



The European Soil Mission

Assessing current knowledge gaps, drivers, bottlenecks,
and novel research and innovation approaches

Carlos A. Guerra



UNIVERSIDADE D
COIMBRA

Soil BON

● ○ • Soils
SOLO for
• ● ○ Europe



EUROPEAN UNION

EU MISSIONS



Climate
adaptation



Cancer



Smart cities



Oceans &
Water



Soil





Mission goal and specific objectives



1. Reduce desertification



2. Conserve soil organic carbon stocks



3. Stop soil sealing and increase re-use of urban soils



4. Reduce soil pollution and enhance restoration

100 living labs
and lighthouses
to lead the
transition
towards healthy
soils by 2030



5. Prevent erosion



6. Improve soil structure to enhance soil biodiversity



7. Reduce the EU global footprint on soils

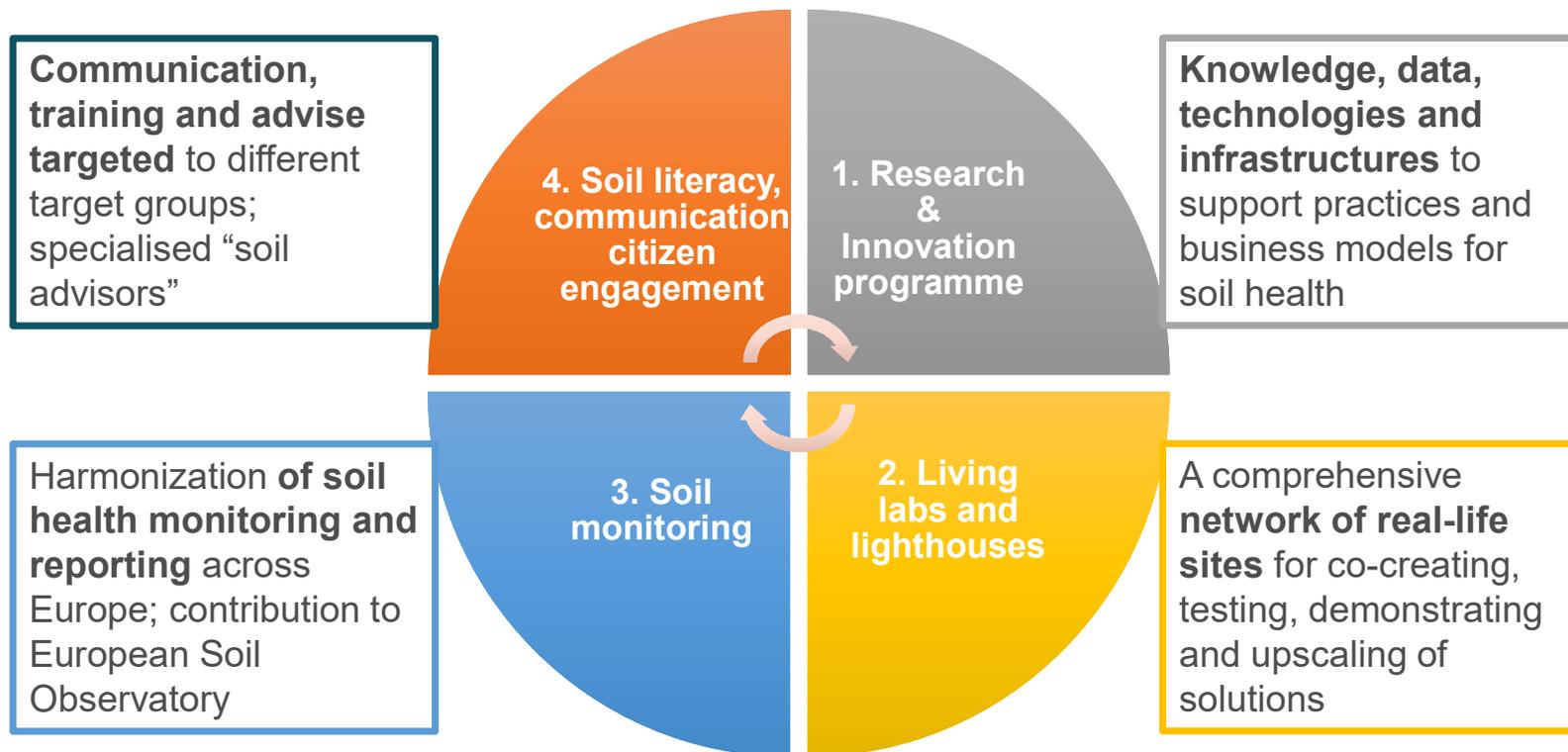


8. Improve soil literacy in society



How will the Mission be implemented?

Activities under the **four building blocks** to address **soil health** and the **drivers of soil health**



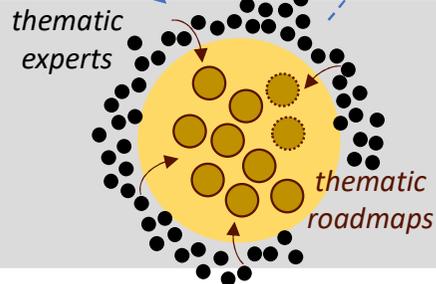
Co-implementation of mission by: researchers, land managers, regions, businesses, policy makers, citizens and international partners

Integrating R&I roadmaps the Soil Mission Objectives and projects dealing with R&I roadmaps

- *Implementation of Think Tanks across Soil Mission Objectives*
- *Collaboration and enrichment of the current EUSO Forum*
- *SOLO aims to act as a focal point across current and future EU projects that include the development of topic-specific **R&I roadmaps***



Sectorial topics



synthesis

tradeoff assessments and prioritization

Transdisciplinary research and innovation roadmaps (*balance between basic research and transdisciplinary research*)

horizontal integration



Think Tanks in support of the Mission and EUSO



Erosion
Prevention



Land
degradation



Footprint
on soils



Soil organic
carbon stocks



Pollution and
restoration



Soil sealing and
urban soils



Soil
structure



Soil
literacy



Nature
conservation of
soil biodiversity



Climate smart
agriculture



Develop Objective-specific R&I Roadmaps

Transdisciplinary



● ○ ● Soils
SOLO for
● ● ○ Europe

Knowledge Gaps to Guide the EU Soil Mission Funding Priorities



SOLO receives funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101091115. Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the EU nor the EC can be held responsible for them.



SOLO Reduce desertification and land degradation



- Identify the extent and intensity of land degradation across EU Member States, considering multiple sources of degradation and making use of the latest monitoring mechanisms (e.g., EUSO, Copernicus);
- Identify, test and standardise the best practices across land use types to prevent the effects of land degradation and restore healthy soils.



SOLO Conserve soil organic carbon stocks



- Develop new knowledge on long-term trends in European agricultural soils, in particular on mechanistic understanding of the consequences of intensive use and land use change on soil functions and their impact on soil organic carbon stocks;
- Explore conceptual, legal, policy and practical ways of how can soil organic carbon stocks be assessed and quantified in an overall health concept that includes healthy plants, clean water, healthy animals and people in the context of “climate-smart” agriculture, horticulture, and forestry, and practises adaptation to new climatic extremes;

● ○ ● Soils
SOLO for
● ○ ● Europe

Knowledge Gaps to Guide the EU Soil Mission Funding Priorities



SOLO receives funding from the European Union's Horizon Europe research and innovation programme under grant agreement No.101091115. Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the EU nor the EC can be held responsible for them.



SOLO Improve soil literacy in society

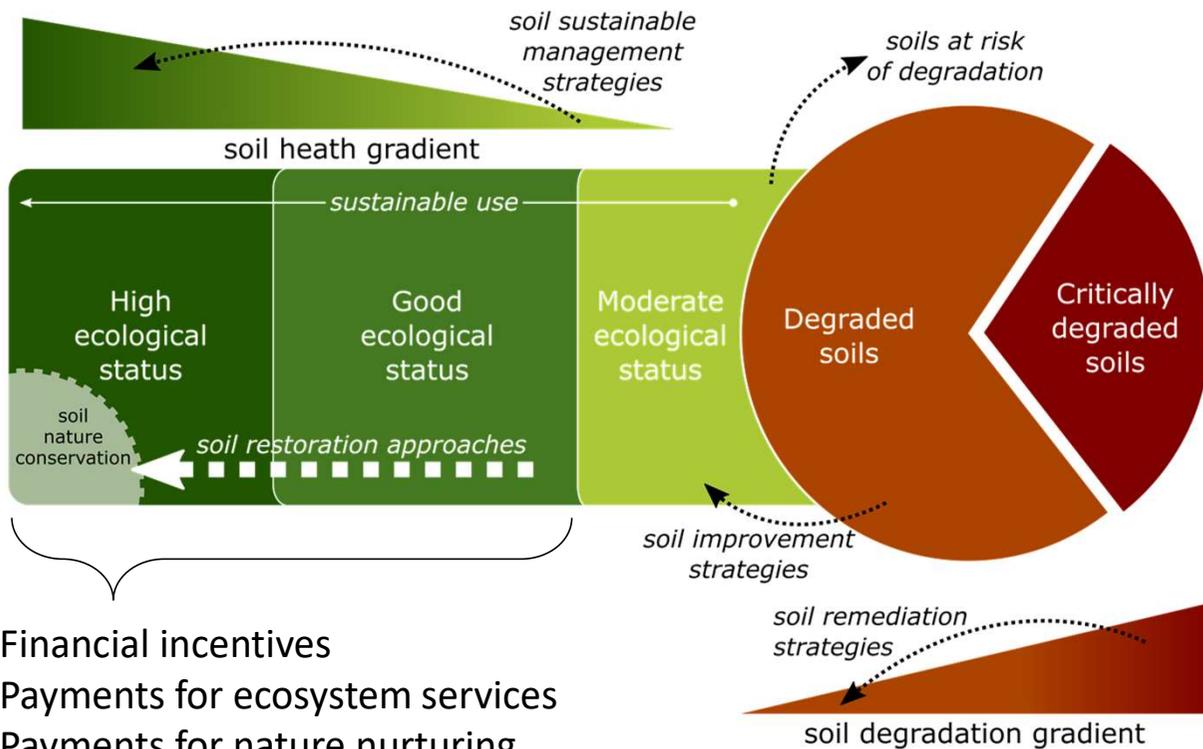
- Development and investigation of the consequences of new practical curricula adapted across educational levels which can improve citizen knowledge on soil health and ecology, particularly in citizens' perception of soils, soil needs and social implications of healthy soils;
- Investigate the level of impact of current knowledge, soil protection strategies, and capacity-building programmes on the perception of citizens, practitioners, and policymakers of what constitutes a healthy soil and the main strategies to improve it;



SOLO Nature conservation of soil biodiversity

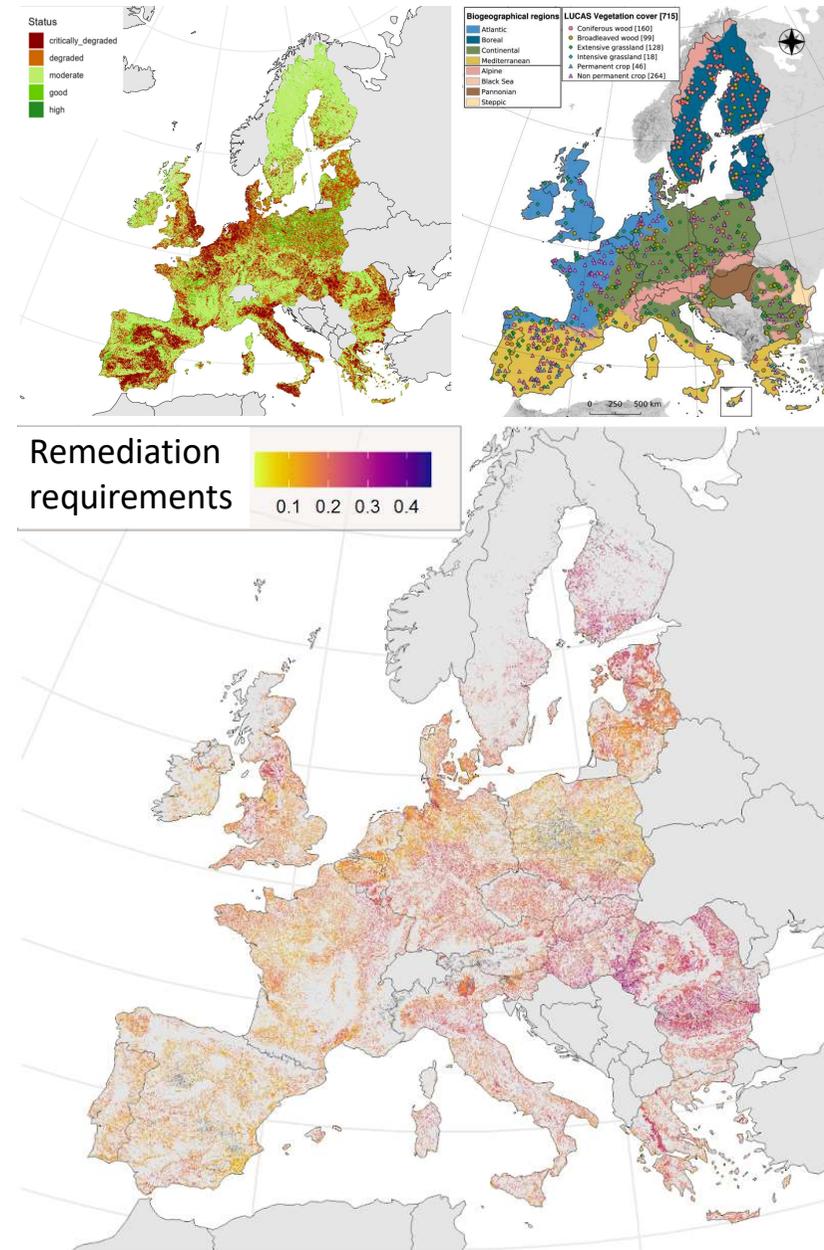
- Identify nature conservation practices that enhance the quality of soil habitats, the protection of soil organisms and the multi-functionality of soils according to different local environmental conditions;
- Investigate the effects of current types of conservation areas on soil organisms and identify adjustments needed to improve soil conservation and restoration across European landscapes and land-use types;

an ecological classification system

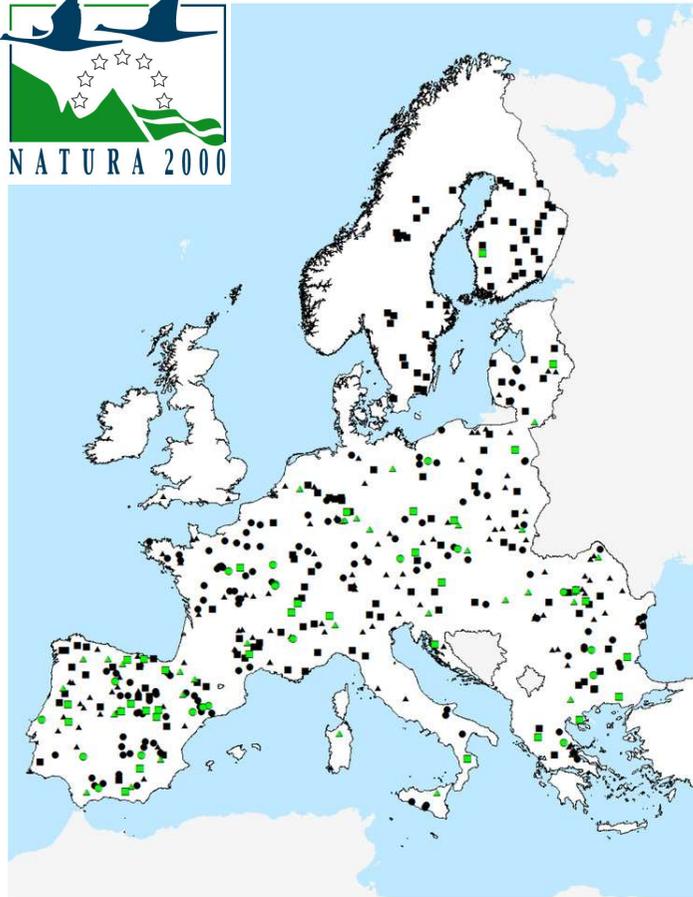


- Financial incentives
- Payments for ecosystem services
- Payments for nature nurturing
- Financial support for restoration
- Commercial gains
- Guidelines for soil restoration

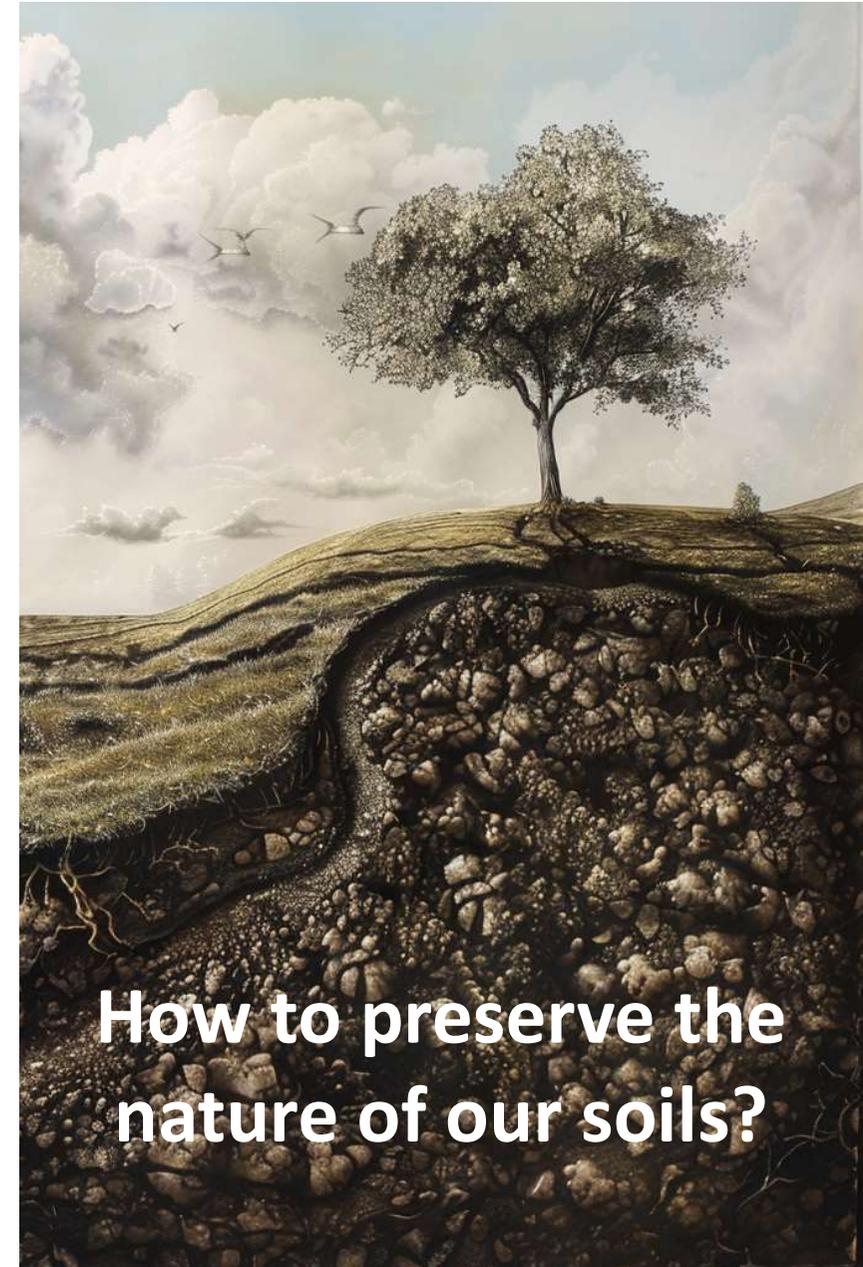
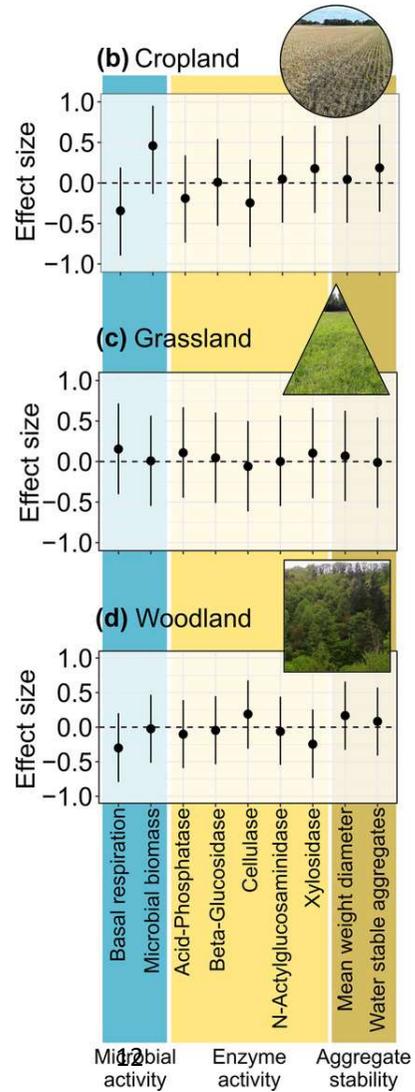
- Incentives for changes in land management practices
- Support for small-scale farmers
- Guidelines for soil remediation



(non)Effects of protected areas



- | | |
|------------------------|--------------------------|
| Protected sites | Unprotected sites |
| ● Cropland (20) | ● Cropland (124) |
| ▲ Grassland (34) | ▲ Grassland (124) |
| ■ Woodland (33) | ■ Woodland (139) |



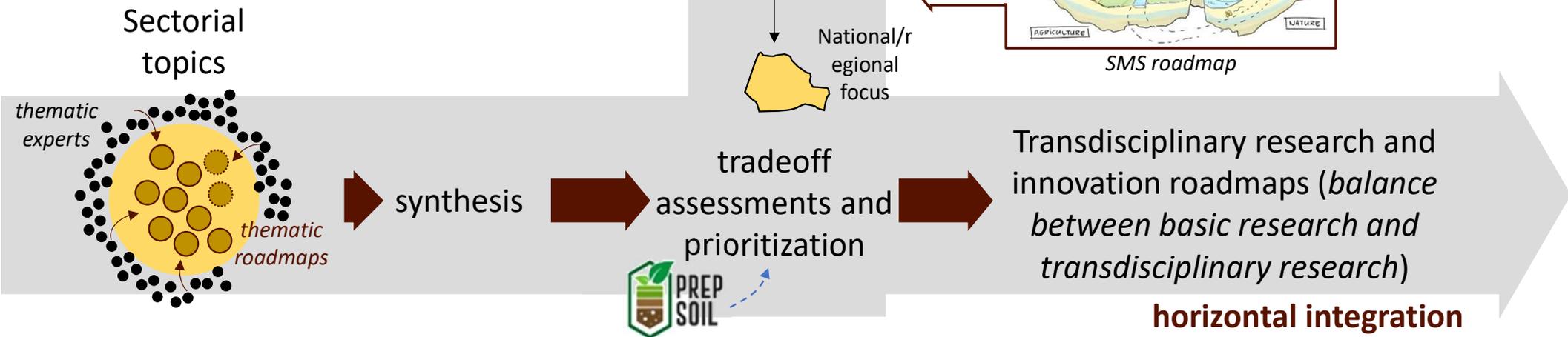
How to preserve the nature of our soils?

Providing a European R&I roadmap that includes a regionalization of the identified priorities

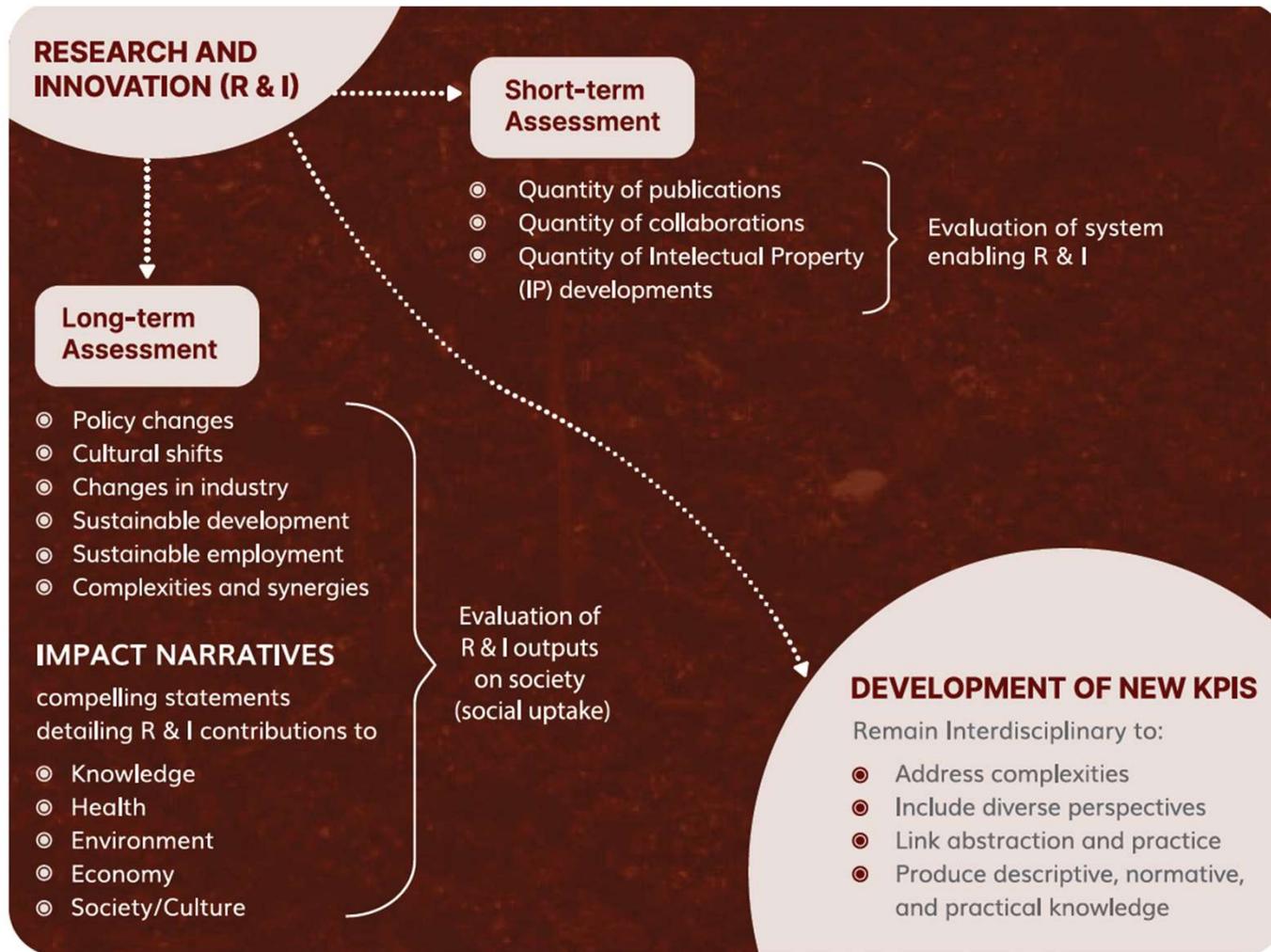
- Overall European R&I roadmap for the next decade
- Recognize the need to have these priorities regionalized across different countries

vertical integration

- Challenges with cross-border integration of research funding



Evaluating the outcomes of the Roadmaps



Key Performance Indicators allow to assess the progress and success of R&I activities by evaluating:

- The system enabling the R&I
- The social, economic, cultural and environmental impacts of R&I

Key Performance Indicators include:

- Academic dimensions
- Training and capacity building
- Public take-up
- Market and practice take-up
- Governance structures and institutional arrangements
- Literacy and community building