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D4.2 Report on LL/LH model business plans

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Contributors

Name	Organisation & Country
Alberto Cerezo Soto, Michelle González Torres, Giulia Campodonico	European Network of Living Labs (ENoLL), Belgium
Judit Berényi Üveges	ÖMKi, Hungary
Lars Munkholm	AU, Denmark
Yann Raineau, Violaine Dory	INRAE, France
Laura Nogues	Deltares, The Netherlands
Hanneke Heesmann	Wageningen University (WR), The Netherlands
Helena Aronsson	Swedish University of Agricultural Sciences (SLU), Sweden
Concha Civantos	FUNDECYT, Spain

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List of Abbreviations and Acronyms

BM	Business Model
BMC	Business Model Canvas
BP	Business Plan
CAP	Common Agricultural Policy
D	Deliverable
EC	European Commission
ENoLL	European Network of Living Labs
EU	European Union
KPI	Key Performance Indicator
LH	Lighthouse
LL	Living Lab
Mission Soil	Mission "A Soil Deal for Europe"
NGO	Non-Governmental Organization
QH	Quadruple Helix
R&I	Research and Innovation
T	Task
WP	Work Package

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Executive Summary

The Mission “A Soil Deal for Europe” aims to establish 100 Living Labs and Lighthouses to lead the transition towards healthy soils by 2030. On this basis, PREPSOIL is the first preparatory action aimed at facilitating the deployment of the Mission across European regions, by helping key players to reduce soil degradation, while increasing soil awareness and soil literacy. In particular, Work Package 4 “Knowledge transfer and co-creation in regional living labs” focuses on improving the understanding of the concept of Living Labs and how they can lead to a significant improvement of soil health, developing a new taxonomy, mapping current and emerging initiatives, and delivering a service package for Living Labs and Lighthouses including model business plans to support long-term stability of such initiatives.

In this context, the "Report on LL/LH business model plans" intends to serve as a comprehensive guide to design Business Models for Living Labs and Lighthouses that address soil health concerns, as overarching frameworks. The goal is to contribute to the long-term sustainability of Soil Living Labs and Lighthouses, and initiatives that aspire to become such.

This report, developed from an extensive literature review and co-creation activities within the PREPSOIL project, delves into the concept and evolution of the business models canvas as a widely recognized tool that aids entrepreneurs, managers, and organizations in visualizing, designing, and innovating their business models. It is aimed to propose a tailor-made canvas that considers the particularities of Soil Living Labs and Lighthouses, and initiatives, guide users throughout this tool, and serve as inspiration with concrete examples according to different land use types: agriculture, forestry, (post-)industrial, and (peri-)urban. Related activities of this report followed a three steps methodology: understand, co-design, and evaluate. This process ensured the involvement of PREPSOIL partners, Living Labs with focus on soil health, and collaboration with sister projects.

Central to the business model canvas for Soil Living Labs are the different layers that should guide Living Labs when designing their strategies and business models:

1) The Mission Soil objective(s), as defined by the Implementation Plan,
2) The land use type in which the Living Lab operates,
3) The different elements of the canvas, and
4) The spheres of intervention within each of the elements.

The Business Model Canvas for Soil Living Labs and Lighthouses is an essential tool to start planning their growth, upscale and stability and is expected to be included in the PREPSOIL service package aimed to increase the performance and accelerate maturity of Living Labs and Lighthouses.

1. Introduction

1.1 The Mission "A Soil Deal for Europe"

Horizon Europe is the European Union's (EU) framework programme for research and innovation, spanning from 2021 to 2027. The programme features five missions designed to tackle significant challenges through well defined, inspirational, and measurable goals within a set timeframe. These missions address some of the most pressing issues of our time, including Climate Change, Cancer, Oceans and waters, Climate-Neutral and Smart Cities, and Soil (EU Missions in Horizon Europe, 2024).

The mission titled "A Soil Deal for Europe," henceforth referred to as Mission Soil, aims to create 100 Living Labs (LLs) and Lighthouses (LHs) by 2030 to promote the transition to healthy soils, that should be achieved by 2050. Given the crucial role of soil in sustaining life on Earth, this mission highlights its importance in supporting food systems, clean water, biodiversity, and climate resilience. It stresses the need to combat the lack of awareness among various stakeholders – such as land managers, industries, consumers, policymakers, and society – regarding soil degradation, which hampers its capacity to provide essential ecosystem services (European Missions. A Soil Deal for Europe, 100 Living Labs and Lighthouses to Lead the Transition towards Healthy Soils by 2030, n.d.). The mission's research and innovation components include knowledge development, sharing, transfer, application, and harmonisation, all of which directly contribute to achieving the primary objective of Mission Soil. Additionally, Mission Soil has outlined eight 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,
5. Prevent erosion,
6. Improve soil structure to enhance soil biodiversity,
7. Reduce the EU global footprint on soils, and
8. Improve soil literacy in society.

The Implementation Plan of the Mission Soil (European Commission, 2024) provides a definition of LLs & LHs for the purpose of the Mission:

- **Living Labs (LLs)** are defined as "*user-centred, place-based and transdisciplinary research and innovation ecosystems, which involve land managers, scientists and other relevant partners in systemic research and codesign, testing, monitoring and evaluation of solutions, in real-life settings, to improve their effectiveness for soil health and accelerate adoption. These Living Labs are collaborations between multiple partners that operate at regional or sub-regional level and coordinate experiments on several sites within a regional or sub-regional area (or working landscapes).*"
- **Lighthouses (LHs)** are defined as "*places for demonstration of solutions, training and communication that are exemplary in their performance in terms of soil health improvement. They are local sites (one farm, one forest exploitation, one industrial site, one urban city green area, etc.) that can be included in a living lab area or be situated outside a living lab area*."

1.2 The PREPSOIL project for Living Labs and Lighthouses sustainability

The Preparing for the "Soil Deal for Europe" Mission (PREPSOIL) project – the first one funded under the Mission Soil – aims to facilitate the implementation of the Mission Soil across European regions. This involves the collaborative development and use of tools and platforms for interaction, knowledge-sharing, and co-learning (Preparing for the Soil Deal for Europe Mission – PREPSOIL) Project, n.d.). Additionally, the project includes stocktaking and dialogue to understand how a regional assessment of soil needs, supported by standardized monitoring mechanisms, can be translated into actionable initiatives within Living Labs and exemplary projects that promote soil health (Preparing for the Soil Deal for Europe Mission – PREPSOIL Project, n.d.).

Work Package (WP) 4, led by the European Network of Living Labs (ENoLL), focuses on "Knowledge transfer and co-creation in regional Living Labs." According to the Grant Agreement (GA), the objectives of WP4 are:

- To improve the understanding of the concept of LLs and how LLs/LHs can lead to a significant improvement of soil health.
- To map current and emerging LLs and LHs using a new taxonomy and to engage LLs in development to co-design a spectrum of model business plans considering the high variability among LL and the taxonomy.
- To create a service package for knowledge transfer and co-creation for LLs/LHs, prioritizing specific soil needs.

Task 4.3 within WP4 specifically focuses on designing a diverse range of model business plans to scale up LLs and LHs across different soil use types and socio-economic conditions beyond the mission's duration. This *Deliverable (D) 4.2 Report on LL/LH model business plans* is dedicated to business models (BMs) for Soil LLs & LHs, aiming to support to their long-term sustainability, as well as for initiatives that aspire to become such. The goal of D4.2 is to provide tool and guidance Soil LLs & LHs and initiatives in designing BMs necessary for their upscaling and expansion. To achieve this, the document offers examples according to different soil uses, intended to inspire and guide the unique adaptation of each BM to the specific context of each LL & LH. Given the guidance nature of this document, it will be included, along with other tools and materials, the PREPSOIL service package developed as part of WP4 to increase performance and accelerate maturity of LLs & LHs engaged in soil health.

Originally intended to collect on model business plans (BPs), the focus of Task 4.3 and this report has shifted towards designing BMs. Such decision is rooted in the inherent flexibility and adaptability of BMs. Unlike rigid BPs, which detail specific strategies and tactics, BMs provide a conceptual framework that can evolve with changing circumstances. This flexibility enables organizations, including LLs & LHs, to respond swiftly to new opportunities and challenges, fostering continuous improvement and adaptability in dynamic operational environments. Given the guidance nature of this document, the use of BMs enables LLs and LHs to identify the optimal solutions tailored to their unique open

innovation ecosystems and specific elements of their business strategy. This approach avoids the pitfalls of adopting fixed BPs that may not be relevant to their environment, context, and goals.

In summary, focusing on BMs rather than BPs allows LLs and LHs to navigate their operational complexities more effectively, promoting innovation and resilience. While BPs are crucial for outlining detailed operational and financial strategies, BMs offer a more versatile approach that support strategic agility and long-term sustainability. More details on BMs and BPs is provided into 2.1 Business Models, Business Plans and Strategy: key themes and differences.

1.3 Incentives and Business Models in the Mission Soil context

The Mission Soil (European Missions. A Soil Deal for Europe, 100 Living Labs and Lighthouses to Lead the Transition towards Healthy Soils by 2030, n.d.) emphasizes the necessity of new (policy) incentives and BMs for soil health must be delivered, acknowledging that transformative changes are needed to achieve the ultimate goal of restoring soils.

To this end, three key projects have been funded under the Mission Soil, beyond PREPSOIL, specifically to address the development of new incentives and sustainable business models that support soil health:

- InBestSoil[1] tests the incorporation of an economic valuation system of ecosystem services delivered by healthy soils in five BMs.
- SoilValues[2] explores financial mechanisms such as equity investment or compensation for risk or cost reduction, as well as hybrid incentives schemes. SoilValues also aims at developing six BMs to help land managers to make decisions.
- NOVASOIL[3] delves into four BMs that allow the creation of new incentives from healthy soils.

While connected to these projects, the work performed in PREPSOIL and reported in this deliverable, differentiates itself by focusing specifically on business models for Soil Living Labs (LLs) and Lighthouses (LHs).

Despite this different specific focus, collaboration with two of these key projects has been integral to this deliverable.

With InBestSoil, a collaboration was established to present economic instruments aimed at improving soil health during the PREPSOIL webinar on Smart Financing and Sustainability of Soil Health LLs & LHs, held in June 2024. Recommendations and main takeaways from this collaboration are included in

Annex II: Recommendations and takeaways from the webinar *Smart Financing and Sustainability of Soil Health Living Labs & Lighthouses*.

[1] InBestSoil, *Monetary valuation of soil ecosystem services and creation of initiatives to invest in soil health: setting a framework for the inclusion of soil health in business and in the policy making process*, GA 101091099, https://cordis.europa.eu/project/id/101091099
[2] SoilValues, *Enhancing Soil health through Values-based business models*, GA 101091308, https://cordis.europa.eu/project/id/101091308/fr
[3] NOVASOIL, *Innovative business models for soil health*, GA 101091268, https://cordis.europa.eu/project/id/101091268

In April 2024, a collaboration with SoilValues began, focusing on discussing results from various exercises conducted within PREPSOIL T4.3, as detailed in Chapter 3. Methodology. This collaboration contributed to the development of six new business models to assist land managers.

1.4 Structure of this document

Besides this introduction, D4.2 comprises four main chapters:

- **2. Business Model literature**: provides a clear understanding of the concept of BPs and BMs, showcases the BMs relevance for the long-term sustainability of LLs, and provides an overview of the existing BM templates.
- **3. 3.** Methodology: presents the approach utilized to get to the different BMCs for LLs & LHs according to land use types in three steps (understand, co-design, evaluate), and the actions performed and their results.
- **4. 4. Business Model Canvas for Soil LLs and** LHs: introduces the structure of the PREPSOIL BMC, and includes further clarification of the elements related to environmental risks, and revenue stream. Chapter 4 also describes how to complete the Soil LLs & LHs BMC, and deploys the BMCs according to land use types, including guidance to understand the different components.
- **5. 5. Conclusions, recommendations and next** steps: summarizes the key aspects of this deliverable and proposes recommendations for enhancing the Soil LLs & LHs BMs, and ultimately their long-term sustainability.

In addition, the following annexes are provided in attachment to complete the narrative reporting of the document:

- **Annex I: Business Models Canvas for Soil Living Labs & Lighthouses** summarizes the key content of chapter 4 into a stand-alone and easy-to-digest guidance document.
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- **Annex II: Recommendations and takeaways *from the webinar Smart Financing and Sustainability of Soil Health Living Labs &*** *Lighthouses* outlines the main recommendations and takeaways from the webinar.

2. Business Model literature

A BM serves as a representation of reality, simulating the real world by illustrating a specific combination of resources that generate value through transactions for both customers and users. Essentially, BMs depict how the components of a business fit together at a given time, while strategy reflects what the company aims to become in the future. Therefore, LLs must dynamically adapt their BMs in response to emerging opportunities or threats.

The concept of sustainable BMs is gaining traction, emphasizing the importance of sustainable development at both the organizational and societal levels. These models focus on reducing negative and/or creating positive external effects for the natural environment and society. They address an organization's purpose and goals, the consideration of all stakeholders, the treatment of nature, and whether leaders are driving necessary cultural and structural changes to implement sustainability. This is particularly relevant to Soil LLs & LHs.

Sustainable development, defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"(United Nations, 2015) aligns with the evolving notion of BMs. Early BM concepts emerged at the end of the 20th century to describe and analyse new forms of business, such as e-businesses or virtual organizations. Pioneers like Chesbrough & Rosenbloom (2002) linked the BM to strategy and innovation, sparking extensive research that has since produced numerous approaches to conceptualizing BMs.

BMs have evolved from a narrow focus on profit to a broader value creation logic that encompasses an organization's overall impact. Modern BMs extend beyond customer value propositions to include value creation for a wider range of stakeholders, recognizing that sustainable value for customers cannot be achieved without also benefiting other stakeholders and the natural environment. A business or organization is supported by a network of stakeholders, and those that contribute to sustainable development must create value for this entire network, not just customers and shareholders.

2.1 Business Models, Business Plans and Strategy: key themes and differences

Over the past decades, the term business model has frequently been misused by academics and practitioners alike, with managers, consultants, scholars from diverse fields, and even popular media employing the term inconsistently. Despite its widespread use and recognized importance, there remains no consensus on its precise definition. Nonetheless, several key themes have emerged (Zott et al., 2011):

- The BM is recognized as a distinct unit of analysis, broader than the product, service, or industry;
- It emphasizes a system-level, holistic approach to explaining how firms or organizations conduct business and purpose;
- The activities of a focal firm and its partners or an organization are central to various conceptualizations of BMs; and
- It aims to elucidate both value creation and value capture.

In support to these findings, Teece (2010) states that whenever a business enterprise is established, it inherently adopts a BM that describes the design of its value creation, delivery, and capture mechanisms. Essentially, a BM defines how the enterprise or organization delivers value to customers, users, and stakeholders at large, persuades them to pay for this value or to embrace their proposals, and converts these payments into profit or these proposals into solutions. It reflects management's hypothesis about customer and user desires, preferences, and how the enterprise or organization can best organize to meet these needs, receive payments, and achieve profitability, and/or to achieve their goals.

It is thus clear that a BM is a conceptual model rather than a financial one, making implicit assumptions about user behaviour, revenue and cost dynamics, evolving user needs, and potential competitor responses. A well-constructed BM yields compelling value propositions, achieves advantageous cost and risk structures, and enables significant value capture by the business or organization (Teece, 2010). Its suitability can only be determined within a specific context.

In contrast to BMs, a BP is a comprehensive document that outlines the operational and financial plans of the company. It is a detailed document that describes the business, its objectives, strategies, the market it is targeting, and its financial forecasts. It includes sections such as an executive summary, company description, market analysis, organizational structure, product or service lines, marketing and sales strategies, funding requests, and detailed financial projections. A BP provides an in-depth roadmap that covers both short-term and long-term goals, detailing the specific steps necessary to achieve these objectives (Cremades (2021) Evans (2011).

The primary distinction between BMs and BPs lies in their scope and level of detail. A BM offers a broad, high-level overview of how the business intends to operate and generate revenue, focusing on the core logic and value proposition. It’s a flexible tool that can be adapted and changed as the business evolves and new information emerges. In contrast, a BP delves into the granular details, providing a thorough analysis that supports operational planning, for this reason its structure is more rigid and needs updates as the business progresses.

BMs are often developed during the early idea phase to test the viability of the business concept. Once validated, the BM serves as a foundation for creating a detailed BP, which is used to guide the launch and growth phases of the company.

With these clear elements in mind, it is also important to delineate what a BM is not. A BM does not involve a linear mechanism. Instead, it encompasses a complex, interconnected set of exchange relationships and activities among multiple players, extending beyond the internal organization of firms or institutions. It spans firm boundaries and includes external interactions, not just internal organizational issues.

The BM is not synonymous with strategy. According to Casadesus-Masanell & Ricart (2010), BMs are reflections of realized strategies, whereas strategy is about building dynamic capabilities to respond efficiently to future and existing contingencies. Strategy, with a long-term perspective, establishes these dynamic capabilities, which in turn constrain potential BMs, focusing on the present or short-term to address contingencies. Thus, strategy devises dynamic capabilities to respond through the organization's BM. Notably, while every organization has a BM, not every organization has a strategy.

Strategy defines what a company or organization aspires to become, whereas BMs describe what they currently are (DaSilva & Trkman, 2014).

Two additional distinctions between BMs and strategy warrant emphasis. First, traditional strategy focuses on competition, value capture, and competitive advantage, whereas the BM concept emphasizes cooperation, partnership, and joint value creation. Second, the BM concept centres on the value proposition and the customer or user, which is less pronounced in traditional strategy literature. The consensus is that BMs revolve around customer/user-focused value creation (Zott et al., 2011).

In conclusion, while the term "BM" has been frequently misused and inconsistently defined, it remains a critical concept in understanding how businesses create and capture value. Distinct from a BP, which provides a detailed operational and financial roadmap, a BM offers a high-level, flexible overview of how an organization delivers value and generates revenue. It encompasses the activities and relationships within and beyond firm boundaries, highlighting system-level, holistic approaches to business operations. BMs reflect realized strategies focused on present contingencies and customer value creation. Understanding these distinctions and the core elements of BMs enable better organizational planning and adaptation in dynamic market environments.

2.2 The relevance of Business Models for Living Labs

A substantial number of LLs struggle to translate their value propositions into sustainable BMs. According to a survey of 56 LLs within the European Network of Living Labs (ENoLL), conducted in 2011 by the Ulster University (Mulvenna et al., 2011), 84% confirmed that access to funding was a problem. The LLs were asked too about their main sources of funding. The public sector provided for 43% of funding; universities for 14%; and private organisations contributing with 10,7%. The European Commission provided 19.6% of funding, making it the second main source for the continued existence of LLs. Consequently, most LLs primarily rely on public grants and often cease their activities when public funding ends. This ongoing reliance on public funding poses a risk to the long-term goals set by the Mission Soil and the targets for restoring soil health across Europe.

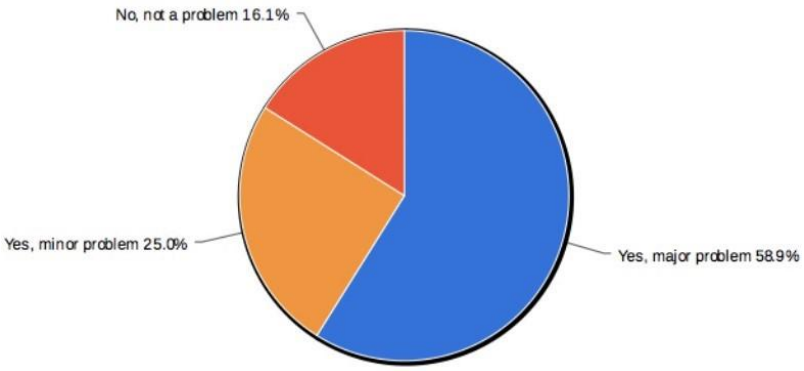

Figure 1 Access to funding
Mulvenna, M., Martin, S., McDade, D., Beamish, E., de Oliveira, A., & Kivilehto, A. (2011). TRAIL Living Labs Survey 2011: A survey of the ENoLL living labs. Ulster University

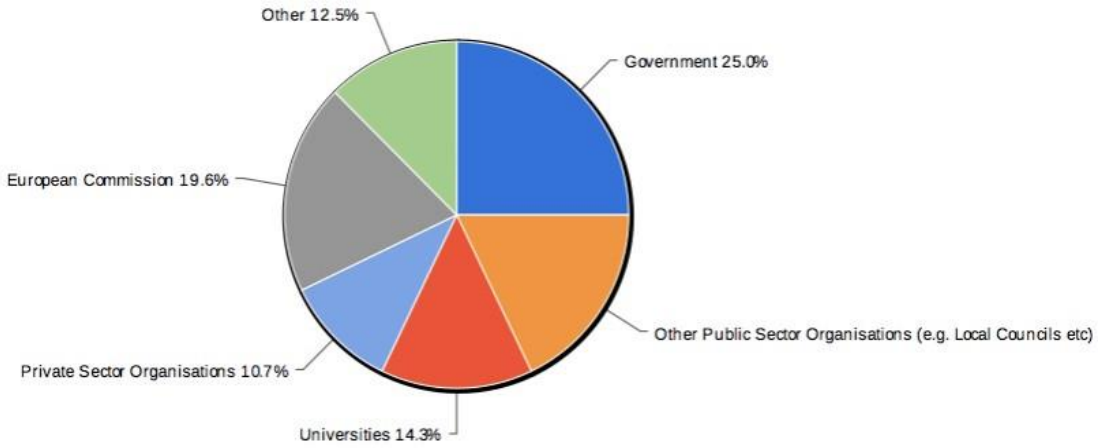

Figure 2 Source of funding
Mulvenna, M., Martin, S., McDade, D., Beamish, E., de Oliveira, A., & Kivilehto, A. (2011). TRAIL Living Labs Survey 2011: A survey of the ENoLL living labs. Ulster University

A crucial aspect for Soil LLs & LHs to attract investments is to create, deliver, and capture value effectively. It is essential for these LLs to to engage different stakeholders, clearly communicating to each of them how they operate and how they create value, distinguishing themselves from other initiatives and increasing their chances of securing funding. BMs describe the way to identify and create value, providing a high-level framework that outlines how a business or organization operates and becomes sustainable.

A BM is not only a framework for how an organization creates value but also a cognitive tool through which decisions are evaluated and economic gains is achieved. This is particularly significant for open innovation, which relies on managed knowledge flows across boundaries involving diverse stakeholders. These stakeholders must navigate and reconcile divergent interests to produce successful compromises. Open innovation inherently induces tensions between *value creation*, which necessitates openness, and *value capture*, which requires more protective processes (Chesbrough & Rosenbloom, 2002). LLs, as intermediaries between different stakeholders are at the heart of this tension (Fasshauer, 2020).

Capturing value from innovation is a key element of BM design. Technological innovation alone does not guarantee economic success. Successful innovators must offer compelling value propositions to consumers and/or users and establish profitable business systems to satisfy them with quality at acceptable prices. Of course, this makes management, entrepreneurship and BM design and implementation as important to economic growth as technological innovation itself. But the more radical the innovation, and the more challenging the revenue architecture, the greater the changes likely to be required to traditional BMs (Teece, 2010).

While public funding is often the initial financing option, it does not ensure long-term viability. Moreover, public subsidy programs increasingly require a revenue share from private sources, posing a risk due to their temporary nature. But the main risk is that this can lead to a rush for funding, potentially causing deviations from the initial LL goals. The sustainability of LLs depends on their ability to become autonomous and generate sufficient income from the services and solutions provided (Gualandi & L. Romme, 2019; Fasshauer, 2020).

LLs produce significant environmental, social, and economic impacts, strengthening social cohesion. However, identifying and measuring the social value of LLs remains challenging. They often act as intermediaries, producing knowledge integrated into innovative products and services marketed by stakeholders. This necessitates new management principles to account for the value produced in revenues and the equitable sharing of this value among stakeholders (Fasshauer, 2020).

The key challenge for LLs is to exploit the economic and public value they generate to ensure revenue streams for financial sustainability. Creating economic viability involves aligning the internal processes of a LL with the needs of external stakeholders to generate and share revenues (Katzy, 2012). Often, the optimal BM may not be apparent initially, requiring learning and adjustments. In fact, new BMs are provisional solutions to user needs, likely to evolve over time with further technological or organizational innovations (Teece, 2010).

2.2.1 The Value Proposition – Economic, Business, and Public Value

Much has been said about the importance of BMs to create and capture value. Echoing Gualandi & L. Romme (2019), the value created by a LL may vary in terms of the nature of this value and the actors affected. Hence, to better understand and direct the LL's activities, it is helpful to understand the nature of the value the LL aims at. They adopt a framework that differentiates between economic, business and public value, as follows:

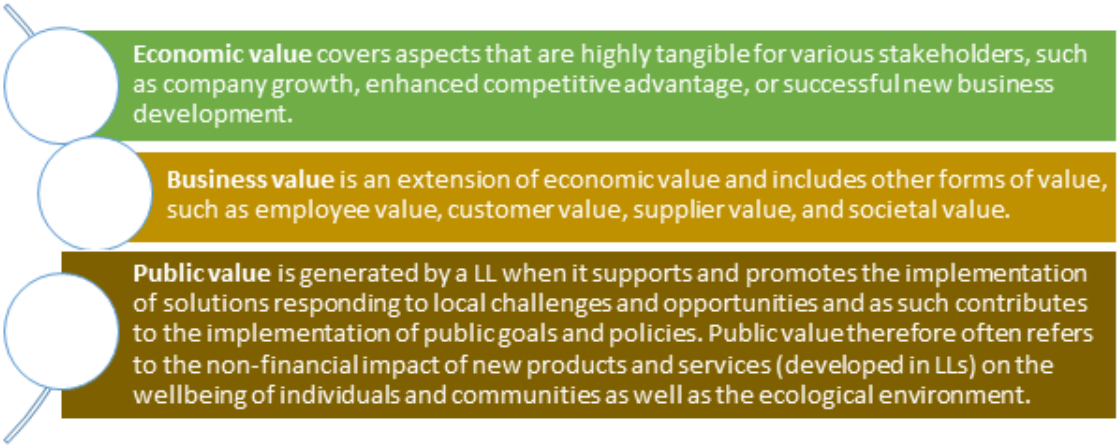

Figure 3 Values' framework
Gualandi, E., & Romme, A. G. L. (2019). How to make living labs more financially sustainable? Case studies in Italy and the Netherlands. Engineering Management Research

While public value is often considered to be the most important deliverable arising from LLs, also in the case of those addressing soil health issues, it is also more difficult to define and measure than its economic and business counterparts. LLs dedicated to public value can therefore effectively increase cohesion in society (Schuurman et al., 2016) and improve the behaviour of users regarding issues like environmental awareness.

Indeed, if the primary value created by Soil LLs is of public nature, they need also to aim at creating economic and business value to strengthen their sustainability. Moreover, LLs need to explicitly classify the kind of value created in order to better define their strategies, as they are very different in nature, also in terms of the actors affected, comprising users, customers, and stakeholders, as clarified in subchapter 2.3.4 The LivingLab BMC (Liaison).

2.3 Business Model Canvas

A widely recognized and extensively utilized framework for BMs is the business model canvas (BMC). This strategic management tool aids entrepreneurs, managers, and organizations in visualizing, designing, and innovating their BMs (Santonen et al., 2024). In contrast, other BM tools are often more detailed and lengthier, which can make them cumbersome and less adaptable to change. In addition, they may not offer the same level of visual clarity and ease of use as the BMC, making them less effective for brainstorming and collaboration. Overall, the BMC stands out for its simplicity, comprehensiveness, and ability to facilitate strategic discussions and innovation. For these reasons the BMC has been considered as the most appropriate tool to design BMs (Maurya, 2012a; Moskovitz, 2020a; Osterwalder & Pigneur, 2010a).

Several benefits are next described about what the BMC offers compared to other BM tools:

- **Simplicity and clarity**: the BMC provides a one-page overview of the entire BM, making it easy to understand and communicate. It breaks down the business into nine essential components, which are visually represented on a single canvas.
- **Holistic view**: it offers a comprehensive view of the business, encompassing all critical aspects such as value propositions, customer segments, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure. This holistic perspective helps ensure that no important elements are overlooked.
- **Flexibility and adaptability**: the BMC is highly flexible and can be easily updated and modified as the business evolves. This adaptability is crucial for startups and businesses operating in dynamic environments where changes are frequent.
- **Visual and collaborative tool**: the visual nature of the BMC makes it a powerful tool for brainstorming and collaboration. Teams can work together to fill out the canvas, fostering communication and idea sharing. This collaborative approach often leads to more innovative and robust BMs.
- **Focus on value proposition**: by emphasizing the value proposition, the BMC helps businesses to clearly define what makes them unique and how they deliver value to their customers. This focus is essential for differentiating the business in competitive markets.
- **Customer-centric approach**: the BMC places significant emphasis on understanding customer segments and tailoring value propositions to meet their needs. This customer-centric approach ensures that businesses are aligned with market demands and customer preferences.
- **Efficiency and speed**: creating a BM using the BMC is relatively quick compared to more detailed and lengthy BPs. This efficiency is particularly beneficial for LLs who need to iterate rapidly and test their assumptions.
- **Strategic alignment**: the BMC helps align the strategic vision of the company with its operational activities. By mapping out the key components of the business, it becomes easier to ensure that all aspects are working towards the same goals and objectives.

- **Facilitates innovation**: the BMC encourages creativity and innovation by allowing teams to experiment with different BM configurations. This experimentation can lead to the discovery of new opportunities and revenue streams.
- **Better risk management**: by providing a clear overview of the business, the BMC helps identify potential risks and challenges early on. This foresight allows businesses to develop strategies to mitigate risks and navigate uncertainties more effectively.

Still, it must be noted that the original proposal for a BMC was not born nor entirely suited to the specific context and objectives of LLs. Over the years, various configurations of the canvas have been developed to address different needs. These configurations are explored in the following subchapters, analysing their differences and strengths, and understanding the reasoning and processes that led to the development of the LivingLab BMC (LIAISON) by Bertolin in 2018.

2.3.1 The BMC by Osterwalder

The original BMC developed by Alexander Osterwalder in 2006 comprises nine critical elements that define, describe, and analyze BMs (Osterwalder & Pigneur, 2010):

1. **Customer Segments**: identifies and categorizes the different groups of people or organizations an enterprise aims to reach and serve, emphasizing the importance of understanding each segment's needs.
2. **Value Proposition**: articulates the bundle of products and services that create value for a specific customer segment, detailing how a company addresses problems or fulfils customer needs.
3. **Channels**: details how a company communicates with and reaches its customer segments to deliver its value proposition, encompassing communication, distribution, and sales channels.
4. **Customer Relationships**: describes the types of relationships a company establishes with its customer segments, ranging from personal assistance to automated services.
5. **Revenue Streams**: identifies the sources of cash flow from each customer segment, including transaction-based (one-time payments) and recurring (subscriptions) revenue streams.
6. **Key Resources**: lists the most important assets required to make the BM work, including physical, intellectual, human, and financial resources.
7. **Key Activities**: highlights the critical actions a company must undertake to operate successfully, such as production, problem-solving, and platform/network maintenance.
8. **Key Partnerships**: defines the network of suppliers and partners essential to the BM, including strategic alliances, joint ventures, and buyer-supplier relationships.
9. **Cost Structure**: outlines all costs involved in operating the BM, covering fixed and variable costs, economies of scale, and economies of scope.

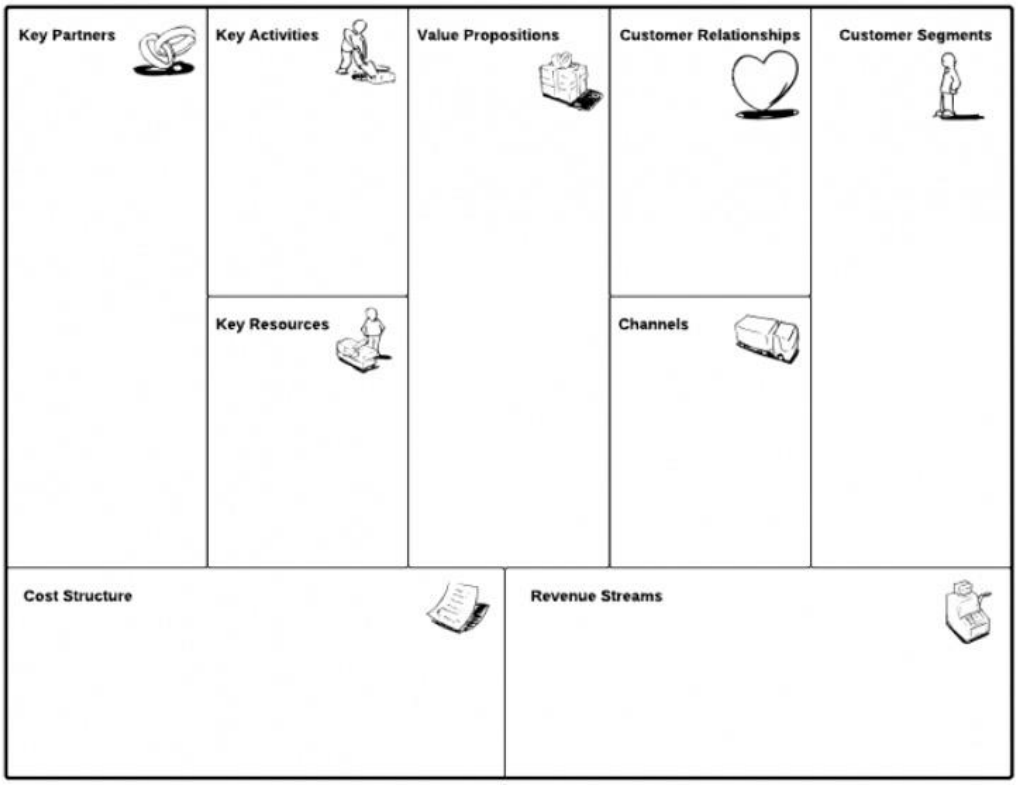

Figure 4 The BMC by Osterwalder
Osterwalder, A., & Pigneur, Y. (2010). Business Model Generation: a handbook for visionaries, game changers, and challengers. (10). John Wiley & Sons, Inc.

By integrating these elements, that cover the four main areas of a business, namely customer, offer, infrastructure and financial viability, this canvas provides a comprehensive and strategic approach on how operations work, identifies areas for improvement, and innovates ways to deliver value to customers and/or users. It is a dynamic tool that can be adjusted as the business environment and market conditions change (Osterwalder & Pigneur, 2010).

2.3.2 The Lean BMC

Ash Maurya developed a variation of the BMC called the "Lean Canvas" (Maurya, 2012). The Lean Canvas is specifically tailored for startups and focuses on problem-solving and early-stage customer validation. Indeed, with respect to the Osterwalder BMC, Maurya replaced the four elements “Customer relationships”, “Key resources”, “Key activities”, “Key partnerships” with:

- **Problem**: identifies the main problems that the target customer segments face. This section helps ensure the startup is addressing a real and significant issue.
- **Solution**: outlines the main features or solutions that address the identified problems. This element focuses on the minimal viable product needed to solve the problems effectively.
- **Key Metrics**: defines the key performance indicators (KPIs) that will be used to measure the startup's success and track progress. These metrics are crucial for making data-driven decisions.

- **Unfair Advantage**: identifies the unique advantage that cannot be easily copied or bought by competitors. This could include proprietary technology, unique insights, a strong brand, or a unique BM.

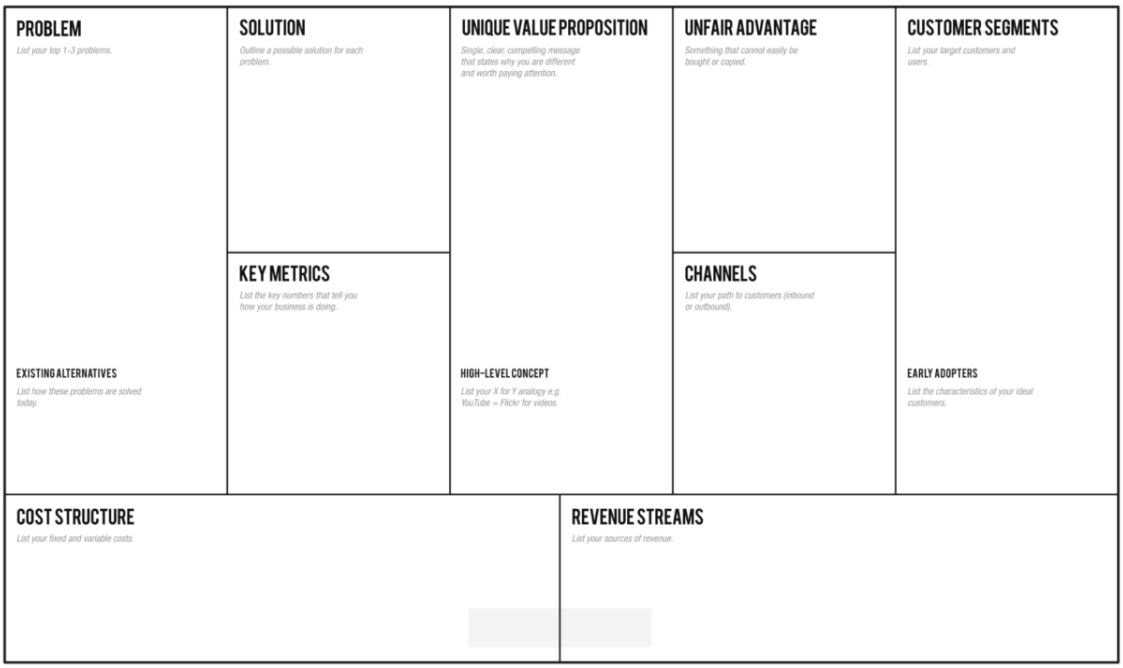

Figure 5 The Lean BMC
Maurya, Ash (2012), Running LEAN, Iterate from Plan A to a Plan That Works, O'Reilly Media, Inc.

The LEAN Canvas thus offers a focused approach, addressing the specific needs and challenges of startups by emphasizing critical factors for early-stage success.

2.3.3 The Social Lean BMC

Later in 2013, Yeoman and Mokovitz developed a specialized BMC for social entrepreneurs, called the "Social LEAN Canvas" (Moskovitz, 2020). This adaptation integrates social and environmental objectives alongside financial goals, reflecting the dual mission of social enterprises. It incorporates all the elements from the Lean Canvas, while also addressing the unique needs and goals of social enterprises by adding two crucial components:

- **Purpose**: clearly defines the venture's mission in terms of the social or environmental problems it aims to solve.
- **Impact**: this unique block focuses on the measurable social and environmental outcomes the enterprise aims to achieve. It emphasizes the importance of tracking and reporting impact to stakeholders.

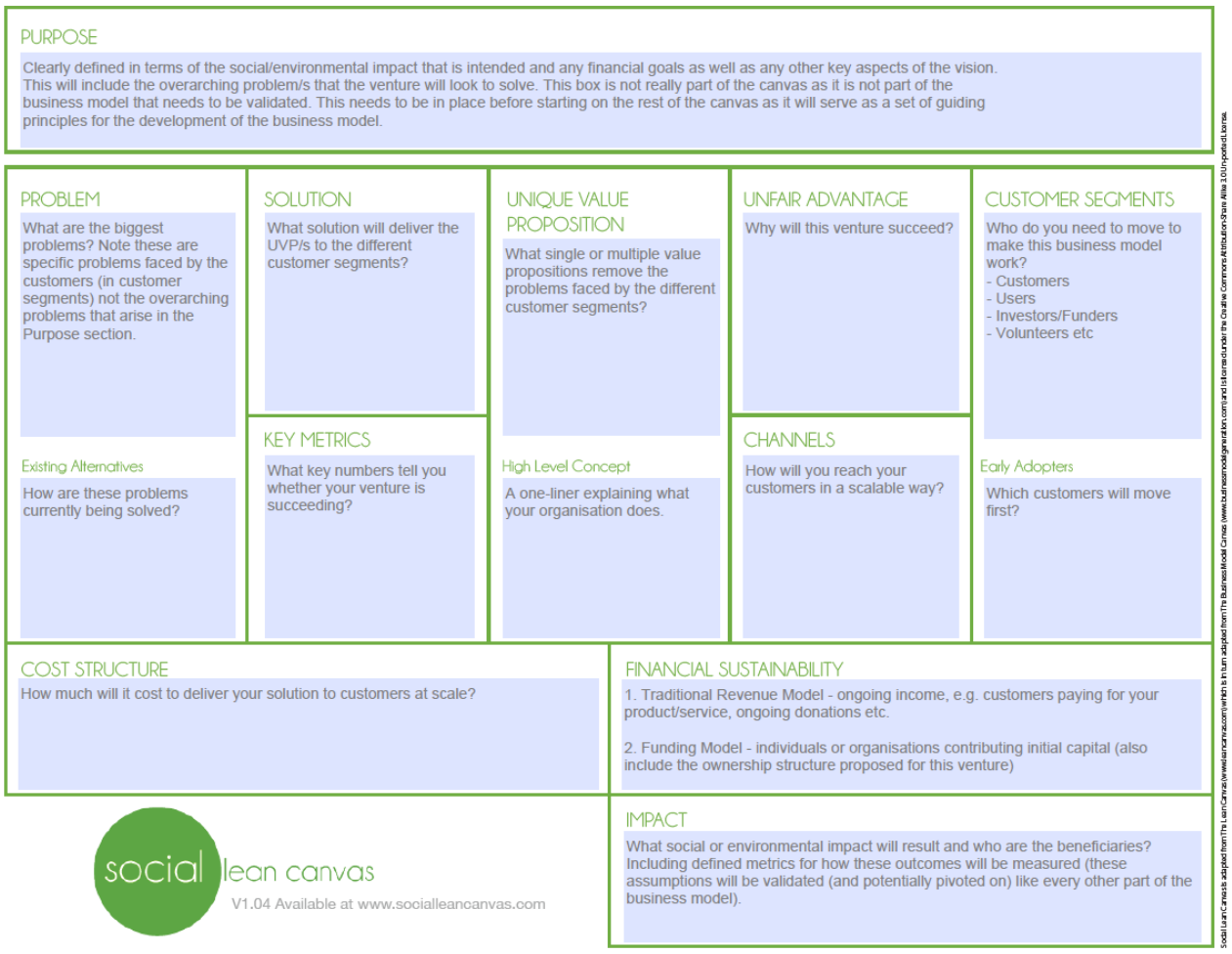

Figure 6 The Social Lean Canvas
Moskovitz, D. (2020, May 29)

The Yeoman and Moskovitz Canvas assists social entrepreneurs in balancing financial sustainability with their social and environmental objectives. It serves as a strategic tool for designing, communicating, and refining BMs that create positive change while ensuring economic viability (Moskovitz, 2020).

In conclusion, the BMC and its variations provide frameworks for designing, visualizing, and innovating BMs. These frameworks serve as dynamic tools for a wide range of enterprises, from startups to social ventures, providing strategic guidance on how to create, deliver, and capture value. By leveraging these models, businesses and organizations can better communicate their operations, differentiate themselves in the market, and achieve long-term sustainability.

2.3.4 The LivingLab BMC (Liaison)

While all BMCs offer valuable tools for various types of entrepreneurs, none are specifically designed for a LL context. Despite some commonalities with the Lean Canvas – such as addressing problems, solutions, key metrics, and impact –, key characteristics of LLs remained unrepresented, particularly

on the collaborative co-creation processes that involve a diverse range of stakeholders, inherent to the nature of LLs.

To fill this gap, Bertolin developed the LivingLab BMC (Liaison) in 2018 (Bertolin, 2023). This model, fully deployed in chapter

4. Business Model Canvas for Soil LLs & LHs with additions that evolves to the PREPSOIL BMC for Soil LLs, is specifically tailored to the LL environment. A key characteristic of LLs, absent in other BMCs, is their role as orchestrators of the Quadruple Helix (QH) stakeholders within innovation ecosystems (ENoLL, 2023; Schuurman, 2015). To address this, Bertolin introduced the "Key Stakeholder" box. Stakeholders here include individuals and organizations (from the QH) involved in the strategy of the LL and management of its activities. They might not benefit directly from the solution developed by the LL, but have a vested interest on it. Each stakeholder group has unique interests, concerns, and expectations regarding the LL's performance, activities, and impacts. Understanding and effectively managing relationships with key stakeholders is essential for building trust, fostering collaboration, and mitigating risks. By considering the needs and perspectives of all stakeholders, LLs can make informed decisions, enhance accountability, and create value that benefits both the organization and its broader ecosystem.

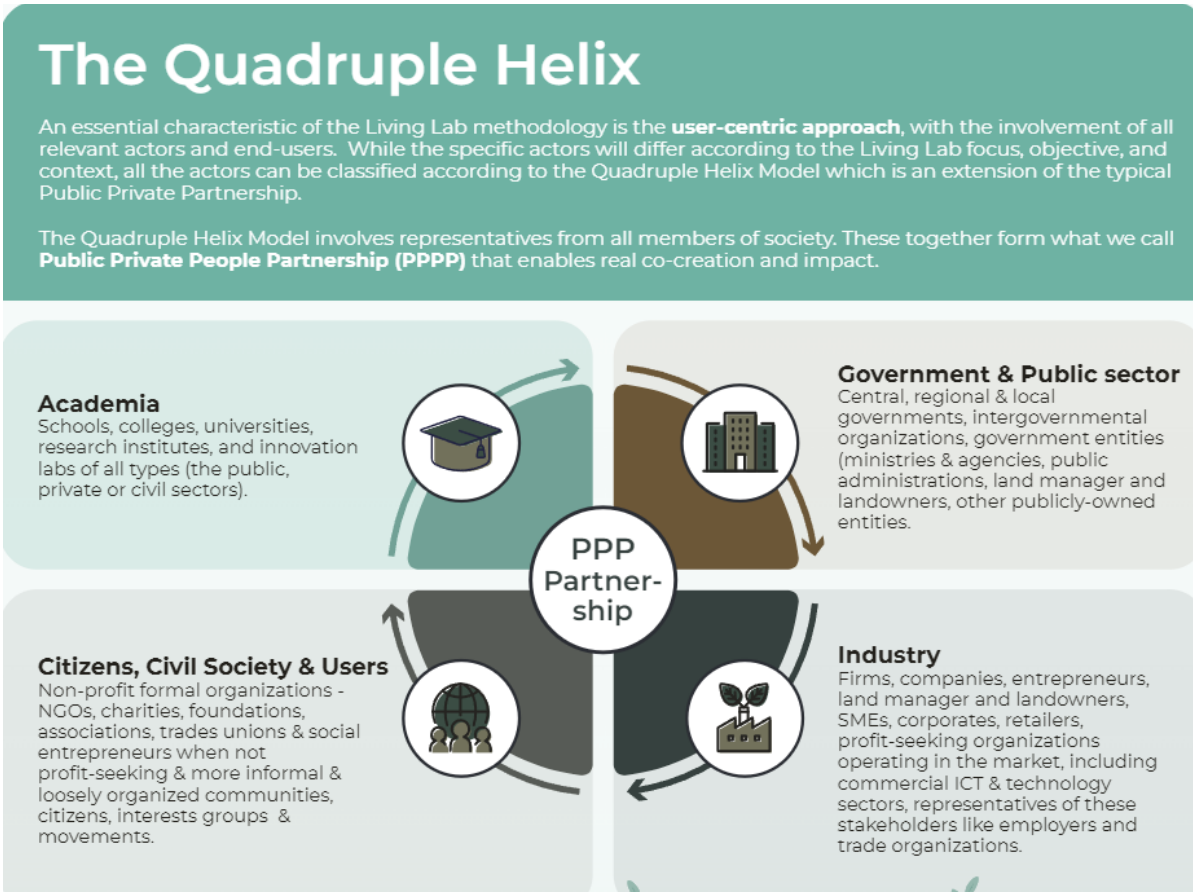

Figure 7 The Quadruple Helix model
NATI00NS project[4]

LLs are characterized by active user involvement, real-life experimentation, and an innovation process rooted in co-creation. They ensure that user feedback is not only gathered but also integrated throughout the entire innovation lifecycle (ENoLL, 2023). As this iterative co-creation process is

[4] NATI00NS, *National engagement activities to support the launch of the Mission "A Soil Deal for Europe" 100 Living Labs and Lighthouses*, GA 101090738, https://cordis.europa.eu/project/id/101090738

missing in the other canvases, Bertolin added two key boxes: "User Segments" and "User Engagement."

"User Segments" encompass all individuals or organizations that the LL targets as its primary users, to be involved in the LL research and co-creation activities. Users can be stakeholders of the LL or external to the LL organization. Moreover, it is important to note that not all QH actors need to be involved in every activity of the LL. Their level of participation and time commitment can vary depending on the specific needs of the innovation process at different stages (Leminen et al., 2012).

"User Engagement" refers to the strategies and initiatives employed by a LL to interact with and involve its users. This involves creating meaningful opportunities for participation, ensuring that users are actively contributing to and shaping the innovation process.

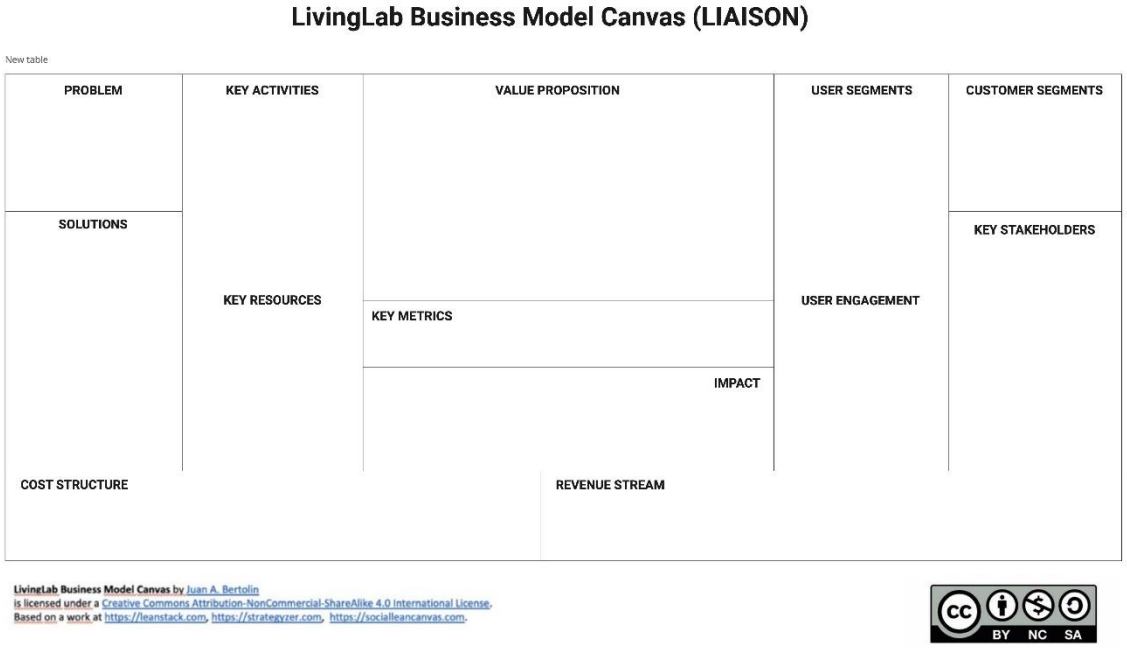

Figure 8 The LivingLab BMC (Liaison)

Thus, the LivingLab BMC (Liaison) is composed of thirteen elements:

1. **Problems**: identifies the main problems that the LL would like to address. This section helps ensure the LL is tackling a real and significant issue. By understanding, addressing, and leveraging problems effectively, LLs can unlock new opportunities for growth and create sustainable value for stakeholders.
2. **Solutions**: outlines the main features or solutions that address the identified problems. Solutions form the backbone of a BM, serving as the means by which LL deliver value to their stakeholders and achieve their objectives.
3. **Value Proposition**: represents the promise of value that a LL provides to its stakeholders. It articulates the specific benefits and advantages that differentiate the LL's solutions or services from competitors and addresses the needs or desires of the target groups. A compelling value

proposition communicates how the LL's offerings solve stakeholders' problems, fulfil their needs, or create positive outcomes, ultimately driving stakeholder engagement.

4. **Key Stakeholders**: they are the individuals or groups (from QH) who have a vested interest in the success and outcomes of the LL. They are involved in the strategy of the LL and organization of its activities. They might not benefit directly from the solution developed by the LL, but have a vested interest on it. Each stakeholder group has unique interests, concerns, and expectations regarding the LL's performance, activities, and impacts. Understanding and effectively managing relationships with key stakeholders is essential for building trust, fostering collaboration, and mitigating risks. By considering the needs and perspectives of all stakeholders, LLs can make informed decisions, enhance accountability, and create value that benefits both the organization and its broader ecosystem.
5. **User Engagement:** user engagement refers to the strategies and initiatives employed by a LL to interact with and involve its users. Effective user engagement fosters stronger relationships, enhances user satisfaction, and drives loyalty, ultimately leading to increased retention and advocacy.
6. **User Segments**: they are the specific groups of individuals or entities that the LL targets as its primary users, to be involved in the LL research and co-creation activities. Users can be key stakeholders of the LL or actors externals to the LL organization. Understanding the user segments is crucial for tailoring strategies and user experiences to meet the unique requirements and preferences of each group.
7. **Customer Segments**: defines the different groups of people or organizations that will purchase the products or uptake the solutions of the LL at the end of the innovation process. They can be either stakeholders or users of the LL, or completely external to the LL and its activities, still interested in the product or solution developed. Therefore, it's essential to identify and understand the needs of each segment
8. **Key Activities:** describes the most important actions a LL must take to operate successfully. Key activities can include production, problem-solving, platform/network maintenance, etc.
9. **Key Resources**: key resources in a BM represent the critical assets, both tangible and intangible, that enable a LL to operate and compete effectively. These resources can include physical assets such as facilities, equipment, and inventory, as well as intellectual property, technology, human capital, and strategic partnerships. Key resources provide the foundation for product development, service delivery, and customer engagement, and they contribute to the LL's unique value proposition and competitive advantage.
10. **Key Metrics**: key metrics refers to the quantitative measures used to assess the performance and success of the LL.
11. **Impact**: impact refers to the broader consequences and effects of the LL's activities on various stakeholders and the environment. The impact element of a BM encompasses the social, environmental, and economic outcomes resulting from the LL's operations and decisions. By prioritizing responsible and sustainable practices, LLs can maximize positive impact while minimizing negative repercussions.
12. **Cost Structure**: cost structure in a BM refers to the breakdown of expenses incurred by a LL in its operations. It outlines the various expenses involved in running the LL and delivering its

solutions or services. These costs can include both fixed costs (such as rent, salaries, and utilities) and variable costs (such as materials, production, and distribution). Understanding the cost structure is essential for assessing profitability, managing expenses, and making strategic decisions.

13. **Revenue Streams**: the revenue stream of a BM outlines the different channels through which the LL earns revenue. This can include sales of physical products, subscription fees, licensing, advertising, or any other monetization methods. Understanding the revenue streams is essential for determining the profitability and sustainability of the BM.

The LivingLab BMC (Liaison) has been tailored to reflect the specific environment of LLs, providing a comprehensive and practical framework for fostering innovation, collaboration, and sustainable value creation. This specialized tool not only bridges the gap left by traditional canvases but also enhances the ability of LLs to achieve their objectives effectively. Consequently, the LivingLab BMC (Liaison) stands as the premier choice for advancing the development of guidance BMs for Soil LLs.

3. Methodology

T4.3 Model business Plans for living labs & lighthouses, in which this deliverable is embedded, aims to design a spectrum of BMs needed for the upscaling of LLs & LHs in different soil use types beyond the lifetime of the Mission Soil.

Discussions and analysis with T4.3 partners and during a workshop with LLs (see 3.1 Workshop with soil health related Living Labs), the difference between BPs and BMs have been carefully assessed to best identify the best guidance tool for LLs and LHs. As outlined in the introduction, it has been agreed that T4.3 should focus on BMs, given their overarching framework nature that evolve with changing circumstances. In turn, BPs draw detailed operational and financial strategies, and heavily rely on specific circumstances.

Alongside, discussions have been put in place to understand the focus of T4.3 work on LLs, LHs or both actors. What has emerged, it's the importance to start the BM analysis from the LLs point of view given the higher literature available and also the more complex structures and nature of LLs that, in the majority of cases, include LHs in their ecosystem. Nevertheless, the approach has then expanded to both LLs and LHs to ensure the development of solutions and valuable guidance for both initiatives.

The methodology put in place has been constituted by three phases – understand, co-design, evaluate – to collaboratively spur the reflection. Following the LL approach, these feedback loops are essential, as the co-design and evaluate phases bring back to the evolving understand phase.

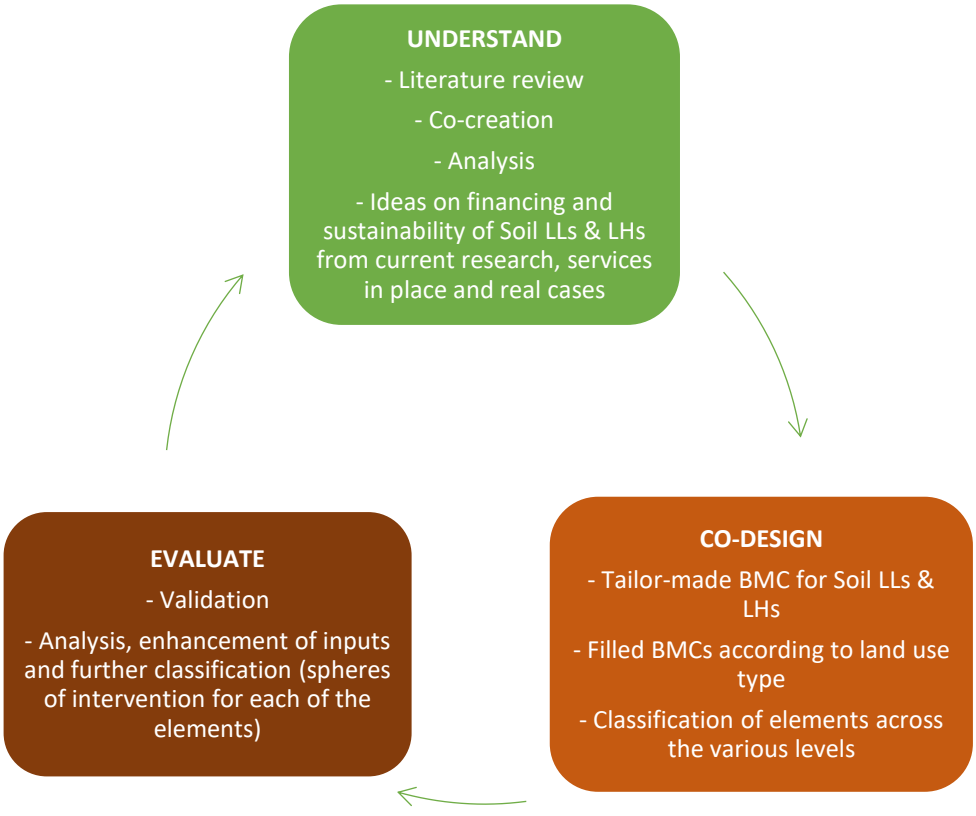

Figure 9 PREPSOIL methodology for Soil LLs & LHs BMs

Understand. A mixed methods approach was adopted. This pphase involved at first a critical evaluation of existing research and practices on LLs and BMs from the literature review, as well as an assessment of available tools for designing BMs. Then, this phase focused on co-understanding with LLs that address soil health to identify inputs for deploying BMs. The results of the co-creation exercise were then analyzed. Finally, ideas on financing and the sustainability of Soil LLs and Living Labs (LHs) were derived from current research, existing services, and real-world cases.

Co-design. The co-design phase with LLs resulted in a tailor-made BMC, and a range of items to configurate the BMCs. Along with PREPSOIL contributing partners, the inputs were classified across various levels, if they were related to all LLs regardless of the focus topic wise, if only common to all SHLLs, or if specific to a particular land use type.

Evaluate. The last phase aimed at validating results from the co-design phase with partners of the SoilValues EU project and analyse and enhance the inputs for the BMs for consistency. A further clustering was implemented with the spheres of intervention for each of the elements contained in the BMCs. A final analysis was performed by ENoLL, that led again to the understand phase.

Besides the literature review, included in

Business Model literature, next is described each of the activities that led to the PREPSOIL BMC for Soil LLs & LHs, and the proposed BMs per land use type.

3.1 Workshop with soil health related Living Labs

A hybrid workshop was organized in Brussels in October 2023 with LLs engaged in soil health across Europe. The aim was to discuss on the concept of BMs and BPs and their utility to ensure long-term financial sustainability. The workshop hosted 17 managers and those involved in the operations and financial planning from 15 LLs, as well as 12 participants from 7 PREPSOIL partner organizations, among which 1 is a LL.

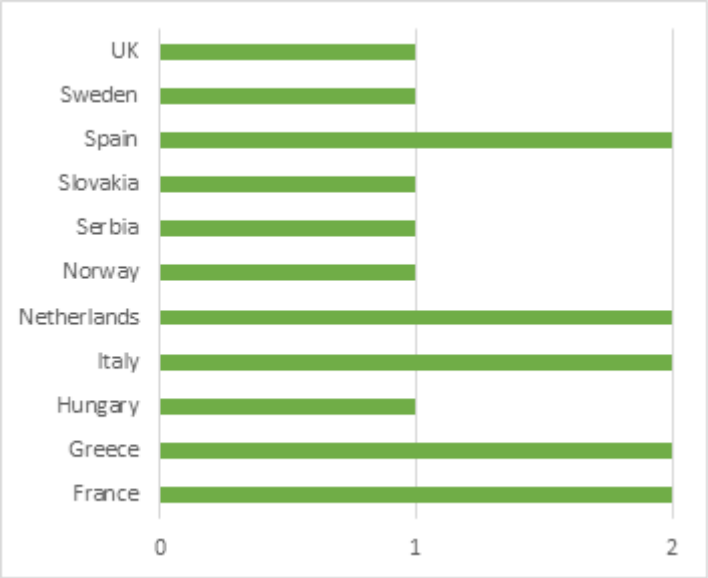

Figure 10 Origin of the participating LLs

Figure 11 Participants at the PREPSOIL workshop on BMs

The LivingLab BMC (Liaison) was presented, and inputs were collected for the different elements according to the land use type (agriculture, forestry, post-industrial, peri-urban), resulting in the completion of 6 canvases, outlined in

4. Business Model Canvas for Soil LLs &LHs. After discussions, participants expressed the need to include a new element that directly addresses the environmental risks, given the paramount importance of such for Soil LLs & LHs.

3.2 Development of a tailor-made BMC for Soil Living Labs and Lighthouses

Based on the inputs and feedback collected during the workshop with LLs and PREPSOIL contributing partners, one new element was incorporated to the LivingLab BMC (Liaison), environmental risks. In this context, **environmental risks** in a BM for Soil LLs refer to natural events and external factors that can jeopardize the achievement of the LL's objectives. These risks include, on the one hand, adverse climate conditions, water scarcity, pollution, biodiversity loss, invasive species, and other environmental changes that could negatively impact the effectiveness of soil health initiatives. On the other, environmental regulatory and policy changes with a negative financial impact on the LL. They are environmental related external factors that are often beyond the direct control of the LL management team but must be identified and mitigation strategies developed to minimize its impact if it does occur.

3.3 Analysis and enhancement of inputs

PREPSOIL contributing partners were assigned with different elements of the BMC for Soil LLs according to expertise on the specific land use type. Feedback was collected and thus first inputs retained, clustered, and others removed after analysis. Beyond the items identified in the workshop with LLs, others were retrieved from sources such as the needs and drivers of change mapped for different land use types in PREPSOIL (Bayer et al., 2023), the literature review, results thrown by NATI00NS (Larson, 2024; Morello & de Franco, 2024; Munkholm & ten Damme, 2024; Siebielec, 2024) and proposals by PREPSOIL contributing partners in T4.3.

Initially, six land-use types were identified in PREPSOIL WP2: agriculture, forestry, industry, mixed, natural, and urban. However, for the support actions aimed at LLs and LHs in PREPSOIL, the focus has narrowed to four key categories, outlined briefly below. More detailed information can be found in PREPSOIL D4.1 ”Report on LL/LH taxonomy, identification and mapping feeding the online interactive atlas”.

To ensure consistency in the services and guidance tools provided by PREPSOIL for LLs and LHs (including the taxonomy of Soil LLs and LHs and the service package) as well as to the support and training material provided by the NATI00NS project to LLs and LHs applicants[5], this document is structured around these four land-use types:

- Agriculture: including (non)perennial cropland, grassland and agroforestry as identified in PREPSOIL WP2 (Bayer et al., 2023).
- Forestry/Natural: forestry has been merged with natural to form the combined category of "forestry/natural." This decision aligns with NATI00NS, which consolidates "natural" with "forestry" to streamline categorization (as detailed in NATI00NS's D3.1, "Overarching Event Plan with Guidelines for Event Organisers").

[5] NATI00NS, *National engagement activities to support the launch of the Mission ”A Soil Deal for Eurpe” 100 Living Labsa nd Lighthouses*, GA 101090738, https://cordis.europa.eu/project/id/101090738

- (Peri-)Urban: this category encompasses areas on the periphery of urban centres, significant for soil health due to unique environmental interactions and human activities.
- (Post-)Industrial: retained to cover areas with a history of industrial use or transitioning from industrial activities.

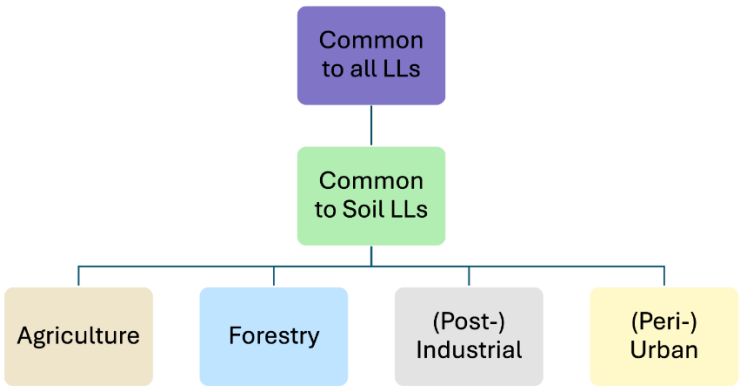

Figure 12 Focus of the LL topic wise

3.4 Validation of results

The BMC for Soil LLs was presented online at the SoilValues EU project Consortium Meeting in April 2024. Project partners had the expertise to provide informed feedback on the results the BMCs for Soil LLs were taking shape.

The workshop accounted for a total of 33 participants among soil scientists and practitioners, all partners of the SoilValues project, of which 14 came from Belgium, 7 from Poland, 3 from the Netherlands, 2 from Denmark, Germany, Portugal and Serbia respectively, and 1 from Spain, as showcased in the graph below. Specific elements of the canvas were assigned to groups, and inputs were validated, new ones collected, and others discussed.

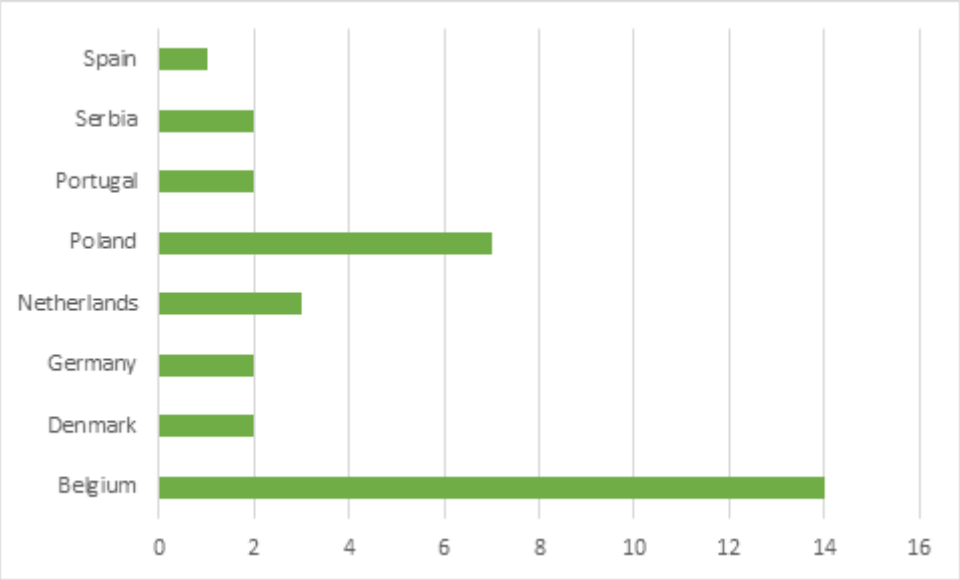

Figure 13 Origin of the participants in the validation workshop

3.5 Final analysis

Further classification was introduced according to the nature of the inputs, clustering them as spheres of intervention for each of the elements of the canvas.

First cluster refers to the elements of the Soil LLs & LHs BMC:

PREPSOIL Business Model Canvas for LLs & LHs in the Mission Soil

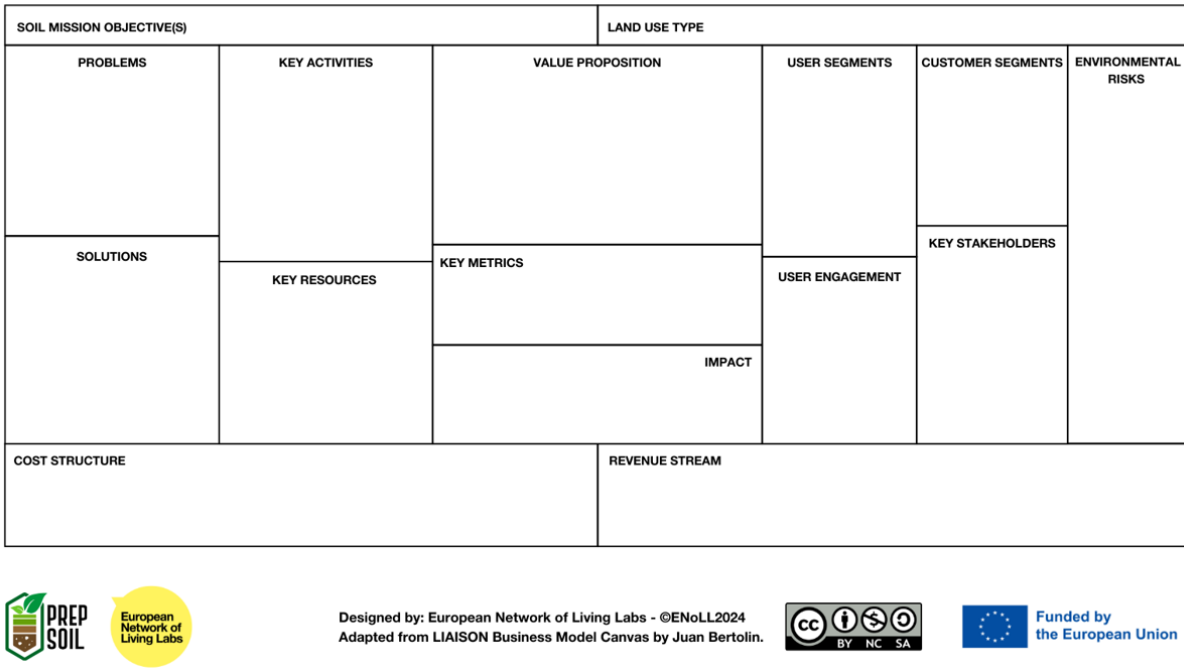

Figure 14 Elements of the Soil LLs & LHs BMC
(Click here for a higher resolution image)

Second cluster connects to the focus of the LL, as showcased in figure 12, classifying the items if connected to all LLs regardless of their field of intervention, if only to all SHLLs, or if specific to each of the four land-use types (agricultural, forestry, (post-)industrial, or (peri-)urban).

The third classification relates the items to spheres of intervention within each of the elements:

PREPSOIL Business Model Canvas for LLs & LHs in the Mission Soil

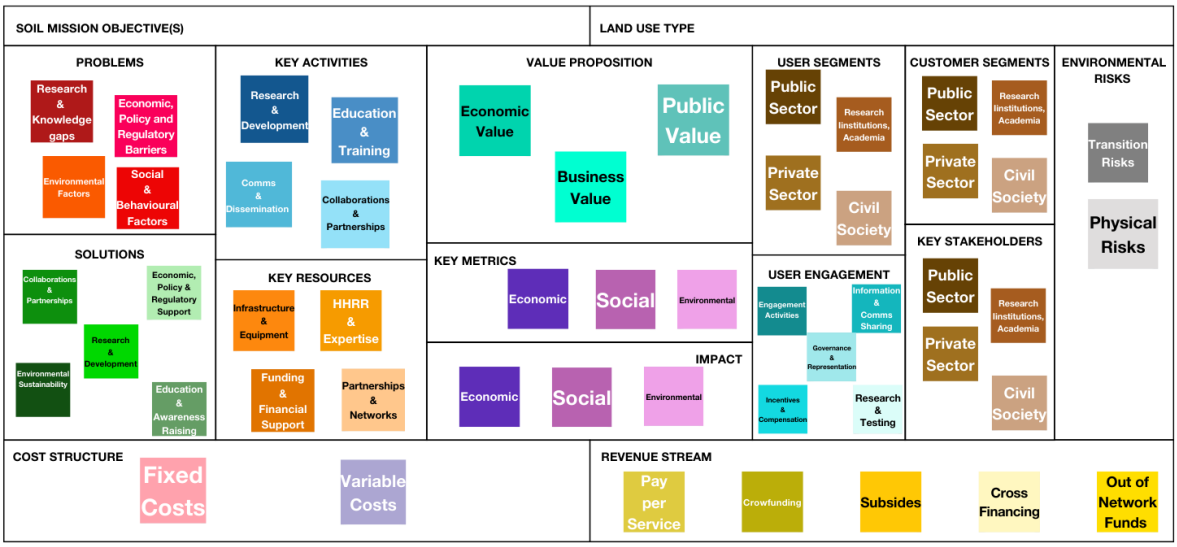

Figure 15 Spheres of intervention of the Soil LLs & LHs BMC
(Click here for a higher resolution image)

4. Business Model Canvas for Soil LLs and LHs

This chapter outlines the PREPSOIL BMCs for Soil LLs & LHs. The structure of the BMC is first presented, with particular clarification of the elements and spheres of intervention foreseen for environmental risks and revenue streams. Next, guidance on how to complete the BMC is provided, followed by the items identified for each of the elements and classified according to the focus of the LL. This page must be visited to have a full overview of the BMCs.

As already outlined, items for each of the elements of the PREPSOIL BMCs for Soil LLs & LHs have been classified within the so called spheres of intervention. The items listed should not be seen as exclusively belonging to the spheres they have been placed in because many of them are interconnected. Instead, the classifications highlight the main aspect each item is related to. The intention of the PREPSOIL BMC for Soil LLs is to support and inspire LLs to find a strategy for their long-term sustainability.

4.1 Structure of the Soil LLs & LHs BMC

The Soil LLs & LHs BMC contains 2 overarching components, 14 elements, and a range of spheres of interventions within each of the elements. The overarching components should describe the objective(s) the LL aims at, according to the Mission Soil Implementation plan, and the land use type in which the LL will operate. The elements and spheres of intervention are outlined next, with colours in accordance with the full spectrum of BMCs hosted here.

I. Mission Soil Objective(s): indicates the objective(s) that the LL will tackle in line with the EU strategy to ensure that all soil ecosystems in its territory are healthy and resilient by 2050. The Mission Soil Objective(s) is an overarching element within the BMC:

- Reduce desertification
- Conserve soil organic carbon stocks
- Stop soil sealing and increase the re-use of urban soils
- Reduce soil pollution and enhance restoration
- Prevent erosion
- Improve soil structure to enhance soil biodiversity
- Reduce the EU global footprint on soils
- Increase soil literacy in society

II. Land use type: presents the specific land use type that the LL will address. Main land use types:

- Agriculture
- Forestry
- (Post-)Industrial
- (Peri-)Urban

1. Problems: identifies the main problems that the LL would like to address. This section helps ensure the LL is tackling a real and significant issue. By understanding, addressing, and leveraging problems effectively, LLs can unlock new opportunities for growth and create sustainable value for stakeholders. Classification:

- Research & knowledge gaps

- Social & behavioural factors
- Economic, policy and regulatory barriers
- Environmental factors

2. Solutions: outlines the main features or solutions that address the identified problems. Solutions form the backbone of a BM, serving as the means by which LL deliver value to their stakeholders and achieve their objectives. Classification:

- Environmental sustainability
- Collaborations & partnerships
- Research & development
- Economic, policy & regulatory support
- Education & awareness raising

3. Value Proposition: represents the promise of value that a LL provides to its stakeholders. It articulates the specific benefits and advantages that differentiate the LL's solutions or services from competitors and addresses the needs or desires of the target groups. A compelling value proposition communicates how the LL's offerings solve stakeholders' problems, fulfil their needs, or create positive outcomes, ultimately driving stakeholder engagement. Classification:

- Economic value
- Business value
- Public value

4. Key Stakeholders: they are the individuals or groups with an interest in the LL and their participation is crucial to ensuring that the LL achieves its goals. Stakeholders can affect or be affected by the LL activities and outcomes. Stakeholders include, but are not limited to, customers and users. Each stakeholder group has unique interests, concerns, and expectations regarding the LL's performance, activities, outcomes and impacts. Understanding and effectively managing relationships with key stakeholders is essential for building trust, fostering collaboration, and mitigating risks. By considering the needs and perspectives of all stakeholders, LLs can make informed decisions, enhance accountability, and create value that benefits both the organization and its broader ecosystem. Classification:

- Public sector
- Private sector
- Research institutions & academia
- Civil society

5. User Segments: they refer to specific groups of individuals or entities involved in the LL co-creation activities. They benefit from the LL products, services and/or solutions (including data) at any stage of the innovation process. Users are among the LL key stakeholders. Understanding

user segments is crucial for tailoring strategies and user experiences to meet the unique requirements and preferences of each group. Classification:

- Public sector
- Private sector
- Research institutions, academia & other education
- Civil society

6. Customer Segments: define the different groups of people or organizations that will purchase or adopt the LL products, services and/or solutions (including data) at the end of the innovation process. These customers can be key stakeholders, users of the LL, or external to the LL and its activities but interested in the developed product, service or solution. Identifying and understanding the needs of each segment is essential for ensuring the LL's offerings are relevant and valuable to a diverse audience. Classification:

- Public sector
- Private sector
- Research institutions & academia
- Civil society

7. User Engagement: user engagement refers to the strategies and initiatives employed by a LL to interact with and involve its users. Effective user engagement fosters stronger relationships, enhances user satisfaction, and drives loyalty, ultimately leading to increased retention and advocacy. Classification:

- Engagement activities
- Information & communication sharing
- Incentives & compensation
- Governance & representation
- Research & testing

8. Key Activities: describes the most important actions a LL must take to operate successfully. Key activities may include knowledge production, problem-solving platform/network maintenance, etc. Classification:

- Research & development
- Education & training
- Communication & dissemination
- Collaboration & partnerships

9. Key Resources: key resources in a BM represent the critical assets, both tangible and intangible, that enable a LL to operate and compete effectively. These resources can include physical assets such as facilities, equipment, and inventory, as well as intellectual property, technology, human capital, and strategic partnerships. Key resources provide the foundation for product development, service delivery, and user/customer engagement, and they contribute to the LL's unique value proposition and competitive advantage. Classification:

- Funding & financial support
- HHRR & expertise
- Partnerships & networks
- Infrastructure & equipment

10. Key Metrics: key metrics relate to the quantitative measures used to assess the performance and success of the LL. Classification:

- Economic & business impact
- Social Impact
- Environmental impact

11. Impact: impact refers to the broader consequences and effects of the LL's activities on various stakeholders and the environment. The impact element of a BM encompasses the social, environmental, and economic outcomes resulting from the LL's operations and decisions. By prioritizing responsible and sustainable practices, LLs can maximize positive impact while minimizing negative repercussions. Classification:

- Social outcomes
- Environmental outcomes
- Economic outcomes

12. Environmental Risks: they refer to they refer to natural events and external factors that can jeopardize the achievement of the LL's objectives. These risks include, on the one hand, adverse climate conditions, water scarcity, pollution, biodiversity loss, invasive species, and other environmental changes that could negatively impact the effectiveness of soil health initiatives. On the other, environmental regulatory and policy changes with a negative financial impact on the LL, at least in its short-term. They are environmental related external related factors that are often beyond the direct control of the LL management team but must be identified and mitigation strategies developed to minimize its impact if it does occur. Classification:

- Physical risks
- Transition risks

13. Cost Structure: cost structure in a BM refers to the breakdown of expenses incurred by a LL in its operations. It outlines the various expenses involved in running the LL and delivering its solutions or services. These costs can include both fixed costs (such as rent, salaries, and utilities) and variable costs (such as materials, production, and distribution). Understanding the cost structure is essential for assessing profitability, managing expenses, and making strategic decisions. Classification:

- Fixed costs
- Variable costs

14. Revenue Stream: the revenue stream of a BM outlines the different channels through which the LL earns revenue. This can include sales of physical products, subscription fees, licensing, advertising, or any other monetization methods. Understanding the revenue streams is essential for determining the profitability and sustainability of the BM. Classification:

- Pay per service
- Subsidies
- Out of network funds
- Cross-financing
- Crowdfunding

4.1.1 Environmental Risks and Revenue Stream

Given the comprehensive nature of a BM for soil LLs and LHs, it is crucial to further clarify the environmental risks and revenue streams. Environmental risks pose significant threats to the sustainability and effectiveness of LL initiatives, especially those targeting soil health. Additionally, regulatory and policy changes can have substantial financial implications. Clear identification and mitigation strategies for these risks are essential for maintaining project viability and achieving long-term goals. On the other hand, a well-defined revenue stream is fundamental to the financial health of an LL. Understanding and optimizing revenue channels ensures that the LL can sustain its operations and continue delivering value to stakeholders. Clarifying these elements enhances the overall robustness and resilience of the LL BM.

As previously outlined, **Environmental Risks** in a BM for Soil LLs & LHs refer to external factors and natural events that can jeopardize the achievement of the LL's objectives. Two spheres of intervention for this domain have been proposed and are next described (adapted from the Guide on Climate-Related and Environmental Risks. Supervisory Expectations Relating to Risk Management and Disclosure, European Central Bank, 2020):

- **Physical risk** refers to the financial impact of climate change and environmental degradation, including extreme weather events and gradual changes. It encompasses issues like air, water, and land pollution, water stress, biodiversity loss, and deforestation. Physical risk is categorized as *acute* when it arises from events like droughts, floods, and storms, and *chronic* when it involves gradual shifts such as increasing temperatures, sea-level rise, and habitat

destruction. These risks can directly damage property or reduce productivity and indirectly disrupt supply chains

- **Transition risk** is here understood as the financial loss an institution may face due to the shift towards a lower-carbon and more environmentally sustainable economy. This risk can arise from the sudden implementation of climate and environmental policies and regulations. Such changes can directly or indirectly impact financial stability, necessitating careful planning and adaptation strategies for LLs to mitigate potential losses and capitalize on emerging opportunities.

About the **Revenue Stream**, understood as the different channels the LL can obtain incomes for their goals and operations, five spheres of intervention have been identified (Gualandi & Romme, 2019; Hong & Ryu, 2019):

- **Pay per service**: it is the most direct form of monetary revenue generated from the services provided by the LL. It represents the financial return from the economic value created. This economic value is mainly delivered to customers (e.g. business partners) who seek the LL's help in developing or enhancing their commercial products and services. As a result, the source of *pay per service* is predominantly private. However, occasionally, *pay per service* can also be generated from creating business or public value, shifting some of the revenues towards the public sector. The stakeholders contributing to *pay per service* are part of the LL's network and have been previously identified in the customer segment of the BMC. Importantly, *pay per service* is a funding option that is only available at the project level.
- **Subsidies**: they are the main source of funding provided by stakeholders, who offer subsidies to create public and business value. Generally, these stakeholders are committed to a long-term relationship with the LL, aiming to develop shared goals and objectives. Public value is delivered to citizens and stakeholders usually from the public sector or higher education, who compensate the LL with subsidies. Additionally, various public, educational, and business organizations receive specific forms of business value, which further justifies these subsidies. Therefore, subsidies are a revenue stream that primarily depends on public sources. It is also observed that this funding option is linked to the entire innovation process and operations of the LL.
- **Out of network funds**: the mission of a LL frequently aligns with the United Nations' sustainable development goals. Consequently, LLs can obtain funds by consistently submitting proposals to supranational (e.g. EU), national, and regional funding opportunities. Many LL projects relate to public policies, making open calls an attractive option for financing public value creation. These out of network funds are primarily provided by public bodies, thus mostly originating from public sources. Occasionally, calls may come from private entities such as banks, but these instances are rare. The public bodies offering these funds are not directly involved in the LL's network; their role is to grant proposals based on specific criteria. Ultimately, out of network funds resources support the LL's mission and are mainly related to the strategic level.
- **Cross-financing**: unlike the previous three revenue streams, cross-financing is not connected to the activities of the LL nor its immediate network. Instead, cross-financing is a different

approach to generating revenue from the LL's assets, such as its physical space or equipment. For instance, the LL can rent out part of its space to a bar, a co-working office, or temporarily for events, conferences, and meetings. Also, the LL can offer its equipment to external users for a rental fee. Therefore, the source of cross-financing is almost entirely private and separate from the LL's core activities.

- **Crowdfunding**: crowdfunding is a revenue stream that commonly leverages small contributions from a large number of individuals, typically via online platforms, to support the initiatives of the LL. Crowdfunding allows LLs to gather financial support from a diverse pool of backers, including both the general public and private entities. This approach not only helps in financing specific projects but also builds a community of stakeholders committed to the LL's goals of enhancing soil health and environmental stewardship. Moreover, given the primary public value of soil health initiatives, Hong & Ryu (2019) encourage fostering public-private partnerships, as the government involvement provides some type of accreditation that attests that crowdfunding projects truly aim to achieve public rather than private goals, ultimately improving citizens' trust in the projects.

4.2 How to complete the BMC for Soil LLs & LHs

Given the intermediary and orchestrator role of LLs, it is crucial that the BMC is developed, completed, and assessed collaboratively with all key stakeholders. Involving users, potential customers, and stakeholders from the QH in a co-creation exercise will foster a sense of ownership across the broader ecosystem and ensure that the model reflects the diverse needs and expectations of the entire community. This comprehensive engagement enhances the realism of the business model and increases its chances of success by aligning it closely with the goals and values of all actors within the Living Lab.

Filling in the BMC for Soil LLs involves a structured approach that logically builds on each component, ensuring this way that all elements align coherently to provide a comprehensive understanding of the BM. In the following image the numbers indicate the order in which the canvas can be completed:

PREPSOIL Business Model Canvas for LLs & LHs in the Mission Soil

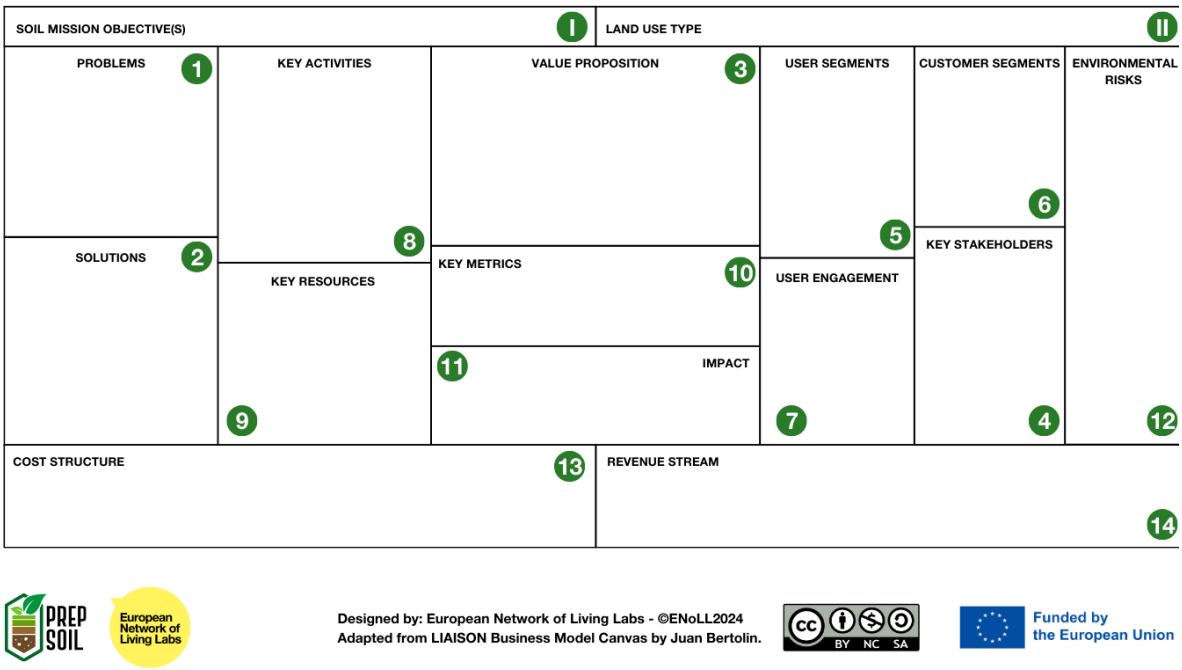

Figure 16 Order suggested to complete the Soil LLs & LHs BMC
(Click here for better visualization)

Before starting the exercise, the objective(s) pursued by Soil LLs & LHs according to the Mission Soil Implementation plan should be outlined (0). Also, the land use type (1) the LL intends to address with its intervention. This will provide for the overarching elements when completing the BMC.

Problems (2) and **solutions** (3) should be first identified. Understanding the problems is crucial, as they will point at the specific soil health issues that the LL intends to address, and challenges faced by users and stakeholders. In addition, at least for those projects funded under the Mission Soil, problems should relate with one or more of the Mission Objectives. Directly related, solutions are the response to the problems, as they establish how the Soil LL will address them. They provide clarity on the approaches and innovations to be implemented. Problems and solutions set the stage for the entire canvas.

After that, the **value proposition** (4) will articulate the unique benefits and value the Soil LL brings to its users. It should directly respond to the problems and solutions, making it clear why users and stakeholders should engage in the LL, on the one hand, and on the other provide a unique argument for funders, regardless of their nature, to invest in the LL.

Next step will identify the broader ecosystem in which the LL operates, distinguishing between **key stakeholders** (5)**, user segments** (6), and **customer segments** (7), and the strategies that will facilitate their engagement to the LL's activities and goals. These roles can be misunderstood, as they may be considered under a general understanding of *stakeholders* at large. Even though some roles may fit into the different elements of this matrix, it is important to differentiate them for each purpose, being

the users those who benefit from and interact with the Soil LL; the customers who will potentially be paying for the products, services and/or solutions proposed by the LL; and the stakeholders, including users and customers, as well as partners, funders, regulatory bodies, and community groups, those whose support and collaboration are often crucial for success. When the unique ecosystem for the particular Soil LL is clearly identified, effective **user engagement** (8) strategies should be outlined, as users will help in gathering feedback, ensuring adoption, and fostering a community around the soil health initiatives boosted by the LL.

In regard to stakeholders, Arnkil et al. (2014) speak of the Quadruple Helix (QH) approach, an innovation framework in which key societal actors from academia, industry, government, and civil society collaborate to drive innovation. The QH approach gains even more relevance for Soil LLs & LHs, given the interconnectedness of matters related to soil health.

Moving forward, the BMC will provide a roadmap for implementation by detailing the **key activities** (9) necessary to deliver the solutions and value proposition, as well as define and plan for the **key resources** (10) needed, both tangible and intangible, to ensure that these activities can be carried out.

Next, the BMC will establish **key metrics** (11). These metrics should relate to the value proposition and key activities, providing tangible indicators of progress and outcomes. They allow for measuring the impact of the LL, both short-term and long-term. Articulating the intended **impact** (12) helps understanding the broader significance of the LL. This includes environmental, economic, and social outcomes, and aligns with the overall mission and goals.

After outlining the previous elements, a Soil LL should identify **environmental risks** (13). Acknowledging that potential external environmental impacts are of high risk for the effectiveness of the activities performed by a Soil LL, and ultimately their goal, mitigation strategies should be established to reduce their impact in the event they happen.

Last, the cost structure and revenue stream must be defined. The **cost structure** (14) provides insight into the financial requirements and helps in budgeting and financial planning. It includes fixed and variable costs associated with running the LL. Whereas the **revenue stream** (15) clarifies how the LL will generate income or secure funding. It ensures sustainability and provides a financial model that supports the ongoing activities and impact of the LL.

By following this order, the BMC for Soil LLs builds logically from understanding the foundational problems and solutions to defining the operational and financial aspects. This approach ensures that each element aligns with and supports the previous components, creating a coherent and comprehensive BM.

4.3 The completed BMCs for Soil LLs & LHs according to land use types

As outlined in 4.1 Structure of the Soil LLs & LHs BMC, a range of items have been identified from the different activities conducted by PREPSOIL for the Soil LLs & LHs' BMs. They have been classified according to their applicability on the focus of the LL, meaning if the items are relevant for all LLs regardless of their scope topic wise; if common only to all LLs addressing soil issues without distinction of the land use type; if relevant only to agriculture; forestry; (post-)industrial; or (peri-)urban (see **¡Error! No se encuentra el origen de la referencia.**). As previously mentioned, it must be noted that LHs are implicitly included in this section, as LHs are supported by the BMs of the LLs they relate to.

As a result of the co-creation process outlined in Chapter 3. Methodology, the items here showcased, and the conclusions drawn for each of the elements of the BMC for Soil LLs do not intend to be understood as final statements, but as the results and conclusions based on the different activities performed by PREPSOIL for this aim. They should serve instead as guidance and inspiration for the design of BMs for Soil LLs, acknowledging the uniqueness of each of them in terms of the ambition, capacities, and context in which the LL operates.

Also, for clarification, at least those projects funded under the Mission Soil should include the objective(s) they are pursuing when designing their BMs, included in the Implementation Plan, as well as the land use type they aim to address. By doing so, Soil LLs will gain focus to deploy the BM onwards.

Next, the BMCs are presented, including a brief description of each element, the questions that need to be addressed, and the conclusions drawn from the mapped items. To have a full overview including the spheres of interventions, the following page should be visited.

1. Problems

Short description of the element: the main problems that the LL would like to address. This section helps ensure the LL is tackling a real and significant issue. By understanding, addressing, and leveraging problems effectively, LLs can unlock new opportunities for growth and create sustainable value for stakeholders.

Questions to be addressed: What are the main soil health problem(s) or related one(s) that your LL would like to address? These are specific problems within the territory your LL operates.

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Sunk investments in unsustainable practices	Complexity to address soil health issues due to path dependencies	Invasive plant species outcompete native vegetation, leading to soil degradation and reduced biodiversity	Historical waste deposits and contaminated sites can pose risks to their surroundings such as densely populated areas, ecosystems and cop production on arable land		
Bureaucracy and complex regulatory frameworks to secure funding	Land scarcity	40% of arable land suffering from soil erosion	Resilience on monocultures as pests is increasing in coniferous monocultural production systems	Combination of challenges related to multifunctionality of land use and variability of challenges (e.g. contamination, resource use, sealing of land, etc. under the pressures of climate change)	
Lack of evidence-based data proved by R&D results	The EU CAP does not take into account the particular and local characteristics and needs of different territories and regions	Reduced yields caused by low biodiversity, compaction of soil, reduced humus layer, and erosions	Heavy foot traffic and improper waste disposal from ecotourism activities compact soil and introduce pollutants, degrading soil health	Negative social and environmental impacts due to industrial activities causing contamination and degradation, including reduced agricultural productivity and health risks to local communities	Urban development leads to soil compaction, contamination, and loss of green spaces, negatively impacting soil health and limiting community access to healthy environments and recreational areas
		High demand for monoculture crops driven by dietary preferences depletes soil nutrients and reduces soil health		Degradation of soil health and reduction of agricultural productivity due to poor water management practices by industrial activities,	

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
				resulting in soil salinization and waterlogging	
	Behaviours and habits of individuals that negatively affect soil health are difficult to change	Negative environmental impact of agri-food system		High energy costs for green houses	
	Between 60% and 70% of EU soils are unhealthy	Lack of a representative number of farmers in soil health projects and activities			
	Climate change (pollution, floods, heats, etc.)	Farmers discontent (low incomes, working conditions)			
		Reduced yields caused by some management practices			
		Scattered approach to solve the different issues			
		Short-term thinking			

Table 1 Items classified for Problems

Conclusions of key aspects mapped: most of the problems identified for a LL addressing soil health issues respond equally to environmental factors as well as social and behavioural considerations. Also relevant, in a medium range of importance, are matters related to economic, policy and regulatory barriers. Instead, research and knowledge gaps do not come up as a problem to be considered within a Soil LL BM.

2. Solutions

Short description of the element: solutions outline the main features that address the identified problems. Solutions form the backbone of a BM, serving as the means by which LL deliver value to their stakeholders and achieve their objectives

Questions to be addressed: What does your LL propose to address the identified problems? What makes your solution unique or innovative?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Develop PPP (Public-Private Partnerships) for funding	Increase soil health awareness knowledge and application of successful approaches	Putting precision agriculture in the service of soil health	Implement erosion prevention techniques to stabilize the soil and prevent nutrient loss (e.g. reforestation, planting cover crops, constructing terraces, and maintaining riparian buffers)	Reduce soil pollution by mitigating negative externalities (e.g. pollution, contaminations, emission) and enhance restoration	
Reconnect citizens and policymakers in real life settings	Run a LL with experimental set ups which include nature-based solutions and integrating mixed production	Stop soil sealing	Adapt forest management to climate change (drought, excessive water, fire) with diversification	Conserve and increase soil organic stocks	
Interact and co-create with stakeholders	Improve soil literacy in society	Improve soil structure to enhance soil biodiversity	Consider watershed relationships in agricultural and urban water management (irrigation, drainage)	Reduce the EU global footprint on soils	
Open the market to different customer segments	Changes in market preferences (increase the price of animal products that are almost organic with animal welfare, labelling, etc.)	Conserve soil organic carbon stocks	Invent new energy sources	Transit to healthy soils to facilitate the restoration of the natural system, and thereby its potential to deliver ecosystem services	Improve soil structure to enhance soil biodiversity

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
	Reverse of rural exodus and attention to rural renewal	Reduce desertification	Increase energy independence of farmers' own solar panels (e.g. small energy generators)	Use green, gentle and sustainable remediation	
	Balance land use, avoiding the overutilization of land close to the villages/cities while in remote areas they are abandoned	Reduce soil pollution and enhance restoration	Maintain ecosystem services provided by forest soils, essential for sustainable forest management	Use nature-based solutions and de-sealing where possible to limit excessive heat and rainfall	Transit to healthy soils to facilitate the restoration of the natural system, and thereby its potential to deliver ecosystem services
	Changes in land management (new ways to reduce live stocks, number and making farm still profitable, fair subsidies, carbon farming, etc.)	Prevent soil erosion by applying regenerative agricultural techniques	Conserve soil organic carbon stocks	Stop soil sealing & increase re-use of urban soils	
	Address key soil health related problems considering circular economy (e.g. implementing a system that converts agricultural waste - such as crop residues and animal manure - into organic fertilizers through composting or anaerobic digestion)	Promote the use of sustainable agri-practice to farmer community to minimise negative environmental impact	Reduce desertification	Support remediation in contamination sites and their surroundings, and transform (post-) industrial and brownfield land to other uses	Transform polluted, flooded and private owned brownfields into other uses (e.g. public parks, housing)
	Support climate change adaptation and awareness of higher flood, landslide, erosion, fire risks	Unified approach to the interrelated problems in agro-ecology system, involving all users, stakeholders and customers		Follow novel approaches in housing, which limit land take and soil sealing	
	To prevent hazards (presence of toxic and harmful elements) to reduce pollution and	Reconnect farmers, citizens and policymakers in real life settings		Incentivize transformations to enhance restorations through reclamation, regeneration, remediation, reuse, upcycle plans and projects	

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
	improve structure and biodiversity				
		Promote healthy organic / sustainably produced food through several initiatives involving food shops, restaurants, school and university canteens		Redirect spatial planning & design practices to support provision of ecosystem services	
		Acknowledge cultural identity, ownership, and a sense of belonging to an area		Support circularity in terms of sustainable, local and energy solutions (e.g. aquifer thermal energy storing, aqua thermal energy, geothermic heat, etc.)	
		Integrate agro-ecological principles with modern technologies in a systems approach		Regenerate economic activities in post-industrial areas	
		Invent new energy sources			
		Remove economic, policy and knowledge barriers to soil improving management			
		Redirect policy (CAP) to support provision of ecosystem services alongside production			
		Shorten logistic chain to increase the profit margin for farmers and improve wellbeing			
		Promote (sustainable) eco-tourism for economic diversification of the regions			
		Increase energy independence of farmers'			

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
		own solar panels (e.g. small energy generators)			
		Consider path dependencies and land use history			

Table 2 Items classified for Solutions

Conclusions of key aspects mapped: the solutions mostly identified relate to economic, policy and regulatory barriers, and matters directly connected to the environment. In a medium rage, solutions refer to collaboration and partnerships, and research and development. Those that point at education and awareness raising are the less commented.

3. Value Proposition

Short description of the element: the value proposition represents the promise of value that a LL provides to its stakeholders. It articulates the specific benefits and advantages that differentiate the LL's services or solutions from competitors and addresses the needs or desires of the target groups. A compelling value proposition communicates how the LL's offerings solve stakeholders' problems, fulfil their needs, or create positive outcomes, ultimately driving stakeholder engagement.

Questions to be addressed: What value does your LL deliver to its stakeholders, users and customers? Which of their needs is your LL satisfying? How does your product/service/solution benefit the stakeholders? Why should customers choose your LL over competitors?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
The LL methodology brings economic and financial advantages for businesses and organizations, as by	LLs offer a dynamic platform for pioneering climate-smart, sustainable soil management practices, essential for	Agricultural LLs accelerate the development of new solutions to tackle soil health problems by bringing	Forestry LLs have the potential to accelerate the development towards sustainable forest soil	Brownfield land is extremely important for environmental and ecosystem quality and human health. Involving	Urban LLs may transform city landscapes by revitalizing soil health through innovative green

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
operating through real-world testing and direct user involvement, it achieves significant cost reductions and maximize return on investment with faster market adoption and enhanced product and/or service quality. Delivering user-centric solutions drive sustainable growth and market leadership. Also, LLs develop innovative, low-cost solutions via collaborative co-creation, boosting operational efficiency and accelerating time-to-market	mitigating and adapting to climate change. By fostering collaborative innovation, LLs raise awareness and deepen knowledge about soil health, ensuring long-term environmental and social benefits. This approach stabilizes and increases local, healthy food production, enhancing climate resilience and supporting sustainable practices. Engaging stakeholders at all levels, LLs harness collective expertise to develop and adapt solutions tailored to local constraints, promoting soil biodiversity and conservation	together innovative farmers and citizens, researchers and companies. Solutions can for instance be new climate smart sustainable soil management practices to mitigate and/or adapt to climate change, or adaptations of existing practices needed to deal with local constraints. Further, a structured collaboration with potential investors as well as regulators and authorities fosters a faster development and upscaling of solutions and removal of barriers of their implementation	management by finding and developing solutions to tackle soil health issues. LLs do this by bringing together innovative forest owners, researchers, companies and citizens. LLs will a provide a platform for all levels of stakeholders to contribute with knowledge, experience and solutions. Solutions can for instance be new climate smart sustainable soil management practices to mitigate and/or adapt to climate change or to conserve soil biodiversity. Adaptation of existing practices needed to deal with local constraints	citizens, municipal administration, planners, land developers, researchers, and environmental officers in the LL co-creation processes might help to optimize the re-use of land in a way that involves soil information, soil ecosystem services, and risk management in the planning	infrastructure and community engagement. The LL can create sustainable, biodiverse urban environments that enhance water management, boost local food production, and foster healthier communities. By partnering with different stakeholders, cities can improve their resilience to climate change, increase property values, and provide their residents with attractive, functional green spaces that support both environmental and social well-being
L**Ls** provide access to cutting-edge technology and offer free testing environments, empowering innovation and accelerating the development of new solutions. They serve as experimentation, innovation, and demonstration spaces, bridging the gap between research communities and productive, social environments. By offering both physical and digital	LLs offer comprehensive support in utilizing advanced tools, significantly reducing risks in the prototype phase. By assisting SMEs with testing and development during their innovation processes, LLs enable the creation of smart soil health solutions and services. Through user panels, co-creation tools, and dedicated labs, they provide access to essential knowledge and networks, ensuring that innovations are robust,	LLs accelerate the development of innovative solutions to soil health challenges by uniting farmers, citizens, researchers, and companies. This collaboration fosters fair and sustainable, regionally produced food, while enhancing soil health and crucial ecosystem services such as climate change mitigation, flood prevention, and erosion control. By promoting agroecology and beneficial soil health practices, LLs boost soil biodiversity and fertility, reducing soil degradation in arable lands, grasslands, and forests. This approach not only creates sustainable livelihoods for farmers, especially younger generations, but also drives sustainable forest soil management, ensuring a resilient and healthy ecosystem for future generations		In many (post-) industrial regions, a substantial part of the land is still used as arable land. Elevated soil contaminants might pose a risk of food contamination. Therefore, alternative agricultural production and soil management practices must be proposed to farmers. They can be effectively developed only in a co-creation process with farmers and advisors to address environmental and socio-	

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
spaces, Living Labs foster social cohesion and support corporate social responsibility project-based activities, enabling diverse stakeholders to collaborate and drive impactful technological advancements. This holistic approach not only accelerates technological progress but also enhances community engagement and societal benefits	effective, and ready for market deployment. This collaborative approach empowers SMEs to develop high-quality solutions while minimizing risks and accelerating the path to success			economic barriers the transformation might face	

Table 3 Items classified for Value Proposition

Conclusions of key aspects mapped: incontestably, Soil LLs bring public value with their initiatives by promoting environmental sustainability, enhancing sustainable productivity, and fostering community engagement. Soil LLs serve as educational hubs, raising awareness and training stakeholders in sustainable practices, and acts as centres for research and innovation, advancing soil health technologies and methodologies. By informing policy and facilitating multi-stakeholder collaboration, LLs ensure integrated approaches to soil management, ultimately contributing to healthier ecosystems, more resilient communities, and social well-being. But they can also contribute with business value, in a lower range of relevance, when their proposition is based on LL methodologies, bringing economic and financial advantages for business and organizations by achieving cost reductions and maximizing return on investment with faster market adoption. The innovation boost that LLs offer is also noted within the business value they contribute with.

4. Key Stakeholders

Short description of the element: they are the individuals or groups with an interest in the LL and their participation is crucial to ensuring that the LL achieves its goals. Stakeholders can affect or be affected by the LL activities and outcomes. Stakeholders include, but are not limited to, customers and users. Each stakeholder group has unique interests, concerns, and expectations regarding the LL's performance, activities, outcomes and impacts. Understanding and effectively managing relationships with key stakeholders is essential for building trust, fostering collaboration, and mitigating risks. By considering the needs and perspectives of all stakeholders, LLs can make informed decisions, enhance accountability, and create value that benefits both the organization and its broader ecosystem.

Questions to be addressed: Who are the individuals or organizations that have an interest in your LL? How does each stakeholder impact your LL? What roles could they play in the LL activities?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Mainly local and regional authorities and agencies, but also national and European if a purpose	Decision-makers at local, regional, national and EU levels	Agribusiness companies (e.g. agricultural engineers, food engineers, manufacturers of seeds and inorganic fertilizers, retailers) and contractors	NGOs (nature conservation protection organizations), timber/paper companies	Spatial planners	Building/construction professionals (e.g. civil engineers, architects, real state), GIS specialists, urban planners
Political parties	Health authorities (public health, epidemiologists, etc.)	Cooperatives	Community and citizens representatives	Industrial landowners, land developers, environmental consultants, SMEs, farmers	Universities and research institutions - social sciences (e.g. anthropologists, economists, geographers, sociologists), physical sciences (e.g. agronomists, biologists, chemists, climatologists, geologists, epidemiologists, physicians)
Trade Unions	Green parties	Farmers and landowners	Landowners and forest managers, forest companies, forest owner associations, industries		Inhabitants (e.g. residents, tenants), civic groups (e.g. associations, cooperatives, NGOs), loosely organized

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
					groups (e.g. artists, designers, retailers, and local businesses), nature conservation groups, ad more informal interest groups of the communities
SMEs and startups	Environmental managers (disaster/risk and environmental managers)	Supermarkets	Researchers in forest and soil sciences, social science researchers		
Donors / Funders	Environmental consultants	Researchers (e.g. from private foundations, companies, innovative labs)			
Press	Land managers and landowners	Investors			
Non-Governmental Organizations	Researchers and professionals from sciences (environmental, social, and economy sciences)	NGOs (nature conservation and water protection organizations)			
Citizen groups and representatives, social movements, communities, informal interest groups, civil society at large	Soil advisors	Citizen groups, and movements (local, regional, and national)			
	Land users	Consumers			
		Agricultural advisors			

Table 4 Items classified for Key Stakeholders

Conclusions of key aspects mapped: support of stakeholders of the QH in the LL's operations are well understood as key for the success of Soil LLs, in line with any other type of LL. About those coming from the public sector, local and regional authorities are regarded as the most influential, but also policymakers at national and European if a specific purpose (e.g. the Common Agricultural Policy – CAP at European level). When it comes to research institutions and academia, a range of disciplines are considered as relevant, beyond the expertise of soil scientists. Those disciplines are included in the wider sciences and social sciences fields. About stakeholders of the private sector, they refer mainly to SMEs and startups, land managers and landowners, donors and funders, and the press. In turn, beyond communities and NGOs at large, stakeholders from civil society relate to NGOs engaged in nature conservation and associations of farmers.

5. User Segments

Short description of the element: they refer to specific groups of individuals or entities involved in the LL co-creation activities. They benefit from the LL products, services and/or solutions (including data) at any stage of the innovation process. Users are among the LL key stakeholders. Understanding user segments is crucial for tailoring strategies and user experiences to meet the unique requirements and preferences of each group.

Questions to be addressed: Who are the different users of your LL product/service/solution? What are the characteristics of each user segment? What specific needs does each user segment have? How will your LL tailor its solution to each user segment?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Government at local and regional levels, and advisory services	Soil research centres	Common Agricultural Policy - CAP advisors			
Academia and vocational education	Cooperatives	Farmers			
Students	Landowners				
SMEs and startups	Nature NGOs				
Corporations					
Industrial and technology companies					
Citizens, associations, and civil society organizations					

Table 5 Items classified for Users Segments

Conclusions of key aspects mapped: similar to the stakeholders, users from all the QH are taken into account. Local and regional authorities are spotted at the front when it comes to the public sector, as well as CAP advisors in a secondary order of relevance; a mix of researchers from sciences and social sciences

for research institutions and academia, but also users coming from other type of education (e.g. vocational), as teachers and students; SMEs, corporations, cooperatives, land owners and farmers from the private sector; and associations and nature NGOs from the civil society.

6. Customer Segments

Short description of the element: customer segments define the different groups of people or organizations that will purchase or adopt the LL products, services and solutions (including data) at the end of the innovation process. These customers can be key stakeholders, users of the LL, or external to the LL and its activities but interested in the developed product, service or solution. Identifying and understanding the needs of each segment is essential for ensuring the LL's offerings are relevant and valuable to a diverse audience.

Questions to be addressed: Who are your LL target customers? Who might be interested to purchase the product/service developed in the LL or uptake the solution?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Public administrations at national, regional and local levels		Agriculture advisory services			Food shops, supermarkets and restaurants
Industry and large companies		Farmers and associations of farmers			Products sellers and intermediaries
SMEs and startups		Food shops, supermarkets and restaurants			
Health institutes		Products sellers and intermediaries			
Universities and research organizations					

Table 6 Items classified for Customers Segments

Conclusions of key aspects mapped: alike stakeholders and users, customers segments identified include equally potential buyers of new products or and services developed within the Soil LL context from all sectors of the QH, as well as actors who may uptake the solutions proposed by the LL.

7. User Engagement

Short description of the element: user engagement refers to the strategies and initiatives employed by a LL to interact with and involve its users. Effective user engagement fosters stronger relationships, enhances user satisfaction, and drives loyalty, ultimately leading to increased retention and advocacy.

Questions to be addressed: How will your LL attract users to its the activities? What channels will your LL use to reach and engage them? What strategies will be put in place to retain and grow the LL user base?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Project and ideas contest for companies	Economic incentives for land owners	Research program connected to on-farm experiments			Activities at canteens and restaurants (e.g. menu with farmers)
(Digital) surveys	Raising awareness on how soil health could benefit land owners / managers	Activities at canteens and restaurants (e.g. menu with farmers)			Food tasting
Co-creation workshops, interviews and discussion groups	Politicians in on-site visits	Food tasting			
In-person events and networking		Involve advisors in education courses (e.g.in farm experimentations)			
Social activities (community building)		Demo farm visits			
Citizens / residents assemblies		Put farmers in the centre of the LL			
Digital platforms combined with regular presential events					
Print media and social media channels					
Continuous feedback and feedforward					

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Citizens' representatives in the management team					
User panel with diverse representation, active engagement, in real-life contexts, with iterative feedback among their members, and collaboration with stakeholders					
Compensation to participants for lost working hours					
Consideration of the different interests of the users and stakeholders involved					
Involvement of users in testing and research					
Propitiate simulation in labs					

Table 7 Items classified for User Engagement

Conclusions of key aspects mapped: unique engagement activities that respond to the specific context of the Soil LL, their initiatives and specific users are considered the most, while those related to information and communication sharing, incentives and compensations of users for their time invested in the LL's activities, governance and representation of users in the LL decision making mechanism, and research and testing activities as engagement strategy remain low in comparison.

8. Key Activities

Short description of the element: key activities include the most important actions a LL must take to operate successfully. Key activities can include production, problem-solving, platform/network maintenance, etc.

Questions to be addressed: What are the main activities your LL must perform to deliver the LL value proposition? What activities are crucial to achieve the solutions proposed by your LL?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Promotional and demo activities	Training for advisors	On farm step by step experimental set ups which include nature-based solutions, integrating mixed production systems like cover crops, no till, diversity over and underground, grazing strategies, holistic approaches, agroforestry, etc.	Conduct experiments and research on new methods and technologies for improving soil health in forestry settings	Test and discuss soil management limiting dispersion and transfer of contaminants to humans and the ecosystem, alternative crop production in the areas with elevated soil contaminants, land management, and planning to reduce negative effects	Co-create monitoring mechanisms on soil health and its effects on residents
Dissemination & upscaling of succesful solutions	Social awareness raising content and activities (formal, non-formal and informal), also by thinking out of the box (visits to demo sites or establish portable soil health showrooms)	Support experiments under real-life conditions in field experiments on research field stations and lighthouses farms	Partner with academic institutions, government agencies, and NGOs to implement and scale effective soil health practices	Develop innovative cost-effective, and non-invasive (to soil) sustainable, gentle and green remediation techniques	Create the occasions to grasp emerging demands on land use interventions, guiding both formal and informal practices
Development of tools	Demonstrate activities for soil health challenges	Initiate and support focused scientific work in controlled laboratories and field experiments	Provide workshops and training sessions for local communities and stakeholders on sustainable soil management practices	Develop sustainable and risk-based land management strategies involving soil health	Make the LL the platform where different expertise meets and collaborate to support policy decisions and interventions (e.g. identifying and monitoring the presence of toxic and harmful elements)
Research departing from existing one	Foster collaboration between landowners, managers and researchers	Develop business models for farmers willing to apply new ways for improving soil health	Work with policymakers to develop and promote regulations and incentives	Run experimental set ups which include nature-based solutions and the integration of mixed production	Bridge concrete stakes of urban users with practical solutions of different types

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
			that support soil health in forestry		of professionals, also in a cross-sectoral perspective
Testing, iterations as needed and reframing	Co-design processes to design more socio-economically sustainable solutions and overcome regulatory barriers	Pilot menu with local restaurants or canteens	Target young people with the goal to continue engaging on extensive livestock husbandry	Create the occasions to grasp emerging demands on land use interventions, guiding both formal and informal practices	Support and enhance communication activities, organizing thematic seminars, meetings, focus groups with professionals and the population
Real life testing	Expand citizen science projects	Help farmers to make their farms more profitable keeping natural essence		Co-creation of monitoring mechanisms on soil health and its effects on residents	Hands-on workshops where residents learn and participate in creating and maintaining green spaces, such as urban gardens and parks, focusing on techniques to improve soil health (e.g. composting, mulching, sustainable planting practices)
In house testing with users	More discussions with stakeholders of different nature on how tools can be improved from a soil point of view	Food-tasting trucks to promote consumption of local & sustainable food		Support community lead activities for a greening transition	
Training with stakeholders at local and regional levels	Conduct soil health assessments on a frequent basis	Foster collaboration between private partners (farmers, industry, etc.) and investors			Run experimental set ups which include nature-based solutions and the integration of mixed production
Postgraduate programmes	Provide access to training and cooperation among land users	Encourage young people to continue working on extensive livestock husbandry			Foster citizen science soil conservation programmes
Engagement in regional, national and international research & innovation projects		Integrate governmental regulators in the co-design process to design more socio-economically sustainable			

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
		solutions and overcome regulatory barriers			
Engagement of actors in the identification of common problems and agreement of solutions					
Partnership agreements with stakeholders					
Workshops at local and regional level					
Provide flexible, tailormade education, co-created with different stakeholders					
Other type of participatory activities					

Table 8 Items classified for Key Activities

Conclusions of key aspects mapped: co-creation activities and partnerships at the local and regional levels are the most mentioned, with involvement of users and stakeholders from the QH, particularly including landowners and applying a cross-sectoral approach. Research and development related activities are also well extensively brought up, with the need to count on experimental set ups in real life conditions, and research on new methods and technologies that can response to soil threats. Not as high ranked but still valued are activities related to education and training, and communication and dissemination for awareness raising.

9. Key Resources

Short description of the element: key resources in a BM represent the critical assets, both tangible and intangible, that enable a LL to operate and compete effectively. These resources can include physical assets such as facilities, equipment, and inventory, as well as intellectual property, technology, human capital,

and strategic partnerships. Key resources provide the foundation for product development, service delivery, and customer engagement, and they contribute to the LL's unique value proposition and competitive advantage.

Questions to be addressed: What resources, both tangible and intangible, does your LL need to conduct the activities?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Monetary and non-monetary support (knowledge, expertise, networks, etc.) with different organizations, public and private	Fields: experimental and demo sites for implementing and testing soil health practices	Agriculture and agrifood experts	Forestry experts	Green remediation expertise	
Know how about EU funds	Green Competence Centres				
In-kind contributions from universities and local administrations (e.g. staff, premises)	Social scientists, researchers, and field workers				
Networks	Methods for involving local communities and stakeholders in soil health initiatives				
Stakeholders at local and regional levels					
Political support					
Human capital of the LL					
Staff with futurists' expertise					
Staff with proposal writing and fundraising expertise					
Research and technical expertise					

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Staff with expertise in LL methodology					
Outreach and engagement plans					
Availability of testing and experimentation spaces					
Digital platforms					
Equipment					
Communication channels					
FabLab equipment and support					
Tools & prototypes					

Table 9 Items classified for Key Resources

Conclusions of key aspects mapped: beyond the funding and financial support to be able to operate the LL, human resources and expertise appears as the most crucial resource to run initiatives within the Soil LLs. Such expertise refers both to soil, in which the knowledge domain differs depending on the land use type the Soil LL addresses, and LL methodologies. Infrastructure and equipment are considered next as the most needed resource for the LL, including experimental and demo sites to conduct research. Last, partnerships and networks remain important as support of the LL regardless of the focus.

10. Key Metrics

Short description of the element: key metrics relate to the quantitative measures used to assess the performance and success of the LL.

Questions to be addressed: How will your LL measure the success of the initiative? Which metrics are most critical for understanding the performance of your LL? How will the LL track them?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Number of users of the LL	Number of landowners participating in the project	In case the LL counts on value chain analyses as part of the performance, number of restaurants, food shops and canteens involved, as well as number of products labelled to reward fair practices		Number of Ha. restored	
Number of people reskilling	Number of social awareness campaigns	Average increase in quality products and farm profitability		Tons of polluted soil cleaned-up	
Number of successful projects run by the LL	Ha of land in healthy conditions	Number of farmers using the LL			
Number of activities organized by the LL	Number of soil health indicators monitored	Number of demo farms as part of the experiment sites of a LL			
Number of stakeholders reached		Satisfaction rate of farmers			
Number of products, services and/or solutions created as a result of the work performed by the LL		Percentage of farms that have guaranteed their generational relay for sustainability and long-term thinking			
Increased engagement in social media		Number of farms practicing good soil practices (e.g. agroecology)			
Number of publications					
Increase of the well-being in the region					
Number of companies and organizations testing products, services, and methodologies of the LL					
Number of companies and organizations adopting the solutions proposed by the LL					

Table 10 Items classified for Key Metrics

Conclusions of key aspects mapped: metrics that primarily point at social benefits derived from the Soil LLs initiative are the most commented. Next comes equally those that intend to measure both environmental and economic and business impacts, the last mainly regarding local businesses and the profitability of farms that adopt solutions put forward by the LL.

11. Impact

Short description of the element: impact refers to the broader consequences and effects of the LL's activities on various stakeholders and the environment. The impact element of a BM encompasses the social, environmental, and economic outcomes resulting from the LL's operations and decisions. By prioritizing responsible and sustainable practices, LLs can maximize positive impact while minimizing negative repercussions.

Questions to be addressed: What is the intended social, environmental, and/or economic impact of your LL? How the key metrics you have chosen will help your LL measure the impact?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Effective social channels in place for collective decision making	Health risks reduced	Increased and more resilient food production and other systems linked to ecosystem services		Reduced exposure to soil contaminants, leading to improved public health outcomes	Improved soil fertility and structure through sustainable urban practices
Valorisation of stakeholders' knowledge	Improved landowner´s public image	Reduced environmental footprint of agri-food production (increased biodiversity and carbon in the soil)		Adoption of environmentally friendly industrial practices, reducing future soil degradation	Greater diversity of plant and animal life in urban areas
	Climate change mitigation	Citizens more connected to nature and sustainable food production		Increased agricultural productivity and potential cost savings from sustainable soil management	Enhanced green spaces contribute to better air quality and public health
	Increased biodiversity and beauty	Improve the social awareness on sustainable food		Informing and shaping policies that promote	Better water retention and reduced runoff, decreasing flood risks

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
				sustainable industrial and soil management practices	
		Resilient local value chains to share healthy and sustainable food			Increased urban resilience to climate change impacts through better soil and water management
		Farm profitability remains stable or increased			Hands-on learning experiences for residents and students about soil health and sustainability
		Create more value for farmers (e.g. income, wellbeing)			Informing and influencing urban planning and environmental policies
					Potential cost savings in stormwater management and increased property values

Table 11 Items classified for Impact

Conclusions of key aspects mapped: in the same vein than the key metrics, a majority of impacts identified in the BMC are connected to social outcomes, coming next those of an environmental nature, and last those that refer to economic outcomes.

12. Environmental Risks

Short description of the element: environmental risks refer to external factors and natural events that can jeopardize the achievement of the LL's objectives. These risks include adverse climate conditions, water scarcity, pollution, biodiversity loss, invasive species, and other environmental changes that could negatively impact the effectiveness of soil health initiatives. They are external environmental factors that are often beyond the direct control of the LL management team but must be identified and mitigation strategies developed to minimize its impact if it does occur.

Questions to be addressed: What are the potential environmental risks specific to your LL location and operations? How might these risks impact the LL soil health initiatives and overall operations? What strategies can the LL implement or adapt to or mitigate identified environmental risks?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
	Extreme weather events, like floods, droughts, and storms, can damage soil and infrastructure, leading to operational disruptions and increased costs				
	Gradual climate changes in temperature and precipitation patterns can affect soil health and crop yields, requiring long-term adaptation strategies				
	Water scarcity can affect irrigation practices, leading to reduced crop productivity and increased soil salinity				
	The loss of biodiversity can disrupt ecosystem services vital for soil health, such as nutrient cycling and pest control				
	New policies and regulations aimed at environmental protection can impact operational practices. Compliance may require investments in sustainable technologies and practices				

Table 12 Items classified for Environmental Risks

Conclusions of key aspects mapped: both physical risks and those regarding resource scarcity are equally considered as crucial factors that can jeopardize the operations and goals of Soil LLs, without distinction of their focus on land use type. Environmental risks should be looked at and mitigation measures planned beforehand in case they materialize.

13. Cost Structure

Short description of the element: cost structure in a BM refers to the breakdown of expenses incurred by a LL in its operations. It outlines the various expenses involved in running the LL and delivering its solutions or services. These costs can include both fixed costs (such as rent, salaries, and utilities) and variable costs (such as materials, production, and distribution). Understanding the cost structure is essential for assessing profitability, managing expenses, and making strategic decisions.

Questions to be addressed: What are the most significant costs in your BM? What fixed and variable costs will your LL incur to deliver the activities?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Infrastructure and maintenance	Soil assessments	Payment of incentives for involving farmers in activities and projects of the LL			
Office facilities	Dissemination actions on soil health with (portable) showrooms	Additional tools for on farm demo activities and events			
Equipment					
Staff					
Software / Hardware					
Data structure					
Overhead costs (utilities, legal advice, etc.)					

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Marketing and (internal and external) communication expenses					
Travel costs					
Publications					
Co-financing if applicable by the respective donor					
External moderators / facilitators					
Innovation costs (the investments and risks on the side of the companies)					
Experiments					
Incentives for stakeholders to participate					
Workshops / Meetings / Conferences / Courses					
Stipends and prizes					

Table 13 Items classified for Cost Structure

Conclusions of key aspects mapped: both fixed and variable costs remain equally important for the existence of the LL and the achievement of their goals. Specifically, for Soil LLs variable costs are considered to conduct soil assessments, particular tools for onsite demo activities, and incentives for involving farmers in activities and projects of the LL.

14. Revenue Stream

Short description of the element: the revenue stream of a BM outlines the different channels through which the LL earns revenue. This can include sales of physical products, subscription–fees, licensing, advertising, or any other monetization methods. Understanding the revenue streams is essential for determining the profitability and sustainability of the BM.

Questions to be addressed: How will your LL cover the cost structure and sustain its operations?

Feedback for Soil LLs & LHs:

All LLs	All Soil LLs	Agriculture	Forestry	(Post-)Industrial	(Peri-)Urban
Fees from test, workshops, projects, etc.	Sustainable project funds from banks and other businesses	If part of the LL, inflow of cash from pilot activities (e.g. food trucks, menus in restaurants and canteens)			
Advisory services	Green initiatives from the local government				
Organization of events					
Public funding (including local and regional innovation agencies)					
Sponsors & crowdsourcing					
In kind local government support (e.g. providing spaces, materials, etc.)					
Donations					
Project based public funding (regional, national, European)					
Project based private funding					
Social impact funds					
A percentage from production					
Service charge to companies for using the LL (physical space, equipment)					
LL membership					
Advertisements					

Table 14 Items classified for Environmental Risks

Conclusions of key aspects mapped: the revenue streams mostly brought into the Soil LLs BMC put down inflows equally from the pay per service modality, together with subsidies, primarily from local and regional governments, and out of network funds also at national and EU levels, as well as from the private sector. Inflow of funds from the cross-financing option remains the less mentioned, being such restricted to the direct local territory in which the LL is physically established.

4.4 How to read the BMCs for Soil LLs & LHs

This page must be visited to have a full overview of the PREPSOIL BMC for SHLLs, and both colour coding here presented crossed for a better understanding.

First, items classified in the spheres of intervention for each of the elements of the BMC have been coded with different colours:

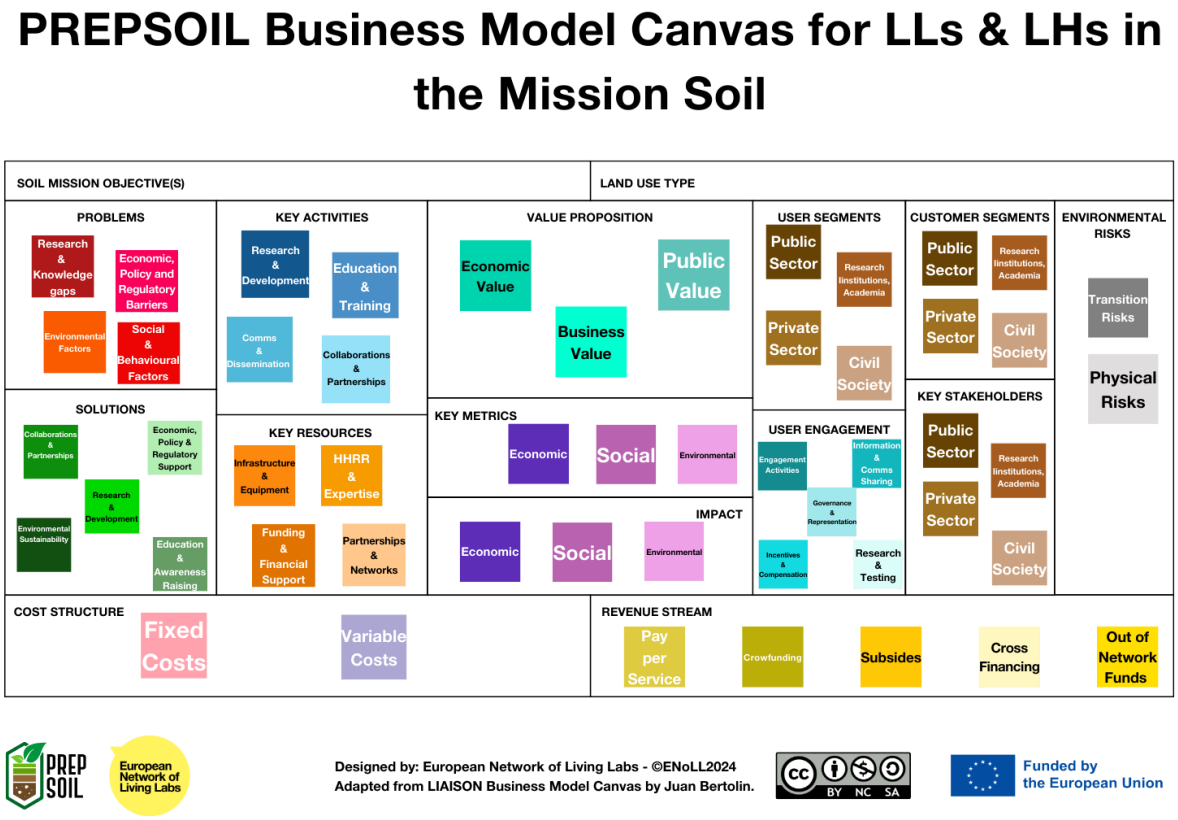

Figure 15 – Spheres of intervention of the Soil LL & LH BMC
(Click here for a higher resolution image, or refer to the **¡Error! No se encuentra el origen de la referencia.**)

PROBLEM	KEY ACTIVITIES	VALUE PROPOSITION	USER SEGMENTS	CUSTOMER SEGMENTS	ENVIRONMENTAL RISKS
Research & knowledge gaps	Research & development	Economic value	Public sector	Public sector	Transition risks
Social & behavioural factors	Education & training	Business value	Research institutions & academia	Research institutions & academia	
Economic, policy & regulatory barriers	Communication & dissemination	Public value	Private sector	Private sector	
Environmental factors	Collaboration & partnerships		Civil society	Civil society	
SOLUTIONS	**KEY RESOURCES**	**KEY METRICS**	**USER ENGAGEMENT**	**KEY STAKEHOLDERS**	
Environmental sustainability	Funding & financial support	Economic & business impact	Engagement activities	Public sector	
Education & awareness raising	Infrastructures & equipment	Social benefits	Information & communication sharing	Research institutions & academia	Physical risks
Collaborations & partnerships	HHRR & expertise	Environmental impact	Incentives and compensation	Private sector	
Research & development	Partnerships & networks	**IMPACT**	Governance & representation	Civil society	
Economic, policy, and regulatory support		Economic outcomes	Research & testing		
		Social outcomes			
		Environmental outcomes			

COST STRUCTURE	REVENUE STREAM		
Fixed costs	Crowdfunding	Subsidies	Cross-financing
Variable costs	Pay per Service	Out of Network Funds	

Figure 17 Colour coding of the spheres of intervention

Secondly, a different colour coding has been applied in the background to refer to the applicability of the LL topic wise:

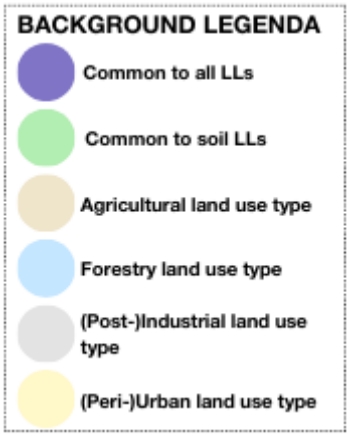

Table 15 Background legenda for the items classified according to the focus of the LL topic wise

If the result provides for six canvases, those items classified as common to all LLs and common to soil LLs must be included in the ones for each particular land use type, agriculture, forestry, (post-)industrial, and (peri-)urban.

5. Conclusions, recommendations and next steps

LLs & LHs have been entrusted to lead the transition toward healthy soils, but they must sustain their impact beyond the EU funding and secure long-term sustainability. BMs appear as an option to create, deliver, and capture value effectively, essential to attract investments. Clear communication of their operations and value creation is necessary to distinguish themselves from other initiatives and increase their chances to secure funding. BMs become meaningful tools in this process, providing frameworks for sustainability and detailed operational strategies.

The literature review reveals that BMs have transformed from a narrow profit-centric focus to a broader value creation logic. For Soil LLs, dynamically adapting their BMs in response to emerging opportunities or threats ensures that they can sustain their operations and continue to generate value for their stakeholders, the environment, and the society at large.

The BMC is a widely used tool for visualising and designing BMs. Its simplicity, clarity, and adaptability make it particular useful for the aim. The BMC proposed by PREPSOIL appears as a tailor-made tool for LLs & LHs to visualise and design BMs that address health soil concerns. The PREPSOIL BMC for Soil LLs departs from the LivingLab BMC (Liaison), that includes the actors' matrix intrinsic to LLs. After different exercises conducted by PREPSOIL partners internally, and externally with LLs and sister projects, it has evolved with the addition of a new element, the environmental risks that should be considered, inherent to any soil health initiative.

The success of the Mission Soil hinges on the ability of Soil LLs to develop sustainable BMs, secure diverse funding sources, and engage a wide range of stakeholders. The strategic integration of research, innovation, and policy, combined with regional approaches and effective knowledge transfer, will be key to achieving the mission's objectives and ensuring healthy and resilient soil ecosystems across Europe.

Based on the exercises conducted by PREPSOIL with the BMC for different land use types, here are key recommendations for enhancing the LLs BMs, and ultimately their long-term sustainability:

1. **Adopt a collaborative approach to ensure the effective development and implementation of the BMC**: this approach should encompass inclusive co-creation, by engaging users, potential customers, and stakeholders from the QH; diverse stakeholder participation, by ensuring that the BMC reflects the diverse needs and expectations of the entire community; realistic and aligned model, by aligning the BM closely with the goals and values of all stakeholders. This comprehensive engagement strategy will not only enhance the realism and practicality of the BM but also increase its likelihood of success by ensuring it meets the collective aspirations of the LL community.
2. **Diversify funding sources**: Soil LLs need to reduce their reliance on public funding by exploring alternative financing options such as hybrid incentive schemes, and compensation for ecosystem services. Public-Private Partnerships appear as a promising option.
3. **Leverage existing networks and partnerships**: strengthen collaborations with networks and partners to enhance awareness, capacity-building, and matchmaking among Soil LLs. These partnerships can facilitate the sharing of best practices and resources, contributing to more resilient BMs.

4. **Promote stakeholder engagement**: engage a wide range of stakeholders, including local communities, private sector entities, academic institutions, and non-governmental organizations. This engagement should be aimed at co-designing solutions, sharing knowledge, and ensuring the alignment of goals and strategies across different sectors.
5. **Implement robust governance structures**: establish strong multistakeholder governance frameworks that facilitate continuous adaptation and responsiveness to new challenges and opportunities in soil health management.
6. **Enhance value propositions**: clearly define and communicate the unique value propositions of the specific Soil LL. This involves highlighting the added value of the BM and the benefits of healthy soils, such as improved agricultural productivity, enhanced biodiversity, and climate resilience, to attract broader support and investment.
7. **Utilize economic valuation of ecosystem services**: incorporate economic valuation methods to quantify the benefits of ecosystem services provided by healthy soils. This approach can help in making a compelling case for investment and support from both public and private sectors.
8. **Facilitate knowledge exchange and capacity building**: consider activities to disseminate best practices, lessons learned, and innovative approaches among Soil LLs.
9. **Regular monitoring and evaluation**: implement continuous monitoring and evaluation processes to assess the effectiveness of the BMs and strategies employed. This will help in identifying areas for improvement and ensuring that the Soil LL remains adaptive and resilient over time.

Onwards, the PREPSOIL BMC will be included in the service package of T4.4 along with other resources, to increase the performance and accelerate the maturity of Soil LLs & LHs. These resources will be transferred to SOILL-Startup for the support of the Mission Soil as well as for the growth and upscale of emerging LLs & LHs initiatives.

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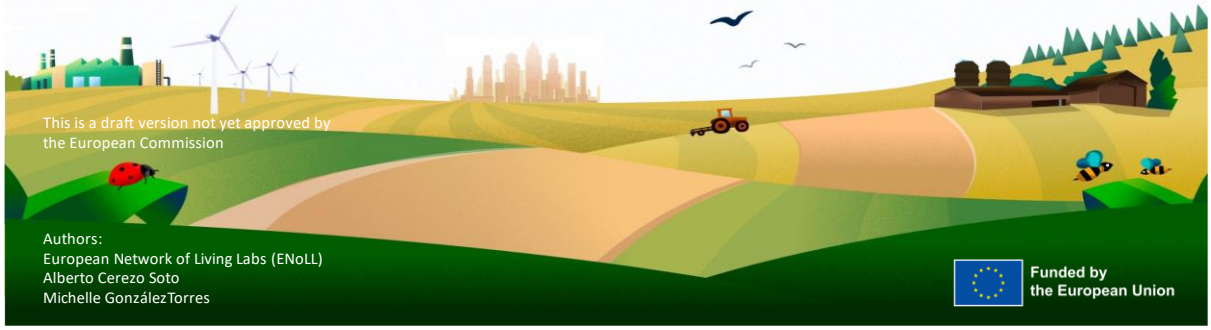
Annex I: Business Models Canvas for Soil Living Labs & Lighthouses

Annex I is an adaption of Chapter 4 PREPSOIL Business Model Canvases for Soil Living Labs and Lighthouses, foreseen to support the development of business models by soil LLs and LHs, and to serve as inspiration from the examples identified.

Delivered as annex to the related deliverable of the PREPSOIL project (D4.2 "Report on LL/LH business model plans"), this guideline is intended as an easily digestible and stand-alone document.

This annex is published as a separate document for higher usability:
https://zenodo.org/records/12819107 (Cerezo & Gonzalez, 2024)

Business Model Canvas for Soil Living Labs and Lighthouses: A guide for users



This is a draft version not yet approved by the European Commission

Authors:
European Network of Living Labs (ENoLL)
Alberto Cerezo Soto
Michelle GonzálezTorres

Funded by the European Union

Table of contents

Introduction

This document intends to serve as a guide for Soil Living Labs (LL) and Lighthouses (LH) to design Business Models (BM).

The document summarizes the key aspects of a tailor-made Business Model Canvas (BMC) as a tool that considers the specificities of Soil LLs, and provides practical examples and conclusions based on different exercises conducted by PREPSOIL project. These examples that filled the BMC are categorized according to elements, spheres of intervention within each of the elements, and the focus of the LL for different land use types. To expand the information, *Deliverable 4.2 Report on LL/LH model business plans* must be consulted.

The Mission "A Soil Deal for Europe" foresees BMs as a contribution to ensure the long-term sustainability of Soil LLs, as vehicles designated to lead the transition to achieve the objectives set forth in the Soil Mission Implementation plan by 2050, and beyond the EU funding in 2030. In this vein, BMs are effective frameworks that outline how an organization creates, delivers and captures value, a crucial aspect for LLs to attract investments. They provide a high-level structure that outlines how a LL operates and becomes sustainable within its specific context. Moreover, the LL methodology has at its core the co-creation of solutions among users and stakeholders within their territories. The PREPSOIL BMC for Soil LLs here proposed considers this context.

This document is embedded in PREPSOIL Work Package 4 that facilitates knowledge transfer and co-creation in LLs, and contributes this way to the goal of PREPSOIL: enabling the deployment of the Soil Mission across European regions, by understanding how regional assessment of soil needs can lead to action in Soil LLs. Together with PREPSOIL contributing partners, WP4 has collaborated with matured Soil LLs and sister projects. Furthermore, the regional approach taken by PREPSOIL and other preparatory actions has been pursued, associating soil needs and challenges with main land use types, namely agricultural, forestry, (post-)industrial and (peri-)urban.

Onwards, the PREPSOIL BMC for Soil LLs will be part of a service package for increased performance and accelerated maturity of LLs. Along with other resources, the service package will be transferred to the SOILL-Startup project, that supports the Soil Mission LLs & LHs, as well as the growth and upscale of emerging LLs & LHs initiatives.

3

Business Model Canvas for Soil LLs & LHs– Elements

The Business Model Canvas (BMC) for LL s & LHs contains 2 overarching components (Soil Mission Objectives and land use types) , and 14 elements.

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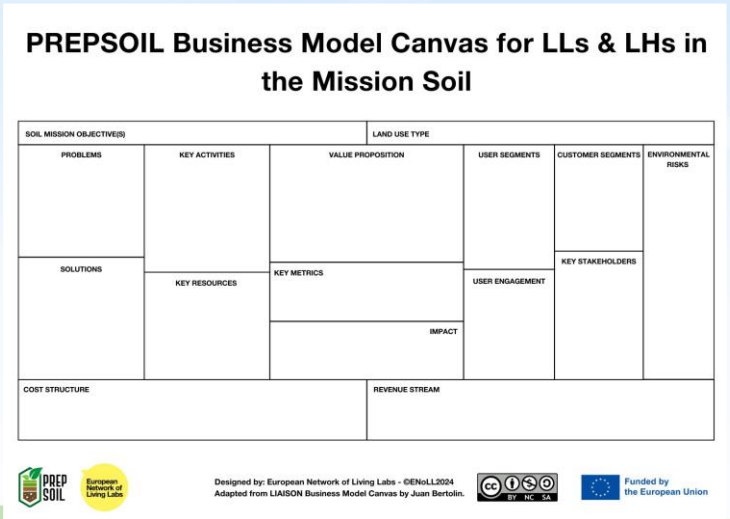


4

The EU Soil Health Mission objectives and land use types– Overarching elements

LLs under the Mission Soil should indicate the objective(s) that they will tackle in line with the EU strategy to contribute to the healthiness and resilience of soil ecosystems in the LL/LH territory.

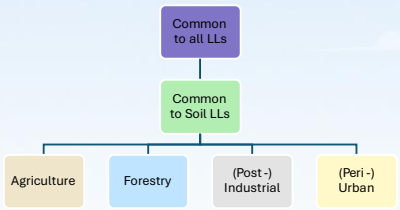
1. Reduce land degradation relating to desertification
2. Conserve and increase soil organic carbon stocks
3. Stop soil sealing and increase the re -use of urban soils
4. Reduce soil pollution and enhance restoration
5. Prevent erosion
6. Improve soil structure to enhance soil biodiversity
7. Reduce the EU global footprint on soils
8. Increase soil literacy in society across Member States

The second overarching element of the Soil LLs BMC presents the specific land use type that the LL will address. In PREPSOIL, items have been identified the following structured approach:

Items that apply to any LL, regardless of the focus topic wise

Items that specifically apply to Soil LLs, regardless of the land use type they address

Items that are relevant to the land use type approached

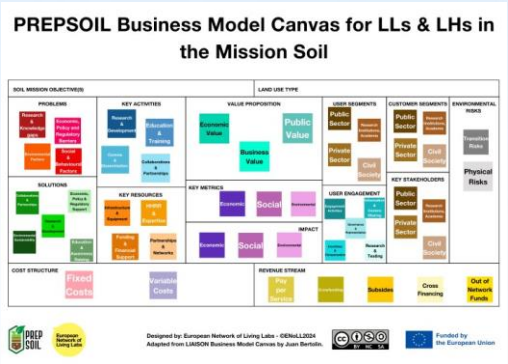


In the PREPSOIL BMC for Soil LL&LH, the background colors refer at this classification.

5

Business Model Canvas for LLs & LHs– Spheres of Intervention

Next layer corresponds to the spheres of intervention within each of the elements. They should serve as guidance for Soil LLs when designing their BMs:



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6

Problems
- Research & knowledge gaps
- Social & behavioral factors
- Economic, policy and regulatory barriers
- Environmental factors

Solutions
- Environmental sustainability
- Collaborations & partnerships
- Research & development
- Economic, policy & regulatory support

Value Proposition
- Economic value
- Business value
- Public value

Key Stakeholders, User and Customer Segments
- Public sector
- Private sector
- Research institutions & academia
- Civil society

User Engagement
- Engagement activities
- Information & communication sharing
- Incentives & compensation
- Governance & representation
- Research & testing

Key Activities
- Research & development
- Education & training
- Communication & dissemination
- Collaboration & partnerships

Key Resources
- Funding & financial support
- HHRR & expertise
- Partnerships & networks
- Infrastructure & equipment

Key Metrics
- Economic & business impact
- Social Impact
- Environmental impact

Impact
- Social outcomes
- Environmental outcomes
- Economic outcomes

Environmental Risks
- Physical risks
- Transition risks
- Education & awareness raising

Cost Structure
- Fixed costs
- Variable costs

Revenue Stream
- Pay per service
- Subsidies
- Out of network funds
- Cross-financing
- Crowdfunding

7

The filled PREPSOIL Business Model Canvas for Soil LLs & LHs

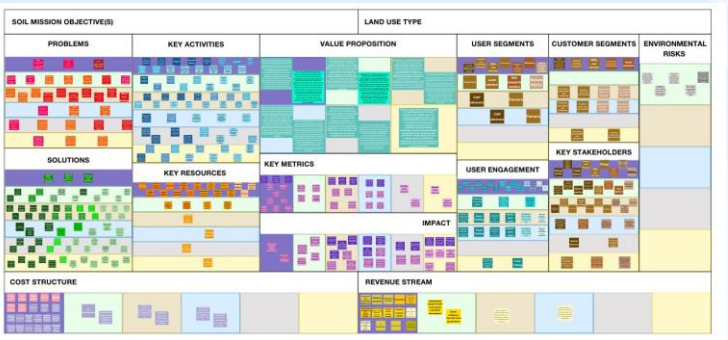
This BMC for Soil LLs & LHs has been filled with items identified by 16 Soil LLs across Europe for each of the elements, and enhanced by PREPSOIL partners (see chapter 3. Methodology of D4.2 Report on LL/LH model business plans). They should serve as inspiration for the design of specific BMs according to the goal s and the context in which each LL operates.

Recommended identified items can be visualized according to :
1. Elements;
2. Spheres of intervention, that can be recognized with the colour coding; and/or
3. Focus of the LL, reflected by the colour background.

Click here for a higher resolution image of the filled canvas.

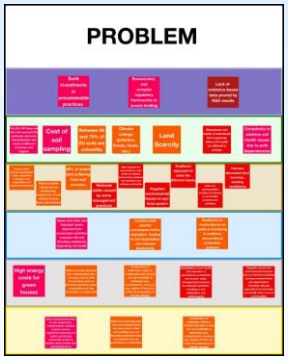
Click here for a higher resolution image of the filled canvas, without the distinction among the spheres of intervention.

Click here for a higher resolution image of the filled canvas, without the distinction among the focus of the LL.



8

Business Model Canvas for Soil LLs & LHs: PROBLEM element



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Definition

This element identifies the main problems that the LL would like to address. This section helps ensure the LL is tackling a real and significant issue. By understanding, addressing, and leveraging problems effectively, LLs can unlock new opportunities for growth and create sustainable value for stakeholders.

Questions to address

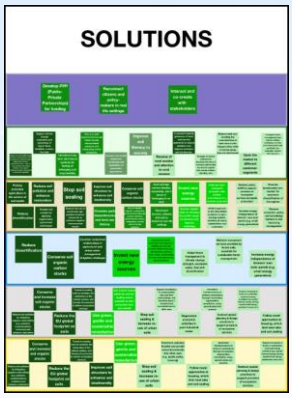
What are the main soil health problem(s) or related one(s) that your LL would like to address? These are specific problems within the territory your LL operates.

Conclusions of key aspects mapped

Most of the problems identified for a LL addressing soil health concerns respond equally to environmental factors as well as social and behavioural considerations. Also relevant, in a medium range of importance, are matters related to economic, policy and regulatory barriers. Instead, research and knowledge gaps do not come up as a problem to be considered within a SHLL&LH BM.

9

Business Model Canvas for Soil LLs & LHs: SOLUTIONS element



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Definition

This element identifies the main problems that the LL would like to address. This section helps ensure the LL is tackling a real and significant issue. By understanding, addressing, and leveraging problems effectively, LLs can unlock new opportunities for growth and create sustainable value for stakeholders.

Questions to address

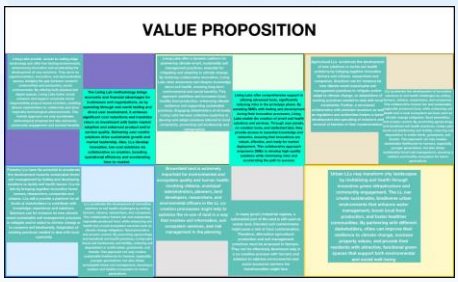
What are the main soil health problem(s) or related one(s) that your LL would like to address? These are specific problems within the territory your LL operates.

Conclusions of key aspects mapped

BM. The solutions mostly identified relate to economic, policy and regulatory barriers, and matters directly connected to the environment. In a medium range, solutions refer to collaboration and partnerships, and research and development. Those that point at education and awareness raising are the less commented.

10

Business Model Canvas for Soil LLs & LHs: VALUE PROPOSITION element



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Definition

Value proposition represents the promise of value that a LL provides to its stakeholders. It articulates the specific benefits and advantages that differentiate the LL's solutions or services from competitors and addresses the needs or desires of the target groups. A compelling value proposition communicates how the LL's offerings solve stakeholders' problems, fulfil their needs, or create positive outcomes, ultimately driving stakeholder engagement.

Questions to address

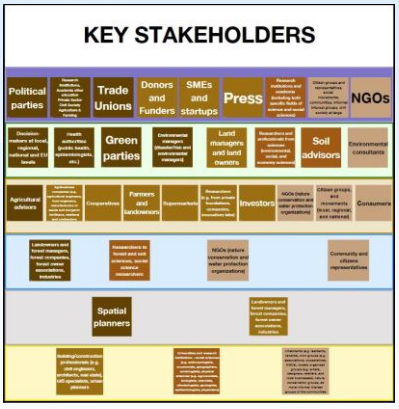
What value proposition does your LL deliver to its stakeholders, users and customers? Which of their needs is your LL satisfying? How does your product/service/solution benefit the stakeholders? Why should customers and stakeholders choose your LL over competitors?

Conclusions of key aspects mapped

Incontestably, SHLL&LH bring public value with their initiatives by promoting environmental sustainability, enhancing sustainable productivity, and fostering community engagement. SHLL&LH serve as educational hubs, raising awareness and training stakeholders in sustainable practices, and acts as centres for research and innovation, advancing soil health technologies and methodologies. By informing policy and facilitating multi-stakeholder collaboration, living labs ensure integrated approaches to soil management, ultimately contributing to healthier ecosystems, more resilient communities, and social well-being. But they can also contribute with business value, in a lower range of relevance, when their proposition is based on LL methodologies, bringing economic and financial advantages for business and organizations by achieving cost reductions and maximizing return on investment with faster market adoption. The innovation boost that LLs offer is also noted within the business value they contribute with.

11

Business Model Canvas for Soil LLs & LHs: KEY STAKEHOLDERS element



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Definition

They are the individuals or groups with an interest in the LL and their participation is crucial to ensuring that the LL achieves its goals. Stakeholders can affect or be affected by the LL activities and outcomes. Stakeholders include, but are not limited to, customer and users. Each stakeholder group has unique interests, concerns, and expectations regarding the LL's performance, activities, outcomes and impacts. Understanding and effectively managing relationships with key stakeholders is essential for building trust, fostering collaboration, and mitigating risks. By considering the needs and perspectives of all stakeholders, LLs can make informed decisions, enhance accountability, and create value that benefits both the organization and its broader ecosystem.

Questions to address

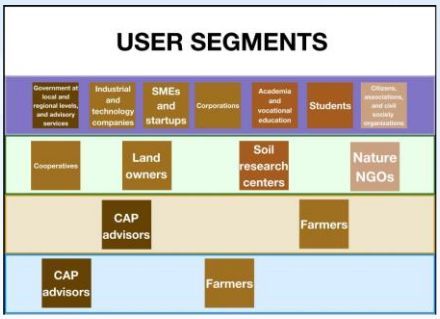
Who are the individuals or organizations that have an interest in your LL? How does each stakeholder impact your LL? What role could they play in the LL activities?

Conclusions of key aspects mapped

Support of stakeholders of the QH in the LL's operations are well understood as key for the success of SHLL&LHs, in line with any other type of LL. About those coming from the public sector, local and regional authorities are regarded as the most influential, but also policymakers at national and European if a specific purpose (e.g. the Common Agricultural Policy – CAP at European level). When it comes to research institutions and academia, a range of disciplines are considered as relevant, beyond the expertise of soil scientists. Those disciplines are included in the wider sciences and social sciences fields. About stakeholders of the private sector, they refer mainly to SMEs and startups, land managers and landowners, donors and funders, and the press. In turn, beyond communities and NGOs at large, stakeholders from civil society relate to NGOs engaged in nature conservation and associations of farmers.

12

Business Model Canvas for Soil LLs & LHs: USER SEGMENTS element



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Definition

User segments refer to specific groups of individuals or entities involved in the LL co-creation activities. They benefit from the LL products, services and/or solutions (including data) at any stage of the innovation process. Users are among the LL key stakeholders. Understanding user segments is crucial for tailoring strategies and user experiences to meet the unique requirements and preferences of each group.

Questions to address

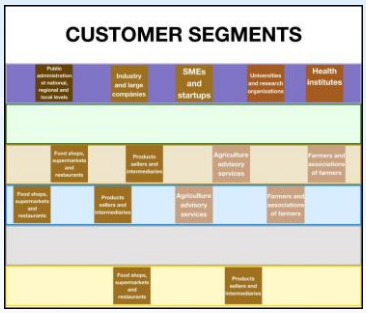
Who are the different users of your LL product/service/solution? What are the characteristics of each user segment? What specific needs does each user segment have? How will your LL tailor its solution to each user segment?

Conclusions of key aspects mapped

Similar to the stakeholders, users from all the QH are taken into account. Local and regional authorities are spotted at the front when it comes to the public sector, as well as CAP advisors in a secondary order of relevance; a mix of researchers from sciences and social sciences for research institutions and academia, but also users coming from other type of education (e.g. vocational), as teachers and students; SMEs, corporations, cooperatives, landowners and farmers from the private sector; and associations and nature NGOs from the civil society.

13

Business Model Canvas for Soil LLs & LHs: CUSTOMER SEGMENTS element



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Definition

Customer segments define the different groups of people or organizations that will purchase or adopt the LL products, services and/or solutions (including data) at the end of the innovation process. These customers can be key stakeholders, users of the LL, or external to the LL and its activities but interested in the developed product, service, and/or solution. Identifying and understanding the needs of each segment is essential for ensuring the LL's offerings are relevant and valuable to a diverse audience.

Questions to address

Who are your LL target customers? Who might be interested to purchase the product/service developed in the LL or uptake the solution?

Conclusions of key aspects mapped

Alike stakeholders and users, customers segments identified include equally potential buyers of new products and/or services developed within the SHLL&LH context from all sectors of the QH, as well as actors who may uptake the solutions proposed by the LL.

14

Business Model Canvas for Soil LLs & LHs: IMPACT element

Navigate the canvas for a higher resolution image

Definition

Impact refers to the broader consequences and effects of the LL's activities on various stakeholders and the environment. The impact element of a BM encompasses the social, environmental, and economic outcomes resulting from the LL's operations and decisions. By prioritizing responsible and sustainable practices, LLs can maximize positive impact while minimizing negative repercussions.

Questions to address

What is the intended social, environmental, and/or economic impact of your LL? How the key metrics you have chosen will help your LL measure the impact?

Conclusions of key aspects mapped

In the same vein than the key metrics, a majority of impacts identified in the BMC are connected to social outcomes, coming next those of an environmental nature, and last those that refer to economic outcomes.

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Business Model Canvas for Soil LLs & LHs: ENVIRONMENTAL RISKS element

Navigate the canvas for a higher resolution image

Definition

They refer to they refer to natural events and external factors that can jeopardize the achievement of the LL's objectives. These risks include, on the one hand, adverse climate conditions, water scarcity, pollution, biodiversity loss, invasive species, and other environmental changes that could negatively impact the effectiveness of soil health initiatives. On the other, environmental regulatory and policy changes with a negative financial impact on the LL, at least in its short-term. They are environmental related external related factors that are often beyond the direct control of the LL management team but must be identified and mitigation strategies developed to minimize its impact if it does occur.

Questions to address

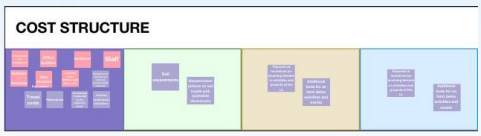
What are the potential environmental risks specific to your LL location and operations? How might these risks impact the LL soil health initiatives and overall operations? What strategies can the LL implement or adapt to or mitigate identified environmental risks?

Conclusions of key aspects mapped

Both physical risks and those regarding resource scarcity are equally considered as crucial factors that can jeopardize the operations and goals of SHLLs, without distinction of their focus on land use type. Environmental risks should be looked at and mitigation measures planned beforehand in case they materialize.

20

Business Model Canvas for Soil LLs & LHs: COST STRUCTURE element



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Definition

Cost structure in a BM refers to the breakdown of expenses incurred by a LL in its operations. It outlines the various expenses involved in running the LL and delivering its solutions or services. These costs can include both fixed costs (such as rent, salaries, and utilities) and variable costs (such as materials, production, and distribution). Understanding the cost structure is essential for assessing profitability, managing expenses, and making strategic decisions.

Questions to address

What are the most significant costs in your BM? What fixed and variable costs will your LL incur to deliver the activities?

Conclusions of key aspects mapped

Both fixed and variable costs remain equally important for the existence of the LL and the achievement of their goals. Specifically, for SHLL&LH variable costs are considered to conduct soil assessments, particular tools for onsite demo activities, and incentives for involving farmers in activities and projects of the LL.

21

Business Model Canvas for Soil LLs & LHs: REVENUE STREAM element

Navigate the canvas for a higher resolution image

Definition

The revenue stream of a BM outlines the different channels through which the LL earns revenue. This can include sales of physical products, subscription—fees, licensing, advertising, or any other monetization methods. Understanding the revenue streams is essential for determining the profitability and sustainability of the BM.

Questions to address

How will your LL cover the cost structure and sustain its operations?

Conclusions of key aspects mapped

The revenue streams mostly brought into the SHLL&LH BMC put down inflows equally from the pay per service modality, together with subsidies, primarily from local and regional governments, and out of network funds also at national and EU levels, as well as from the private sector. Inflow of funds from the cross-financing option remains the less mentioned, being such restricted to the direct local territory in which the LL is physically established.

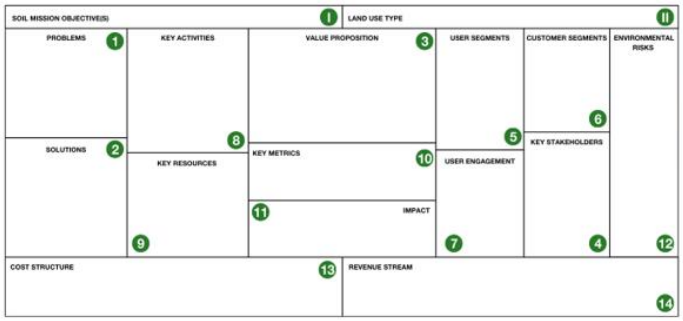
22

How to complete the PREPSOIL Business Model Canvas for Soil LLs & LHs

Numbers indicate the suggested order to complete the Soil LL BMC.

Click here for a higher resolution image.

PREPSOIL Business Model Canvas for LLs & LHs in the Mission Soil



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Adapted from LIAISON Business Model Canvas by Juan Bertolin.

Funded by the European Union

23

0. Mission Soil Objectives
- Outlines the objective(s) pursued by Soil LL according to the Mission Soil Implementation Plan

1. Soil use type
- Specifies the land use type the LL intends to address.

2. Problems
- Problems point at the specific soil health issues that the LL intends to address, and challenges faced by users and stakeholders. Problems should relate with one or more of the Mission Objectives.

3. Solutions
- They are the response to the problems, as they establish how the Soil LL will address them. They provide clarity on the approaches and innovations to be implemented.

4. Value Proposition
- It articulates the unique benefits and value the Soil LL brings to its users. It should directly respond to the problems and solutions, making it clear why users and stakeholders should engage in the LL, on the one hand, and on the other provide a unique argument for funders, regardless of their nature, to invest in the LL.

5. Key Stakeholders
- Those whose support and collaboration are often crucial for success, including users and customers, but also partners, funders, regulatory bodies, and community groups.

6. User Segments
- Those who benefit from and interact with the Soil LL.

7. Customer Segments
- Those who will potentially be paying for the products, services and/or solutions proposed by the LL.

8. User Engagement
- Strategies to bring in the LL and maintain users and stakeholders.

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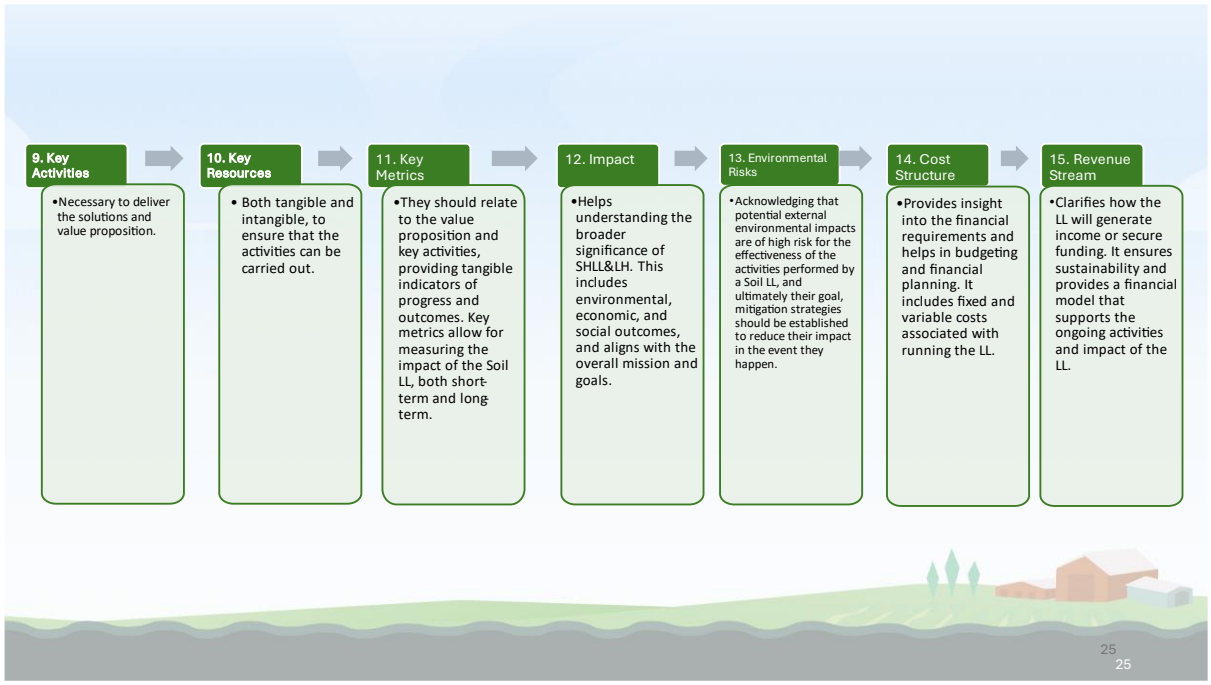
24


9. Key Activities
•Necessary to deliver the solutions and value proposition.
10. Key Resources
• Both tangible and intangible, to ensure that the activities can be carried out.
11. Key Metrics
•They should relate to the value proposition and key activities, providing tangible indicators of progress and outcomes. Key metrics allow for measuring the impact of the Soil LL, both short-term and long-term.
12. Impact
•Helps understanding the broader significance of SHLL&LH. This includes environmental, economic, and social outcomes, and aligns with the overall mission and goals.
13. Environmental Risks
•Acknowledging that potential external environmental impacts are of high risk for the effectiveness of the activities performed by a Soil LL, and ultimately their goal, mitigation strategies should be established to reduce their impact in the event they happen.
14. Cost Structure
•Provides insight into the financial requirements and helps in budgeting and financial planning. It includes fixed and variable costs associated with running the LL.
15. Revenue Stream
•Clarifies how the LL will generate income or secure funding. It ensures sustainability and provides a financial model that supports the ongoing activities and impact of the LL.
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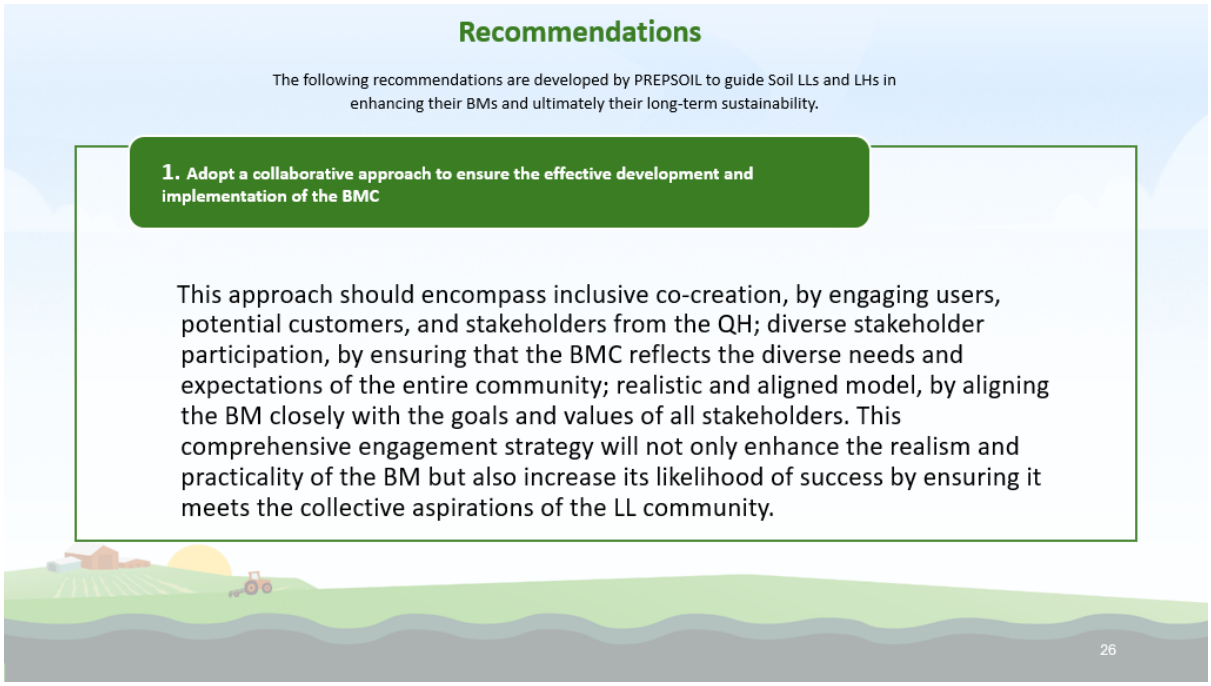
Recommendations
The following recommendations are developed by PREPSOIL to guide Soil LLs and LHs in enhancing their BMs and ultimately their long-term sustainability.
1. Adopt a collaborative approach to ensure the effective development and implementation of the BMC
This approach should encompass inclusive co-creation, by engaging users, potential customers, and stakeholders from the QH; diverse stakeholder participation, by ensuring that the BMC reflects the diverse needs and expectations of the entire community; realistic and aligned model, by aligning the BM closely with the goals and values of all stakeholders. This comprehensive engagement strategy will not only enhance the realism and practicality of the BM but also increase its likelihood of success by ensuring it meets the collective aspirations of the LL community.
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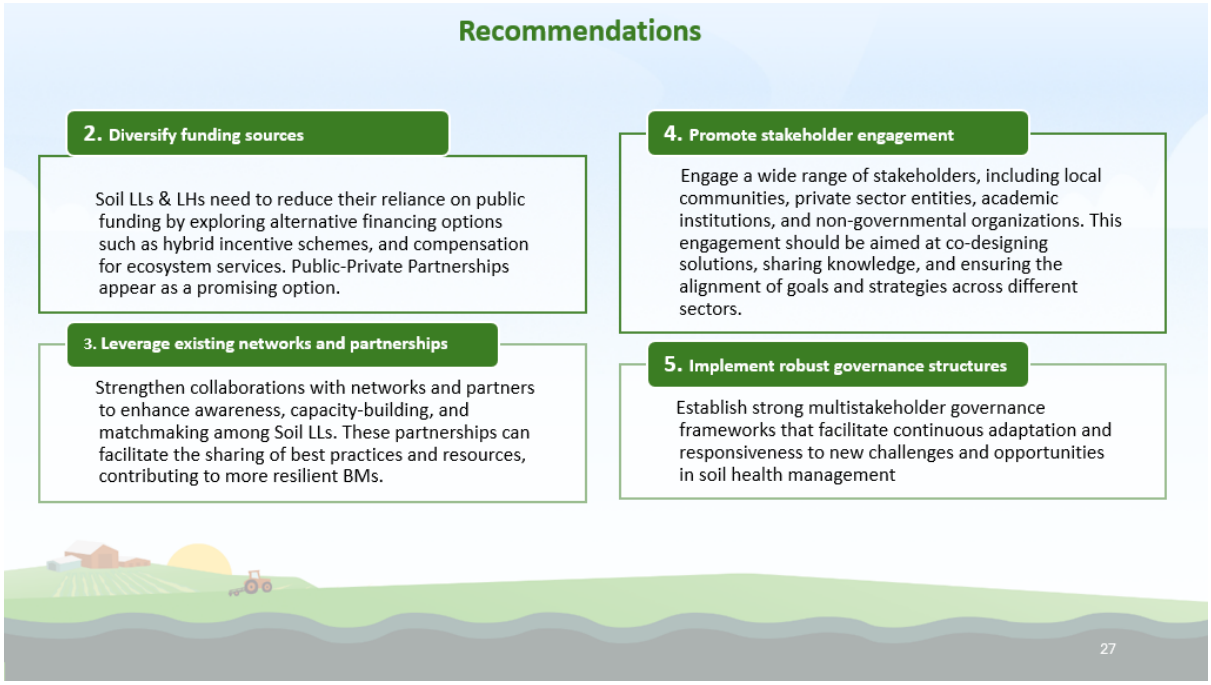
Recommendations
2. Diversify funding sources
Soil LLs & LHs need to reduce their reliance on public funding by exploring alternative financing options such as hybrid incentive schemes, and compensation for ecosystem services. Public-Private Partnerships appear as a promising option.
3. Leverage existing networks and partnerships
Strengthen collaborations with networks and partners to enhance awareness, capacity-building, and matchmaking among Soil LLs. These partnerships can facilitate the sharing of best practices and resources, contributing to more resilient BMs.
4. Promote stakeholder engagement
Engage a wide range of stakeholders, including local communities, private sector entities, academic institutions, and non-governmental organizations. This engagement should be aimed at co-designing solutions, sharing knowledge, and ensuring the alignment of goals and strategies across different sectors.
5. Implement robust governance structures
Establish strong multistakeholder governance frameworks that facilitate continuous adaptation and responsiveness to new challenges and opportunities in soil health management
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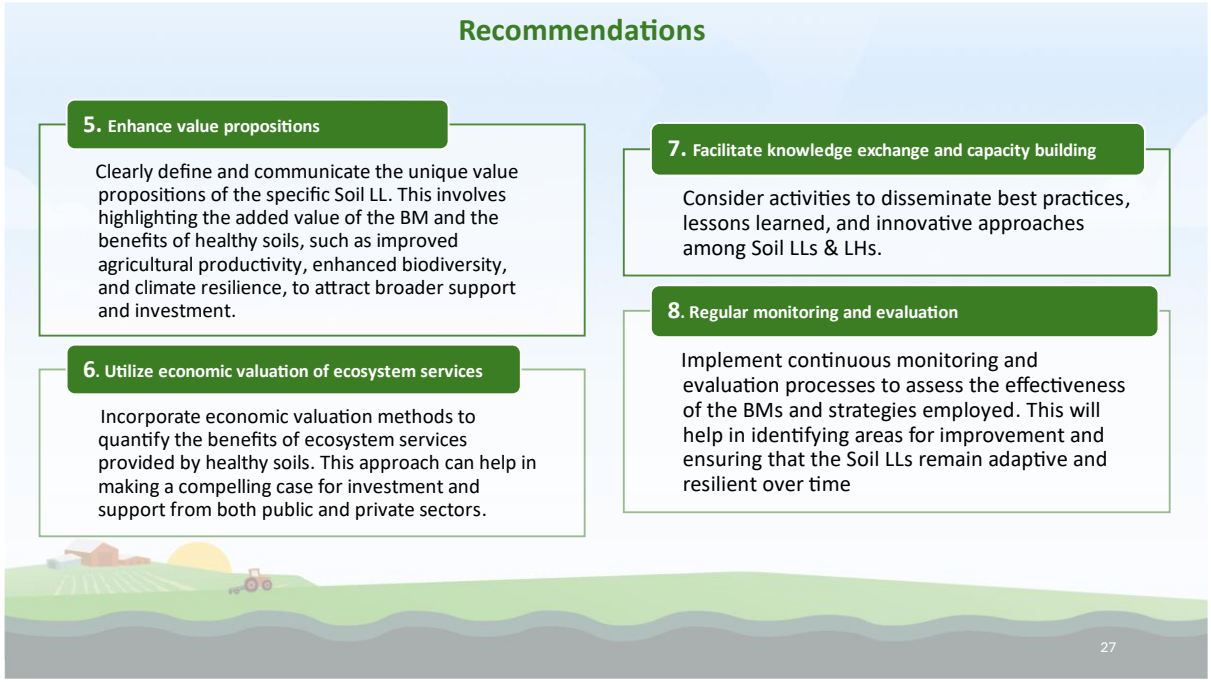
Recommendations
5. Enhance value propositions
Clearly define and communicate the unique value propositions of the specific Soil LL. This involves highlighting the added value of the BM and the benefits of healthy soils, such as improved agricultural productivity, enhanced biodiversity, and climate resilience, to attract broader support and investment.
6. Utilize economic valuation of ecosystem services
Incorporate economic valuation methods to quantify the benefits of ecosystem services provided by healthy soils. This approach can help in making a compelling case for investment and support from both public and private sectors.
7. Facilitate knowledge exchange and capacity building
Consider activities to disseminate best practices, lessons learned, and innovative approaches among Soil LLs & LHs.
8. Regular monitoring and evaluation
Implement continuous monitoring and evaluation processes to assess the effectiveness of the BMs and strategies employed. This will help in identifying areas for improvement and ensuring that the Soil LLs remain adaptive and resilient over time
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Annex II: Recommendations and takeaways from the webinar *Smart Financing and Sustainability of Soil Health Living Labs & Lighthouses*

On 13th and 18th of June, 2024, and within *T4.3 Model business plans for living labs and lighthouses*, the online webinar "Smart Financing and Sustainability of Soil Health Living Labs & Lighthouses" brought together 61 participants from across Europe. The goal was to bring ideas to ensure the long-term sustainability of Soil LLs & LHs and initiatives, based on current research, services in place, and hands-on experiences of LLs addressing soil health issues. Recommendations and main takeaways are next outlined:

1. The definition of soil health varies across international, EU and national levels. For these reasons, there is not a single policy and economic instrument, but rather many instruments with direct and indirect impact on soil health. Therefore, since the relevant regulation is not specified, LLs & LHs need to consider multiple instruments to protect, restore, and rehabilitate soil health.
2. In terms of policy, the protection of new soil is disconnected. Policies that understand and enhance the reproductive capacity of soil should be developed.
3. Policy and economic instruments are applied mainly in ways to rework soil for agriculture and cover. Dedicated mechanisms should be created for other land uses.
4. In terms of monitoring and data gathering, more public expenditure is required to assist farmers in measuring and monitoring soil health.
5. In terms of liability and social responsibility, landowners and farmers should be more accountable for the long-term health of the soil. Also, governments should conduct regular physical, chemical, and ecological soil analysis, and involve society in supporting sustainable practices. Moreover, consumers should consider soil health practices in their purchasing decisions, supporting farmers who adopt sustainable methods.
6. Both the value proposition and revenue streams may evolve over time. LLs should diversify their viable revenue and value streams, making sure they adapt accordingly.
7. LLs should take advantage of the Mission Soil and the outputs that are being progressively achieved on soil health and LLs. For instance, Soil LLs and initiatives are encouraged to make use of business models' tools that are currently being proposed for soil health, like the PREPSOIL BMC for Soil LLs & LHs contained in this document, or the protocol to design sustainable BMs by InBestSoil.
8. There are services in place to connect LLs with businesses or to maximize the impact of Horizon 2020 and Horizon Europe projects, like the Horizon Results Booster (HRB) or Accelup. The HRB provides tools, methodologies, and mentorship to draw dissemination and exploitation strategies, develop business plans, and support Go-to-Market, whereas AccelUp connects businesses with LLs, academic institutions, and independent professionals, seeking to test their prototypes, technologies and products with their end-users. LLs should consider relying on such services.

9. Co-creation and involvement of users in the innovation cycle are inherent to LLs. Therefore, LLs should reach and share new scientific results that are applicable in practice with their experimentation networks. For instance, defining practice oriented relevant questions together with the farmers, conducting simple experiments that fit into the farms' everyday practices, capturing data with farmers, discussing assessments with them, and sharing knowledge with stakeholders.
10. In terms of visibility, peer learning, networking and advocacy with LLs sharing similar goals, Soil LLs and initiatives may become an ENoLL certified member or join other international networks. Increase in EU funding might occur.
11. Frequently, LLs addressing soil health issues do not know well the arena to attract private investments. When communicating business cases to investors, it is recommended to select relevant and measurable indicators, using the right combination of domains e.g. biodiversity, social, economics). Also, to make use of the investor language and frameworks, by aligning the strategy with overarching and external recognized frameworks.

To expand the information, it is recommended to visit the recording of the webinar, uploaded to the PREPSOIL YouTube Channel:

- **Part 1**:
  - ***Welcome. Introduction to PREPSOIL, and webinar overview***. European Network of Living Labs (ENoLL)
  - ***Economic instruments to improve soil health: A strategy for Living Labs and Lighthouses***. InBestSoil
  - ***Horizon Results Booster***, Meta-Group
  - ***Financial sustainability in soil health Living Labs – practical example of ÖMKi On-Farm Living Lab***, Research Institute of Organic Agriculture (ÖMKi)
  - ***How to design sustainable business models: A research integrated protocol.*** InBestSoil
- **Part 2**:
  - ***Sustainability of Living Labs*.** imec
  - ***Accelup, the collaboration place for innovators and accredited testing providers***. THESS-AHALL Living Lab / ENoLL
  - ***MACC-SOIL, a holistic and collaborative approach to find solutions and ways to address soil degradation problems in the Eastern Mediterranean region***. Mediterranean Agrofood Competence Center
  - ***Building business cases for industry to contribute to improved soil health*.** Environmental Resources Management (ERM) / Network for Industrially Co-ordinated Sustainable Land Management in Europe (NICOLE)

Also, the original sources can be visited here:

- Deliverable 6.1 Policy conditions and catalogues of existing soil health economic and policy incentives, InBestSoil project;

- Deliverable 5.1 How to design sustainable business models: A research integrated protocol, InBestSoil;
- ENoLL, European Network of Living Labs.
- Horizon Results Booster;
- Accelup;
- ÖMKi, Research Institute of Organic Agriculture;
- MACC-SOIL, Mediterranean Agrofood Competence Center;
- NICOLE, Network for Industrially Co-ordinated Sustainable Land Management in Europe.
- ERM, Environmental Resources Management.