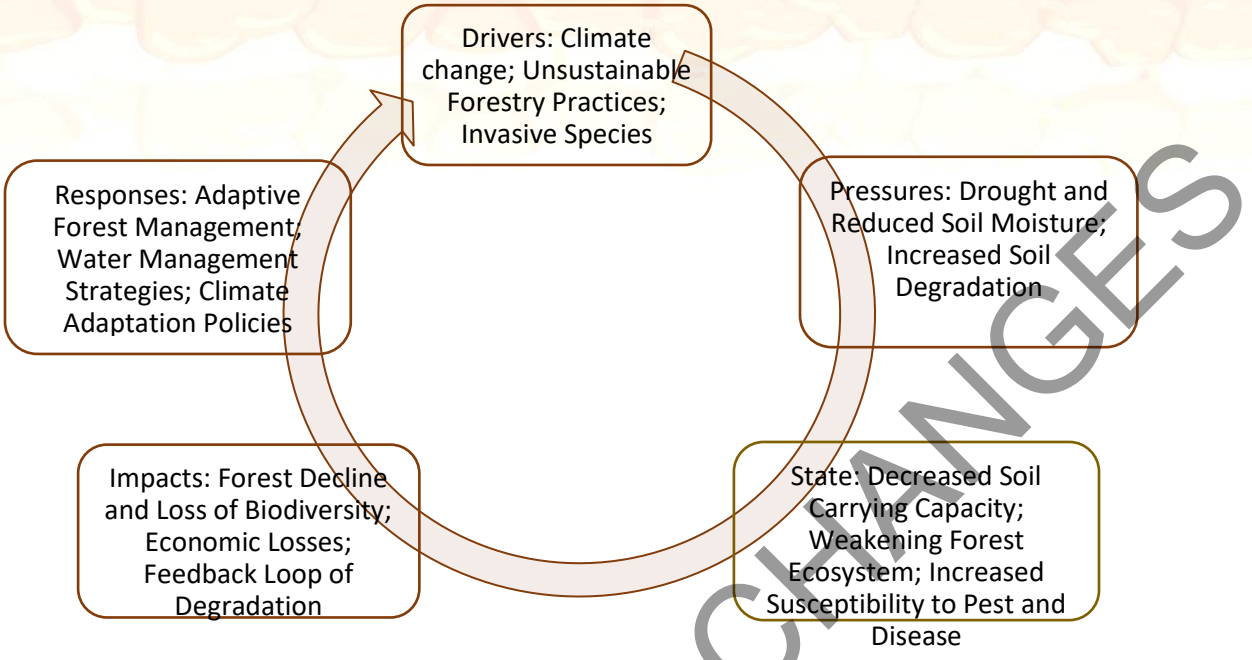
Workshop 2. Figure to the left: graphical summary of the contents of the workshop, in Dutch, by Susan Klinkert. Figure to the right: group photo of workshop participants.

<u>NODE 3 – Hungarian forests</u>

i) Selected top 3 regional priorities for soil regeneration in the focus land use:

- Pollution and restoration
- Land degradation and desertification
- Nature conservation of soil biodiversity

ii) Schematic baseline assessment of what affects and is affected by the regional priorities for soil regeneration – DPSIR analysis



iii) Prioritization list of knowledge gaps relevant to the region, per soil Mission Objective

Pollution and restoration					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1	5	MOP1	In sufficient socio-economic and market instruments for pollution prevention and target achievement. (lack of opportunities for sediment utilization, lack of decision support and advisory systems)	KD, KA	
2	4	MOP2	Agricultural soil pollution: lack of sufficient technical tools, preventive measures, and addressing knowledge gaps related to implementation. (e.g. lack of knowledge on the relationship between local small water treatment plants and soil pollution; and microplastic content of sediments, and how to avoid soil pollution due to use of thermal water as energy source	KD, KA	
3	3	MOP3	Inadequate assessment of broader ecosystem impacts beyond the soil. (e.g. lack of joint assessment of water	KA	

			and soil quality and the impact on nature conservation when excess water is discharged to a specific area to prevent flood damage.)		
4	3	MOP4	Knowledge of socio-economic factors: lack of sufficient knowledge on the economic and social impacts of pollution prevention, market and institutional failures, behaviour-shaping factors. (e.g., urban soil contamination, lack of financial resources)	KD, KA	
5	3	MOP5	Sustainable farming: lack of sufficient knowledge and knowledge transfer on the optimized practices adapted to production systems, climatic and environmental conditions, integrated plant protection.	KD, KA	
6	2	MOP6	Lack of a comprehensive investigation of the effects of pollutants on soil, ecosystem services, and human health (individually and in combination, in the short and long term). (e.g., negative effects on forest soils, and forest management on other fields' soil health)	KD, KA	
7	2	MOP7	Investigation of the behaviour, spread, and fate of pollutants, with particular regard to their interaction with water and air. E.g.: Impact of pollutants transported into surface waters by flash floods, and erosion	KD	
8	2	MOP8	Lack of databases and systematic monitoring to track soil pollution. (e.g., no data on pollutants originating from forests)	KD, KA	
9	2	MOP9	There is still lack of knowledge of the effects of pollutants: soil properties, biodiversity, functions, ecosystem services, human health (different exposure pathways, short- and long-term, mixed and cumulative effects). E.g.: Examination of the (potential) effects of all types of pollutants (according to physical state, composition, etc.) and individual pollutants on different soil types and mapping of these effects	KD, KA	
10	2	MOP10	Data and monitoring: there is an insufficient analysis and evaluation of the collected field data, and impact assessment studies (e.g. toxicity studies, cocktail and chronic effects, baseline values and environmental quality standards, long-term	KA	

			monitoring) made during various procedures.		
11	2	MOP11	Remediation and prevention: there is insufficient knowledge in relation to combining traditional and new technologies, applying best practices to different plants and pedoclimatic conditions.	KA	
12	2	MOP12	Assessment framework: insufficient analysis of spatial and temporal relationships between soil contamination, prevention, and ecosystem functioning. (e.g. determination of regional impacts in addition to local monitoring data	KA	
13	1	MOP13	There is a lack of reliable data for determination of baseline indicators, quality thresholds, and criteria. (e.g. currently, only approximately 50% of soil sampling is done by experts and not the farmers themselves).	KA	
14	1	MOP14	Policy and regulatory instruments: there is inadequate information on risk management of new pollutants, laboratory testing, filling legal gaps.	KD, KA	
15	1	MOP15	Risk assessment: there is no reliable comparative and comprehensive system for measuring and evaluating the effects of new technologies.	KD, KA	
16	0	MOP16	Insufficient development and application of remediation and restoration technologies	KD, KA	

Land degradation and desertification					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1	6	MOD1	Relationship with ecosystem services: lack of adequate comprehensive and, where possible, quantitative assessment of impacts.	KD, KA	
2	6	MOD2	Data and monitoring: multi-scale monitoring, indicators, filling gaps.	KD, KA	
3	6	MOD3	Data and monitoring: reliable field, high-resolution, and time-series data on soil health, degradation, and ecosystem services.	KD, KA	
4	6	MOD4	Farming practices: dissemination of sustainable, soil-friendly methods (e.g., no-till farming, adequate nutrient input), presentation of validated farming models.	KA	

5	5	MOD5	Public education and communication on the value of soil and responsible resource use.	KA	
6	4	MOD6	Exploring relationships: comprehensive understanding of soil degradation–ecosystem services–societal impacts.	KD, KA	
7	3	MOD7	Improving regional planning to reduce degradation (spatial targeting, priorities).	KA	
8	3	MOD8	Support for farmers and incentives to transition to sustainable land and soil management.	KA	
9	3	MOD9	Examining socio-economic interactions (past–present–future).	KD, KA	
10	3	MOD10	Assessment frameworks: weighing benefits and costs from social, ecological, and economic perspectives.	KD	
11	3	MOD11	Scientific consensus: on measuring and classifying soil degradation, distinguishing between cause and effect and risk.	KA	
12	3	MOD12	Cultural and social values: incorporating local knowledge, community participation, and cultural ecosystem services into decision-making.	KA	
13	3	MOD13	Dialogue and cooperation: genuine exchange of knowledge and joint thinking between science, policy and society.	KA	
14	2	MOD14	Toolkit for prevention and restoration tailored to land use and pedoclimate, with cost-effectiveness comparison.	KD, KA	
15	2	MOD15	Comprehensive understanding of causes and effects: drivers, processes, consequences.	KA	
16	2	MOD16	Communication and education: innovative methods, consumer information, recognition of positive actions by farmers.	KA	
17	2	MOD17	Support and training for farmers: knowledge transfer, motivation, and assistance with practical application.	KA	
18	1	MOD18	Economic incentives: coordinated use of existing and new instruments (e.g., carbon, biodiversity, resilience credits).	KA	
19	1	MOD19	Restoration tools: use of traditional and new methods for different land uses (urban, industrial, mining).	KA	
20	1	MOD20	Expanding and evaluating the strategy portfolio, including the suitability of the land degradation neutrality (LDN) concept.	KA	
21	0	MOD21	Land degradation neutrality (LDN): integration into strategies and policies,	KA	

			regional application, taking into account socio-economic aspects.		

Nature conservation of soil biodiversity					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1	5	MOB1	Economic valuation of soil biodiversity.	KD	
2	5	MOB2	Awareness raising and dissemination of knowledge about the importance of soil biodiversity.	KA	
3	5	MOB3	Comprehensive knowledge of threats, species ecology, and the spatial and temporal distribution of biodiversity.	KD, KA	
4	5	MOB4	Comprehensive exploration of the relationships between soil, farming practices, and ecosystem services.	KD, KA	
5	4	MOB5	Standardized methods and data for monitoring soil biodiversity and ecosystem functions.	KD, KA	
6	4	MOB6	Education and awareness raising: training programs, awareness raising, and creative tools (e.g., art).	KA	
7	4	MOB7	Establishment of baseline data and thresholds at regional and European level for long-term monitoring.	KD, KA	
8	4	MOB8	Standardized data collection and indicators for measuring soil biodiversity and ecosystem functions.	KD, KA	
9	4	MOB9	Identification of threats and risks: species threatened with extinction, human impacts, harmful practices.	KD	
10	3	MOB10	Development and application of conservation and restoration methods.	KD	
11	3	MOB11	Understanding the relationship between above-ground and below-ground biodiversity at different scales.	KD, KA	
12	3	MOB12	Conservation and restoration options: management and treatment practices that mitigate risks.	KA	
13	2	MOB13	Detailed ecological knowledge of species distribution, interactions, habitats, and environmental factors.	KD, KA	
14	2	MOB14	A unified framework and definitions for assessing biodiversity and ecosystem services.	KD	
15	1	MOB15	Implementation of effective protection strategies.	KA	
16	0	MOB16	Development of harmonized protection and management frameworks.	KD	

iv) Relevant R&I Actions for the region, per soil Mission Objective

Pollution and restoration							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
SPA1	Review the socio-economic and market tools and develop decision support systems to promote the utilization of local and regional resources, and the ecosystem services for prevention of soil pollution	R and I	MOP1 MOP2, MOP4		x	x	
SPA2	Develop an analytical framework for the assessment of the impact of excess water discharged to specific areas as part of flood control management without causing soil pollution or threating the attainment of nature conservation objectives	R	MOP3		x		
SPA3	Review the market and institutional failures; develop and implement tools to overcome them and to enhance motivation for behavioural changes by introducing region specific incentives.		MOP4		x	x	
SPA4	Review farming methods and models under similar pedoclimatic conditions and promote advisory networks, peer-to-peer knowledge transfer of good practices	I	MOP5		x	x	

SPA5	Develop decision support system that promotes the integration of environmental and agro-technological data into decision making for sustainable agriculture.	R	MOP2, MOP5		x		
SPA6	Review and develop educational, training and awareness raising programs and materials to support changes in behaviour and to promote prevention of soil pollution	I	MOP1-MOP5		x	x	
SPA7	Review monitoring and data; develop an open-access database that reflects on the local and regional conditions and tailored to stakeholders' needs	I, En	MOP5				x
SPA8	Processing of data available in environmental impact assessment documentations on previous and existing land uses to support business and policy decision making at all levels.	I	MOP1-MOP5		x	x	
SPA9	Review and compile all soil pollution/restoration and prevention relevant data sources and data for the assessment, analysis and	I	MOP1, MOP4		x	x	

	evaluation of the local and regional status of soil health to promote adaptive decision making						
SPA10	Review the analytical frameworks addressing the impact of soil pollution and prevention with reference to soil types, soil and land managements, land use to promote soil literacy and prevention-oriented decision making in the region	I	MOP2 MOP3		x	x	
SPA11	Establish and operate a decision support system based on local and regional data including risk maps, monitoring wells	R, I	MOP1-MOP5		x		

Land degradation and desertification							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
LDA1	Develop a framework and decision support system that helps all stakeholders, particularly farmers and foresters to assess the economic values (positive and negative) of the ecosystem.	R	MOD1		x		
LDA2	Review, collect and tailor the data and monitoring to the local and regional conditions and special needs (e.g. erosion maps)	I	MOD1 MOD2 MOD3		x		
LDA3	Develop educational, training and awareness raising programs on the value of soil (highlighting that it is our national heritage) and the	I	MOD4 MOD5		x	x	

	responsible resource use tailored to local and regional stakeholders (e.g. promotion of the advisory network, peer-to-peer information exchange)						
LDA4	Review the CAP and other support tools, identify and develop local and regional specific schemes that enhance motivation, promotes behavioural changes to restore, maintain soil health in the region	I	MOD4-MOD6		x	x	
LDA5	Review the scientific literature, and the good practices under similar pedoclimatic conditions; develop educational, training and awareness raising materials and programs to improve knowledge exchange between science and practice relevant to the local and regional soil degradation issues	I	MOD1 MOD5 MOD6		x	x	
LDA6	Review and improve soil health relevant legislation (at all levels), implementation and enforcement to avoid further land degradation in the region	I	MOD1 MOD4 MOD5 MOD6		x		
LDA7	Develop an evaluation framework of soil health to assess the conditions of and evaluate soil health during all phases of the land lease contracts	R	MOD1-MOD6		x	x	
LDA8	Review the local and regional relevant scientific results and information of various institutions and organise them into an easy to use database to promote decision making of all decision maker at all levels (spatial and temporal).	I, R	MOD1-MOD6		x	x	
LDA9	Review the past dependency and the	R	MOD1-MOD6		x	x	

	social, economic, cultural, historical background of current soil degradation and develop policy recommendations on how to overcome them						
LDA10	Improve the integration of soil health issues into water policy and water management decision making	I	MOD1-MOD6				
LDA11	Develop open-access data base and decision support system for farmers to support sustainable farming by combing environmental and agro-technological data	EC	MOD 4		x	x	

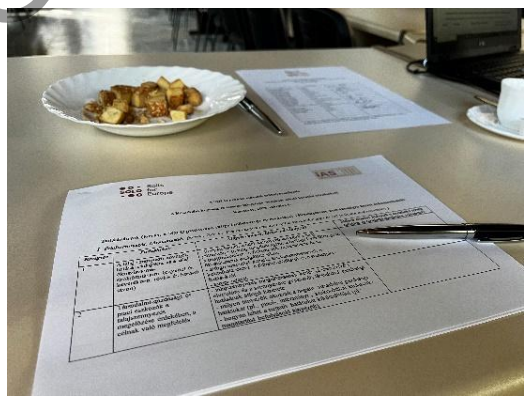
Nature conservation of soil biodiversity							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
SBA1	Develop an economic evaluation framework to assess soil biodiversity, its role in providing ecosystem services that allows the integration of that value into business and policy decision making at all levels.	R	MOB1		x		
SBA2	Develop educational, training and awareness raising programs on the value and the role of soil biodiversity (highlighting that it is our national heritage); collect and present good examples of responsible resource use that is tailored to various stakeholder types and needs; develop the use of creative tools.	I	MOB2 MOB6		x	x	
SBA3	Research on the local and regional species, their role in providing essential ecosystem services.	R	MOB3			x	

SBA4	Research on the relationship between soil biodiversity, farming, and forest practices, what human activities pose threats to them and how behavioural change would mitigate or avoid negative impacts	R	MOB2 MOB4 MOB5		x		
SBA5	Review and develop standards and indicators for monitoring soil biodiversity tailored to the needs of the region (e.g. land use, pedoclimatic conditions, policy, business, and nature conservation objectives)	I	MOB5		x	x	
SBA6	Establishment of baseline data and thresholds on soil biodiversity at regional level for the various land use categories in alignment with European monitoring needs and systems	R	MOB7		x		
SBA7	Review soil relevant issues of the region and use soil biodiversity as an organizational principle		MOB1-MOB8		x		
SBA8	Review the literature and field studies on and develop a framework for assessing the regenerative capacity of soil biodiversity for the various soil types and land use		MOB3, MOB8				
SBA9	Review and analysis of the regulatory framework and subsidy schemes relevant to soil biodiversity protection in view of how to improve motivation and induce the desired behavioural changes	R	MOB2 MOB6				
SBA10	Integrate scientific results into practice through developing open-access databases, promoting advisory networks, and peer-to-peer communication	I	MOB1-MOB8				

	opportunities at local and regional level.						
SB11	Comparative research of soil biodiversity in the region with references to the various soil and land management methods and land uses.	R	MOB1-MOB8				

v) Evidence

Workshop 1



Workshop 2

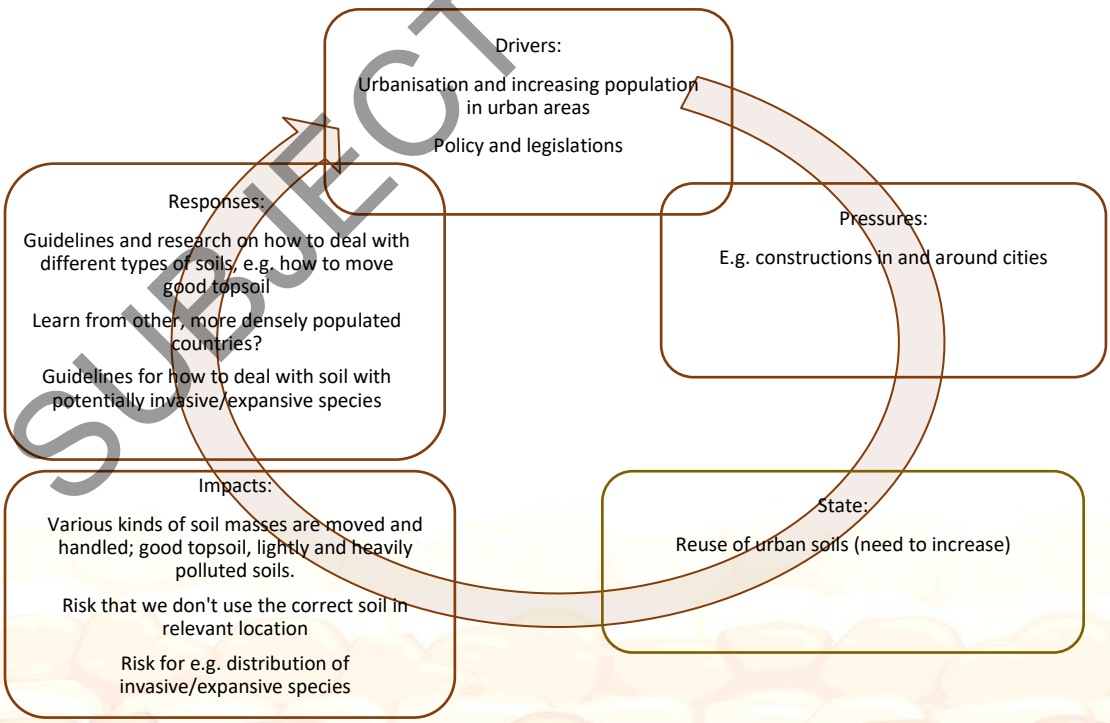
Workshop 3

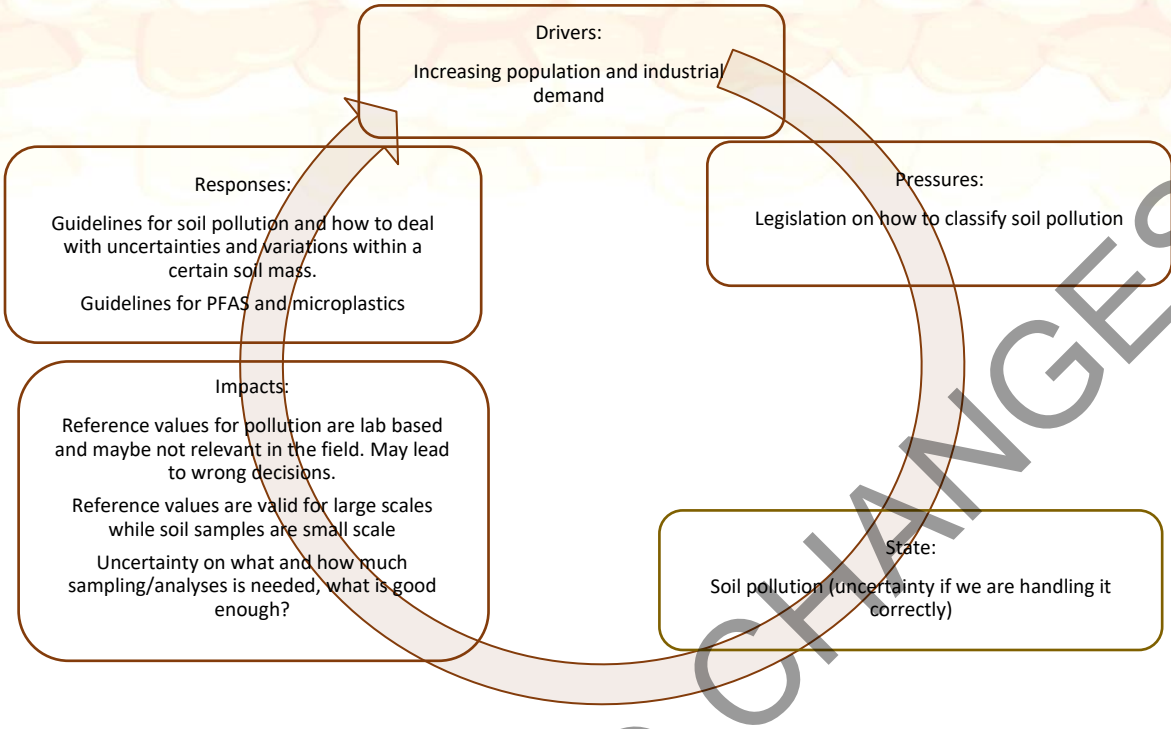
NODE 4 – Swedish urban-rural gradient

i) Selected top 3 regional priorities for soil regeneration in the focus land use:

- Soil sealing and urban soils
- Pollution and restoration
- Soil organic carbon stocks

ii) Schematic baseline assessment of what affects and is affected by the regional priorities for soil regeneration – DPSIR analysis





iii) Prioritization list of knowledge gaps relevant to the region, per soil Mission Objective

Soil sealing and urban soils – from stakeholders working directly with soil related issues					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1	9	*MO2-10*	Lack of education, and awareness, on soils for everyone working with soil related issues.	KA	
2	8	*MO1-1*	Research is needed on how to move and reuse arable soil at and from construction sites (technique and methods).	KD	TMO1-2
3	7	*MO1-2*	Lack of knowledge of what land use types are suitable for reuse of soil masses.	KD	TMO1-2
4	3	*MO1-5*	Lack of knowledge on what do with lightly polluted soil masses.	KD	TMO1-2

Soil sealing and urban soils – from stakeholders working with or especially interested in city/land use planning					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1	11	*MO1-12*	What values should be considered in decisions on development on different types of land?	KD	
2	9	*MO1-13*	How to achieve efficiency in planning decisions to preserve agricultural land?	KD	
3	7	*MO1-14*	Lack of methods for determining trade-offs between multiple planning objectives?	KD	

Pollution and restoration					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1	9	*MO2-10*	Lack of education, and awareness, on soils for everyone working with soil related issues.	KA	
2	7	*MO2-2*	Lack of knowledge of what degree of pollution is safe for reuse of soil masses.	KD/KA	TMO2-1, TMO2-7, TMO2-8
3	4	*MO2-1*	The relationship between lab tests and field is unclear. Reference values for soil pollution are based on lab tests, these are not necessarily relevant for the field.	KD	TMO2-1, TMO2-8
4	3	*MO2-3*	Lack of knowledge on how to handle soil pollution uncertainties and variation, what is acceptable?	KD	TMO2-1, TMO2-8

Soil organic carbon stocks					
Ranking (No.)	**No. of votes**	**Code**	**Gap short description**	**Type of gap (KD, KA)**	**Optional: Connection to other KG (Code)**
1	9	*MO3-3*	Lack of education, and awareness, on soils for everyone working with soil related issues.	KA	TMO3-8
2	8	*MO3-1*	Research is needed on how to move and reuse arable soil at and from construction sites (technique and methods).	KD	TMO3-7, TMO3-6
3	3	*MO3-4*	Lack of knowledge on how to reuse soil masses in the best possible way to conserve soil organic matter.	KD	TMO3-5

iv) Relevant R&I Actions for the region, per soil Mission Objective

Soil sealing and urban soils – from stakeholders working directly with soil related issues							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
1	Education and awareness of soil for everyone working with soil related issues, no matter if working at an environmental office, as project leaders or machine operator	EC	*MO2-10*		x		
2	Investigate farmers' and municipalities' objectives and perspectives on moving of arable soils, i.e. soil masses that result from excavation, such as road construction, building construction or other infrastructure projects on arable soil.	R	*MO1-1*		x		
3	Cost-benefit analysis on community level	R	*MO1-1*		x		
4	Increase collaboration between and among companies and municipalities that are working with related topics. Methods to improve collaboration and thus, proper reuse of soils, are needed.	EC	*MO1-1*	2	x		
5	Increase information exchange between EU countries. How do more densely populated countries manage soil masses (reuse of soils)? Good examples to learn from?	EC	*MO1-1*	2	x		
6	Political decisions needed on reuse of soils for food production and other ecosystem services	EC	*MO1-1*		x		
7	Classification of types of soil masses. Define what soil masses (or degree of pollution) can be used "safely enough" for certain purpose.	R	*MO1-2*		x		
8	Guidelines regarding potential invasive/expansive soil organisms in soil	R	*MO1-5*		x		

	masses. Guidelines on how to map/collect samples for problematic weed, pathogens and pollutants						
9	Efficient tracking of soil transportation ("soil passport")	I	*MO1-5*		x		

Soil sealing and urban soils – from stakeholders working with or especially interested in city/land use planning							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
1	Classification of values of different types of land. Define goal(s) for the classification.	R	*MO1-12*		x		
2	Determine what scale are most efficient for planning decisions and what incentives should be used?	R	*MO1-13*		x		
3	Define and develop methods for valuing multiple objectives. The different goals that must be weighed are environmental goals, housing (development of population and type of housing), contingency targets, market goals, etc.	R	*MO1-14*		x		

Pollution and restoration							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
1	Education and awareness of soil for everyone working with soil related issues, no matter if working at an environmental office, as project leaders or machine operator	EC	*MO2-10*		x		
2	Classification of types of soil masses. Define what degree of pollution is "safe enough" for certain purpose.	R	*MO2-2*		x		
3	Guidelines are good, but they must be useful in practice. Having many different guidelines can become too complicated and difficult/expensive to follow. Need to simplify!	EC	*MO2-2*	2	x		

4	Complementary field trials are needed to establish the relationship between lab test and field	R	*MO2-1*		x		
5	Guidelines for scaling up for soil pollution reference values. The reference values are valid for large scales while soil samples are small scale. Risk for unnecessary sanitation.	R	*MO2-1*		x		
6	Research on how to assess effects of multiple pollutants	R	*MO2-3*		x		
7	Guidelines for PFAS and microplastics in soil	R	*MO2-3*		x		

Soil organic carbon stocks							
No.	**Action short description**	**Type of action (R, I, EC)**	**Link to KG (Code)**	**Link to action (Code)**	**Time frame**		
					Short	**Middle**	**Long**
1	Education and awareness of soil for everyone working with soil related issues, no matter if working at an environmental office, as project leaders or machine operator	EC	*MO3-3*		x		
2	Investigate farmers' and municipalities' objectives and perspectives on moving of arable soils, i.e. soil masses that result from excavation, such as road construction, building construction or other infrastructure projects on arable soil.	R	*MO3-1*		x		
3	Increase collaboration between and among companies and municipalities that are working with related topics. Methods to improve collaboration and thus, proper reuse of soils, are needed.	EC	*MO3-1*	2	x		
4	Increase information exchange between EU countries. How do more densely populated countries manage soil masses (reuse of soils)? Good examples to learn from?	EC	*MO3-1*	2	x		

5	Political decisions needed on reuse of soils for food production and other ecosystem services	EC	*MO3-1*		x		
6	Classification of types of soil masses. Define what soil masses can be used for certain purpose.	R	*MO3-4*		x		

v) Evidence

No photos from the 1st workshop

Workshop 2 – One of the discussion groups. Results.

Workshop 3 – Plenary

8 Annex 2: Complete preliminary results of the Soil Weeks

PORTUGAL

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	General lack of knowledge / capacity to apply conservational and/or regenerative practices MC	KA	3, 5, 6, 10, 13
2	Lack of monitoring data at regional and national scale	KD	2, 9, 12, 13
3	Operational monitoring system that accounts for the various scales, regional pedo-climatic zones, land uses and overall monitoring purposes	KA	2, 9, 12
4	Insufficient demonstration sites and activities to raise awareness among local stakeholders	KA	1, 2, 3, 10, 13
5	Insufficient knowledge on the water soil nexus	KD	1, 11, 12, 13
6	Insufficient knowledge on the long-term impact of agricultural practices, namely on climate and hydrology, as well as on the methods to make that assessment	KD	1, 11, 12, 13
7	Insufficient knowledge on the relation between soil health and nutrition	KD	12
8	Insufficient knowledge on the integrated planning of water and soil	KD	7, 12, 13, 14
9	Further research on the principle of biotic pump	KD	12
10	Further research on key indicators of soil quality and climatic stability	KD	9, 12
11	Need to assess the level of flexibility that should be given to member states in implementing the Soil Monitoring Law (e.g., in defining the soil districts), to ensure that it is effective in countries to which soil is not a political priority	KA	7, 9
12	Need to create methodological instruments to properly accommodate the regional scale, namely a framework to assess regional specificities and problems and a toolbox to validate indicators directed towards the identified needs	KD	12, 13
13	Call for an interdisciplinary approach to learn about soil from the stakeholders who actually manage it	KD	2, 5, 8, 10, 12, 13

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	National public policy promotes a separation between farming economy and biodiversity (e.g., in Alentejo, cheap, uncontrolled	4, 5, 6	2, 3, 4, 7, 8

	access to water, leads to the resources' overuse and to soil erosion)		
2	Lack of national funding for soil health measures	2, 3, 4, 13	2, 3, 4, 7, 8
3	Producers don't have access to knowledge or to advisory services	1, 4	1, 8
4	National subsidisation schemes (1st pillar) are focused on agri-environmental measures and not on soil and water	1	1, 2, 3, 4, 7, 8
5	Incentives for biological agriculture are highly sought by producers, but they promote soil degrading practices (tillage)	1, 13	1, 2, 3, 4, 7, 8
6	Fallacy of organic fertilization (cattle consumes more carbon that it produces)	1	1, 2, 8
7	Lack of harmonisation among policies (e.g., promotion of tillage, shrub deforestation), not only at national level, but also at national-European level	8, 11	2, 3, 4, 6, 7, 8
8	The subsidisation measure of direct seeding is not attractive, particularly for small-scale properties in the North of the country	13	2, 3, 4, 7, 8
9	Lack of funding for soil health monitoring efforts	2, 3, 10, 11	4, 5, 8
10	Lack of integration between public policy and the private sector	1, 4, 13	3, 8
11	The Common Agricultural Policy is not focused on soil health, thus failing to acknowledge issues such as desertification and climate change	5, 6	2, 3, 7
12	Lack of funding for applied research on the sustainable management of soil	2, 3, 5, 6, 7, 8, 9, 10, 12, 13	3, 8
13	Lack of a national strategy for soil health	1, 2, 4, 5, 6, 8, 12, 13	3, 8
14	Political decisions regarding soil health have been conservative and lacking in innovation	8	2, 6, 8

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Creation of an advisory service for producers	3, 4, 5, 6	
2	Establishing policy instruments that promote no tillage and keeping biomass on the plot	1, 2, 4, 5, 6, 7, 8, 11, 14	
3	Harmonising policy instruments to avoid trade-offs	1, 2, 4, 5, 7, 8, 10, 11, 12, 13	
4	Creating Carbon and Water Banks and Certifications (replicating the strategy that was developed by Slovakia's Ministry of Agriculture) at national, regional and local levels	1, 2, 4, 5, 7, 8, 9	
5	Implementation of the AKIS system in Portugal	9	
6	Acknowledging the ecosystems' water retention capacity as decentralised public infrastructures	7, 14	
7	Including water and soil management measures in CAP's first pillar subsidies	1, 2, 4, 5, 7, 8, 11	

8	Creating a specific, dedicated policy strategy for soil conservation (e.g., USA's Soil Conservation Service and Uruguay's agricultural policy which puts soil at its centre since the 1960s)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14	

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Harmonised public policy instruments	1, 7, 10, 11, 13, 14	2, 3, 4, 6, 7, 8
2	Effective subsidisation schemes	2, 4, 5, 8, 9	4, 7
3	Informed stakeholders (producers, land owners, private sector, policy makers, public administration)	3, 5, 6	1, 2

v) Evidence

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Impact of commercial inoculants on soil health	KD	1, 2
2	More data on native inoculants	KD	1, 2
3	Seed microbiome	KD	2
4	More research that compares impact between mobilisation and well-applied glyphosate	KD	2
5	Microbial activity on Montado soils – including differences between open areas and under tree canopy cover	KD	2
6	Lack of understanding by farmers of the objectives and application of soil microbiome analysis	KA	1, 4, 5

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Popularity and misuse of commercial inoculants	1, 2, 6	
2	Lack of public funding / incentives to understand, restore and promote soil health	1, 2, 3, 4, 5	

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Dissemination of trade-offs between mobilisation and well-applied glyphosate		1, 3
2	Inclusion of microbial activity in farm management decision making	2	1, 2, 3

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Better understanding of the current status and implications of microbial activity in Montado soils	1, 2	1, 2
2	Reduction of commercial inoculants' use	1, 2	2
3	Healthier soils in Montado in terms of its microbial activity and biodiversity	2	1, 2

v) Evidence

Soil Week event 2025

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to action (No.)
1	The Centre's dataset on soil management practices and erosion (since the 1960s) is yet to be fully explored and analysed	KD	1, 2
2	Need for map information to be confirmed on the ground (GIS is not enough)	KD	3
3	Need for more applied (soil) research	KD	3
4	Economic valuation of gains and losses associated with different soil management practices	KD	4
5	Lack of knowledge about soil's response to grazing animals (it was never studied at the Centre)	KD	3
6	Little is known about the Centre's soil biodiversity, and it could be particularly interesting, given the extreme temperatures the soil is exposed to	KD	5
7	Lack of knowledge about soil temperature at the surface and the effect/importance of shading on soil health	KD	6

ii) Identified bottlenecks

No.	Bottleneck short description	Link to action (No.)
1	The absence of long-term funding (it is currently project-based) hinders the restoration and conservation of the sediment tanks, the possibility of maintaining experiments related to land management practices, and the capacity to fully explore the existing datasets	1, 2, 3, 4, 5, 6

iii) Identified actions

No.	Action short description	Link to KG (No.)	Link to outcome (No.)
1	Measures to protect the Centre's scientific heritage	1	
2	In-depth analysis of the Centre's datasets	1	
3	Field and applied soil research	2, 3, 5	
4	Research about the economic impact of different types of soil management	4	
5	Research about the region's soil biodiversity	6	

6	Research about the impact of surface temperature on soil health	7	

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to action (No.)	Link to bottleneck (No.)
1	Experimental sites as privileged spaces to collaborate closely and continuously with farmers: experimenting the scientists' vs. the farmers' approaches; showing good practices first hand	3, 4, 5, 6	1
2	More knowledge about the regional specificities concerning soil health	3, 4, 5, 6	1

v) Evidence

SPAIN

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Lack of knowledge on what sustainable management practices improve or maintain food production compared to conventional under different region-specific conditions	K	1

2	Lack of knowledge on what sustainable management practices improve drought resilience in food production systems under different region-specific conditions	K	1
3	Lack of literacy on the importance of soil biodiversity for food production systems	KT	2
3	Lack of knowledge on how the European Soil Monitoring Law will be implemented at national and regional level	KI	3

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Lack of conclusive results in research projects	1,2	1
2	Lack of specific dissemination activities related to soil biodiversity	3	2
3	Uncertainty on how the law will look like and how it will be implemented	4	3

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Funding new research projects at different geographical scales with high importance of co-creation and stakeholder's engagement	1	1
2	Science-policy collaboration to create content	2	2
3	Science-policy-sector collaboration to anticipate the law	3	3

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	New knowledge that can be transferred to practitioners	1	1
2	Increased literacy on policymakers and practitioners about the importance of soil biodiversity in relation to soil health	2	2
3	Increased readiness for the Soil Monitoring Law's implementation	3	3

v) Evidence: No photographs were taken.

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
	Technical/practical tools to prevent agricultural soil pollution	KA	
	Impact of soil pollution to health and ecosystem services	KD	
	Standardisation of methods: lack of method standard globally for monitoring	KA	
	Conservation strategies	KD	

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
7	Unknown species' ecologies		
9	Unknown threats		

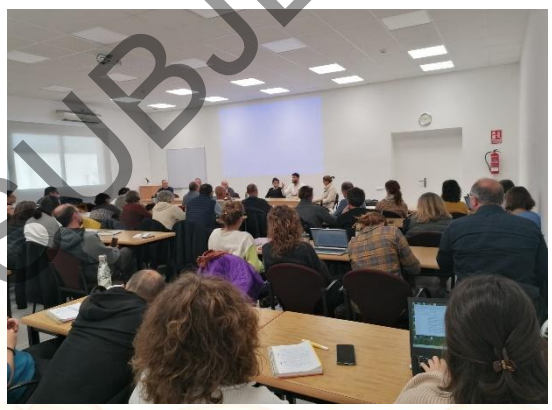
iii) Identified actions

No actions were identified.

iv) Identified expected outcomes resulting from the proposed actions

No expected outcomes were identified.

v) Evidence



BELGIUM

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	General lack of soil 'feeling' in school children	KD	
2	Limited literacy on soil degradation scale outside EU	KD	

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Limited availability of classroom materials specific on soil	1	1
2	Limited public information on EU impact on soils outside Europe	2	2

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Provide science-based practical teaching material to teachers, for free. Ensure communication around availability reaches teachers.	1	1
2	Better coordinated public communication on EU impact outside EU on soils. In general, soil knowledge in the general public is low, compared to knowledge on human impact on atmosphere and water.	2	2

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Increased literacy in school children on soil and its functions	1	1
2	Increased awareness of impact of EU consumption/economy on soils outside EU	2	2

v) Evidence

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Hiatus between research performed at academia level, and research needed at stakeholder level	KA	1
2	Difference between representation of soil in outreach (e.g. the typical hand holding some soil), even by experts, and what soil really is (a deep soil profile, where all horizons have important functions). This leads to soil misconceptions in the general public.	KA	2
3	Limited knowledge of actual soil imprint outside EU, resulting from EU consumer activity	KD	3

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Limited joint research possibilities, lack of 'I' where stakeholder knowledge needs are directly matched to academia research offers	1	1
2	A general unawareness of the true 'depth' of soil and soil functioning, focus on topsoil and organic top layer only in communication	2	2

3	Difficulties in defining supply chain and relating food/fibre import to specific soils. Lack of local assessments of soil specific variables.	3	3

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Installation of a match-forum at the Flemish level	1	1
2	Soil experts should avoid this 'biased' and limited representation of soils, that is not representative of true soil dimensions.	2	2
3	Research action on detailed assessment of supply chains, and identification of key impacted soil variables.	3	3

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Match-forum or match-events at Flemish level	1	1
2	Scientists/experts actively engaging in showing real soils in outreach	2	2
3	Define EU call for specific research action	3	3

v) Evidence

Soil Week event 2025

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	How to achieve healthy soils in cities, supporting ecosystem services and biodiversity in diverse urban contexts, while maintaining local support?	KD	1
2	Methods and metrics for holistic monitoring & evaluation, combining ecological, climatic, technical, and social indicators over time, especially in citizen-science settings.	KA	2
3	Understanding and quantifying the community economy-ecology value of these soils, capturing co-benefits across social, ecological, and even cultural dimensions.	KD	3

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Limited knowledge on urban soils, and how they can evolve into healthy soils, after implementing new NBS	1	1
2	Limited standardized indicators and long-term data collection in cities for newly opened soils	2	2
3	Limited ecosystem services knowledge available in city contexts	3	3

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Establish city laboratories to experiment with different approaches across multiple city contexts	1	1
2	Define key indicators to focus on, together with local stakeholders	2	2
3	Establish eco-social living labs in each of the cities, to assess how co-benefits are perceived by the population	3	3

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Knowledge catalogue on the health of soils after implementation of new nature in cities.	1	1

2	With good choice of indicators, local support for assessing the impact is more likely to occur, opening potential for citizen science	2	2
3	Living labs can serve as example for other future initiatives	3	3

v) Evidence

THE NETHERLANDS

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	How to identify soil animals?	KA	1,4,5
2	Where to find most soil animals?	KD, KA	1,4,5
3	What is the value of soil biodiversity?	KD, KA	1,4,5,6
4	Understanding of interlinking of soil biodiversity into belowground networks and food webs	KD, KA	1,5,6

5	How to create interest at a wider audience for the role of soil biodiversity in soil ecosystem services?	KA	1,2,3,4,5,6
6	How to make gardens 'soil animal friendly'	KD, KA	1,2,3,5
7	How to make urban green 'soil animal friendly'	KD, KA	1,2,3,5

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Reaching a wider audience	1,2,3,4,5,6,7	1,2,3,4,5,6
2	Changing human mentality required for bringing nature to their living environment	5,6,7	1,2,6
3	Cultural values associated to how tidy and artificial a garden should be	5,6,7	1,2,6
4	Soil animals are often not visible and if so, they are not considered 'cute'	1,2,3,5	1,3
5	Soil biodiversity is too massive as a concept	1,2,3,3,4,5,7	1,2,3,4,5
6	There is a lack of iconic species	3,5	1,2,3,4,5

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Organisers of soil animal days involve people with many different backgrounds, enabling creative solutions, a better understanding of such a diverse target group as the general public and a broader network to spread the word about soil animal days	1	NA
2	Include children as a target group, which justifies simple messages, and the childlike wonder about soil animals can potentially changing their mentality and attitude towards soil animals, as well as their parents	1,2,3,5,6	NA
3	Communication focuses on mix of visible soil animals that people usually have seen before, and a couple of soil animals that people can discover for the first time during soil animal days	1,4,5,6	NA
4	Selection of the 'as cute as possible' soil animals (e.g. earthworms/mole, no spiders)	1,4,5	NA
5	Communication of the benefits of soil animals in general, without too much focusing on specific groups unless very clear.	1,5,6	NA
6	Providing practical, small tips on how to achieve the 'benefits' of soil animals by making surroundings more "soil animal friendly"	1,2,3	NA

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	A broader adoption of measures that increase the abundance or diversity of soil animals, and associated functions/ecosystem services	1,2,3,4,6	NA
2	Developing or implementing more targeted measures to increase specific soil animals, in order to safe resources, or better steer specific soil functions through steering the soil community	5,6	NA

v) Evidence

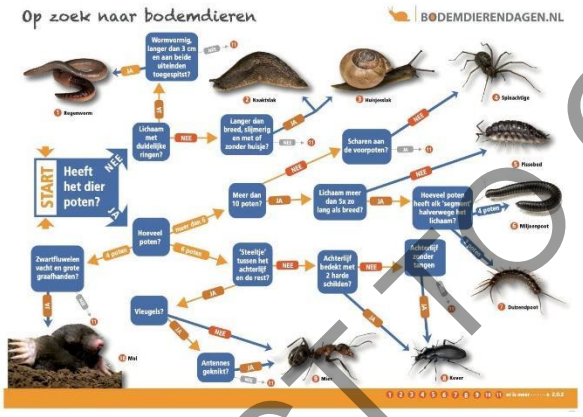


Figure to the left. The identification map of the 10 soil animals that are identified during the Soil Animal Days. From: bodemdierendagen.nl

Figure to the right. The results of the Soil Animal Days in 2023, from: bodemdierendagen.nl

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	How to take care well of gardens to promote soil biodiversity?	KA	2,3,4,5
2	What is the state of soil of gardens (expressed as a mark)?	KD	3,4
3	What is the relationship between plant health and soil life?	KA and KD	2,3 ,4
4	How can we make the policy of the Netherlands as green as in Germany, would writing a letter with facts to the Ministry of Climate and Green Growth help for instance?	KD	1,2,3,5

5	How many herbicides are used by the Dutch railway company (NS) for clearing the railways?	KA	5
6	How can we better care for soil life in urban areas?	KA	2,3,4,5
7	Why do some soils have a very rich and healthy soil life, while other soils are “completely empty”, even though they are just a couple of meters apart?	KA and KD	2,3
8	Which soil animal species need specific conservation measures?	KD	1,2,3,4,5
9	How much time does it take before you see an effect of measures to improve soil life?	KA and KD	4,5
10	Where are most soil animals found (underneath rocks, beneath or between leaves)?	KA	1
11	Can we use the ecological relations and niches to connect management of soil life to management?	KA and KD	4,5
12	How can we make people care about all types of life, or to make their gardens and balconies greener?	KD	1,2,3,5
13	Many questions about knowing more details about beetles, hedgehogs, moles, earwigs and ladybirds	KA	1,2,3
14	Which functions do annoying soil animals have?	KA	2,3, 4,5
15	How can you attract beneficial soil animals to your garden, while repulsing the harmful ones?	KD	1,3,4
16	What do soil animals eat, and how can they see and move through all that dark and heavy soil?	KA	3

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Communication about soil animals that you cannot see is difficult, so engaging the public to the soil microbes (fungi/bacteria/nematodes) is hard	4,10,12, 13, 15	1,3
2	Levels of knowledge between citizens is very diverse, making fine-tuning the story difficult. Some people don’t know anything about animals, and are happily amazed about the existence of centipedes. On the other end, some people have very profound knowledge and in-depth questions that cannot be answered easily.	1,3,4,6,7,8,12,13	1, 2,3
3	Soil life is so unknown, that much basic information needs to be provided before you can start discussing how you can improve soil biodiversity/conditions for soil animals.	1-4,6-8,12,-16	1,3
4	Soils are highly complex ecosystems, so the relationships between soil organisms, soil properties and benefits to humans (e.g. plant health) are often not straight-forward	1-3,6,8,911,14,15	4
5	No very visible and/or quick rewards for investing in management practices increasing soil biodiversity	1,4,5,6,8,9,11,12,14	4

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Outreach activities providing basic information about soil animals	1, 2, 3,4	1,2
2	Organizing more in-depth trainings/events to provide more profound information to specific target groups	2,3,4,5	1,2
3	Organise a science café about soil animals for more interaction between public and science, and discuss what is needed for people to really start caring about soil animals.	1,2,3	1,2
4	More research and innovation for the management options to improve soil biodiversity, with a focus on the potential on the practical applicability of the solutions.	4,5	2

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Increased soil literacy so that people become more motivated to care for soils, as 'unkowns makes unloved'	1-5	1-3
2	Improved soil and land management so that biodiversity and soil health are increased	1-5	1-4

v) Evidence

Figure to the left. Guusje Koorneef giving a soil animal safari in the Arboretum, in Wageningen. Photo by Guy Ackermans.

Figure to the right. Participants searching for soil animals during the Soil Animal safari. Photo by Guy Ackermans.

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to action (No.)
1	How long does it take after creating an urban green space before soil animals appear?	KD	1, 3
2	How can we ensure that we stop using pesticides?	KD	4, 5
3	How is it possible that despite the warning from the Club of Rome (1973), there is still little ecological awareness in the Netherlands? For example, we should mow, saw, remove, cut, and prune less.	KD	4,5,6
4	What are suggestions to keep or make your soil healthy, and how can you recognize that your soil is healthy?	KA	3
5	How do slugs overwinter?	KA	2
6	How does soil type influence the behavior of soil animals?	KA	2
7	I found it fascinating that not only caterpillars transform into butterflies, but that many more soil animals undergo a similar transformation, such as ladybugs. Are there more insects/creatures that undergo such a transformation, and where can I find them?	KA	2
8	What do the homes and nests of soil animals look like?	KA	2
9	What are the consequences for soil life of construction projects (renovation, new construction) that introduce a lot of new debris into the soil, especially cigarette butts and plastic? Which waste materials are the most harmful?	KD	1, 3
10	How can municipalities and individuals ensure that waste/debris is removed from the soil and that no new debris is added?	KD	1,3, 4,6
11	What is the relationship between soil animals and the plants that grow there: does it matter for soil animals if native plants grow?	KA	2
12	What are simple tips to stimulate diverse soil life?	KA	3
13	How can we raise more awareness against paving gardens?	KD	4, 5,6
14	How can soil animals be cloned?	KD	na
15	What are tips to improve soil life—is compost, for example, an effective measure?	KA	3
16	Which soil animals have become rare in Dutch gardens?	KD	2
17	What do soil animals eat?	KA	2
18	How deep do you have to dig before you no longer find animals?	KA	2

ii) Identified bottlenecks

No.	Bottleneck short description	Link to action (No.)
1	The high diversity of urban green spaces and especially urban soils, making it hard to develop universal understanding and solutions for urban areas	2

2	The invisibility of soil animals and organisms that live in the soil, which makes it hard to understand them and to feel and consequently care for them, or to monitor them	1,3
3	The mismatch between the often generic scientific knowledge on what factors stimulate soil life vs. the required practical hands-on knowledge that allows citizens, municipalities, land managers of urban green etc, to take care of soil animals and mese/microfauna.	5
4	Hard to motivate people to take care about soil life, or soil in general.	3,4
5	It is hard to study people who do not care about soils, nature or environment, as this disinterest reduces their willingness to participate in such studies.	4
6	The generally very little knowledge and awareness about soils in general makes it hard to discuss more specific or in-depth topics about soil	1,2

iii) Identified actions

No.	Action short description	Link to KG (No.)	Link to outcome (No.)
1	Make communication events about soil playful and tangible to	1,9,10	1,2
2	Organise dissemination activities with urban planners, municipalities and caretakers of urban green	5.6.7.8.11.16.17.18	1,2,3
3	Make soil life visible, e.g., via microscopic pictures/videos, drawing, etc	1,4,9,10,12,15	1,2
4	Conduct social scientific research about the factors that and demotivate people to take care of nature, environment and soils	2,3,10,13	3
5	Develop transdisciplinary research on soil care that more specifically addresses the knowledge needs for soil practitioners.	2,3,13	3

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to action (No.)	Link to bottleneck (No.)
1	Improved soil literacy, and ultimately soil stewardship, in society	1,2,3,4,5,6	1,2,34,5
2	Improved evidence-based decision-making in soil and land management	1,3	2,5

v) Evidence

Figure to the left. Some colour plates that were made during the citizen science expo, from: https://bodemdierendagen.nl/nl/de-wondere-wereld-onder-een-stoeptegel

Figure to the right. Counting soil animals in the plant containers in front of the central library of Amsterdam, where the citizen science expo took place. Photo by Jiska Vaarwerk.

ITALY

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	The potential of soil reconversion towards net-zero soil sealing	KD	1
3	How to integrate soil functions and soil ecosystem services in urban planning	KD	1
4	Effective strategies and actions to reduce the impact of soil sealing and land take at the local level	KD	2
5	Potential of innovative policy instruments such as transfer of development rights to protect ecosystem services	KD	

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Difficult integration of soil functions and soil ecosystem services in urban planning	3	1
2	Implementation at local scale of limitation, mitigation and compensation of soil sealing	4	3-4
3	Barriers to the reconversion of existing brownfields (e.g., liability rules and funding possibilities)	2	5

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Examples of the Lombardy region case and the Rescaldina Urban Plan 2018 where soil functions and associated ecosystem services have been integrated in the planning documents	1	1
2	Guidelines for planners, local authorities, and investors to manage, regenerate and reuse brownfields	4	4
3	Guidelines for a land take compensation system developed by the SOS4Life project	2	2
4	Desealing demonstration interventions in Forlì	2	2
5	“Brownfield dialogue” initiative funded by the Austrian government, involving all actors with a potential role in the reconversion of existing brownfields	3	2
6	Successful applications of transfer of development rights mechanisms to safeguard soil and soil-related ecosystem services in New York and Cremona.		5

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Soil functions and soil ecosystem services are taken into consideration in the assessment of transformation areas in the case studies.	1	1
2	Use of permeable materials, green infrastructure, and Nature-based Solutions	2	4
3	The organization of webinars, and brownfield excursions to create knowledge among stakeholders	3	5
4	Advancements in the research on the impacts of desealing interventions	4	2

v) Evidence: No pictures were taken.

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Insufficient awareness of soil sealing and desealing	KA	1
2	Limited public engagement in soil desealing projects	KA	6
3	Lack of knowledge of gentle remediation options	KD & KA	5
4	Weak connection between soil biodiversity research and policymakers	KA	3
5	Lack of a straightforward definition of soil health	KD & KA	2

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Insufficient data regarding soil sealing and desealing	1	2
2	The European Commission's definition of soil health is more complex than understood	5	3
3	Limited knowledge and data on soil biodiversity	4	1
4	Few existing applications of gentle remediation options	3	3
5	Limited awareness of existing desealing projects	2	1

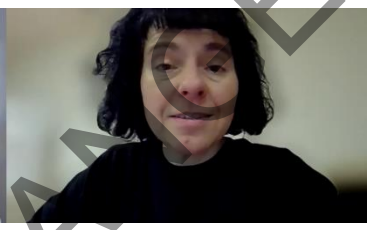
iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Establish soil biodiversity assessment and monitoring in urban areas	3	1-2
2	Collect data on soil sealing and desealing at different scales, with a particular focus on small-scale assessments.	5-1	1-2
3	Develop practical knowledge on soil management and generate evidence-based insights to support sustainable practices.	4-2	1-2-3

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Production of data and evidence on soil	1-2-4	1-2-3
2	Develop guidelines to enhance soil knowledge	3-4-6	1-2-3
3	Case study on gentle remediation methods	5	3

v) Evidence



Soil Week event 2025

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to action (No.)
1	Insufficient awareness of soil degradation and of its causes	KA	1-2
2	Lack of perception of the importance of different causes of soil degradation across the country	KA	1-2
3	Limited knowledge of soil functions	KA	1-2

ii) Identified bottlenecks

No.	Bottleneck short description	Link to action (No.)
1	Insufficient dissemination of data related to soil degradation to the citizenship	2
2	Inadequate knowledge of existing soil dissemination activities by citizens	1

iii) Identified actions

No.	Action short description	Link to KG (No.)	Link to outcome (No.)	Time frame		
				Short	Middle	Long
1	Enhance activities to disseminate information about soil, making them more specific to the audience	1-2-3	1-2	x		

2	Increase the number of dissemination activities	1-2-3	1-2	x		

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to action (No.)	Link to bottleneck (No.)
1	Better dissemination of soil data and evidence	1-2	1
2	Develop guidelines for the inclusion of soil-related knowledge in high school study programmes	1-2	2

v) Evidence

GREECE

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Limitations and knowledge gaps regarding the appropriate criteria for the identification of groundwater quality threshold (BRIDGE method)	KD	1
2	Lack of social awareness via social media and politicians	KA	1
3	Not adequate knowledge transfer	KA	1
4	Lack of innovation	KD	1

5	Lack of an adequate oord strategy and policy to effectively address Land Degradation	KA	1
6	How can we persuade land managers to utilize sustainable soil management practices?	KD, KA	1, 2

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Lack of funding	all	all
2	A lack of a LD cost-benefit analysis regarding the utilization of land/soil sustainable management practices (Return of Investment)	2, 6	1, 2, 3, 6, 7
3	Difficulties in creating a balance between Land Degradation and markets/ecological economics	2, 5, 6	2, 3, 6, 7
4	Lack of an integrated soil degradation monitoring system at different scales	3, 4	1, 4, 5, 7
5	Imbalance in the distribution of the financial resources across the EU countries	2, 3, 4	1, 4, 7

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Erosion & Land Degradation Roadmaps generation	1, 2, 4, 5	all
2	Influence behavioral change associated with LD	1, 2, 3	1, 5
3	Farmers and land users rewarding	1, 2, 3	1, 3, 5
4	Provide adequate datasets that can be utilized in LD related research	1, 4, 5	1, 2, 4
5	Data harmonization	1, 4	1, 2, 4
6	Develop Nature Based Solution	1, 2, 3	1, 2, 3, 5
7	Focused funding	all	all

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Improved soil management	all	all
2	Facilitate our understanding of soil and its threats	1, 2, 4, 5	1, 4, 5, 6, 7
3	Provide opportunities for every EU country to prevent soil degradation	1, 4, 5	1, 3, 5, 6, 7

4	Improved datasets	1, 4	1, 4, 5, 6
5	Involvement of farmers and land users in preventing soil degradation	1, 2, 3, 4, 5	1, 2, 3, 7

v) Evidence

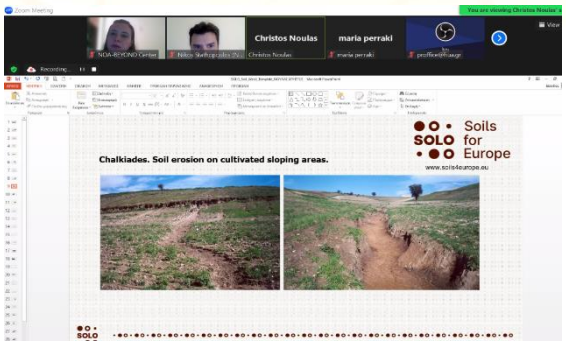


Figure to the left: Presentation on the interrelation of soil organic carbon, erosion and agriculture

Figure to the right: Workshop on knowledge gaps, actions and bottlenecks for the Land degradation and desertification, and Erosion prevention Think Tanks.

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Limitations and knowledge gaps regarding how common soil health protocols can be adapted to the bio-climatic conditions of the Greek territory.	KD	1, 4
2	What is the correlation between soil biodiversity and desertification/drought in Greece?	KD	1, 2, 4
3	How can we persuade land managers to utilize sustainable soil management practices?	KA	1, 3, 4, 5
4	Lack of social awareness via social media and politicians	KA	1, 3
5	Lack of an adequate oord strategy and policy to effectively address Land Degradation	KD, KA	1, 3
6	Lack of dense datasets	KD	1, 2, 4
7	Lack of understanding of soils beyond farming/agriculture (e.g. mining sites)	KD	1, 5

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Lack of funding	all	

2	Limited depth of penetration of commonly used satellite monitoring systems (e.g. Sentinels). However, gravitational satellites (e.g. Grace) can address this issue, but their usage/capabilities need to be further explored.	2, 6	
3	There exists a lot of conflicts among stakeholders	3, 4, 5	
4	Lack of an integrated soil degradation monitoring system at different scales	1, 2, 3, 6	
5	Difficulties in creating a balance between Land Degradation and markets/ecological economics	3, 7	

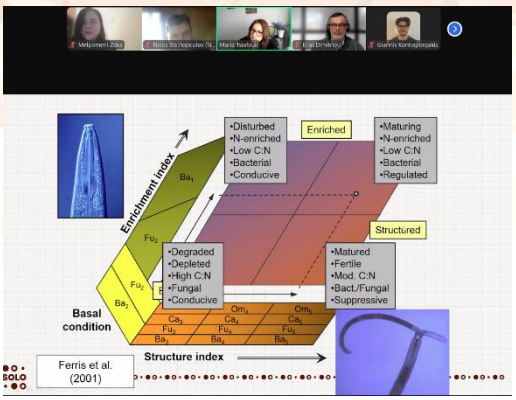
iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Roadmaps generation	1, 3, 4, 5	all
2	Influence behavioral change associated with LD	3, 5	1
3	Increase research studies on soil resources beyond agriculture	1, 3	1, 2, 4, 5
4	Further explore EO capabilities in soil health monitoring	1, 2	1, 3, 4, 5
5	Increase field sampling that can be utilized in soil related research	1, 4	all
6	Increase funding	all	all

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Improved soil management	all	all
2	Facilitate our understanding of soil and its threats	1, 2, 3, 4	1, 3, 5, 6
3	Provide information regarding the status of soils below 20 cm (that is the usual limit of commonly used EO systems (L band-Radar)	2	4, 5, 6
4	Improved datasets	1, 2, 4	1, 3, 4, 5, 6
5	Understand soil degradation in other land uses such as forests, urban regions, and mining sites	1, 4	1, 3, 4, 5, 6

v) Evidence



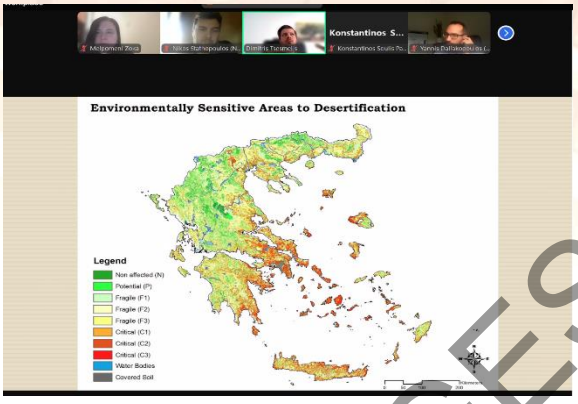


Figure to the left: Presentation related to threats, conservation and monitoring of soil biodiversity.

Figure to the right: Presenting drought/desertification related indices in the Greek territory.

Soil Week event 2025

Main results of the event

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to action (No.)
1	What are the effects of soil antibiotics on the soil health of olive groves in Greece, and beyond?	KD	1, 3, 4
2	How much has pesticide pollution increased in Greece?	KD	1, 3, 4
3	What are the key elements of integrated spatial planning, incorporating environmental impact and sustainable management of resources?	KD, KA	2, 3, 4
4	What is the most reliable integrating monitoring, reporting, and verification system for SOC stocks?	KD	3, 4, 5

ii) Identified bottlenecks

No.	Bottleneck short description	Link to action (No.)
1.	Conflicts among stakeholders	2
2.	In compliance with policies	2
3.	Data scarcity or embargos	1, 2, 5
4.	Spatial planning insufficient to control urban population growth	2

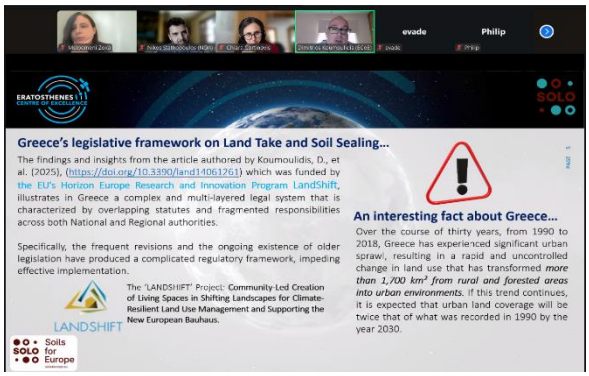
iii) Identified actions

No.	Action short description	Link to KG (No.)	Link to outcome (No.)
1.	Usage of Mediterranean olive groves as early warning indicators of soil degradation	1	
2.	Define a common integrated legislation-policy framework for spatial planning in Europe in relation to land degradation and desertification	3	
3.	Increase funding	all	all
4.	Roadmaps Generation	all	all
5.	Find technical solution for reporting, monitoring, and verification of soc stocks	4	

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to action (No.)	Link to bottleneck (No.)
1.	Improved datasets	all	3
2.	Improved and unified legislations	2	1, 2, 4
3.	Increased funding	all	all
4.	Decreased land take/soil sealing in NATURA areas (as happens in the Greek territory)	2	1, 2, 4

v) Evidence



BULGARIA

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Lack of proper education on soil health and soil biodiversity in school programs	KD	2
2	General lack of taxonomists working on soil biodiversity	KA	1
3	Lack of contemporary learning materials on agronomy	KD	2
4	Insufficient research on the factors that threaten soil organisms and their effects	KD	4
5	Insufficient research on the soil invasive species and their impact on local communities	KD	4
6	Lack of communication between policymakers and researchers, practitioners and farmers	KA	3

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Non-digitised scientific publications	1	1
2	Education materials on agronomy and soil health are outdated	1,3	2
3	Policymakers with a lack of practical knowledge on the topic of soil management	6	4
4	Bulgaria doesn't have an early detection system for invasive species	5	5
5	Lack of a national interdisciplinary research group working on soil biodiversity and relevant topics	4,6	4

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Digitalisation of scientific publications and creation of a platform for soil biodiversity	1	1
2	Manuals, created by researchers, including contemporary guidance	2	3
3	Recommendations from researchers to educational institutions	2	3
4	Creation of a research network comprised of researchers, farmers and practitioners, to issue policy recommendations	3	2
5	Thorough research on invasive species	4	4

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	A digitised collection of scientific publications on soil health and biodiversity, and a national platform created	1	1
2	Policies, created from the recommendations of researchers and practitioners	4	4
3	Contemporary learning tools and materials that are regularly updated with the latest practices and environmental conditions	2	2,3
4	More generated knowledge on environmental changes leading to the migration of new invasive species	4	5

v) Evidence

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Limited majors in universities that focus on soil pollution	KD	1
2	Limited knowledge in local regions about the quality of the soil	KA	2
3	Incomplete evaluation of old pollution from metals and new pollution from microplastics	KD	3,4,5
4	Limited knowledge of human-induced erosion	KA	3,4,5
5	Lack of usage of deterministic models to evaluate soil erosion	KA	3
6	Lack of data on field and experimental research	KD	3,7

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Limited education plans in higher education	1	1
2	Non-existent open-access unified system which integrates data from monitoring, scientific publications, and project reports	2	2
3	Lack of clear government policy and necessary financing	3	4,5
4	Scattered knowledge sources on the contents of dangerous substances in the soil	3	1,2,4

5	Difficult access to primary sources of information	3	4
6	Lack of education and information	4	1
7	Lack of collaboration between national and leading international institutions	5	6

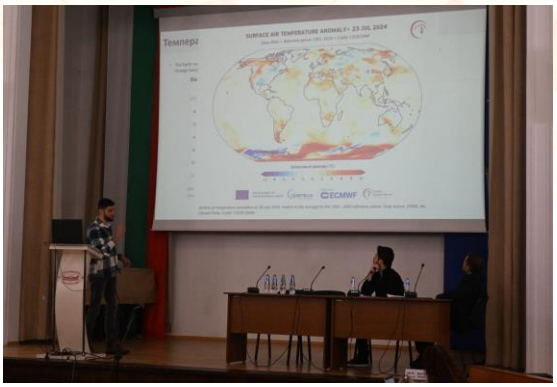
iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Establishing new educational programs	1	1
2	Integration of information, data and expert opinions	2	2
3	Developing projects with researchers from different fields and areas, focusing on international collaboration	2	2
4	Creating an easy-to-use public register for soil pollution on a national level	4,5	3
5	Developing new policies on soil protection	3	3
6	Establishing new educational programs and government policies	4,6	6
7	Wider collaboration and educational programs for young researchers	5	7

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	A more informed, active and knowledgeable society	1	1
2	A common methodology for soil monitoring and evaluation	2	2,3
3	Expansion of information on the level and range of soil pollution	4	3,4,5
4	Lower risks of erosion and desertification	3	5
5	More detailed contemporary information on actual losses due to erosion	4,6	5,6
6	Establishing a critical minimum of educated experts in the field of soil science	5	6,7

v) Evidence



Soil Week event 2025

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to action (No.)
1	No systemic understanding or data on soil sealing or the condition of urban soils in Bulgaria	KA	1
2	No national strategy or unified framework for soil management and monitoring	KA	2
3	Limited awareness among decision-makers, developers and citizens	KD	
4	Few practical examples or technical guidelines	KD	
5	Unclear post-construction soil management	KA	
6	Lack of economic and policy incentives	KA	

ii) Identified bottlenecks

No.	Bottleneck short description	Link to action (No.)
1	Lack of institutional capacity and coordination between ministries	1, 2, 3, 6
2	Fragmented legal framework	2, 6
3	Fragmented laws and weak enforcement of environmental and other regulations	2
4	Limited collaboration between academia, municipalities and civil society	3

5	Weak enforcement of building regulations (e.g. Act 16 granted even if restoration measures are not applied)	4
6	No existing requirement for environmental standards during or after construction	5
7	Limited monitoring capacity at the municipal level	5

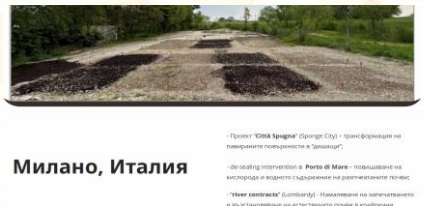
iii) Identified actions

No.	Action short description	Link to KG (No.)	Link to outcome (No.)
1	Establish a national soil monitoring system that includes urban areas	1	1
2	Develop a National Urban Soil Management Strategy aligned with EU Soil Strategy for 2030 and Soil Mission	2	1
3	Implement education and communication programs, and establish Living Labs and Lighthouses as demonstrators of soil-friendly practices	3	3
4	Pilot urban de-sealing projects and develop technical standards	4	4
5	Integrate soil management plans into Environmental Impact Assessments and construction permitting	5	5
6	Introduce financial incentives and regulatory tools	6	6

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to action (No.)	Link to bottleneck (No.)
1	Coherent legal framework and accountability	2	3
2	Evidence-based planning and reporting	1	1
3	Stronger stakeholder engagement and local ownership	3	4
4	Readily available technical standards	3	1, 4
5	Reduce waste and improve resource efficiency	5	5
6	Increased adoption of nature-based solutions	6	1,

v) Evidence



HUNGARY

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1.	Integration of soil biological tests into soil monitoring systems	KA	6, 7, 8
2.	Use of materials from the circular economy in agriculture	KD	2, 4
3.	Won't farmers have a problem if they don't have as many crops by maintaining untilled soil?	KA	-
4.	Inappropriate, degrading land use is not properly sanctioned	KA	1
5.	Clarifying the relationship between pollution and background concentrations	KD	2
6.	Changes in soil characteristics (e.g. pollution) and soil quality: situation analysis, assessment and intervention based on thresholds	KD	2, 3
7.	Impact of biological contamination on food quality (from a food safety perspective)	KD	-

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1.	No cross-sector chamber-type representation for soil protection and soil medicine like the National Chamber of Agriculture for the agriculture sector	4	
2.	Different definitions exist, no common interpretation (e.g.: contaminated land – contaminated soil)	5, 6	
3.	The importance of prevention is overshadowed	6	
4.	Pollution should be prevented at the source; it is less soil type-dependent	2	

5.	Shortcomings of the monitoring service (while the methodology is fine)	6	
6.	Soil testing is incomplete due to lack of financial and human capacity	1, 2, 6	
7.	Databases, data owners, legal frameworks, and data integration	6	
8.	Data validation and verification should be ensured	6	

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
	Soils and water must be treated together to comply with regulation	-	2
	Bringing agriculture, industry, and health together on one platform: monitoring data must be uniformly usable	2	2
	The legal protection of soil (e.g. in case of soil contamination) should be greater than at present, and the legal institution recognising soil as a separate legal entity could help in this respect	1	3
	Accurately mapping the direct link between soil health and human health	7	
	Increased consideration of soil properties when setting limit values	7	
	There is a need for uniform soil contamination dataservice. (Data are available from the regional competent authorities, but different databases should be integrated, e.g. by bringing together the health administration and the agricultural administration)	7	
	Need to identify and register contaminated sites and prioritise remediation based on risk assessment (questionable: based on what: larger area affected; many people affected, most contaminated?)	7	
	Health and environmental risk assessment, risk calculation methodology development	7	
	Introduction of a single EU-wide registration system	-	1,2
	Intensification of deforestation programmes		
	Establishment of monitoring points proposed	-	2, 3
	Proposal for systematic, periodic screening of soils (as for human health)	-	3
	Introduction of dissuasive soil protection measures	1	1

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
	Integration of national and EU soil limit value systems	5, 6, 7	12,13
	Intensifying the remediation of contaminated sites	3, 4, 8	5, 6, 7, 8, 10

	Potentially more frequent risk assessment and risk assessment of soil contamination	3, 8	10, 11, 12

v) Evidence

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1.	How to promote small-scale farms' sustainability and soil health?	KA	1, 2, 4, 5, 7,
2.	How to change farmers' attitudes?	KD, KA	6, 7
3.	How to integrate protection of natural resources including soil protection into the notion of agricultural production efficiency?	KD, KA	3, 5, 7
4.	How to measure/indicate the difference in biodiversity due to alternative land/soil management systems since SOC will not reflect on it?	KD, KA	7, 8
5.	Lack of framework for comparing the positive and negative impact of biological solutions vs. technological solutions on soil health?	KD, KA	1, 4
6.	Lack of sufficient practical knowledge on how to control pests when alternative land/soil management is applied?	KA	1, 7
7.	Lack of common indicators on how to measure SOC improvement and what should be considered as optimum.	KD, KA	1, 5
8.	Lack of common principles to help comparing agricultural land/soil management systems, back up policy development and help implementation and enforcement.	KD, KA	1, 9
9.	Insufficient and ineffective CAP rules aimed at changing farmers' decisions on soil health protection.	KA	1, 2, 3, 5-7
10.	Insufficient knowledge of farmers on how to change their land/soil management system from conventional to alternative systems.	KA	1

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1.	Lack of tailored educational and training materials promoting changes in land/soil management	1, 5, 6, 8, 9, 10	1,
2.	Past dependency: related to (i) farmers attitude including negative attitude towards co-operation due to the coercion to join the co-operatives), (ii) commitments under CAP subsidies.	1, 9	4, 6
3.	The notion of economic efficiency does not include external costs, long-term damages caused to natural resources.	3, 9	1, 4-6
4.	Independent advisory networks are less developed than the company-operated advisory networks that offering their own products and services.	1, 5	1, 5, 6
5.	The conditions of the CAP subsidy: it only awards increases in SOC, while in some cases an increase is not possible, and keeping SOC content could be the only goal considering the soil type of the site, the conditions for the subsidy do not incorporate evaluation of agro-ecological conditions of the site.	1, 3, 7 9	4
6.	Evaluation system of farmers' production does not necessarily promote soil protection and healthy soils, and by the quality of the food produced. Farmers are still evaluated not by the quality of their agricultural products but by yield/ha. Crop yield can be improved through overexploitation of soils, and unhealthy soils cannot provide the necessary nutrients and vitamins.	2, 9	2, 4,
7.	Agricultural production became dependent mainly on chemical products and/or technological solutions instead of utilizing soil functions and ecosystem services. Practices that cause land/soil degradation is not necessarily viewed as damage, or hindrance of efficient production.	1, 2, 3, 4, 6, 9	1, 2, 4,
8.	Methods for measuring SOC does not provide knowledge on soil biodiversity	4	3.
9.	Insufficient guidebooks on how to transform the principles of alternative agriculture into practice.	8	1, 2

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1.	Development of educational, training programs tailored to the special needs of farmers (age, professional background, etc.)	1, 3, 4, 7, 9	1, 2
2.	Development of guidelines and guidebooks for all stakeholders (farmers, authorities, etc.) in order to promote transition to soil health-oriented management systems, relying more on soil functions and ecosystem services	6, 7, 9	1, 2
3.	Research on how to measure soil biodiversity along with SOC.	8	2
4.	Research on how to integrate socio-economic-ecological aspects into one evaluation framework for the CAP reform	2, 3, 5, 6, 7	1, 2

5.	Development and maintenance of a public (open-access) homepage with information on the alternative agriculture management systems, showing how soil functions and ecosystem services support agricultural production and cost reduction.	3, 4, 6	1, 2
6.	Development and operation of an open-access decision support system to promote transition in agricultural practice	3, 4	1, 2

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1.	General acknowledgment of the importance of soil biodiversity, soil functions, and ecosystem services	1-9	1-6
2.	Development and maintenance of soil health-oriented agriculture efficiently utilizing soil functions and ecosystem services	1-7, 9	1, 2, 4-6

v) Evidence

Soil Week event 2025

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to action (No.)
1.	How can land valuation systems integrate erosion?	KD, KA	1
2.	Lack of a comprehensive framework to assess decisions' indirect effects of and on soil erosion.	KD	2
3.	How the interest of future generations can be integrated into maintaining, preserving, improving soil health, and avoiding soil erosion	KD	3, 4
4.	How to communicate erosion issues to the public that would lead to behaviour changes?	KA	5.

5.	Insufficient knowledge on how to overcome the weaknesses of erosion measuring tools and models in decision making at various spatio-temporal levels	KD, KA	6, 7, 8
6.	Insufficient knowledge on the nexus between soil health and soil erosion, and the negative and positive impacts of various methods used against erosion (including erosion on neighbouring lands) and their effects on productivity.	KD, KA	9-13
7.	Insufficient knowledge of the past results of soil science and how it can be utilized to solve current soil health issues.	KA	14
8.	Insufficient acknowledgement of and understanding the nexus between human health and wind erosion (deflation), and the negative and positive impacts of various methods used against erosion (including erosion on neighbouring lands) and their effects on productivity.	KD, KA	15-18
9.	Insufficient knowledge of municipalities, and regional and national decision makers on the impacts of decisions relevant to erosion and their negative consequences (e.g. on public infrastructures, land use).	KD, KA	19, 20
10.	Insufficient systems, networks of knowledge transfer among stakeholders.	KA	21

ii) Identified bottlenecks

No.	Bottleneck short description	Link to action (No.)
1.	Lack of understanding the relationship between water- and/or soil-induced erosion and their negative impact hinders the adoption of preventive measures, and efficient allocation of financial resources.	KG1, KG7, KG8, KG9, KG11, G15 KG18
2.	The perception of and attitude of various stakeholders (e.g. farmers, public authorities) towards water- and/or wind-induced erosion hinders behavioural changes needed for prevention	KG3, KG4, KG8
3.	Insufficient implementation and enforcement of preventive measures against erosion hinders the adoption of effective and efficient solutions.	KG8, KG15, KG20

iii) Identified actions

No.	Action short description	Link to KG (No.)	Link to outcome (No.)	Time frame		
				Short	Middle	Long
1	Review and improve the land valuation systems by developing and integrating soil erosion indicators into them.	KG1		x		
2	Development of a framework that allows the assessment of indirect effects of soil erosion and provides scientific and factual evidence for regulation (e.g. creation of maps that indicates where tillage should be prohibited)	KG2		x		

3.	Research on stakeholders' perception regarding the interest of future generations and on the attitudes and motivation of behavioural changes to consider those interests.	KG3		x		
4.	Research on the erosion relevant regulatory framework and tools to assess, evaluate and improve integration of future generations interest	KG3		x	x	
5.	Review and development of educational training and awareness raising programs and materials tailored to the public needs.	KG4		x	x	
6.	Comparative field testing of erosion under different conditions (e.g. various soil types, soil cover vegetation, spatial scale), and technologies	KG5		x	x	
7.	Review and assessment of the weaknesses/strength and data needs of erosion models, improving data collection and development of indicators to improve decision making.	KG5		x	x	x
8.	Research on the effectiveness of different land and soil management methods and tools against soil erosion under different natural conditions while simultaneously improving water retention and development of integrated decision support systems.	KG5		x	x	x
9.	Research on and development of decision support systems for assessing the direct and indirect costs of erosion and benefits of prevention.	KG6		x	x	
10.	Educational and training programs (including field trips, peer-to-peer exchange of information) on how to avoid erosion with focus on water retention, productivity, cost efficiency on the short, medium, and long term.	KG6		x	x	
11.	Research on the political, historical roots of soil erosion, and how to overcome erosion due to land system (inadequate shape, size of land parcels, land use type category) through decisions affecting them such as regulations	KG6 KG3		x	x	

	on land compensations, spatial planning, river basin management plans, legal and CAP rules (including implementation and enforcement)					
12.	Research on the perception, attitude, and motivation of stakeholders (particularly farmers) relevant to combating soil erosion and how they can be changed.	KG6		x		
13.	Development and operation of an independent (from business interests of producers and service providers) advisory network to improve knowledge transfer between science and practice.	KG6		x	x	
14.	Research of the past scientific studies and process their results (e.g. data, maps.)	KG7			x	
15.	Research on and development of decision support system for assessing the direct and indirect benefits and costs of wind erosion and prevention	KG8		x	x	
16.	Educational, training and awareness raising programs (including field trips, peer-to-peer exchange of information) on how to avoid wind erosion with focus on nature based solutions.	KG8		x	x	
17.	Review and improvement of the regulatory framework relevant to wind erosion and development of decision support systems tailored to different stakeholders and various levels of decision making.	KG8		x	x	
18.	Development and operation of an open-access database with 1. High resolution maps indicating water- and wind-induced erosions (rills and gullies), 2. And decision support tools and technologies indicating strength, weakness, data needs, cost effectiveness.	KG8		x	x	
19.	Educational and training programs (including field trips) for the various kinds of stakeholders (e.g. policy makers, permitting authorities, farmers, etc.) on how to avoid water- and/or wind-induced soil erosion with focus on improving urban well-being by adaptation to the local natural conditions and utilizing ecosystem services, adopting nature-based solutions.	KG8		x	x	

20.	Develop a monitoring network for collecting erosion data along with rills and gullies.	KG9		x	x	
21.	Review of existing networks relevant to soil health and develop programs that supports networking and information exchange	KG10		x	x	x

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to action (No.)	Link to bottleneck (No.)
	Improvement in soil literacy regarding soil erosion	KG5,KG10 KG12,KG16 KG19	1
	Better decision making on erosion control and prevention measures, leading to the adoption of cost effective, efficient, and sustainable solutions and to improved soil health.	KG1,KG2, KG3,KG6 KG7,KG8, KG9,KG11 KG14,KG15 KG18,KG20 KG20	1, 2
	Improved regulatory framework, implementation, and enforcement	KG1, KG2, KG4,KG7 KG11,KG17 KG19,KG20 KG21	3

v) Evidence

GERMANY

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Lack of valuation and education on soil health	K, KT	1, 3, 4
2	Lack of incentives for soil conservation measures	KI	2, 3
3	Limited opportunities for testing innovative technologies	KI	2, 3
4	Top-down policy system with insufficient feedback (bottom-up) loop	K	1, 4

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	A disconnect between land use decision-makers and ownership	1,4	1
2	Difficulty in achieving short-term monetisation and a lack of venture capital for soil-related issues and innovations	2,3	2,3
3	Focus on short-term profits	1,2,3	2,3
4	Missing (not properly functioning) cooperation between research and Practice	1,4	1, 2

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Building trust and improving cooperation between research and practice	1, 4	1
2	Implement/improve ex-ante (participatory) impact assessment of new policy instruments and incentives	2, 3, 4	2
3	Setting up relevant examples to encourage change – e.g. changes adopted by the large land owners to inspire small holders	2, 3	1

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Tailored tools and knowledge-sharing platforms for efficient communication between research and practice	1, 4	1, 3
2	Policies with fewer complexities and detailed regulations to support soil health and sustainable land use	2, 3	2

v) Evidence

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Scaling up and replicating the learning to leverage the knowledge and resources from living labs to policymaking	KA	1
2	Challenges faced by stakeholders in balancing multiple demands for different ecosystem services in agricultural landscape planning	KA	2

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Understanding the occurrence of learning within living labs is often overlooked	1	1

2	Existing tools fall short in simultaneously integrating various ecosystem services, explicitly simulating spatial configuration effects, providing an understandable representation of the system for stakeholders with different expertise, and enabling a dialogue between them	2	2

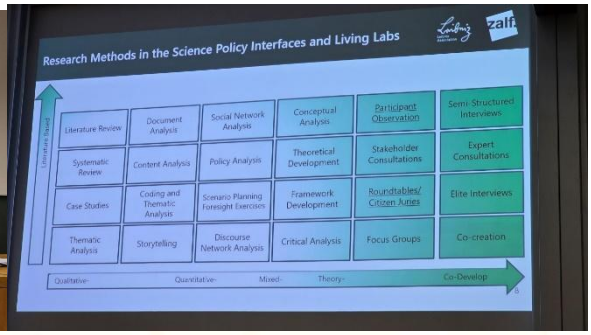
iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	A learning framework for living labs	1	1
2	A tool is developed, PLACES (Participatory Landscape Configuration Effects Simulator), that estimates the influence of land use configurations on multiple ecosystem services in real-time and visualises the trade-offs among them	2	2

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Formulation of recommendations to enhance the impacts of the living labs, ensuring inclusion of all relevant stakeholders, emphasising effective communication among project stakeholders and with the wider public, and providing accessible content	1	1
2	PLACES provided insights on spatial processes and sparked a discussion on the societal goals for the landscape	2	2

v) Evidence



Soil Week event 2025

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to action (No.)
1	Adaptation of existing sustainable practices such as cover crops, no-till, etc.	KA	1, 2, 3
2	Development of precise and adaptive techniques such as precise nutrient management, Site-specific humus management	KD	1, 2, 3

ii) Identified bottlenecks

No.	Bottleneck short description	Link to action (No.)
1	Lease terms too short to plan for the long term or plant hedges, leading to a focus on short-term profitable solutions	1, 3
2	Economic constraints, lack of knowledge and experience with alternative practices	1, 2, 3

iii) Identified actions

No.	Action short description	Link to KG (No.)	Link to outcome (No.)	Time frame		
				Short	Middle	Long
1	Practical, long-term demonstrations with accessible cost estimates	1, 2	1, 2, 3		X	
2	Develop programs and funding options for tackling erosion, biodiversity loss, and carbon depletion	1, 2	3	X		
3	Transparent presentation of methodology, many locations and many years of testing	1, 2	2, 3		X	

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Tools and training programs for precision methods, nutrient and biological indicators.	1	1
2	Established long term experiment programs with innovative tools and technologies for adaptive management in different settings	1, 2	1, 3

3	Funding programs and policies to support long term experiments and training programs needed for adaptive management	2	1, 2, 3

v) Evidence

NORWAY

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	Consensus is lacking regarding which soil parameters adequately describe soil health	KD, KA	1
2	There is a gap in the availability of tested and documented analysis and devices for measuring soil health parameters.	KD, KD	2, 3
3	There is a gap in broad public understanding regarding which soil characteristics define soil health and the significance of soil health for the global carbon balance and soil ecosystem services	KA	4

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Defining which soil parameters are the most important for Soil health	1	1
2	Adequate methods for Soil health analysis	2	1
3	Finding suitable methods and devices for measuring soil health parameters presents a bottleneck.	2	1
4	Determining the best agricultural and forestry management practise to increase the Soil C pool presents a bottleneck.	3	2

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Funds from Research councils allocated to fundamental studies on soil parameter analysis connected to soil health	1,2,3	1
2	Research, as well as testing and advice in practical agronomy and forestry organized by the national agricultural and forestry extension services	4	2

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	More knowledge and focus on the importance of Soil health on the global C balance and the soil ecosystem services (e.g. food and feed production, water quality)	3,4	1
2	Plausible and verified methods and devices for measurements of soil health parameters	1,2	2

v) Evidence: No screenshots were taken from the webinar.

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
	Land degradation and desertification:		
	1. Can commercial fertilizers have a negative impact? 2. Further knowledge and documentation about what soil degradation is and causes.		

	3. What is the impact of pesticides on soil life? 4. Is there a cocktail effect on multiple stress factors on soil life and soil quality? 5. How does soil life provide nutrient cycling? 6. What happens when the interaction between plants and soil biology is stimulated and conversely when this is absent or degraded? 7. We know little about the interaction between reduced soil tillage/management and nutrient status in soil. 8. We have little data on actual leaching of nutrients and the importance of mineral and organic fertilizer in this aspect. 9. Incomplete knowledge on the interaction of soil health and plant health 10. Does or how does circular economy affect soil degradation? 11. Will robotizing have a positive or negative effect on soil compaction? 12. We still know little on the impacts of micro plastic and pfas from bio-digestate, and their accumulation. 13. Is there a quantified effect of agroforestry and soil degradation? 14. Moving of soil and soil degradation. 15. The effects of actions in space and time.		
	Erosion prevention		
	1. Different impacts from different management systems is less known. 2. What are the consequences of increased freezing and thawing events? 3. Still incomplete knowledge on the transport and movement of soil particles to recipients. 4. Which plant species is better for soil erosion control? 5. Long-term data: precipitation, runoff, soil loss etc. 6. Still unclear how actions, crop rotation, management practices impact soil erosion, transport and sedimentation. 7. How suspended material is transported over land and in drain systems? 8. Carbon farming relies on pesticides, but how much does this impact the soil? 9. The importance of the establishment of different plant or crop types in different situations. 10. Do we know enough about the importance of crops and crop rotations, slopes and landscape types? 11. Impact of different erosion processes 12. Wholeness and coherence landscape and production wise. 13. Actions and economy. 14. Trenching: what is the real need, systematic vs. spot actions. 15. What is the impact of measures?		
	Group 1: Soil Organic Carbon- Forestry, agriculture, land use and management:		
	1. Optimized land use in relation to climatic conditions, soil properties etc. (for maximum adsorption of C; minimum emissions and effective productivity). 2. Forestry vs bioenergy output of biomass. 3. Expectation of Carbon in different environments. 4. Landscape aspect – “Upscaling”. 5. Understanding of how natural systems work.		

	6. How to measure – a. Landscape health b. Biodiversity Forest health? 7. Effect of biochar (Movement of biomass on the N cycle).		
	Group 2: Soil Organic Carbon- Strategies for climate adaptation:		
	1. Winter climate change. 2. Robotization (new technologies). 3. Extreme climatic events. 4. Breeding for resilient and robust varieties of plants. 5.Agroclimatic map. 6.Erosion of C (loss of carbon with erosion). 7.Smart technology and smart farming.		
	Group 3: Soil Organic Carbon- Biodiversity and soil health:		
	1.Mapping spectrum of what is good soil health, related to context/place time. What is realistic to expect from biodiversity? 2. Find indicator species. 3. Link soil health to soil function. 4. Relationship between soil health and plant health. 5. Landscape health; biodiversity in landscape- connection to plant and soil health. 6.New method to measure soil health –"cheap and fast" 7. How to assess/measure biodiversity? 8. Find indicators- of key species 9.Link knowledge about the natural ecosystem to soil use system		
	Group 4: Soil Organic Carbon- Urbanization and circular economy:		
	1. Move topsoil? 2. The link to Phosphorous. 3.Circulation of organic resources. 4.Conceptual circular economy.		
	Group 5: Soil Organic Carbon- Education, training, and how to achieve increased commitment:		
	1. Make kids think it's fun – We have knowledge and idea about research directions, but we can communicate with our children about the soil in a fun way and then will find a new language. 2. Integration methods and strategies to link research and stakeholders. 3. Knowledge leads to practice – "missing" 4. Pedagogic scheme for children's education (Primary to Higher secondary) that can be easily used in all grade-level in the school.		

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
	Land degradation:		
	1. Knowledge on what is causing carbon loss does not reach the end users. 2. Lack of knowledge exchange between researchers, traders, law and policy makers and food producers such as farmers.	Not done this time	

	3. Heavy machinery. 4. Efficiency requirements. 5. Grain producing industry too dominating, monoculture dominate 6. Lack of or biased information 7. Farmers economy. 8. Incomplete research collaboration and knowledge exchange. 9. More involvement of farmers in project where their involvement is compensated. 10. Crop rotation is often difficult. 11. climate change. 12. Soil renting, contracting 13. Soil type (clay soil in particular) 14. Intermediate storing of bio rest to be used.		
	Preventing soil erosion:		
	1. Funding for long-term research. 2. Collaboration with stakeholders. 3. Poor implementation of rules and regulations 4. Public awareness. 5. Ensure permanent plant cover. 6. Productions are strategically stimulated for various parts of the country. 7. Climate conditions and differences within a country. Particularly in vegetable and potato productions. 8. Economy and cost. 9. Top-down rather than bottom up: Value chains and food safety define the requirements more than natural premises. 10. Continuity and long-term research 11. Lack of data		
	Group 1: Soil Organic Carbon- Forestry, agriculture, land use and management:		
	1. Network for nationwide observations soil C (long term) 2.Collaboration with organic warehouse, forester, farmers production cooperatives 3. Landscape health vs forest economy 4. Holistic understanding		
	Group 2: Soil Organic Carbon- Strategies for climate adaptation:		
	1.Awareness of the importance of soil to other people than farmers (flood protection and food production) 2. Need more field observation 3. Old school and traditional management want to keep the same practices 4.Awareness of forest function affected by harvest method (clear cutting and Vs preserving on recovery and resilience) 5. Economic survival in present time to increase value of forest in future6. 6. Sector oriented solutions		
	Group 3: Soil Organic Carbon- Biodiversity and soil health:		
	1. Missing method for quantification/measuring 2. Lack of documentation on economic effect in agriculture 3. Use of different functional groups I log (Plants) 4. Time /resource consuming		
	Group 4: Soil Organic Carbon- Urbanization and circular economy:		
	1. Possible legislation for land use. Agricultural conservation area? 2. Tradition- Distance between different subject groups 3. Out of step regulations		

	Group 5: Soil Organic Carbon- Education, training, and how to achieve increased commitment:		
	1. Economy for the farmer (especially biochar). Talk more about it. Involve farmer 2. Each person's own challenges that get in the way of synergies with other people (fear, stress, focus on money etc.)- Psychology security 3. Engaging stakeholders in research 4. Visualize together (Silo-mentality) 5.Outreach activities valorization 6. Distance between languages in different sectors, subcultures 7. Lack of openness (how to become curious about connections between different perspectives?		

iii) Identified actions

No actions were identified.

iv) Identified expected outcomes resulting from the proposed actions

No expected outcomes were identified.

v) Evidence

Soil Week event 2025

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
4.1	**Lack of mechanistic understanding of SOC dynamics:** The complexity and unclear mechanisms of SOC dynamics hinder a deeper understanding and application in climate adaptation strategies. Research needs to develop specific indicators that correlate with SOC storage and climate resilience.	KD	5.4

4.2	**Effects of biodiversity on carbon storage:** There is limited understanding (KDG) of how soil biodiversity, especially belowground communities (microbes and invertebrates), influences the carbon cycle, SOC turnover, and ecosystem functioning.	KD	5.4
4.3	**Missing MRV infrastructure for SOC:** There is a significant knowledge development gap (KDG) and lack of infrastructure for Monitoring, Reporting, and Verification (MRV) of SOC across Europe. This includes insufficient long-term datasets, non-standardized sampling methods, and a shortage of localized models.	KD	5.3
4.4	**Risks associated with organic recycling:** The effects of organic residues on soil carbon processes are not fully understood (KDG), and concerns exist regarding potential risks from pollutants, microplastics, and unregulated toxic compounds. The Norwegian Fertilizer Regulation (2025) regulates microplastics >2 mm but the fraction <2 mm is not regulated.	KD	5.2 & 5.6
4.5	**Lack of integration of science into policy/practice:** The gap between existing scientific knowledge and its practical implementation in policy and land management (Knowledge Application Gap/KAG) is significant. Stakeholders have diverse perceptions of soil quality and functions, indicating a need for tailored advice.	KA	5.4
4.6	**Starvation of soil life:** There is a knowledge gap (KDG) regarding the needs of soil life and how arable soil suffers from "starvation" due to the lack of continuous plant cover (living roots) for large parts of the year.	KD	5.1
4.7	**Long-term effects of agronomic practices:** There is limited empirical evidence and a need for long-term perspectives (KDG) on how specific agronomic practices, such as different tillage and cover crop systems, influence SOC levels over time in various pedoclimatic conditions.	KD	5.5

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
5.1	**Soil Compaction and Time Constraints: Severe soil compaction** caused by heavy machinery and aggressive tillage is a critical bottleneck that destroys soil structure and reduces water storage capacity. This challenge is amplified by shorter time windows for necessary tillage due to climate change.	4.6	6.1 & 6.2
5.2	**Heavy Metal and Contamination Load:** Geologic sources like **alum shale** and **greenstone** contain heavy metals (e.g., arsenic, cadmium, nickel, chromium), posing challenges for agriculture. The risk of contamination from microplastics and unregulated substances in organic residues (like digestate/biogas waste) limits safe use and public trust in recycling.	4.4	6.3, 6.4 & 6.8

5.3	**Challenges with MRV Systems:** The lack of standardized protocols, insufficient long-term datasets, and the fact that traditional SOC measurement methods are time-consuming and costly are bottlenecks that slow down large-scale, cost-effective SOC monitoring and verification.	4.3	6.8 & 6.4
5.4	**Policy Uncertainty and Lack of Support:** Uncertainty about how soils should be utilized for carbon storage hinders climate mitigation planning. Limited research and **political sensitivity** surrounding carbon sequestration techniques impede policy support and long-term adoption.	S:4.5 L:4.1, 4.2	6.7 & 6.4
5.5	**Scaling Regenerative Practices:** The challenge lies in successfully scaling regenerative agricultural methods beyond the idealist-driven efforts, despite documented positive effects on carbon sequestration and yields.	4.7	6.1 & 6.7
5.6	**Focus on N and P over Holistic Soil Health:** Regulations often prioritize nitrogen (N) and phosphorus (P) management, often overlooking broader soil health indicators and contaminant risks. This hinders the integration of organic residue use into comprehensive long-term SOC strategies.	S:4.5, 4.6, L: 4.7	6.5 & 6.3

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
6.1	**Implementing Regenerative Agriculture and Minimum Tillage:** Increased adoption of regenerative practices, including maintaining **continuous living cover** (live roots), crop rotation, and **reduced tillage**. The Norwegian Agricultural Advisory Service (NLR) is following up on the use of Strip-Till and plough-less systems in potatoes/vegetables to reduce soil disturbance. Minimal tillage provides better soil structure over time.	5.1 & 5.5	7.2 & 7.1
6.2	**Species-Rich Intercropping/Cover Crops:** Sowing species-rich cover crops (preferably 15 species) is a central part of regeneration, as it ensures green cover year-round, provides higher bioproduction, increases root exudates, and stimulates microbiology.	5.1	7.2 & 7.1
6.3	**Targeted Pollution Mitigation Measures:** Using **liming** as a simple and inexpensive measure against areas contaminated by cadmium and alum shale. Further research should be conducted on biochar, silicon (Si), mycorrhiza, compost, and cover crops against heavy metals.	5.2	7.3

6.4	**Utilizing Precision Agriculture and Digitalization:** Using mapping of heavy metal loads (e.g., the Norwegian Geological Survey's (NGU) radiometric uranium measurement in alum shale areas) to target mitigation measures via precision agriculture. Develop AI-ready Decision Support Systems (DSS) for sustainable soil management.	5.2 & 5.3	7.6
6.5	**Streamlining Fertilization Strategies:** Reduced N use and shifting fertilization from soil to plants (e.g., **foliar fertilization** with amino acids or urea) is much more efficient and can reduce N needs by 40–60% for the same yield. Develop slow-release N fertilizers, such as biochar-urea composites.	5.6 (focus on N &P)	7.4 & 7.3
6.6	**Implementing Chemical-Free Innovation (Winterleap):** Introducing new technology like Winterleap, which uses microwaves on frozen soil to remove pests and weeds without chemicals.		7.5
6.7	**Strengthened Knowledge Transfer and Advisory Services:** Strengthen the role of knowledge brokers to improve the relevance of research activities and ensure scientific findings are translated into practical advice for land users. Encourage direct communication among farmers and stakeholders to share best practices.	5.4 & 5.5	7.6 & 7.4
6.8	**Harmonizing MRV and Monitoring:** Develop unified protocols and long-term monitoring programs across Europe to create robust data for decision-making. Support the development and field use of rapid SOC assessment tools (such as vis–NIR and LIBS).	5.3 & 5.2	7.6 & 7.3

- ✔ **Fundamental research on agronomic systems:** The need for more experimental research to study the long-term dynamics of different management strategies (SMS) on SOC and emissions is necessary. The knowledge gap (KG 6) related to agronomic systems requires long-term perspectives and appropriate funding for field trials to provide solid, empirical evidence (BN 5.5).
- ✔ **Mechanistic research on SOC dynamics:** The complex understanding of SOC dynamics (KG 1) and the role of biodiversity (KG 2) requires broad and interdisciplinary research fields to develop specific indicators, which is a defined long-term development task.

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
7.1	**Increased Soil Carbon Storage and Climate Resilience:** Significant carbon sequestration and increased carbon content in soil, contributing to enhanced water retention capacity, better structure, and binding of CO_2. This results in increased resistance and resilience to climate-related stress and extreme weather conditions.	5.1 & 5.5	6.1 & 6.2
7.2	**Improved Soil Structure and Health:** Regeneration leads to a rebuilt layered structure, improved erosion stability, and	5.1	6.1 & 6.2

	enhanced infiltration capacity. Minimal tillage will provide better soil structure over time.		
7.3	**Reduced Environmental Contamination and Risk:** Reduced loss of organic carbon compared to traditional methods. Secure application of organic residues through reduced risk of spreading contaminants, microplastics, and pathogenic organisms.	5.2 & 5.6	6.3, 6.5 & 6.8
7.4	**Increased Nutrient Efficiency and Yield Stability:** Higher nutrient efficiency and reduced runoff is achieved through methods like foliar fertilization, which can reduce N needs by 40–60% for the same yield. Regenerative practices may lead to comparable yields while saving diesel.	5.1 & 5.6	6.1 & 6.5
7.5	**Pest/Weed Control:** Massive reduction in pests (e.g., root-knot nematodes) through the use of chemical-free innovation like Winterleap.		6.6
7.6	**Strengthened Policy and Decision Basis:** Robust and harmonized data from MRV systems will provide a solid foundation for decision-making and policy development. This supports the goal for member states to become carbon neutral by 2050.	5.4 & 5.3	6.4, 6.7 & 6.8

v) Evidence: No photographs taken.

SWEDEN

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	The positive effects of Nature Based Solutions (NBS) alone (trees, green roofs, permeable parking lots) on urban heat islands and flooding is only 1-4% (i.e. if actions do not decrease the traffic potential). Lacking knowledge on the problem and what needs to be done.	KD	
2	Lack of knowledge on the effect of de-paving of sealed soil (e.g. roads) on soil ecosystem services.	KD	1
3	Lack of knowledge on how densification and different types of dense cities affect urban ecosystem services	KD	1
4	Trees. A common NBS action is to plant trees in cities. Lack of knowledge on the connection between trees and the urban (compact) soil. What tree species are the best choice in Scandinavia, etc.	KD	

5	Lack of knowledge on NBS solutions: Where to apply? How many types of NBS to apply? Size? Synergies and trade-offs? Do green corridors work?	KD	1
6	Lack of knowledge on how to best plan cities for best use of relevant soil and ecosystem services	KD, KA	2
7	Reuse of soil lacking at construction sites	KA	3

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Follow-up on the status of ecosystem services is rarely done. We have tools for different parts of ecosystem services but a good tool for ecosystem services as whole, with grading system, is lacking.	2, 3, 5	1
2	Lacking tools for city planning	6	2
3	At time of construction it costs time and money to find out what soil is suitable where. More efficient to transport.	7	3

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Tool for follow-up on ecosystem services	1	1
2	Make/improve tools for city planning to make sure we place buildings, green areas etc. on the soil that is best suitable for the purpose (example Geokalkyl, by SGI Sweden)	2	2
3	Classification of the soil in the area of planned construction sites so relevant soil/gravel can be used at current location (example Geokalkyl, by SGI).	3	3

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Better knowledge and streamlining of NBS methods	1	1
2	Cities constructed in more efficient way, regarding soil and ecosystem services	2	2
3	Minimised soil transport and more efficient use of existing soil	3	3

v) Evidence

The seminar was recorded and published on the Lund university website:

LU Land frukostseminarium #26: Går det att förtäta städer utan att äventyra markens viktiga ekosystemtjänster?

Soil Week event 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	What is an acceptable exploitation rate (rate of soil sealing) of arable land in Sweden?	KD?	1-2
2	What is the correct marketing value arable land?	KD	2-3

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Lack of awareness. Our actions today (e.g. building on an arable land) do not have direct consequences. But, it may risk food supply in 50 years.	1	
2	No national goal/guidelines for how much arable land shall be protected for food production.	1, 2	
3	Market value of arable land for exploitation is too low. Market value of arable land does not include “insurance value” (the future risk of sealing the soil is not taken into the market value)	2, 3	

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	Set national goal/guidelines for how much arable land needs to be protected (or set a goal for the production potential of the arable land needed in Sweden).	2	1
2	Additional means of control, e.g. exploitation taxes (on national level)	3	1

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
1	Slower exploitation rate of good arable land		

v) Evidence

The presentation was recorded and published on the Lund university website.

Soil Week event 2025

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
	Public knowledge of soil biodiversity and the functions of soil organisms is limited, which makes it difficult for the general public to realise the importance and diversity of soil organisms	KA	

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
	Lack of opportunities for the public to learn about soil and soil biodiversity		

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
	More hands-on events like this one		
	Production of documentaries and educational material for children and families on soil and soil biodiversity		

iv) Identified expected outcomes resulting from the proposed actions

No.	Expected outcome short description	Link to bottleneck (No.)	Link to action (No.)
	Greater general awareness of the importance of soil and soil biodiversity		

v) Evidence

FINLAND

Soil Week event 2023

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1.	When can disturbances be considered positive?	KD	
2.	Differences in urban and natural soils. How about restored ecosystems? Where do we aim when discussing soil health, is cultural habitat the golden standard?	KD	
3	How can we measure biodiversity? Are the key species enough?	KD	
4.	Scale. Bacterial cell, community, plant, field, city, country, continent. How can we make decisions and recommendations to cover all of these	KA	
5.	How to measure soil structure?	KD	
6.	Soils in Europe are diverse, no one solution that works for all.	KA	
7.	What is the criteria for ecosystem services?	KD	
8	How do we define the specific ecosystem, e.g. certain biotopes if the land use in the site has made changes so that it does not ecologically correspond to the existing biotope anymore; to define the ecosystem based on original soil or changes after vegetation change?	KA	

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1.	Is the key to measure biotic or abiotic factors		
2.	Timescale. Are aiming for solutions within 5, 10 or 50 years? Or 1000 years?		
3.	Human/animal/soil centric view on soil health? Is only productive soil healthy?		
4.	Practically, often it is unclear what is the true baseline in assessing health soil structure as most soils are managed		

iii) Identified actions: No actions were identified.

iv) Identified expected outcomes resulting from the proposed actions: No expected outcomes were identified.

v) Evidence: No photographs were taken.

Soil Week 2024

i) Identified Knowledge Gaps

No.	Gap short description	Type of gap (KD, KA)	Link to bottleneck (No.)
1	How to measure soil structure	KD, KA	
2	How to measure soil biodiversity, especially covering all soil organisms.	KA	
3	Which are the most important groups in soil? (bacteria, animals, microscopic animals, plants?)	KA, KD	
4	What is the role of deadwood for soil structure and soil biodiversity?	KD	

ii) Identified bottlenecks

No.	Bottleneck short description	Link to gap (No.)	Link to action (No.)
1	Diverse nature of soils in Europe (also diverse challenges!)		
2	Is there focus on peat soils? In any TTs?		
3	How to implement Soil Monitoring law within all European soils?		

iii) Identified actions

No.	Action short description	Link to bottleneck (No.)	Link to outcome (No.)
1	We need to remember the diverse nature of soils, not one solution for all	2	
2	Do not forget peat soils		

iv) Identified expected outcomes resulting from the proposed actions

No expected outcomes were identified.

v) Evidence