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SOIL DEAL FOR EUROPE

Mission Soil Board's view on Soil Health Living Labs under Horizon Europe

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Independent Expert Report

Research and Innovation

DISCLAIMER

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Aim of the document

With this document, the members of the Board of the EU Mission 'A Soil Deal for Europe' (Mission Soil), aim at sharing their analytic framework of the features and expected outcomes of soil health living labs (LLs) expected to be implemented under Horizon Europe. The document recalls the context under which proposals applying to the soil health LLs topics under the Mission Soil calls shall be built and consists of three sections: 1. an introduction and summary of key documents to provide a general background regarding soil health objectives and building blocks to take action; 2. a focus on what can be expected from LLs in general and more specifically of LLs for soil health; 3. concluding thoughts regarding the features of soil health LLs built under Horizon Europe.

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1.1 Consideration

1.1.1 Why

According to the EU Soil Observatory Dashboard[1], more than 60% of European soils are considered unhealthy. The ambition under the European Green Deal, notably its EU Soil Strategy for 2030 and the proposal for a Directive on Soil Monitoring and Resilience, is to have all soils in good health by 2050. The Mission Soil aims to help achieve this transition.

1.1.2 What for: as outlined in the Mission Soil Manifesto

1. Soil is essential for the life of humans and nature. Healthy soils provide us with clean water and air, sequester carbon thus mitigating and increasing the ability to adapt to climate change, and support biodiversity and ecosystem resilience. Soils also sustain our landscape and cultural heritage and are the basis of our economy and prosperity. We acknowledge that soil is the basis of our well-being.

2. We need to protect and restore soils. No soil should be left behind.

3. Soil protection and restoration need to be embedded in all human activities that have direct and indirect impact on land. All can contribute to halting soil degradation and building a sustainable future based on healthy soils for food, people, nature and climate. Actions should be encouraged at all levels: global, national, regional and local.

4. The commitment of everyone is essential. Raising awareness on the importance of soil and enlarge the community actively involved in caring for this precious resource is key.

1 EUSO Soil Health Dashboard: https://esdac.jrc.ec.europa.eu/esdacviewer/euso-dashboard

1.1.3 How: The Mission Soil's eight specific objectives and targets for 2030

Under its overall goal, the Mission Soil has defined eight specific objectives[2] :

Table 1. The Mission Soil's eight specific objectives and targets for 2030

Challenges and specific objectives	Mission targets in line with EU and global commitments
1. Reduce land degradation relating to desertification: 25% of land in Southern, Central and Eastern Europe is at risk of desertification.	T 1.1: Halt desertification to help achieve land degradation neutrality and start restoration
2. Conserve and increase soil organic carbon stocks: 23% of the European land have low and declining carbon stocks.	T 2.1: Current carbon concentration losses on cultivated land (0.5% per year) are reversed to an increase by 0.1-0.4% per year T 2.2: the area of peatlands and wetlands losing carbon is reduced and the natural sink is significantly increased to help meet GHG reduction targets by 2030 and the Climate law goal by 2050
3. No net soil sealing and increase the reuse of urban soils: the current rate of recycling of urban land for development is only 13%.	T 3.1: Increase urban recycling of land beyond 13% and switch from 2.4% to no net soil sealing as a contribution towards meeting the target of no net land take by 2050
4. Reduce soil pollution and enhance restoration: 27% - 31% of land are estimated to have excess nutrient pollution; the soil contamination is around 2.5% (non-agricultural), 21% (conventional arable), ca. 40-80% of land from atmospheric deposition depending on the pollutant, and 8.5% for Farmland under organic agriculture.	T 4.1: reduce the overall use and risk of chemical pesticides by 50% and the use of more hazardous pesticides by 50% T 4.2 reducing fertiliser use by at least 20% T 4.3: reduce nutrient losses by at least 50% T 4.4: 25% of land under organic farming T 4.5: Reduce microplastics released to soils to meet 30% target of zero pollution action plan T 4.6 Halt and reduce secondary salinization

2 https://research-and-innovation.ec.europa.eu/system/files/2021-09/soil_mission_implementation_plan_final_for_publication.pdf

Challenges and specific objectives	Mission targets in line with EU and global commitments
5. Prevent erosion: Area of land with unsustainable soil water erosion is 25%, with 70% of this being agricultural land	T 5.1: Reduce the area of land currently affected by unsustainable erosion from 25% to sustainable levels
6. Improve soil structure to enhance habitat quality for soil biota and crops: Area of land with critical levels of soil compaction = 23-33%, 7% of which is outside agricultural area; area of land with unsustainable soil water erosion is 25%, with 70% of this being agricultural land.	T 6.1: Reduce compaction of soils to go significantly below current levels of 23% - 33%
7. Reduce the EU global footprint on soils	T 7.1: Establish the EU's global soil footprint in line with international standards T 7.2: The impact of EU's food, timber and biomass imports on land degradation elsewhere is significantly reduced without creating trade-offs
8. Increase soil literacy in society across Member States	T. 8.1: Awareness of the societal role and value of soil is increased amongst EU citizens, including in key stakeholder groups, and policy makers T. 8.2: Soil health is firmly embedded in schools and educational curricula, to enable citizens' behavioural change towards the adoption of sustainable practices both individually and collectively T 8.3: Citizen involvement in soil and land-related issues is improved at all levels T 8.4: Practitioners and stakeholders have access to appropriate information and training to improve skills and to support the adoption of sustainable land management practices

1.2 To take action

1.2.1 Success factors

The Mission Board considers that the following Success Factors (SF) will help reach the 2030 targets:

- SF1: Building awareness and engagement of the society at various levels, improving soil literacy and connecting people with soils.
- SF2: Co-creating activities and exchanging practices with as many land users and related actors as possible to drive collective experimentation and co-ownership of solutions and results.
- SF3: Working under adequate policy frameworks, involving policymakers and other stakeholders (including private businesses or influential associations) as co-design actors; ensure a good science-policy-practice interaction.
- SF4: Taking in consideration how land use is related with social, cultural, and economic needs and local contexts while paying specific attention to existing structures and values to understand drivers and barriers regarding sustainable land use and soil management.
- SF5: Stimulate efforts to develop economic models fit to circular and solidary economies and the involvement of the actors from the wide value chain- in the co-creation process.
- SF6: Combining and networking activities at local, regional, national and global scales to ensure concerns regarding different land uses and up-scaling can be considered.

1.2.2 The four building blocks of the Mission Soil

In light of the success factors, the Mission Soil has defined four building blocks to provide conditions for action.

- Ambitious research and innovation programme with a strong social science component.
- Effective network of 100 living labs and lighthouses to co-create knowledge, test solutions and demonstrate their value in real-life conditions.
- Harmonised framework for soil monitoring in Europe.
- Raising people's awareness on the vital importance of soils.

2.0 Focus on Living Labs

2.1 General characteristics of the LLs

Living Labs have been around for over 20 years. Implemented initially in the information and communication technology field in the early 2000s to design products based on users' demand, they rapidly developed in other sectors to engage communities for global change: digital transition of the health sector, new economic pathways in rural regions, resilient cities, open universities' campuses, sustainable development of agroecosystems. What can be expected from LLs has been covered in different sources: publications from researchers involved in LLs or studying what is happening in LLs; guidelines published by organisations running LLs and networks; research and development programmes shaped to support the development of LLs; and reports of the projects to which they gave rise, including feedback and testimonies of involved actors.

LLs are open innovation arrangements which activities are organised based on a fundamental principle: co-creation with users in real life conditions. In other words, actors with different perspectives come together with a common aim to collectively imagine, choose, test and co-design new paths to be experimented. Living Labs are instruments of the transition. The way to operationalize the fundamental principle of LLs (co-creation with users in real conditions) is adapted to the sector in which they operate. With such a diversity, an efficient way to categorize LLs is according to their i) aim, ii) types of participants, iii) types of activities and iv) particularities of the context. It helps identifying what LLs have in common and what distinguishes them from other innovation schemes.

2.1.1 Types of activities

- Gathering diverse communities around a major goal, implementing co-decision mechanisms to prioritise challenges and changes to be addressed,
- ensuring the co-design of innovation and experimentation to tackle the challenges and changes, organising the collective evaluation of results and decisions on the next steps,
- maintaining the engagement of the communities and opening out to new stakeholders,
- designing sustainable business plans to support the management and activities of the LLs on the medium to long-term,
- developing demonstration activities, analytic and networking capacities.

With such activities, the innovation/experimentations of the LLs are well anchored in reality and the specific contexts, and the LLs are equipped to scale up from local to global scales.

2.1.2 The aim and type of participants

The LLs emerge and develop for a major goal, such as facing global change, improving resilience, and groups communities of stakeholders in a broad sense to design innovation pathways to change the system. Stakeholders are those who bring knowledge, learn new knowledge, take benefits, are impacted or have opinions on the transformations to be undertaken. LLs thus gather public and private bodies, academics, practitioners and citizens.

2.1.3 The context in which they operate

The approaches and solutions are experimented in real contexts, evaluated by the LLs participants improved through iterative processes. The outcomes can be technical or social innovations, social-economic advances or provision and exchange of knowledge (practical, tacit and academic). It is commonly said that LLs provide three kinds of values: economic, social, and knowledge. The

environmental concern is central in "place-based" LLs, such as urban, rural or agroecosystem LL, which are closely embedded in local conditions.

2.2 The unique features that might be expected on LL aiming at improving soil health

In light of the success factors, the Mission Board believes that Soil Health Living Labs could have the following characteristics, in addition to the usual features of LLs:

- Aim: LLs under the same project should contribute to at least one of the eight specific objectives of the Mission and work together on thematically related soil health challenges. LLs should seek to improve soil health without moving problems elsewhere or generating negative impacts in other spheres.
- Participants: the participants should include land managers and land users, academics coming from different disciplines (including those not directly concerned by soil), industry representatives as well as a mixture of public and private body representatives in particular those involved in local policy making and governance. The involvement of citizens should also be foreseen.
- Activities: on top of activities usually developed in LLs, special attention should be put on services to extend the social, economic and environmental outcomes and impacts and contribute to soil literacy.

3.0 Thoughts regarding the Horizon Europe Mission Soil LLs topics

Specific criteria for living labs are expected to facilitate common approach and comparability of data and experiences in different European countries such as:

- A LL contains a group of sites working together at regional or sub-regional level
- A project gathers partners from at least three Member States or Associated Countries

Given the above considerations, below the Mission Board provides important features for Horizon Europe LLs proposals. Note that the points below gather aspects that the Mission Board members consider relevant. These points are neither exhaustive nor replace the Work Programme call and topics text, the Horizon Europe evaluation criteria nor the assessment that will be carried by the independent experts appointed by the European Commission.

3.1 Excellence

3.1.1 Objectives and ambition

- In a wider sense, the selected theme/focus should be justified, linking with at least one of the eight specific objectives and considering the local context on which the LLs will focus.
- The contribution to the improvement of European soil health with regard to the challenges and 2030 targets outlined by the Mission should be clearly presented and the soil health challenge(s) clearly identified.

3.1.2 Methodology

- The rationale and common denominator behind the gathering of the different sites composing the LLs across regions and Member States should be clear.
- The robustness of the approach to carrying out research in real-life settings should be argued.
- The conditions for a meaningful long-term engagement of a diverse range of stakeholders throughout the processes (not just informing but involving) should be made clear. Their roles, interests, and activities should be well considered, adjusted to each other, and described.
- The soil-landscape, the environmental, and the (agro)technological-financial-cultural system of each LL should be described in order to make the results comparable within and among the multiple sites of each LL and also among the various LLs of a project.
- The methodologies and approaches to be implemented should be oriented to producing tangible results.
- The strategies for empowerment of the communities for example, via capacity building, and the ways foreseen to upscale the practices, results or advances should be explicitly considered and outlined.
- The way to assess the progress regarding the improvement of soil health as well as the evolution of the practices should be described (and either already set up or developed during the implementation). Questions to be addressed could include:
  - How will the baseline for each LL and site for the selected soil health challenge(s) be established? Baseline data and information for comparability and monitoring progress should be sound.

- How will the changes in soil health at the different sites be monitored over time according to the objectives of the respective LLs and the project overall?
- Will the set of soil health indicators presented in the Soil Mission Implementation Plan be used and enriched?

- The planning of uptake and sharing of knowledge activities should be described (from site to site, country to country, at the network level, etc.).

3.2 Impact

- The strategies for ensuring the long-term sustainability and continuity of the LLs beyond the Horizon Europe funding should be described, including the identification of potential social entrepreneurship, business models, or other actions involving local authorities, business communities, SMEs, investors, or entrepreneurs.
- The expected soil health improvements at the local and global levels should be adequately supported by a methodology/strategy, indicators, baselines, benchmarks, and measurements, including modelling efforts.
- Enlargement and empowerment of communities and other upscaling effects should be considered.
- The scale and significance of the contributions to soil engagement and/or soil literacy in society should be outlined.
- The measures for progress assessment are well defined in terms of frequency, content, outreach, and media channels used; the evaluation of the quality of the measures is considered.
- The contribution to other societal challenges and European policies should be considered.
- The measures to maximise expected outcomes and impacts are clearly presented, as well as their draft dissemination and exploitation plan, including communication activities, argues their suitability and relevance for the different target audiences.

3.3 Quality and efficiency of the implementation

3.3.1 Work plan and resources

- The complexity and risks of the orchestration of the co-creation and co-production activities are well anticipated, and adequate resources are allocated to ensure the activities can be efficiently implemented and managed.
- The cross-fertilisation and collaboration activities within each LL across the sites and with the other LLs in the different Member States are well foreseen, and adequate resources to cover Person Months and costs are allocated for those activities.
- One or more tasks and adequate resources are specified to collaborate with other Living Lab projects and the Living Lab Support Structure and to contribute to the network of LLs. Relevant activities and resources are considered to connect with projects funded by the Mission Soil working on the same soil health challenge(s).

3.3.2 Capacity of participants and the consortium as a whole

- The consortium has an adequate composition according to the proposed objectives and approaches.
- The allocation of tasks and roles played by each partner on the onset, orchestration and sustainability of the LLs are clear.