Mission's Ecologies of Exclusion: a new Framework to analyse the exclusionary dynamics in Sustainability Missions

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Summary

This research addresses the gap between Mission-Oriented Innovation Policy's (MIP) promise of inclusion and problematic exclusionary dynamics. While MIP aims to tackle complex, "wicked" societal problems through diverse participation and innovation, missions often unintentionally reinforce exclusion, prioritizing dominant actors and overlooking marginalized perspectives, values, and knowledge. This undermines both the legitimacy and transformative potential of Mission-Oriented Innovation Systems (MIS), fuelling distrust in institutions. Therefore, the research question is: **How do exclusionary dynamics materialise in Mission-oriented innovation systems?**

To tackle this, the research first develops a new analytical framework: MIS Ecologies of Exclusion (MIS-EoE). The Ecologies of Exclusion reverses Chilvers' et al. Ecologies of Participation (2018) framework and adapt it in two critical ways: first, identifies antagonists (those who exclude), subjects (those excluded), objects (what is excluded), and models (how exclusion happens). Second, reframes systemic constitutional structures into two distinct kinds of constitutional structures: institutional, the set of institutions which legitimise the MIS's intervention, and the socio-material, the target system the MIS aims to change.

These concepts are integrated into Elzinga's et al. MIS analytical framework (2023), which has been adapted from assessing the MIS's capabilities, to analysing structurally and functionally exclusion in MIS. This is done through the problem-solution diagnosis, which identifies the main problem and solution framing from the institutional actors and the corresponding divergences that emerge from other actors; the structural analysis, which identifies the constitutional, programming and performance structures and the antagonists, subjects, models and objects which populate them; lastly, the functional analysis, identifies how exclusion is materialising and functioning, shaping participation. The functional analysis mirrors four participation rationale from the perspective of exclusion: normative, substantive, epistemic and instrumental. This framework develops a systemic, ecological perspective of how exclusion is operating and the impacts of that exclusion on the MIS.

The EU Soil Mission serves as a case study to apply this framework, combining document analysis, event ethnography, and interviews. The problem–solution diagnosis reveals that the Mission frames soil degradation as an urgent, society-wide crisis, solvable through research, innovation, and civic awareness. Yet this framing avoids naming industrial agriculture as a primary antagonist, despite evidence that agri-food systems drive most degradation. This mismatch produces a paradox: the Mission acknowledges the food system discursively but is not designed to confront it directly.

Therefore, the structural analysis shows that exclusion is rooted in institutional and socio-material structures. Horizon Europe provides the immediate rules of participation, but its rigidity reflects deeper legacies: CAP exceptionalism and the EU's entanglement with agro-industrial interests. This creates a constitutional structure that makes CAP politically untouchable, leaving the Mission structurally unable to target the food system which is driving soil degradation. Within this setting, the Mission's programming structure operates as an "Institutional Blackbox": decision-making is opaque, dominated by institutional actors, and insulated from other actors. At the performance level, LLs offer participatory spaces but are constrained by pre-defined institutional framings and technocratic outputs. Thus, exclusion cascades across

implementation, translating agricultural exceptionalism into depoliticised procedures that limit participation and innovation.

The functional analysis unpacks how these exclusions materialise across four interrelated dimensions. Normatively, exclusion depoliticises soil health by avoiding the politics of agriculture, marginalising farmers, and idealising citizens as passive communicators rather than active agents in the food transition, undermining democratic legitimacy and social justice. Substantively, exclusion produces a fragile theory of change: awareness, education, and participation are disconnected from reversing soil degradation, with missing perspectives unable to stress test assumptions and solution trajectories. Epistemically, exclusion narrows the Mission's knowledge base through Horizon Europe's techno-scientific requirements, demanding procedures and requirements, which tend to reward experienced academics natural and engineering sciences, to the detriment of social sciences, humanities and arts. However, this epistemic exclusion is what leads to normative and substantive exclusion. Instrumentally, exclusion reduces participation to a performance of openness, for the benefit of the antagonist or the detriment of the subject. Consultations, workshops, LLs, and symbolic roles like "soil ambassadors" legitimise the Mission discursively, but decision-making power remains concentrated within institutional actors.

Together, these findings show that exclusion in the EU Soil Mission is not incidental but constitutive of its design – to not destabilise the EU's food system. As such, exclusion functions as a structuring force within the MIS: necessary to preserve institutional coherence but simultaneously delimiting the Mission's transformative potential. The case study suggests some particularities which are probably not generasible, but there are dynamics that may apply to other EU Missions. It would be imperative to further understand how exclusion materialises in innovation systems, as exclusion reshapes what participation means: depoliticising actors, narrowing knowledge, weakening outcomes, and instrumentalising engagement.

For Industrial Ecology, this contribution is twofold. First, it underscores that transitions cannot be understood solely through technological and material flows, but also through the institutional and political dynamics that govern who participates and whose knowledge counts. Second, by developing a framework that examines exclusion's structures and its normative, epistemic, substantive, and instrumental functions, this research expands Industrial Ecology's capacity to critically engage with the justice dimensions of sustainability transitions. In doing so, it situates Industrial Ecology not only as a science of systemic efficiency, but also as a field attentive to the conditions under which innovation is made inclusive, transformative, and socially legitimate.

1. Introduction

1.1 Background

Today there is an increasing need, demand and urgency to address societal and environmental problems by transforming our socio-technical systems towards more desirable outcomes for people and environment (Fagerberg, 2018; Schot & Steinmueller, 2018). Transition studies are increasingly recognizing the complex, contested and uncertain nature of societal transitions (Hekkert et al., 2020), emphasizing the need to make transitions effective, just and inclusive (Abram et al., 2022; Wiarda, Janssen, et al., 2024).

Mission-oriented innovation policy (MIP) has gained popularity as a policy instrument which leverages state power to direct research and innovation to solve societal and environmental problems (Hekkert et al., 2020a; Wanzenböck et al., 2020), by accelerating and transforming markets and institutions towards desirable goals within a specific time frame (Mazzucato et al., 2020; Wittmann et al., 2020). These societal problems are "wicked": inherently complex, contested and uncertain (Wiarda, Coenen, et al., 2023). Therefore, wicked problems are difficult for policymakers to define, let alone solve, with pre-set solutions and expertise (Wanzenböck et al., 2020).

As MIP claims to seek wider involvement and perspectives and welcome newcomers and bottom-up experimentation, MIP allows to explore and legitimise emergent solutions and pathways, which may not have been considered, to address wicked problems appropriately and trigger transformative change (Janssen et al., 2023; Wiarda, Janssen, et al., 2024). These innovation dynamics of experimentation and diverse actors interacting to meet the mission's goals, can lead to emergence of a mission-oriented innovation system (Elzinga et al., 2023; Hekkert et al., 2020b).

Participation is fundamental for innovation and science because of normative, epistemic, substantive and instrumental reasons (Daviter, 2017; Delgado et al., 2011; Stirling, 2008; Wiarda, Janssen, et al., 2024), especially in the context of sustainability transitions (EEA, 2023). The normative rationale suggests that participation is the right thing to do, due to democratic and justice ideals, regardless of the outcomes (Stirling, 2008; Wiarda et al., 2025). The epistemic rationale specifically addresses that the complexity of wicked problems are ill-suited to be addressed by a particular discipline or type of expertise, and therefore participation can allow for diverse epistemologies to collaborate in understanding the problem (Daviter, 2017; Wanzenböck et al., 2020; Wiarda, Janssen, et al., 2024). The substantive rationale, referring to the "substance" of policies, their intervention logic, design and outcomes, when the ideal outcome has not been yet defined, argues that participation can lead to much better policies (Delgado et al., 2011; Stirling, 2008; Wiarda, Sobota, et al., 2023). In contrast, the instrumental rationale is when participation is needed to meet a pre-defined goal, such as gaining trust and legitimacy from the public (Delgado et al., 2011; Stirling, 2008; Wiarda, Sobota, et al., 2023).

However, despite the claims for meaningful and wider inclusion and participation, recent research suggests these claims have struggled to materialise, as with many other innovation policies (McGookin et al., 2021). For starters, citizens are barely aware of mission's existence in the EU, limiting their capacity to participate (Baeck, 2023). When citizens are aware, engagement tends to be informative and one-directional (Conway, 2024), with no meaningful participation of citizens and other stakeholders into mission governance (Wiarda, Sobota, et al., 2023). In addition, incumbents may use their influence to steer the mission to protect their interests, including influencing what actors participate, and what issues and solutions are discussed (Elzinga et al., 2023; Wesseling & Meijerhof, 2023). By siding with incumbents, mission managers may undermine non-incumbent actors (Klerkx et al., 2024) or prioritise pragmatic directionality

over transformative and diverse experimentation (Bergek et al., 2023; Bulah et al., 2024). Furthermore, missions tend to neglect and overlook underrepresented normative values, such as justice and democracy (de Graaff et al., 2025; Kok & Klerkx, 2023) as well as epistemic considerations, such as lived experiences and other forms of knowledge (Wanzenböck et al., 2020; Wiarda, Janssen, et al., 2024).

Fundamentally, despite many-well intentioned and designed attempts at "opening-up" the innovation process (Stirling, 2008), these participation procedures can be captured by influential policy circles as well as rely on established, consolidated perspectives of known stakeholders – both limiting the possibilities of new perspectives to emerge, that could lead innovation towards different, arguably more substantive directions (Pesch, 2024). This reflects a tendency to prioritise the procedure over the outcomes, a consolidation of predictability and effectiveness, which can exclude the normative, substantive, epistemic and instrumental rationales that do not elegantly fit the known procedure itself (Pesch, 2024).

This requires exploring and understanding not so much who, what and how of participation but rather who, what and how of non-participation and the mechanisms behind it. A shift is required from analysing participation to analysing exclusion. Exclusion is required to be researched on normative grounds, as exclusion of citizens and other actors undermines democratic policymaking, just and fair participation processes and the legitimate concerns of many stakeholders: why is it right to exclude an actor and not another? Furthermore, wicked problems require to address epistemological and substantive exclusion, due to their contested, complex and uncertain nature requiring diverse knowledge and perspectives as well openness in the mission's direction (Daviter, 2017; Termeer & Dewulf, 2019; Wanzenböck et al., 2020). The exclusion of participants narrows and limits the potential knowledge, perspectives and experiences, undermining the mission's effectiveness and transformative outcomes (Bergek et al., 2023; Janssen et al., 2023; Klerkx & Begemann, 2020).

Lastly, in missions, participation is articulated as instrumental in meeting the widespread societal pre-defined goals many missions claim (de Graaff et al., 2025; Klerkx et al., 2024) and increasing trust in institutions and democratic processes (de Looze & Cuppen, 2023). However, whilst the instrumental rationale may be blurry in practice as instrumental rationale can be argued to be done for normative and substantive reasons (Delgado et al., 2011), exclusion implies that decision-makers are not able to invoke enough participants for their pre-defined goals. By focusing on the who, the what and the how of exclusion is excluded, a much better understanding of the barriers to participation and inclusion can be developed. These barriers limit meaningful and wider participation in missions, impacting the effectiveness of the mission as well as its legitimacy, risking the viability and success of the long-term goals (Elzinga et al., 2023; Klerkx & Begemann, 2020) .

1.2 Research problem

Therefore, there are arguably two research problems: firstly, conceptual and theoretical, as even though exclusion is widely understood in many disciplines, it remains ill-defined in mission-oriented innovation policy literature. In contrast to participation, focusing on exclusion is asking who, what and how are actors, their interests and their values being significantly excluded from decision-making and participating in the innovation system. Therefore, exclusion is conceptualised not only as an actor's incapacity to meaningfully engage in policymaking (Joseph, 2014; Sen, 2000; Thapa, 2021) but also as the emergent and structural conditions which, purposefully and accidentally, explicitly and implicitly, lead to actors not being significantly included or able to participate in mission innovation systems (Klerkx et al., 2024).

The second problem is analytical and methodological, which would require theoretical research to integrate and develop a framework which can analyse exclusion in MIS in a clear and systemic

manner. This analytical framework would require the right methods to explore and identity how exclusion is occurring and emerging, systematically and comprehensively within the MIS.

If both problems are adequately addressed, the developed framework may be useful to study and practice of transitions studies and mission-oriented innovation policy in general and Industrial Ecology, in particular. Considering that the field of Industrial Ecology is committed to enabling a successful transition towards sustainable societies in a just and effective manner, it becomes urgent and necessary to understand and address these exclusionary dynamics. Without addressing exclusion, missions may risk becoming undemocratic, unjust, ineffective and undermining trust in public authorities' intentions and capacity. This research aims to meet that gap.

1.3 Research Objective

Therefore, the research objective is to research exclusionary dynamics within MIS by building a new analytical framework which can research these dynamics. This will be done by integrating mission literature, especially Elzinga et al.'s (2023) MIS analytical framework with Chilvers et al.'s (2018) Ecologies of Participation framework, specifically reversing the lens on inclusion by focusing on the exclusion. The new analytical framework will be called MIS Ecologies of Exclusion (MIS-EoE) and will identify *antagonists* - who is enacting exclusion, *subjects* -who is being excluded, *objects* -what is being excluded and *models* - how exclusion is being enacted, as well as how all these relate to one another. This analytical framework is applied to a case study, the EU Soil Mission. By applying the framework, we examine and evaluate how effective the framework is at identifying ecologies of exclusion within MIS.

1.4 Research Question

Therefore, the main research question is:

How do exclusionary dynamics materialise in Mission-oriented innovation systems?

1. How can exclusion be conceptualized for Mission-oriented innovation systems?
2. What are the Ecologies of Exclusion within the EU Soil Mission's-oriented innovation system?

The research objective is to understand and address the exclusionary dynamics in MIS, so the question asks how these dynamics materialise – who enacts them, who is excluded, what is excluded and how exclusion is enacted. This leads to the first sub-question, which is tasked with developing the MIS- EoE analytical framework that can identify and research these dynamics within a specific MIS. This sub-question is responded in Chapter 2 by reviewing the mission literature and conceptualising theoretically the framework.

The second sub question is the application of the analytical framework to a case study. The case study is the MIS of the EU Soil Mission. The MIS-EoE is applied deductively as types of antagonists, subjects, models and objects are identified. However, analysis also includes an inductive element to identify case study specific antagonists, subjects, models and objects and the relations among them. In Chapter 3, collection and analysis of data through the qualitative methods of policy documents, event ethnography and semi-structured interviews leads to the results in Chapter 4, which answer the second sub-question by identifying the relevant antagonists, subjects, models and objects and what are the ecologies of exclusion. In Chapter 5, these results are discussed within the theoretical and academic context and answering the question whilst acknowledging limitations and future avenues of research.

2. Theoretical Background

This chapter introduces a history and overview of missions (section 2.1), followed by the relevant literature for this research on mission-oriented innovation systems (section 2.2). Inclusion and participation in missions are problematised, showcasing the analytical limitations (section 2.3). This is followed by identifying exclusionary dynamics within mission-oriented innovation systems and why an ecological approach is needed to research these dynamics (section 2.4). Lastly, the Ecologies of Exclusion framework is constructed from the Ecologies of Participation framework (Chilvers et al., 2018) and the mission literature is used to identify antagonists, subjects, models and objects.

2.1 Missions

In the 1950's, missions were historically employed within the defence, aerospace and nuclear sector. These missions existed to transform the technological capabilities of a nation-state through research and innovation, especially within the spere of national security (Mazzucato, 2018a). These missions were characterised by:

- Research direction and desirable goals were decided by a closed and small group of government employees
- Goals were pursued with little regard for economic feasibility or other social and political considerations
- Missions were centrally controlled and normally secretive
- Participation was limited and allowed only to specialised and vetted firms and employees
- Developed knowledge was normally not available to the public

Since the 2010s, missions have been reconceptualised by Mazzucato, reversing many of these traits as the focus of research and innovation is redirected from defence, nuclear and aerospace towards addressing social and environmental challenges. Historical and contemporary mission-oriented policies still shared defining traits, such as directionality of research; clarity and commitment to timelines and goals; urgency in achieving these goals; and committed, willing participants (Kattel & Mazzucato, 2018; Mazzucato, 2018a, 2018b).

2.1.1 Mission-oriented innovation policy

In the 2020s, Mission-oriented Innovation Policy (MIP) has emerged as one of the most relevant policy instruments, employing state power to direct science and research to create and shape markets towards solving social and environmental problems (Mazzucato et al., 2020). MIP is supporting innovation towards transformative system change (Schot & Steinmueller, 2018) and the scope of transformation is not limited to technological and economic systems, but also behavioural and institutional (Wittmann et al., 2020).

Social and environmental problems tend to be *wicked problems* (Hekkert et al., 2020b). Wicked problems are characterised by their inherent complexity, uncertainty and contestedness, which reinforce each other to "…render problems intractable – that is to say, incomprehensible, and unmanageable – and commonly lead to ineffective and irresponsible outcomes" (Wiarda, Janssen, et al., 2024, p. 2). Therefore, wicked problems require MIP to acknowledge "the degree of wickedness of the underlying challenge, and the active role of policy in ensuring coordinated action and legitimacy of both problems and innovative solutions across multiple actors"

(Wanzenböck et al., 2020, p. 476). Therefore, engaging with the complexity, uncertainty and contestation helps avoids simplifying problems and their solutions, allowing for emergent and innovative approaches to the problem (Janssen et al., 2020; Wiarda et al., 2024).

In addition to addressing wicked problems, contemporary missions are different from their historical predecessor (Mazzucato, 2018a) in the following ways:

- Goals are influenced by a wider range of participants, including government, sector representatives and civic organisations
- Solutions are expected to be economically feasible and scalable
- Developed knowledge is expected to be shared, ensuring transparency and fostering collaboration across sectors and stakeholders
- Decision-making is far more decentralized, involving multiple public agencies, and supporting broader participation
- Participation is theoretically open to anyone willing to engage, allowing for wider and diverse involvement

Mission's goals are tethered to agreed timelines and targets, balancing ambition and pragmatism (Mazzucato, 2018a). Targets serve to measure the impacts, monitor progress and identify milestones (Larrue, 2021). However, with a variety of approaches and inputs from different participants, missions can provide space for innovation, experimentation and bottom-up solutions to reach goals (Janssen et al., 2020), emphasizing flexibility and reflexivity to either accelerate or kickstart the transformation of systems towards solving societal problems (Wittmann et al., 2020). The need to understand these emerging innovation dynamics as well as analyse and evaluate their impact, has led to the development of the Mission-oriented innovation systems framework (Hekkert et al., 2020b)

2.2 Mission-oriented innovation systems

The concept of Mission-oriented innovation systems (MIS) was developed to focus beyond the policy instrument of the "mission", identifying the innovation system, the network of actors and institutions which are emerging within and the subsequent interactions to solve the mission's targeted problem (Hekkert et al., 2020b). Therefore, MIS can serve as a framework to map a mission's performance and how the innovation system is evolving towards the stated goals (Anand et al., 2023; Wesseling & Meijerhof, 2023).

MIS's analytical elements have been developed into "a theory-informed and empirically inspired perspective suitable for grasping developments underlying the pursuit of a challenge-led mission" (Elzinga et al., 2023, p. 12), aiming to analyse the innovation system to assess how well the MIS performs according to its stated goals.

Elzinga et al.'s (2023) framework introduces three analytical building blocks for this purpose: the problem solution-diagnosis, the structural analysis and the functional analysis. The *problem - solution diagnosis* defines the mission, the problems and perceived solutions, and therefore the needed innovation system to nurture and scale those solutions. The *structural analysis* focuses on the relevant actors of the mission and how these actors interact. These actors are either at the *programming structure* which consists of "the collection of actors that deliberately formulate, operationalise, and govern efforts to support the mission" (Elzinga et al., 2023, p. 7) or the *performance structure* consists of the "actors, networks, technology, and institutions involved in the actual development and diffusion of various solutions" (Elzinga et al., 2023, p. 7). The

functional analysis, identifies functions which evaluate the performance of mission's direction and solution trajectories, and regime transformation. The functional analysis is critical to understand the impact of the MIS on the existing socio-technical regime; identifying whether the MIS's solutions are symbiotic, neutral or competitive with the regime, evaluating the MIS's capacity to destabilise and transform the regime towards the desirable outcomes (Elzinga et al., 2023).

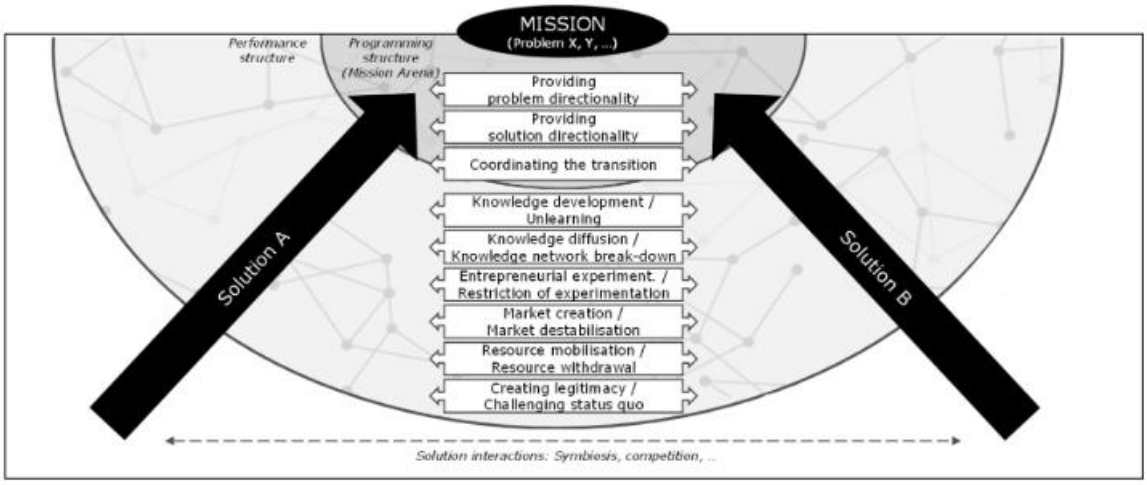

Figure 1 Proposed MIS's analytical framework (Elzinga et al., p. 11)

These concepts allow to explore the political nature of MIS, proving useful to explore power inequalities, diversity and exclusion (Klerkx & Begemann, 2020; Klerkx & Rose, 2020; Kok & Klerkx, 2023) as well as to critically engage with the politics of innovation and transformative potential of the mission (Klerkx & Begemann, 2020; Kok & Klerkx, 2023). Missions are not political only because missions are public sector interventions which are discussed, approved and legitimised by political actors (Janssen et al., 2023) but because the programming structure, which plays a centralising and coordinating role as well as defining the boundaries of the MIS, is the *mission arena* (Elzinga et al., 2023). MIS's openness and potential reflexivity, implies that the mission arena is where the MIS's stakeholders with different interests, values and worldviews frame and negotiate the directionality of the MIS. Therefore, this allows to problematise participation and inclusion in missions, who is part of and what decisions are produced in the mission arena are highly political and significant for transformative potential of MIS (Wesseling & Meijerhof, 2023).

2.3 Inclusion and participation in Missions

Contemporary missions are expected to be significantly inclusive compared to their historical counterparts (Conway, 2024; Mazzucato, 2018a; Wiarda, Sobota, et al., 2023) and arguably, be capable of responsibly governing the different epistemic and normative considerations, which are conducive towards transformative change for a variety of reasons (Wiarda, Janssen, et al., 2024). Scholars highlight several reasons why inclusivity is crucial in this regard. Firstly, wickedness necessitates multiple actor perspectives leading to deeper and layered sense-making of problems (Wiarda, Sobota, et al., 2023), facilitating innovative, relevant and transformative solutions (Köhler et al., 2019; Mazzucato, 2018a; Schot & Steinmueller, 2018). Secondly, inclusion of citizens provides much needed public and democratic legitimacy for the transformative potential of missions (Al-Jayyousi et al., 2023; Conway, 2024). Lastly, the transformative potential of missions may be fulfilled by opening research and innovation to marginalised, vulnerable communities as well as distinct systems of knowledge and practice

from the mainstream, leading to much greater diversity of potential solutions within the mission-oriented innovation system (Klerkx et al., 2024; Kok & Klerkx, 2023).

In this sense, missions reflect a trend in the broader Science and Technology Studies (STS) towards participatory and inclusive innovation policy to "fix" innovation considered too rigid, top-down and focused on economic growth, disregarding societal needs (Frahm et al., 2022) and exacerbating existing inequalities (Kalliomäki et al., 2024). Public participation as conceptualised in Arnstein's *Ladder of Participation*, frames citizen public participation as spectrum from low citizen engagement to the highest, presenting citizen control as a desirable and positive outcome (Conway, 2024; IAP2, n.d.; McGookin et al., 2021). Seeking legitimacy, this call for inclusion has materialised as participatory practices, such as formal civic engagement and open dialogues facilitated by public agencies and authorities (Braun & Könninger, 2018; Stilgoe et al., 2014), focusing on the public and actors outside of the usual policy process (Fritz et al., 2024).

2.3.1 Problematizing inclusion and participation

Despite the spread of participatory practices, many argue this has not necessarily led to more inclusive innovation, and that the potential of public participation has not been fulfilled (Braun & Könninger, 2018; Stilgoe et al., 2014). These critiques point to different reasons why participation has not delivered on its promises: firstly, despite seeming more "inclusive", formal public engagement can mostly be seen as an exercise of gaining trust from the public for an existing approach, rather than a serious process to use the input of diverse stakeholders for policymaking (Stilgoe et al., 2014). Missions have tended to have a higher number of participants, these did not translate into significant higher diversity or influence (Wiarda, Sobota, et al., 2023). Research into European national mission's citizen engagement efforts, discovered that despite the countries' commitment to the most impactful engagement, most initiatives are one way communication, focused on public outreach and information sharing (Conway, 2024). Conway (2024) identifies how citizen engagement is instrumentalised in service of missions, so that the innovation can be more trustworthy, legitimate, impactful and effective, inclusion and participation serving as means to solve a problem, rather than an end. This suggests to a degree, that inclusive innovation may have prioritised public participation to increase societal impact rather than as meaningful participation of marginalised communities (Kalliomäki et al., 2024).

Secondly, this kind of public participation does not tend to challenge incumbent positions and is rarely an opportunity to reconsider existing policies and their direction (Braun & Könninger, 2018; Frahm et al., 2022; Stilgoe et al., 2014), leading to a sort of *tokenism* (IAP2, n.d.) a form of *illusive inclusion* which is "when inclusion is ensured but the outcome is not different from that of being excluded" (Joseph, 2014, p. 75).

Thirdly, the purpose of inclusion has changed from including those who are specifically marginalised from the innovation process and impacted by it, towards a neutrality seeking to including any type of relevant actor in any innovation policy process, effectively leading to widespread use without necessarily engaging with discrimination and marginalisation (Kalliomäki et al., 2024). Within the EU, missions establish multi-actor partnerships as an eligibility condition for research projects without defining any specific social criteria of the type of actors (European Commission, 2024).

Lastly, the current blurriness of what inclusion and participation means, allows these terms to be loosely used by policymakers for a variety of innovation policies, holding a particular connotation and purpose in each context (Fritz et al., 2024) . Using Cornwall and Brock's (2005) research on

the use of buzzwords in economic development, Lee (2023) advances that inclusion can be considered a buzzword, as the concept's meaning is updated and changing as policymakers find that "...buzzwords are ripe for such reappropriating as they are optimistic, hard to oppose, but lack a clear precise meaning" (2023, p. 8). Within the context of MIP, Wiarda et al. (2023) identify how public participation emphasizes the challenges within MIP to be inclusive through public participation as well as unclear to what degree public participation is required and necessary for the mission.

In conclusion, due to the arbitrary interpretations and depending who uses the term and for what purpose there is not a solid consensus on what inclusion implies within innovation policy and how to practice inclusion meaningfully (Lee, 2023; Stanley et al., 2018). This nebulousness and fuzziness surrounding the concept of inclusion, can lead to misguided practices of participation within innovation policy (Braun & Könninger, 2018; Frahm et al., 2022; Stilgoe et al., 2014), pursuing policies with greater social impact without necessarily addressing excluded groups (Kalliomäki et al., 2024) and create significant blind spots for missions when dealing with wicked problems (Wanzenböck et al., 2020; Wiarda, Sobota, et al., 2023).

Therefore, inclusion can be understood as a wicked problem, both complex and contested, and uncertain in practice. When seriously engaged, this leads to questions: Who is not included? What issues are not included? And how are these actors and issues being excluded? However, due to the abovementioned reasons, inclusion struggles to seriously engage and inquire into these questions.

Furthermore, whilst inclusion focuses on who is not included, but rarely leads to interrogate who is excluding and from what they are excluding. To identify who and what should be included, requires first to identify who is being, from what and how this happens. Reversing the focus from inclusion to exclusion can provide conceptual clarity and problematises inclusion and participation in MIS. The semantics of exclusion are defined by negative connotations, resisting the tendency to become a vague buzzword as exclusion carries a weight and urgency that inclusion can lack. This creates a meaningful starting point for analysis. Exclusion demands that we ask difficult questions: Who is being excluded? How are they being excluded? What are the consequences of this exclusion? By centring our lens on exclusion, we can explore the root causes of marginalisation of actors and issues, gaining a clearer picture of the mechanisms of exclusion within innovation systems. This compels to confront and accept the contested nature of innovation, acknowledge the power dynamics at play, and seriously consider how to address the systemic reasons why certain actors and perspectives are excluded. From this perspective, inclusion may be a 'nice to have,' whilst addressing exclusion becomes an imperative.

2.4 Exclusion in Mission-Oriented Innovation Systems

Exclusion has been conceptualised in many ways, mainly in political and social terms. Political exclusion refers to how citizens and organisations can feel excluded from the representative process (Van Der Does & Kantorowicz, 2022) as well as directly targeting actors through laws and institutions for political reasons, such as race, ideology, gender or sexuality (Binder et al., 2009). Since the 1990s, social exclusion emerged to research and analyse disadvantaged communities which normally intersected with conditions of poverty (Sen, 2000) and occasionally, social separation from mainstream society (Bak, 2018; Sibley, 1998). Nowadays social exclusion refers at all kind of exclusion which limits how much an individual can "...participate fully in economic, social, political and cultural life as well as the process leading to and sustaining such a state." (Cuesta et al., 2024, p. 3).

Nowadays, due to the unequal impacts, risks and responsibilities in societal transitions, actor exclusion is increasingly being researched in societal transitions, especially focused on climate and sustainability (Avelino et al., 2023; Avelino & Wittmayer, 2016; Boss et al., 2023; Loorbach et al., 2017; Wilgosh et al., 2022). This research is relevant to MIS, as innovation systems can exclude transition pathways, technologies and actors from meaningfully participating (Klerkx & Rose, 2020). To achieve far more inclusive MIS, it's necessary to identify and address these forms of exclusion (Joseph, 2014; Thapa, 2021).

Within the programming structure, the higher level of political decision-making is normally limited to a small number of scientific experts, policymakers and high-ranked civil servants (Normann et al., 2024) who are balancing grand ambitions and realistic goals to gain support within their institutions (Mazzucato, 2018a). These technical-political actors tend to control and define the overall problem to solve and can significantly condition what are considered viable solutions a mission should engage with (Janssen et al., 2023; Normann et al., 2024; Nylen et al., 2023). Furthermore, during mission formulation, exclusion of a wide variety of actors can be justified by the framing of urgency to achieve the goals faster (Reale, 2021) or to articulate a mission vision, which does not fully integrate the contestation and complexity of the wicked problem (Wanzenböck et al., 2020; Wiarda, Coenen, et al., 2023). Therefore, exclusion is enacted to make a wicked problem to some degree tractable, and marketable to internal public sector stakeholders, aiming to be effective and pragmatic, rather than idealistic (Normann et al., 2024), This can be achieved by significantly reducing contestation and complexity and increasing certainty about the who, the what and the how of the mission (Janssen et al., 2023; Klerkx et al., 2024).

This process legitimises the contours and mandate of the mission arena, which sets the boundaries for experimentation, coordination and directionality of the MIS (Elzinga et al., 2023), characterised by constant contestedness and renegotiation (Janssen et al., 2023; Wesseling & Meijerhof, 2023). Despite the flexibility for a variety of solution pathways within the MIS's boundaries, the mission arena shapes and steers these solutions towards a certain vision (Janssen et al., 2023; Parks, 2022), creating a tension between top-down coordination and bottom-up experimentation. The programming structure can exercise pragmatism to avoid the MIS's divergent experimentation becoming too open and "fuzzy", without clear direction and timeline towards certain outcomes (Brown, 2021).

Therefore, the mission arena has the capacity to exclude actors, issues and pathways. This is especially significant when disagreements emerge between incumbents with vested interests towards change that maintains their beneficial position (Elzinga et al., 2023; Wesseling & Meijerhof, 2023) and new actors challenging the current regime, which has been conceptualised as exploitative and explorative forces, respectively (Klerkx et al., 2024). Recent research suggests that an MIS's programming structure may be inclined towards top-down approaches to solve contestation, rather than working through negotiation, prioritising a mission's speed and effectiveness over broader social support and diverse perspectives (Klerkx et al., 2024). This capacity to govern innovation, to provide directionality in a specific direction, fundamentally relies on the capacity to exclude, especially when differences are "... rooted in incompatible values and worldviews" (Wiarda, Coenen, et al., 2023, p. 12).

During implementation, the programming structure sets criteria and indicators to measure and evaluate progress to monitor experimentation and performance. Nonetheless, what to measure and not to measure, is a political exercise that cements the programming structure's capacity to pre-determine what is worth measuring and implicitly determining through the lens of "objective

indicators" what is and is not valid transformative innovation (Kirchherr et al., 2023; Klerkx & Begemann, 2020). Furthermore, what to measure implies what is not worth measuring as well as what unknown impacts are acceptable (Kirchherr et al., 2023), potentially ignoring underrepresented and excluded actor's perspectives and how the mission impacts them. Therefore, exclusion within the programming structure implies that certain actors as well as their perspectives and interests, are not significantly included into key decisions about the mission's boundaries, direction, metrics and what can be overlooked and neglected.

Arguably, MIS success during implementation relies on pre-existing power structure, exacerbating exclusionary dynamics. From an economic perspective, missions' pursuit of new markets require that solutions must be scalable and profitable (Mazzucato, 2018a), introducing a fundamental asymmetry in economic terms, between incumbents and smaller economic actors and newcomers, who overall have much less resources (Stirling, 2019). Sectorial incumbents have considerable advantages in scaling innovation over challengers, such as access to human and financial capital as well as business models and supply chains geared towards providing services and products to an existing client base (Bergek et al., 2023; Klerkx & Rose, 2020). From a scientific perspective, the MIS's reliance on pre-existing research and collaboration networks (Mazzucato, 2018a), implies actors in research and industry are well positioned to use their knowledge to significantly influence and frame the problem and the solution space in their favour, potentially to the detriment of other underrepresented and under resourced actors (Kirchherr et al., 2023; Klerkx et al., 2024; Kok & Klerkx, 2023; Nylen et al., 2023; Turnheim & Sovacool, 2020).

Lastly, the focus on the *willing,* those who seek to address the problem (Mazzucato, 2018a), assumes that the main difference between those who participate in a MIS and those who do not, is a matter of will rather than capacity. Ultimately, actors at the performances structure represent the willing who can, excluding those who are willing but cannot (Rosa et al., 2021). This could be due to circumstances, such as lack of awareness, or a conscious choice, such as lack of time, knowledge, or not being able to assume risks related to innovation (Joseph, 2014; Sen, 2000; Thapa, 2021). A complex mosaic of interrelated factors emerges, constructing a particular reasoning and meaning for why an actor cannot or will not participate in the MIS. Therefore, exclusion in the performances structure can be when certain actors, technologies, or pathways are systematically prevented or unable from significantly participating in or benefiting from the processes of developing, implementing, and diffusing knowledge and solutions.

2.4.1 Why is an ecological approach needed?

To conclude the problematization of inclusion and participation and the relevance of reversing the focus towards exclusion, requires a more suitable research approach. In Conway's (2024) recent report on citizen engagement in European missions highlights the many gaps in participation within National Mission's implementation, identifying one way communication with the citizen as the predominant form of participation among all countries and emphasizing their inadequacy. However, the report struggles to analyse and interrogate how these practices come to be in the first place. Pre-defined participation practices tend to portray participation as a discreet and contained within a specific time and space within a policy process (Chilvers et al., 2018), such as Arnstein's Ladder of Participation, which identify explicit cases of insufficient participation and exclusion (IAP2, n.d.). However, these pre-defined frameworks normally ignore how participatory practices emerge from many context-specific and interrelated factors which are articulated uniquely to each policy setting (Fritz et al., 2024). These kinds of frameworks tend

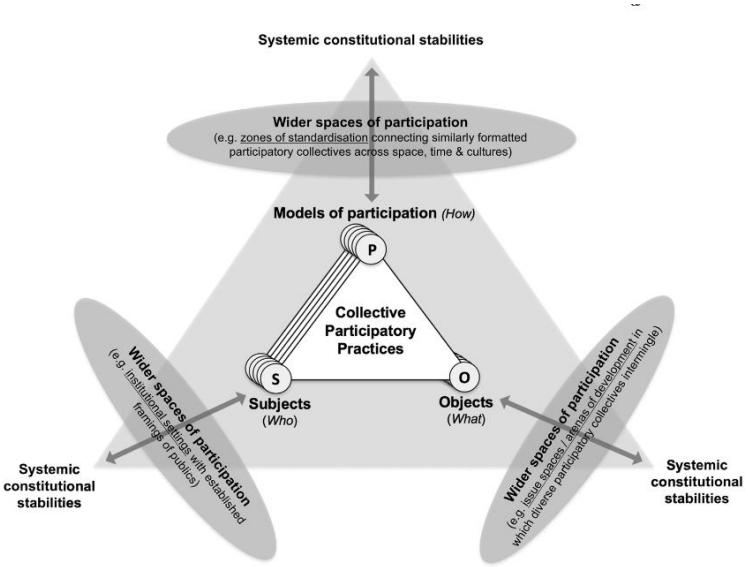

Figure 2 Chilver's et al's relational co-productionist framework for understanding ecologies of participation in socio-technical systems (2018, p. 202)

to illustrate a reductionist perspective of power in policy processes, which ignores systemic and structural dynamics beyond a specific policy process (Avelino, 2021; Chilvers et al., 2018, 2021).

When applied to MIS, as Conway does, MIS seem to be monolithic entities with similar interests and dynamics, even in different countries, presenting participation as standardizable and a "choice" of the MIS leadership (Conway, 2024). However, MIS are complex, interrelated innovation systems balancing experimentation and directionality among a variety of actors, issues and dynamics. And these MIS are conditioned by underlying participatory values and power relations between governments, stakeholders and citizens (Rabadjieva & Terstriep, 2021; Rosa et al., 2021) which manifest differently across and between communities, topics, regions and countries (Baeck, 2023; Boss et al., 2023; McGookin et al., 2021).

To overcome these limitations, Chilvers et al (2018) have suggested understanding the relations among different elements of a system, as if it were an ecology. This means approaching participation as co-produced by interrelated institutions, actors, practices and meanings, with participation evolving and fluctuating as relations among them change (Chilvers et al., 2018). Chilvers et al. (2018) identified a triad of elements within an ecology of participation which relate to one another: firstly, the *who* is participating, the subject. Secondly, *what* is discussed, the objects, which can be either social or technical. Thirdly, the *how* objects and subjects interact, the models of participation. These three elements interact, developing and standardising collective practices as part of or outside the formal public participation in a socio-technical system.

Chilvers et al. (2018) situates this triad into a system, to emphasise that participatory practices do not take place in a vacuum but are shaped by broader systemic and political cultures. Systemic constitutional structures consist of enduring rules, infrastructures, imaginaries, and forms of public reasoning that have become stabilised over time within a given system (Chilvers et al., 2018). They influence which participatory practices are seen as legitimate, how publics are imagined, and what forms of knowledge carry authority. In this sense, systemic constitutional stability highlights the recursive relationship between participatory practices and the wider institutional and socio-technical contexts in which they are situated: while collective practices contribute to shaping systems, they are also conditioned by the established political cultures and material arrangements of those systems. Including this dimension is therefore essential for understanding participation, as it draws attention to the deeper, systemic factors that structure and constrain how engagement unfolds.

Therefore, an ecological approach is far more suitable to understand the limitations of participation and the underlying dynamics of exclusion within MIS. As proposed by Chilvers et al (2018), the ecological approach allow "...to understand the dynamics of diverse interrelating collectives and spaces of participation and their interactions with wider systems and political cultures" (p. 200). If participation is a particular symptom of the exclusion within a system, an ecological approach is fundamental to address many of the limitations of pre-defined frameworks and begin to adequately conceptualise how exclusion is produced and reproduced by decisions, power, practices and actors interrelating and interacting within a dynamic MIS.

Whilst there may be cases where MIS explicitly exclude certain actors, MIS are not seeking to explicitly exclude actors (Kattel & Mazzucato, 2018; Mazzucato, 2018a). In fact, MIS claims to trigger wider and significant participation among many stakeholders as well as increase support and engagement among the citizenries (Rabadjieva & Terstriep, 2021; Wanzenböck et al., 2020). Therefore, to approach exclusion in MIS, requires understanding exclusion not as discreet event in a particular policy process, but as a product of interrelated factors (Sen, 2000) and part of a greater system at play which has constructed and normalised the exclusion of citizens, other actors, and their interests and perspectives. From this perspective, the normalised and accepted capacity and practice of exclusion within the MIS is what conditions who, what and how to participate is considered viable, acceptable and legitimate.

3. Ecologies of Exclusion - Conceptual Integration of MIP, MIS and Ecologies of Participation

This chapter introduces the conceptual framework of Ecologies of Exclusion and outlines how it integrates and adapts elements from Ecologies of Participation and Mission-Oriented Innovation Systems. It defines the key analytical components - antagonists, subjects, models, and objects - and explains how they are integrated into MIS's analytical framework. The framework is then operationalised through a four-step analytical process. The aim is to provide a clear and structured basis for analysing exclusion within a MIS.

3.1 Adapting Ecologies of Participation to Ecologies of Exclusion

The Ecologies of Participation (EOP) framework was adapted in four key manners. Firstly, the framework reorients from participation to exclusion, which is defined as the barriers to participation which emerge and are co-produced by different actors and structures, leading to the exclusion of actors, their perspectives and values in a structural manner. Secondly, the EOP's subject, object and model are redefined. Subject will refer to who is being excluded, model to how is exclusion enacted and object to what issues and/or solutions, social or technical, are being excluded. Thirdly, as exclusion requires to be enacted upon a subject, the framework introduces the Antagonist. The antagonists are the actors within the Ecology of Exclusion of the MIS, which hold the power to enact models of exclusion to exclude subjects and objects. In Table 1 identified themes in the mission literature is listed, though this is not an exhaustive overview. Lastly, Chilver's et al. (2018) concept of systemic constitutional stability is integrated with Elzinga's et al. (2023) concept of regime, to make explicit how MIS emerge from and are embedded within pre-existing institutional and socio-technical structures.

3.1.1 Antagonists

Antagonists are those who have the capacity and discretion to exclude, either formally through institutional power (Borrás & Edler, 2020; Molica, 2025; Parks, 2022) or informally, through other methods (Janssen et al., 2023; Reale, 2021; Stirling, 2019). Capacity is mainly produced by institutional legitimacy but can also have been informally co-produced by the interactions of formal political institutions with non-governmental actors, such as companies, universities, industry representatives, which seek to influence, be part of, or benefit from the action of the public sector (Avelino, 2021; Janssen et al., 2023; Kok & Klerkx, 2023; Stirling, 2019; Turnheim & Sovacool, 2020). Antagonists are active agents who use their capacity to exclude to protect their interests and values and therefore are expected to be concentrated, represented or influencing the programming structure's strategic and mission arena (Bergek et al., 2023; Normann et al., 2024; Parks, 2022), whilst also influencing decision-making and implementation in the performance structure (Janssen et al., 2023; Klerkx et al., 2024; Rabadjieva & Terstriep, 2021).

Institutional antagonists are actors from the public sector, such as policymakers, politicians and government employees and experts, who can be actively involved in the mission's governance (Bergek et al., 2023; Borrás & Edler, 2020; García Casañas & Kovacic, 2025; Kirchherr et al., 2023; Normann et al., 2024). Arguably, institutional antagonists can be more present in supranational and national governance as these concentrate the most institutional power (Borrás & Edler, 2020; Kattel & Mazzucato, 2018), whilst regional and local authorities can be both antagonists (Engelbert et al., 2019) and subjects (Bergek et al., 2023; Parks, 2022). *Incumbent antagonists*

include economic actors which are dominant in their respective sector and close to the institutional antagonists, such as multinationals and industry representatives (Bulah et al., 2024; Klerkx et al., 2024). *Academic antagonists* are academics who benefit from closeness to industry and the public sector and therefore tend to use their knowledge to reinforce the worldviews and interests of the institutional and incumbent antagonists (Klerkx et al., 2024; Klerkx & Begemann, 2020; Kok & Klerkx, 2023; McGookin et al., 2021; Parks, 2022)

3.1.2 Subjects

Subjects come into existence when antagonists enact exclusion directly and indirectly, limiting an actor's capacity to participate. This cements exclusion as a lack of capacity and agency to represent and act upon their own values, interests and perspectives (Sen, 2000). Within the programming structure, antagonists tend to isolate subjects and their perspectives and priorities in key decision-making moments (references). Subjects even when present, may lack a significant capacity to advance their interests and perspectives (Klerkx et al., 2024; Rabadjieva & Terstriep, 2021; Rosa et al., 2021). Within the performance structure, subject's exclusion is further reinforced from within the MIS, such as when mission leadership sides with incumbents, (Klerkx et al., 2024), but also due to factors which the MIS may overlook or neglect, such as subjects lacking the right information, knowledge, capital, time, expertise, experience or energy to participate(Rabadjieva & Terstriep, 2021) , as well as product of the subject's self perception and perception of the MIS (McGookin et al., 2021).

Civil Society subjects are actors driven for social and civic reasons and neither formally institutional or economic, such as citizens (Wiarda, Sobota, et al., 2023), NGOs, social movements (Kok et al., 2025) artists and activists (Chilvers et al., 2018). Within this kind of subject, we should also include those who are overlooked by the mission or who are structurally disempowered, such as such as indigenous communities, vulnerable groups and women (Kok & Klerkx, 2023). *Market subjects* are economic actors, such as SME (García Casañas & Kovacic, 2025). *Institutional subjects* are public sector actors, such as regional and local governments, upon who exclusion is enacted by the supranational and national institutional antagonists (Borrás & Edler, 2020; Parks, 2022). Similarly, there is research and science, which is dismissed and ignored by antagonists or at least, not adequately integrated, which have been identified as *academic subjects* (Klerkx et al., 2024). *End users* are those whom the mission seeks to support and impact, such as cancer patients (Berns et al., 2020) but rarely are significantly included as antagonists tend to believe they possess a deficit of knowledge and understanding (Chilvers et al., 2018). Lastly, *newcomer subjects,* are new or emerging actors the mission aim to mobilise to introduce innovative solutions, approaches and perspectives (Kattel & Mazzucato, 2018), but may lack the established networks and required resources to participate effectively, such as start-ups (Henry et al., 2024).

3.1.3 Models

The models are how the antagonists enact exclusion upon subjects, covering the most direct and explicit to the most indirect and implicit exclusionary models: *Domination, Marginalisation, Bias, Neglect* and *Overlooking*. Within the MIS-EoE, these are occurring simultaneously, reinforcing and reproducing each other.

Domination is exercised by institutional antagonists which both cements the institutional worldview (Avelino et al., 2023; Klerkx & Rose, 2020) and legitimises public sector intervention, even to exclude (Borrás & Edler, 2020; Molica, 2025). Furthermore, institutional power is coupled

with discursive and framing authority which determines an MIS's priority, such as economic growth (Bergek et al., 2023) and urgency (Reale, 2021), and pragmatic priorities about feasibility and effectiveness (Bulah et al., 2024; Klerkx et al., 2024).

Marginalisation and *Bias* focuses on how institutional antagonists coalesce incumbent antagonist's interests, positions and innovation pathways and can be validated by academic antagonist*s* (Avelino, 2021; Avelino et al., 2023; Klerkx & Rose, 2020; Sovacool et al., 2020), similar to what Stirling deemed the "dynamics of incumbency" (2019, p. 1), how the current economic and technical regime, both directly through incumbent antagonists and indirectly, through established preferences, ideas and values of desirable and ideal outcomes. Marginalisation covers specifically incumbent antagonists who proactively use their position and resources, position and influence to exclude or undermine subjects from MIS's decision making (Borrás & Edler, 2020; García Casañas & Kovacic, 2025; Klerkx et al., 2024), whilst Bias focuses on the overall inclination, preference and inertia of institutional, economic and academic antagonists, towards certain outcomes, experimentation and pathways (Bergek et al., 2023; Klerkx & Begemann, 2020; Rosa et al., 2021).

Beyond dynamics of incumbency and towards more indirect and implicit models of exclusion, *Neglect* refers to when antagonists claim to desire diverse and deeper stakeholder participation, but do not adequately allow the means for this to materialise, such as by formally including subjects in decision-making arenas but not addressing any meaningful inequalities in power or maintaining them involved (Klerkx et al., 2024) or when subjects are included to deflect criticism but rarely benefit from participating engaging in *tokenism* (García Casañas & Kovacic, 2025). *Neglect* can be considered a form of illusive inclusion (Joseph, 2014; Sen, 2000). Furthermore, if the institutional antagonists wish for more active participation but fail to consider if there "is enough interest, resources and capacities for the desired participation"(Rabadjieva & Terstriep, 2021, p. 5), can indicate a lack of care towards the subject.

Lastly, *Overlooking* relates to the lack of consideration and awareness of certain objects and subjects, such as when selecting certain goals implies pre-determining the target groups that will collaborate, whilst not including many others who might have a say, are *de facto* excluded (Bergek et al., 2023). However, this can occur inversely, which is when institutional antagonists tend to engage with the groups which are already enthusiastic and interested in participating, prioritising the value and interests of these groups (McGookin et al., 2021). This is in line with a popular critique that mission-oriented innovation policy tends to "pick winners" (Kirchherr et al., 2023, p. 5), implying that many actors and themes are excluded by default by not being considered, addressed or included in any way.

3.1.4 Objects

Objects are contested social and technical issues that become marginalized or insufficiently addressed during the formulation and implementation of MIS. Some objects are systemically excluded, such as of epistemic and normative nature (Wiarda et al., 2024), whilst others are much more context dependent (Klerkx et al., 2024).

Normative objects refer to values and standards, which are not being considered such as social justice, whilst *epistemic* objects, refers to different worldviews and ways of knowing, which are not being considered as valid sources of knowledge (Wiarda et al., 2024). Directionality is arguably the most contested dimension of MIS, understood *as* "a political process of how emerging and materializing pathways in transitions influence and are influenced by the formation

and negotiation of normative policy directions" (Graaff et al., 2025 p. 2). Furthermore, "the notion of directionality implies that certain directions of change are valued, while other directions are valued less. By providing directionality, missions promote values and represent normative visions of what futures are deemed desirable" (Wiarda, de Wildt, et al., 2024, p. 3) Therefore, *directionality objects* could be excluded pathways and solutions as well as lack of social and democratic legitimacy. Furthermore, directionality can refer to issues with how the mission itself governs the abovementioned objects as well, as inadequate support and resources for implementation (Rabadjieva & Terstriep, 2021; Rosa et al., 2021) or criticisms of favouritism towards incumbent's interests (Klerkx et al., 2024) or unacknowledged power dynamics (Kok et al., 2025).

Category	**Observed themes of exclusion in Mission related literature**	**Examples**
Antagonists	***Institutional***	Politicians & Policymakers (Molica, 2025; Normann et al., 2024) , Government Experts (Kirchherr et al., 2023)
	Incumbents	Multinationals (Bulah et al., 2024; García Casañas & Kovacic, 2025), sectorial organizations (Kok et al., 2025), regional companies (Bergek et al., 2023), technological infrastructure and digital companies (Kok & Klerkx, 2023)
	Academic	Research institutes (Klerkx et al., 2024)
Subjects	***Civil Society***	Citizens (Wiarda, Sobota, et al., 2023), grassroots initiatives (Kok et al., 2025) indigenous communities (Kok & Klerkx, 2023)
	Market	Small and medium enterprise (García Casañas & Kovacic, 2025) , socially driven business models (Klerkx & Begemann, 2020)
	Institutional	Regional governments (Borrás & Edler, 2020**)**, Cities (Parks, 2022)
	Academic	Researchers (Klerkx et al., 2024)
	End users	Citizens (de Looze & Cuppen, 2023), farmers (Kok & Klerkx, 2023), healthcare patients (Berns et al., 2020), energy communities (García Casañas & Kovacic, 2025)
	Newcomers	Start-ups (Henry et al., 2024), digital companies (Klerx & Rose, 2020)
Models	***Domination***	Choosing the actors of the mission arena (Wesseling & Meijerhof, 2023), invoking urgency (Reale, 2021) determining MIS directionality (Bulah et al., 2024; Klerkx et al., 2024) dominance of a particular epistemic and normative worldview (Wanzenbock et al., 2020)
	Marginalisation	Lobbying (Elzinga et al., 2023) , publishing favourable research to frame problem/solutions (Elzinga et al., 2023), path dependency (Graaff et al., 2025), coalition formation (Hekkert et al., 2020)
	Bias	Experience in policy processes (Klerkx et al., 2024) preference for insiders (Graaff et al., 2025) preference for scientific, evidence-based knowledge from research institutes (Chilvers et al., 2018) picking winners (Hekkert et al., 2022)
	Neglect	Tokenism (García Casañas & Kovacic, 2025, illusive inclusion & poor communication (Klerkx et al., 2024)
	Overlooking	Pre-selecting target groups (Bergek et al., 2023), favouring interest groups (McGookin et al., 2021), ignoring potential impacts of the mission (Kirchherr et al., 2023)

Objects	***Normative***	Energy justice (Chilvers et al., 2018) food justice & livelihoods (Klerkx & Begemann, 2020) democratic energy systems (García Casañas & Kovacic, 2025)
	Epistemic	Alternative narratives and worldviews (Elzinga et al., 2023; Wiarda et al., 2023) societal input (Wanzenbock etl., 2020) indigenous knowledge (Kok & Klerkx, 2023)
	Directionality	Exclusion of diverse perspectives (Bulah et al., 2024), pathway identification (Bergek et al., 2023) explorative vs exploitative pathways (Klerkx et al., 2024) bottom-up experimentation (Bergek et al., 2023) legitimacy (Parks, 2022), Unacknowledged power dynamics (Kok et al., 2025), lack of material support (Rosa et al., 2021), favouritism of incumbents (Klerkx et al., 2024)

3.1.5 Systemic constitutional structures

While Elzinga et al. identify the regime as the socio-technical status quo's both institutional and informal set of rules which "determine possibilities for emerging solutions to develop and diffuse" (2023, p. 11). MIS's capacity to transform the regime is operationalised through the MIS's destabilisation and creation of novelty (Elzina et al, 2023). Chilvers et al. (2018) defines systemic constitutional stabilities as enduring arrangements of political culture, legal frameworks, infrastructures, and socio-technical imaginaries that shape which participatory practices are deemed legitimate, and which are marginalized.

Bringing these perspectives together allows the framework to account not only for the immediate structures and actors of the MIS, but also for the deeper systemic conditions that shape which forms of exclusion become possible, normalised, and durable. Building upon Chilvers et al. notion of systemic constitutional stabilities, two separate analytical concepts are developed: *institutional* and *socio-material constitutional structures*.

Institutional constitutional structure refers to the institutions, their formal rules and procedures as well as their political cultures of governance. These institutions design and legitimise the intervention of the MIS towards a target e.g. an industry, a sector or system. The MIS normally aims to transform or accelerate desirable outcomes within the target, which will have its own socio-material constitutional structures: a set of material and social structures and relationships which determine who and what is legitimate to participate. Material is preferred to technical, to embrace fuller material realities that go beyond the technical e.g. the environment.

Taken together, these constitutional structures demonstrate that exclusion in MIS's governance is not solely the result of immediate design choices or actor strategies. Rather, exclusion is co-produced through the interplay of institutional and socio-material constitutional structures that both constrain and enable participatory practices and spaces. By making these systemic dimensions explicit, the analysis can move *beyond MIS* to explain not just how MIS function, but how they are embedded in longer-standing constitutional structures that structure inclusion and exclusion over time.

3.5 Framework operationalisation - Integrating Ecologies of Exclusion with Mission Oriented Innovation Systems

To operationalise the integrated framework of EoE-MIS, inspiration is drawn from Elzinga et al.'s (2023) assessment approach: problem-solution diagnosis, structural and functional analysis. These are repurposed to assess and diagnose exclusion within the MIS. Whilst these analytical

steps can be done linearly, in practice this will be iterative. As the analysis deepens, previous steps are revisited.

EoE-MIS's *problem-solution diagnosis* interrogates how the mission's targeted problem and associated solutions are framed. Specifically, it asks: What is the nature of the problem as defined by the mission? Which solutions are prioritised, and by whom? Is there contestation between different actors? Which alternative perspectives, knowledge systems, or values are excluded?

The main antagonists can be identified as those with the most influence in defining the problem-solution diagnosis. How the antagonists exercise their influence will determine their models and the subjects and objects which are marginalised or considered irrelevant. In addition, the problem-solution diagnosis helps identify the contours of the programming structure, which is needed for the following step.

The EoE-MIS's *structural analysis* of the MIS is disaggregated into the three parts:

- *Systemic Constitutional structures*: Beyond and pre-existing the MIS, the formal and informal rules, expectations and processes in the institutional and socio-material structures influencing the MIS.
- *Programming structure*: the governing structure of the MIS responsible steering, coordinating, and governing the mission (e.g., policymakers, government agencies, expert groups, industry representatives).
- *Performance structure*: the MIS's implementation structure involved in the development, diffusion, and scaling of solutions (e.g., researchers, SMEs, end users, civic organisations).

This step position antagonists and subjects within the different structures and identify through the models how they are excluded from or within a structure. In addition, this identifies at different scales and points where objects are excluded, within or beyond the MIS.

This step synthesises the findings from the previous steps, identifying the dynamic and interrelated patterns of exclusion that emerge within and across the structures and what antagonists, objects and subjects populate them. This initial identification of separate structures allows to analyse the aggregated effects of these separate structures on the MIS as a whole – identifying and conceptualising the MIS's Ecologies of Exclusion.

Inspired by Elzinga et al's functional analysis, this final step is not simply descriptive but diagnostic: it enables us to surface the deeper institutional logics and power configurations that shape exclusionary dynamics within the mission. By locating exclusion within a clearly bounded innovation system, we can contextualise the impact of exclusion on the mission's goals in normative, epistemological, substantive and instrumental terms and ultimately understand how exclusion is *functioning* within the MIS.

This ultimately allows us to understand how the functioning of exclusion, reshapes participation. Exclusion does not simply remove actors or perspectives from the process; it redefines what participation looks like and what it can achieve. By tracing its functioning, we can recontextualise participation across four dimensions and assess how exclusion materialises within MIS:

- *Normative Exclusion* interprets how values and actors are excluded, such as justice, and democracy e.g. Whose rights to participate are being denied or marginalised? How does exclusion undermine democratic legitimacy and social justice within the mission?
- *Epistemic Exclusion* is understood in terms of what knowledge is valid, desired and credible and by whom and which ways of knowing, values, or experiences are sidelined. E.g. How does this exclusion narrow the epistemological basis of the mission's solutions?
- *Substantive Exclusion* understands how exclusion impacts the effectiveness and robustness of policies and their desired goals e.g. How does exclusion affect the quality and resilience of the mission's outcomes? Which missing perspectives could have improved or challenged the direction of proposed solutions?
- *Instrumental Exclusion* understands how participation can be instrumentalised to the detriment of subjects or to the advantage of antagonists, and its impacts e.g. How does exclusion weaken public trust, reduce legitimacy, or hinder stakeholder commitment? To what extent does symbolic or tokenistic participation undermine the mission's long-term acceptance?

Taken together, these four lenses show how exclusion operates not only as a barrier to inclusion, but as a structuring force that shapes the very functioning and trajectory of the mission. The following chapter introduces the case study of the EU Soil Mission and outlines the methodological approach used to apply the Ecologies of Exclusion framework. It describes and justifies the selected methods - document analysis, event ethnography, and semi-structured interviews - as complementary strategies to capture both systemic and diverse perspectives, tracing exclusionary dynamics within the mission.

4. Research Approach & Methods

This section outlines the research strategy used to investigate the dynamics of exclusion within the EU Soil Mission. It introduces the study's qualitative and exploratory design, describes the case selection, and explains how data was collected through policy document analysis, event ethnography, and semi-structured interviews. This is followed by the selection and description of the case study, the EU Soil Mission, which is the unit of analysis. The final section details how the data was analysed and interpreted, using a thematic coding process guided by the Ecologies of Exclusion framework.

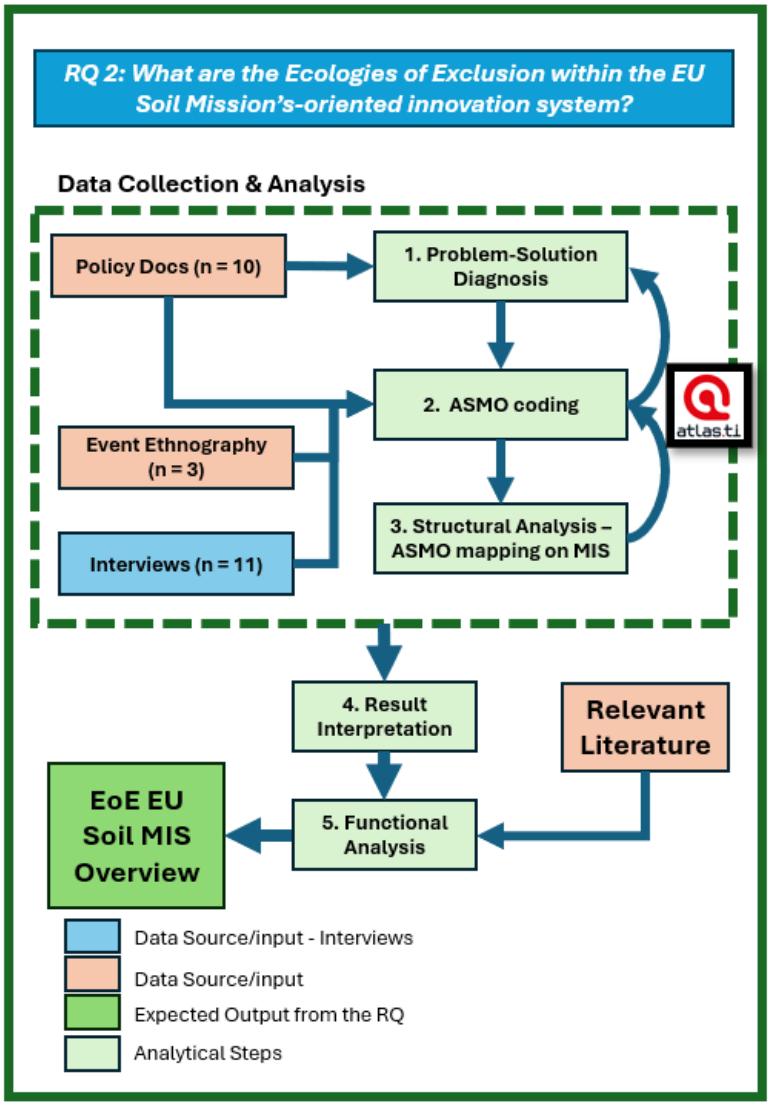

Figure 3 Research Flow diagram for RQ2

4.1 Research Design

This section describes how the second sub-question ***What are the ecologies of exclusion within the EU Soil Mission's oriented Innovation System?*** is answered. The research's approach is qualitative and explorative, consisting of document policy analysis, event ethnography and semi-structured interviews, which are used to identify antagonists, subjects, models and objects and map them on the MIS's programming, performance structure and constitutional structures. To do this in a structured manner, firstly, this requires researching the problem-solution diagnosis, which was mainly done through the interpretation of selected policy documents related to the EU Soil Mission as well as event ethnography. This provides an initial overview of how the main antagonists have defined the problem and solutions for the case study's innovation system as constructing a preliminary assessment of who and what has been or is being excluded. In addition, this allows later in structural and functional analysis to contrast with the results from the event ethnography and the interviews to identify any differences between the antagonist's problem solution diagnosis and what other actors perceive.

Secondly, the structural analysis is divided in two parts: coding and mapping. Policy documents and the data collected from event ethnography observations and semi-structured interview

answers are interpreted and coded through the previously identified MIS Ecologies of Exclusion framework. While the research is predominantly deductive, elements of inductive inquiry are also present, especially to finetune existing codes. The insights generated from these different sources may reveal patterns or perspectives that were not fully anticipated by the initial theoretical framework. Although the primary aim of the empirical research is not to develop new theory, these emergent findings have the potential to inform refinements to the framework or suggest avenues for future research. In this way, this research remains open to inductive learning without making it a central methodological focus.

Then, the results are mapped upon the case study's MIS programming, performance structure and identified institutional and socio-material constitutional structures. At this stage, multiple iterations are expected as a deeper understanding of the MIS and dynamics at play emerge. This helps identify the boundaries of the specific structures, the ASMO that populate them and how these different structures interact with one another to form the MIS's ecologies of exclusion

Thirdly, the problem-solution diagnosis and structural analysis are contextualised within the literature. The empirical results are non-exhaustive and still require to be interpreted and contextualised both socially and scientifically. Therefore, from now on the analysis becomes an abductive approach, by combining the empirical data observed with theory and relevant research, to fill in any existing gaps and identify divergences and convergence between theory and observation

Furthermore, the problem-solution diagnosis, which has been performed from the antagonist's perspective through the analysis of official publications, is contrasted with the results from interviews and ethnography. Combined with literature, they allow to identify broader and deeper relations and issues within the MIS and the pre-existing institutional and socio-material constitutional structures, leading to the conclusive identification and interpretation of the Ecologies of Exclusion of the EU Soil Mission

Lastly, the functional analysis, analyses the identified Ecologies of Exclusion and interprets how exclusion is functioning and how this defines and materialises through the four dimensions of participation: normative, epistemological, substantive and instrumental. This step provides the final answer to the main research question: ***How do exclusionary dynamics materialise in Mission-oriented innovation systems?***

4.2 Case Selection & Description

This section describes provides an overview of the case study: the EU Soil Mission. This meet meets the criteria – clear goals, time bound, lead by the public sector, and aiming to be transformative, aiming for a wide variety of scientific, technical and social solutions to the problem of soil degradation. In addition, the EU Soil Mission impacts the food system, which is one of the most researched type of MIS (Klerkx & Begemann, 2020; Kok & Klerkx, 2023) and due the EU's goals within the food system, research into tensions around food system transformation can be particularly relevant (Gomes & Reidsma, 2021; Matthews, 2024; van der Ploeg, 2020).

In recent years, there has been increasing awareness on the consequences of unhealthy soils. Soils not only make life on land possible, but are essential for water, nutrient and carbon cycles but produce food, flora and raw materials which are essential to human life (EC, 2021). The EU has a wide variety and rich number of soils, playing an essential role in our food systems and biodiversity. However, approximately 60%-70% of the EU's soil is considered unhealthy (EC, 2021). The European Commission concludes that "Land and soil continue to be subject to severe

degradation processes such as erosion, compaction, organic matter decline, pollution, loss of biodiversity, salinisation and sealing. This damage is the result of unsustainable land use and management, overexploitation and emissions of pollutants."(EC, 2021, p. 1). If no action is taken to reverse this trend, the EU will not only lose the foundation for its own food system, but will be far more unpredictable local water and nutrient cycles as well as much more vulnerable to droughts and floods (DG R&I, n.d.)

Therefore, the EU has developed the Soil Strategy. The EU Soil Mission is the main policy instrument of the EU's Soil strategy (EC, 2021). The Soil Strategy "sets out a framework and concrete measures for protecting, restoring and sustainably using soils and that mobilises the necessary societal engagement and financial resources, shared knowledge, sustainable practices and monitoring to reach common objectives."(EC, 2021, p. 2).

Kickstarted in 2019, the EU Soil Mission's goal is to "establish 100 Living Labs and lighthouses to lead the transition towards healthy soils by 2030" (DG R&I, n.d.). Soil Living Labs is where innovative and experimental soil practices are implemented, in collaboration with a wide range of stakeholders. The practice itself of Living Labs (LL) is innovative, experimenting in real life conditions and end-users, such as commercial farms (DG Research and Innovation, n.d.). Lighthouses are places to showcase and share the findings from LLs.

These 100 LLs, are developed to innovate towards the Mission Soil's eight objectives:

1. Reduce land degradation relating to desertification
2. Conserve and increase soil organic carbon stocks
3. No net soil sealing and increase reuse of urban soils
4. Reduce soil pollution and enhance restoration
5. Prevent erosion
6. Improve soil structure to enhance soil habitat quality for soil biota and crops
7. Reduce the EU global footprint on soils
8. Increase soil literacy in society across Member States

According to the Mission's Implementation plan, the goal is to reverse the trend of unhealthy soils to only 30-40% by 2030, and have healthy soils overall by 2050 (DG R&I, 2021c).

The unit of analysis is defined as the MIS of the EU Soil Mission. The MIS's is the innovation system that has emerged for the mission as well as the systemic constitutional structures, both institutional and socio-material that condition the MIS.

4.3 Data Collection

This section outlines how empirical data was gathered across the three selected methods: policy document analysis, event ethnography, and semi-structured interviews. Each method was chosen to follow the steps identified in the analytical framework as well as to capture distinct but complementary facets of the Mission's potential ecologies.

Policy Documents

The policy documents provide a chronological overview on how the Mission's institutional stakeholders frame the problem and solutions for unhealthy soils as well as emerging tensions and challenges in the implementation. The document analysis was conducted for EU Soil Mission policy documents between the mission's creation in 2019 to 2025 (Table 2). Due to the vast number of documents related to the EU Soil Mission, two initial databases were selected as they contained self-selected relevant documents by the EU Soil Mission: the EU Soil Mission Platform's Resource Library and the SOILL's resources database.

Within the EU Soil Mission Platform, the goal was to identify documents which reflect high-level institutional priorities, agreements, and scientific perspectives, making them representative of the performance structure. Including these documents ensures the analysis captures the mission's formal problem-solution diagnosis as well as related documents. Furthermore, policy documents were selected only if authored by Mission Board, the European Commission, an EU agency or a Directorate Generale (DG) and if the policy document is specifically about the EU Soil Mission. Therefore, within the database, only documents which met these criteria were considered.

SOILL's resources database was selected to reflect the programming structure, focusing on stakeholder engagement, knowledge exchange, project support, and funding processes, offering insights into how the mission's goals are translated into action. Therefore, documentation published by SOILL which is specifically about guidelines for potential and current participants as well as implementation progress updates, were included. In cases where multiple versions of similar guidelines existed, the most recent version at the time of analysis was selected to ensure the data reflects the latest mission practices.

Table 1: List of policy documents used for analysis

Item	Year	Title	Repository	Description
P1	2020	Caring for soil is caring for life	Mission Soil Platform	The Mission Board's proposal to the European Commission for a mission in soil health and food (Mission Soil Board, 2020).
P2	2021	Communication from the Commission to the EU on European Missions	Mission Soil Platform	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the importance and purpose of each European Missions (DG R&I, 2021b)
P3	2021	Soil Mission Implementation Plan	Mission Soil Platform	Implementation plan developed by the DG Research & Innovation on how to achieve the mission's goals (DG R&I, 2021a)
P4	2021	Mission Area: Soil Health and Food Foresight on Demand Brief in Support of the Horizon Europe Mission Board	Mission Soil Platform	Scientific and technical report developed by the DG Research & Innovation with the aims of supporting the Mission Board on Soil Health and Food in developing the building blocks of the mission and in the identification of priorities (Giuffré et al., 2021)
P5	2022	Communication and Citizen Engagement Initiatives in line with the Horizon Europe Mission 'A Soil Deal for Europe'	Mission Soil Platform	Study by the DG Research & Innovation aims to identify and map out good examples of soil-related activities and initiatives launched by, co-developed with or targeted at citizens that can serve as a basis for further actions to be financed under Horizon Europe and support the

				implementation of the EU Mission “A Soil Deal for Europe” (DG R&I, 2022a).
P6	2023	Mission Soil Board’s view on Soil Health LLs under Horizon Europe	Mission Soil Platform	The Mission Board’s sharing their analytic framework of the features and expected outcomes of soil health LLs (LLs) expected to be implemented under Horizon Europe (Mission Soil Board, 2023)
P7	2024	One year into the Mission Soil Key takeaways and recommendations for the LL community	SOILL Publications	SOILL’s report highlights key findings and recommendations gathered during two sessions on the Mission “A Soil Deal for Europe.”, with participants form ongoing Soil Mission projects (SOILL, 2024b).
P8	2024	Catalogue 2024 - Mission Soil LLs and LHs	SOILL Publications	SOILL’s report, created with input from each of the LLs, provides an initial overview of the planned work, scope, and ambitions of these LLs as they embark on their journey toward healthier soils across Europe (SOILL, 2024a)
P9	2024	Social sciences, humanities, and the arts in the EU Mission “A Soil Deal for Europe”	Mission Soil Platform	The Mission Board seeks to enhance the understanding of the relevance of social sciences, humanities, and the arts in soil research (Mission Soil Board, 2024)
P10	2025	SOILL Monitoring and Evaluation Guidelines - A complete guideline to the SOILL Monitoring & Evaluation process for Soil Health LLs	SOILL Publications	This document provides a comprehensive monitoring and evaluation framework to assess, support, and certify Soil Health LLs (SHLLs) under the EU Mission "A Soil Deal for Europe," ensuring they align with mission objectives through standardized criteria, stakeholder engagement, and continuous learning (SOILL, 2025)

Event Ethnography

To complement the document analysis, an event ethnographic approach was employed by attending the EU Soil Mission Week on 12th–13th November 2024 and PREPSOIL’s LL Implementation final event on the 26th May 2025. The event ethnography allows to engage with the most pressing, dynamic and live issues in the MIS, which reflect more faithfully the current situation beyond policy documents and the specific perspective of interviewees. This method provided an opportunity to engage directly with the broader network of actors, institutions, and ongoing processes involved in the mission. Event ethnography offers valuable, real-time insights into the dynamics of stakeholder interactions, institutional priorities, and emerging themes, including information not always captured in official documents (Campbell et al., 2014).

During the event, detailed observations were gathered, focusing on the language and topics in formal sessions and the responses from participants, such as the Q&A. This allowed to observe how mission stakeholders were framing ongoing challenges, priorities, and future directions and expectations for the mission and the responses of participants, with a special focus on moments of tension and disagreements, during panel discussions, among participants and Q&A.

When possible, the observations are further contextualized and cross-validated against the EU Soil Mission Week summary report (Mission Soil Platform, 2025) to ensure accuracy and alignment with the event’s official takeaways as well as the YouTube recordings of the event posted by the organisers. This combination of firsthand observation and official reporting helps capture not only the formal outcomes of the event but also the more subtle dynamics and tensions present among participants.

Table 2: List of events used for empirical phase (for event observations, see Appendix I)

Item	Event	Description	Date & Location

E1	Soil Mission Week 2024 - Event	Yearly event which congregates Mission participants and outsiders alike to share the progress of the Mission	12th-13th November 2024, Brussels
E2	Soil Mission Week 2024 – Co-creation workshop	Co-creation workshop about soil remediation during the Soil Mission Week, which served as input for policy guidelines	12th November 2024, Brussels
E3	PREPSOIL Final Event: Facilitating the deployment of the Mission Soil across European regions	Event that concluded the PREPSOIL project which had the mandate of preparing the LL implementation and served as day of reflection with experts and LL practitioners from the Mission	26th May 2025, Brussels

Semi-structured interviews

Interviews allow to engage deeper with different stakeholder and their perspective and experiences with the MIS. Semi-structured interviews of 45–60 min was scheduled with different stakeholders of the EU Soil Mission ranging from the Board to non-participants, relating to how inclusive and/or exclusive the MIS is. The goals of the interviews are:

- Integrate diverse perspectives into a comprehensive view of the ecology of exclusion of the mission, from participants and non-participants alike
- Provide perspectives which cannot be found in policy documents
- Provide more in-depth data about issues within this specific innovation system

As the mission is European, interviewees range from institutional actors in Brussels to participants from all around Europe. Interviewees were contacted through publicly available information. The first question helps the interviewee reflect on *"inclusion"* and "*success*", whilst each of the following questions helps the interviewee provide their perspectives on antagonists, subjects, objects and models.

Table 3: Open questions & rationale (for handbook see Appendix II)

Item	Question	Rationale
1	The EU Soil Mission aims to be inclusive. How successful do you believe the mission has been in achieving this goal?	General overview of inclusion and participation of the mission. This sets the stage by capturing the interviewee's perception of the mission's inclusivity.
2	Who do you think are the most influential actors in the EU Soil Mission? How and/or why do they exercise their influence?	Inquiring about **antagonists** and their **models**. This question helps identify who and how power is exercised
3	What actors do you think are not adequately represented? How and/or why this happens?	Inquiring about **subjects** and how they are **excluded**. It aims to uncover who is being left out and the reasons behind it.
4	Are there any technical or social issues that you think are not being adequately addressed? How and/or why this happens?	Inquiring about **excluded epistemic and normative objects**. This question explores objects which the interviewee considers might not adequately included
5	What barriers, if any, do you perceive in the mission's structure or approach that might be limiting inclusion?	Inquiring into **models** of exclusion (e.g., domination, marginalization, bias, neglect, overlooking). This helps uncover structural or procedural barriers that may reinforce exclusion.

Interviews proceeded as stipulated in the Interview Handbook, developed for this research (Appendix II), to ensure the interviewee's informed consent and keep them adequately informed about what to expect before, during and after the interview; as well as ensure a structured and

replicable approach. The interviews were online calls through Microsoft Teams, which were recorded, transcribed and anonymised, all data and identities remaining confidential.

All interviews had the same open questions. The semi-structured approach allows the interviewer discretion to explore further the interviewee's responses and their experience. The open questions were based on the framework but rephrased to make them accessible to the interviewees without needing to understand the theoretical framework. Table 3 showcases the questions. At the end of the interview, interviewees were given a chance to reflect and share anything they believed could be relevant.

Table 4: Type & total number of interviewees

Type of Stakeholder	Description	Number of Interviews
EU Soil Participants	Involved in the designing and implementation of the EU Soil Mission LLs	A1, A2, A3, A4
EU Soil Mission Management & Leadership	EU administrators and managers leading the implementation of the Soil Mission or Mission Board Members	B1, B2
Non-EU Soil Mission Participants	Actors who are not involved in the EU Soil Mission's leadership or projects but are aware of/collaborate with the Mission	C1, C2, C3, C4, C5

After the interview, a summary of the answers was produced per each interviewee as well as identifying relevant quotes which could be relevant to share within the research, which was deemed the interviewee's report. This report was anonymised and used for the analysis. The final version of the thesis was shared with them, with the final summary of the report in case they wished to retract any data.

4.4 Data Analysis

This section explains the different steps in the analysis. Firstly, how the Problem-Solution Diagnosis is constructed. Secondly, using Atlas.ti (version 25), the coding was applied on selected policy documents, event ethnography observations and interview reports were thematically coded. Thirdly, these results are aggregated and mapped upon the EoE-MIS framework and help identify the Ecologies of Exclusion. Lastly, how the results are interpreted in a separate chapter.

Problem-Solution Diagnosis

To understand how the EU Soil Mission defines the problem of soil degradation and frames its proposed solutions, the problem–solution diagnosis draws on policy documents and event ethnography. The former provides the formal institutional perspective as documented, whilst the latter provides a far more current and visible framing. These sources are used to identify dominant framings and any visible divergences or contestations, capturing how antagonists articulate the mission's purpose and strategy. It also helps identify early signs of exclusion by revealing whose problems are being addressed, which solutions are considered legitimate, and whose perspectives are absent or marginalised.

Coding

Themes were previously identified in the theory conceptualisation of the MIS-EoE, which identified types of antagonists, subjects, models and objects (ASMO). Furthermore, codes were

added inductively if these were not covered by the original framework. Most inductive coding is product of more specific and clear codes for previously identified deductive codes from the EoE-MIS framework. For example, the Subject type "*User*", within the context of the Soil Mission, can be specified as "Farmer" and "Forester".

Table 5: Deductive code has been documented in the following table, with a description and examples to guide analysis (for further details see Appendix III)

EoE	Type	Description	Example
Antagonist	*Institutional*	Public sector actors who decide and broker the MIS	*DG AGRI*
Antagonist	*Incumbent*	Economic actors who have influence within policy-making due to their sectorial relevance	*Bayer*
Antagonist	*Academic*	Actors from the research sector who collaborate and validate institutional and incumbent position and interests	*Wageningen University*
Subject	*Civil Society*	Civil Society actors who are excluded or underrepresented in MIS, normally with social and civic goals	*NGO*
Subject	*Institutional*	Public sector actors who are excluded or underrepresented in MIS	*Local Authorities*
Subject	*Market*	Economic actors who are excluded or underrepresented in MIS	*Advisory Services*
Subject	*Academic*	Academic actors who are excluded or underrepresented in MIS	*Social Scientists*
Subject	*End Users*	End users of the mission who are excluded or underrepresented in MIS	*Farmers*
Subject	*Newcomers*	New actors introduced by the mission but who lack resources, networks and influences to participate effectively	*Soil Health Start-up*
Model	*Domination*	Explicit and direct exclusion exercised by institutional antagonists	*Budget control*
Model	*Marginalisation*	Implicit and direct exclusion exercised consciously by institutional, academic and incumbent antagonists	*Agenda Setting*
Model	*Bias*	Implicit and indirect exclusion exercised inadvertently by institutional, academic and incumbent antagonists	*Preference for regenerative farmers*
Model	*Neglect*	Exclusion by institutional antagonists by inadequately including subjects	*Unpaid Mission Ambassadors*
Model	*Overlooking*	Exclusion by institutional antagonists by inadvertently not considering excluded subjects and objects	*Not considering inviting medium-sized farmers*
Objects	*Epistemic*	Issues on how to understand and what knowledge is valid	*Farmer's perspectives*
Objects	*Normative*	Issues on the values and worldviews of the mission	*Distribution of responsibilities*
Objects	*Directionality*	Issues on the direction of the mission	*Lack of co-creation*
Objects	*Mission Governance*	Issues on how missions manage issues and the implementation of the mission	*Struggles to raise awareness*

At the conclusion of the analysis, the most relevant codes are aggregated into the most relevant and important themes.

As the policy documents and the event ethnography were readily available at the time of analysis, these were coded before the interview reports. Analysing first the policy documents and event

ethnography allows to initially contextualise the framework into the specific case study and helping identify significant gaps that can be addressed in the interview, specifically the relations between the ASMO initially identified. The unit of coding consisted in individual sentences, unless more context is required to make sense of the code choice. Coded sentences are attached to pre-identified ASMO types or to new codes identified specifically in this case study. Another example related to code hygiene is that all new codes generated during the analysis will be stored in separate code groups from the initial MIS-EoE's framework to differentiate between pre-existing (deductive) and new codes (inductive).

A Coding Handbook was developed with rules and guidelines to analyse the data, help identify patterns, keep the coding neat and provide a structured and replicable approach (Appendix III). An example of a coding guideline to help identify patterns is whenever an antagonist is identified, whenever explicitly possible this should be attached to a model of exclusion. If this is possible, then the next step would be connected to a subject or object. This way the coding can help identity patterns between an antagonist's enaction of exclusion towards specific actors or topics.

Aggregating results

Once all data is coded the compilated coded sentences per ASMO type are manually analysed to identify patterns and trends relating to each other. Initially, the focus will be on the most relevant and important findings and mapping these along the framework. This will be followed by identifying gaps and iteratively reviewing the codes and the data to see if there are further codes.

Based on this, the results identify and describe the relations among the ASMO within different ecologies concluding with an overview of the EU Soil's mission Ecologies of Exclusion.

Interpreting results

The final step connects the analytical components through an abductive interpretation of the findings using literature. It begins with a synthesis of the problem–solution diagnosis, contextualised with interviewee responses and ethnographic results. This is followed by an interpretation of the empirical results of the structural analysis, providing a final iteration of the Soil MIS's Ecologies of Exclusion. This is followed by the functional analysis using the normative, epistemic, substantive, and instrumental dimensions.

These results are divided in the following two chapters. Chapter 5 presents an overview of the results for the problem solution diagnosis and the structural analysis, whilst Chapter 6 presents the abductive analysis and the functional analysis.

5. Results

The following chapter presents the findings from each of the three research methodologies employed: policy document analysis, event ethnography, and stakeholder interviews. As each method identifies antagonists, subjects, models and objects from the Ecologies of Exclusion framework, in the final sub-section the most relevant are mapped (see Table 6 in this chapter) and the results form the different methods are integrated into the EU Soil's Mission five identified ecologies of exclusion. This analysis further elaborates how these ecologies relate to one another.

5.1 Policy Documents

This subsection synthesizes findings from the analysis of key policy documents related to the EU Soil Mission, as identified in the Methods section. The results focus on the problem framing, solution approaches, and divergences within these framings as well as what the policy documents reveal about the current trends and state of implementation.

Problem Framing

The Mission's Board proposal frames soil degradation as an urgent and existential threat as "Life on Earth depends on healthy soils"(2020, p. 3), and identifies our society and economy as the cause as "Soil degradation is largely driven by how we live"(2020, p. 3). Unhealthy soils are product of human activities, especially "unsustainable management practices in agriculture and forestry, contamination from industries and soil sealing through urbanisation and infrastructures. Food choices, processes in the food chain and food waste are also affecting soil health"(Mission Soil Board, 2020, p. 8). This problem framing situates our current society as the main antagonist, identifying those who are impacted by the European Union's society and have no say or capacity to act: future generations (Mission Soil Board, 2020, p. 9), soil (Mission Soil Board, 2020, p. 28) and the rest of the world (Mission Soil Board, 2020, p. 6). Most documents in this analysis are rooted in this problem framing which identifies society as the main antagonist and the urgent need to act for the sake of future generations, the soil itself and to reduce our impact on the rest of the world.

Therefore, the DG R&I justifies to the EU institutions why the mission as a policy instrument is needed, as "continuing with the status quo is not an option" (2021b, p. 1). Missions serve to "...go beyond the existing instruments. EU Missions are designed to do things differently" (DG R&I, 2021b, p. 1,2).

The Mission's Implementation plan explicitly identifies the following issues as hampering progress towards soil health: knowledge gaps, limited data access, context and stakeholder-insensitive solutions, inadequate monitoring capacities, and a general lack of awareness and expertise in soil-related matters (DG R&I, 2021c, p. 18).

Solution Framing

The Mission's solution framing is rooted on two pillars. Firstly, to develop 100 LLs (LL) by 2030. Secondly, these LL must address one of the eight selected indictors for the mission, of which seven are environmental and scientific and the eighth is social, based on soil literacy. The implementation plan identifies four operational objectives for the mission:

1. Build capacities and the knowledge base for soil stewardship

2. Co-create and upscale place-based innovations (such as LL) to improve soil health in all places
3. Develop an integrated EU Soil monitoring system and track progress towards soil health
4. Engage with the soil user community and society at large

These operational objectives are expected to crosscut through business, digital, territorial and international dimensions to "…trigger profound, systemic changes, mission activities address both, soil health itself and the drivers of soil health such as land use practices, markets and value chains across agri-food systems, consumer behaviour, policies, regulation and education and advice" (DG R&I, 2021c, p. 19).

	2021	2022	2023	2021 - 2023	budget share 2021 - 2027 (%)
1. R&I programme	33				32
2. Living labs and lighthouses	2				40
3. Monitoring and indicators	12				14
4. Soil literacy, communication and citizen engagement	15				7,5
5. Support structures and governance	5				1,5
6. Scaling out - InvestEU	0				5
TOTAL	67	95	158	320	100

Figure 4 Indicative budget for first three years of Mission "A Soil Deal for Europe" (DG R&I, 2021c, p. 50)

Programming Structure's is rooted in pre-existing EU policy instruments, mainly Horizon Europe and CAP. This determines and limits the Mission's capacity to set the terms for procurement, funding and potentially the nature of the projects. The 2021-2027 budget highlights how Soil Literacy, communication and citizen engagement is the least funded by far (7,5%), with research and innovation and LLs concentrating 72%, highlighting a preference technical and scientific knowledge and experimentation. How or why, this was decided is not explained. Relying on existing infrastructure and institutional buy in, implies that many of the challenges that normally exist for inclusion and participation, may also exist in the Mission.

Soil Literacy

The Mission Board uses the systemic nature of the challenge to advocate for shared responsibility of actors and how their actions need to change, hence the "…need to focus on communities (land managers, citizens, consumers, stakeholders, researchers, advisors, policymakers, industrialists)" (2020, p. 10). However, the Mission is also seen as a democratic opportunity, asserting the critical need to re-set the relationships with citizens and local communities, empowering them to become "soil stewards" (DG R&I, 2021b, p. 7) and to "…put communities and stakeholders at the centre of the innovation process" (DG R&I, 2021b, p. 5). Citizens are considered essential as sources of legitimacy and advocates for change (DG R&I, 2021b; Mission Soil Board, 2020), with specific research focused on their role in raising awareness, communication and engagement, especially in schools and arts (DG R&I, 2022b). DG R&I identified communication and citizen initiatives which are in line with the mission's goal on soil literacy. These initiatives were focused on urban and rural areas alike, broad consultation and occasional co-production with citizens, highly focused on educating schoolchildren and a wide variety of art and communication materials for educational purposes (2022).

Living Labs

The Living Labs (LL) novel approach and language, such as "co-creation", emphasize the Mission's prioritisation of stakeholder involvement and engagement for a variety of reasons. Whilst the Mission finances other research projects that can assist the overall goals of the Mission, the focus is on the LLs. In late 2023, the Mission Board released guidance on expectations of LL and their outcomes within the scope of soil health. LL should explicitly contribute to one of the eight specific goals and should aim to involve land managers, land users, academics, industry representatives, and "…a mixture of public and private body representatives particularly those involved in local policy making and governance. The involvement of citizens should also be foreseen."(Mission Soil Board, 2023, p. 10).

Guidance is provided to harmonise comparability of data and experiences, as LL projects are expected to both have multiple sites at similar regional level and gathering partners from at least three different Member States. The Mission Board's evaluation framework for LL proposals is structured around three key criteria: *Excellence*, *Implementation*, and *Impact*. The *Excellence* criterion emphasizes comprehensive, context-sensitive, and methodologically robust project design, requiring applicants to clearly justify their thematic focus, stakeholder engagement strategies, real-life research methodologies, and plans for monitoring, upscaling, and knowledge diffusion. The *Impact* criterion focuses on long-term sustainability, expecting proposals to articulate strategies for continuation beyond EU funding, measurable improvements in soil health, community empowerment, societal engagement, and the relevance of dissemination and communication plans for diverse target audiences. Finally, the *Implementation* criterion assesses whether proposals anticipate the complexity of orchestrating co-creation across multiple sites and allocate sufficient resources for coordination, collaboration, and integration with other projects and the broader LL network. It also examines the consortium's composition and whether roles are clearly defined to support the sustainable launch and operation of the LLs.

Currently, the mission has funded five LL projects Horizon Europe. With each project consisting of five LLs each, the mission currently totals 25 LLs in development. The first wave of LL, 16 are in Spain (5), France (4), Greece (4) and Italy (3), showing a strong inclination towards the Mediterranean region. The most popular objective is Soil Literacy (20), followed by Carbon Stocks (19) and Soil Biodiversity (19), Erosion (13), Pollution (12), Desertification (3), with both Urban Soils and EU Footprint with zero LL. Most LLs are focused on the land type of agriculture (25), followed by Forestry (6) and Natural (6), peri-Urban (2) and post-Industrial (1) (SOILL, 2024a).

Respective to stakeholders, LLs show a wide variety in number and type. Some LLs have more than 16 stakeholders, whilst others only have two. Most stakeholders are primarily universities and research institutes followed by national, regional and local authorities as well as civic organisations, chambers of commerce, cooperatives and SMEs, of all types. Only two multinationals were identified: Danone, a global food product company, and Summit Agro, a global agrochemical supplier.

In late 2024, lessons learnt after the first year of the LL's implementation were published by SoiLL. SoiLL summarises findings from different perspectives of institutions, the Mission Board and LL experts, highlighting in particular the importance of local communities' s long term commitment, dealing with community resistance to change and engagement, improving robust monitoring and evaluation frameworks, developing adaptive management to respond to feedback, improving knowledge transfer and technical support for users, establishing clear and effective multi-

stakeholder governance, considering geographic and climatic conditions and developing sustainable business models due to limitations in resources and budgets.

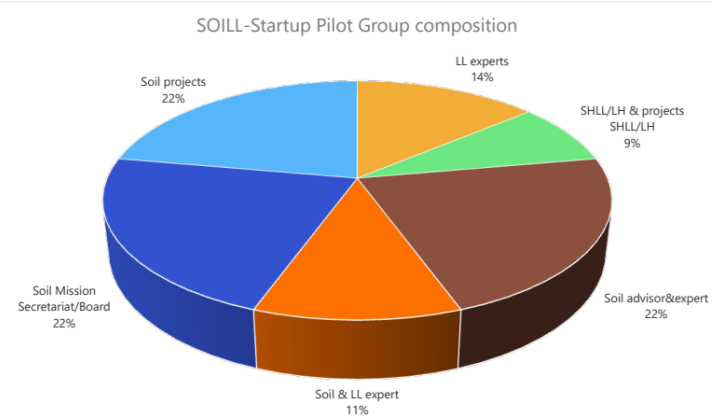

Figure 5 Composition of the SOILL Startup Pilot Group (SOILL, 2025 p. 14)

In early 2025, SoiLL published the Monitoring and Evaluation Guidelines, which are a mandatory requirement for all Soil Mission funded labs (SOILL, 2025). The framework was co-created by Pilot Group through 2024, which consisted of the Mission Secretariat (DG Agri and REA), Mission Board members, soil and LL advisors, experts and practitioners as well as participants from the Mission's own projects and LL (see Fig. 4), with the report explicitly mentioning the Mission Secretariat "...played a particularly strong role, ensuring that the framework aligns with EU policies while supporting the reporting obligations of the Mission Soil Initiative"(2025, p. 14). EUSO and the Mission Board also played a fundamental role in providing insights into soil monitoring, soil health indicators and data collection and comparability methodologies.

The purpose of the SOILL M&E framework is "...to generate meaningful insights that support the continuous improvement of soil health LL activities while ensuring alignment with Mission Soil objectives. By systematically tracking progress, the framework enables evidence based decision-making and fosters learning within the LL community"(SOILL, 2025, p. 15). Monitoring specifically provides data on performance and outcomes to align LL with Mission Soil objectives; evaluation assesses progress against the pre-defined objectives and criteria; and learning uses all these data to develop implementable guidance to improve performance, policy and improve impact. Lastly, this framework serves SOILL to certify soil health projects which are performing according to their adherence to Mission Soil criteria.

Divergence with institutional problem and solution framing

Within the policy document selection, two documents present substantially different perspectives on the predominant institutional view and this arguably has significant impacts on participation. The "Foresight on Demand Brief in Support of the Horizon Europe Mission Board" report is the main scientific report backing the Soil Mission. The report provides integrated solutions to soil health through a systems approach, maps key soil management practices against EU mission goals and impact indicators, and provides conceptual guidance for designing LLs and Light Houses with criteria centred on soil health outcomes (Giuffré et al., 2021). Though the report shares a similar existential problem framing, it diverges from the institutional solution framing by focusing on a specific set of stakeholders, identifying who are key actors of change, what are the barriers and what kind of soils should be targeted.

Initially, the report analyses different scales of the food system from local field and farm to global food system, explicitly focusing on the role of farmers in regional and national food systems and global trade systems as well as the impacts and issues of the conventional industrial model. In contrast to the EU's institutional perspective, which places responsibility on the whole of society and its activities, the report explicitly identifies industrial agri-food incumbents, who concentrate

the production of "…fertilisers, agrochemicals, machinery, animal and plant genetic materials, as well as international commodity trade, food processing and retailing are dominated by a surprisingly small number of players operating all over the world, determining the range of choices available to producers and the behaviours of customers."(Giuffré et al., 2021, p. 29). The report proceeds to describe how the concentration of economic power allows these incumbents to influence institutional actors through lobbying and pressure as well as shaping the agenda of public research.

Furthermore, this report acknowledges the essential wickedness of soil health as "…In agricultural production systems, the challenge is to improve the production function of the soil while maintaining or even improving the other soil functions" (Giuffré et al., 2021, p. 20) and how this conundrum is the most relevant for the farmer, who depends on high yields for their livelihood. In the policy documents, the EU Soil Mission does not seem to even acknowledge many of these tensions. The report emphasizes that most of the farm practices which improve the Mission's soil health indicators, will be slow and potentially reduce yields in the short term hence suggesting "Farmers need a financial buffer to survive through this transition period" (Giuffré et al., 2021, p. 21). This report clearly identifies the farmer as the main subject within the food system, excluded both by institutional and incumbent antagonists.

This report inadvertently challenges the problem and solution framing underlying the Soil Mission and reveals power dynamics within the mission arena, which have remained unacknowledged. Whilst institutional actors are expected to filter scientific advice into politically relevant and expedient policy, arguably DG R&I and other EU institutions are ignoring many of the key insights from their scientific advice, creating antagonist and subject relations within the Mission Arena itself, between scientists and institutional actors. This highlights the exclusionary potential of institutional antagonists and their worldview in marginalising normative objects – such as wellbeing of farmers who implement soil friendly practices - and obfuscating tensions and issues related to industrial farming, which disappear in the nebulous language of soil health, LLs, co-creation and citizen science, communication and engagement.

In late 2024, the Mission's Board published a point of view on the underrepresentation of social sciences, humanities and arts (SSHA), advocating that LLs should be co-designed with social groups and include robust SSHA leadership, specialists and methodologies from the start. The Mission Board argued for the importance of "…understanding the concerns of social groups and designing methodologies for addressing these concerns" (2024, p. 11).

Furthermore, the report criticises that the "…engagement with SSHA continues to be largely dominated by the knowledge deficit model, in which problem framings are developed within the natural sciences and SSHA are mainly tasked with societal engagement with those framings" (Mission Soil Board, 2024, p. 6). The Board argues that without serious and rigorous engagement of SSHA, the "…claims that the work of the Missions will be embedded in social and cultural contexts are empty without structures that can understand the type of research needed to achieve this aim, where this research is produced and developed, and how to recruit leading researchers to participate" (2024, p. 9).

The Mission Board concludes that specific pre-funding mechanisms are required to address the limitations imposed by Horizon Europe procurement process, the knowledge deficit model and go beyond the limitations of the current paradigm:

"...to ensure the participation of a range of actors. Many important players operate outside academia or other formal institutions; it must be possible to account for their participation in funding mechanisms. Communities engaged in transdisciplinary research must go beyond policymakers, corporations, or the main sectoral organisations (e.g. national foresters' or farmers 'unions)" (Mission Soil Board, 2024, p. 13)

These prefunding mechanisms would "...prevent privileging a narrow group of well-networked research organisations and to enable inclusion of a variety of social groups" (Mission Soil Board, 2024, p. 14). This report is strongly criticising the current approach within the Soil Mission, the reliance on the default approach within Horizon Europe - the knowledge deficit model – and how by not adequately including potential, under resourced participants in the process, there is a serious risk of not fulfilling the required social transformation of soil relations.

In the context of the other documents analysed in this selection, a stark contrast emerges where there seems to be two potential directionalities emerging within the Soil innovation system. The predominant direction is rooted on techno-scientific knowledge, normative and epistemic axioms. For example, some of the lessons learnt by the Mission in relation to rural communities' s resistance to change, is addressed as a technical problem as "...low motivation often hinders participation. Financial incentives can encourage involvement, while co-creating technologies with farmers ensures that solutions are practical and readily adoptable" (SOILL, 2024c, p. 9). The Mission Board's point of view would probably argue that low motivation can be addressed by genuinely engaging with these communities first and co-producing and co-creating what is the problem to be solved before developing the LL project – or at least leave enough openness for this in the LL.

5.2 Event Ethnography

This subsection details observational insights and reflections from ethnographic research conducted at key EU Soil Mission events. It provides a critical examination of how participation and stakeholder engagement are enacted, the alignment between discourse and practice, and how event dynamics reflect broader patterns of inclusion and exclusion within the Mission's initiatives (for further details, reflections and observations see Appendix 2).

European Soil Mission Week – 12-13th November 2024 - Event

Figure 6 LL panels at EU Soil Mission Week (Brussels, November 2024)

Organised by the European Commission in collaboration with the JRC, the event serves to share progress, updates and big picture updates with participants of the EU Soil Mission as well as other stakeholders. The problem framing remained existential and urgent, emphasizing the soil degradation as a threat to food security, human and nature wellbeing, biodiversity resilience and water cycles, necessary for Europe's

economy and wellbeing. In addition, soil was characterised as a strategic resource, imperative for European economic competitiveness and sovereignty. Similarly, the solution framing emphasized that the way forward is through research and innovation in soil monitoring and health, requiring a multi-dimensional approach integrating social, economic and environmental indicators. Europe's "soil guardians", such as land managers and farmers, as well as citizens had to be on board with the mission, as their support and commitment were critical for long term success.

Figure 7 Dr. Anna Krzywoszynska during her speech

The above problem and solution framing was challenged earnestly by two speakers: Alexander Bernhuber, Member of European Parliament and Dr. Anna Krzywoszynska, EU Mission Soil Board member. MEP Bernhuber's challenged the established framing of the problem as well as emphasis on digital solutions, suggesting that farmer's do not need databases, but less regulation and pressure from Brussels. The MEP celebrated the LL approach, reflecting the correct step towards being closer to farmer and citizens, but also insisting that farmers are looking for more dialogue to do things differently. The MEP concludes that this will take longer than the current approach but will deliver better, long-lasting results. On the second day, Dr. Krzywoszynska's speech passionately highlighted how much of the discussion was about caring soil, with little regard about the conditions of soil carers, our "soil guardians". So much research is focused on soil health, but no focus on healthy communities or the socioeconomic conditions impacting rural communities and the crisis they face.

In private discussions with participants, many people highlighted how these speeches were by far the most invigorating and for many, far more accurate and grounded than what the mission covers, highlighting that the soil health problem according to an organic farmer is "not a matter of science, but politics". A quote that resonated with many from Dr. Krzywoszynska's speech was "The people present in the room already reflect the values of what will be decided". In this vein, some attendees highlighted privately that the room was full of many kinds of actors, from start-ups and academics to consultants and digital solutions, but they had simply not met or seen a "normal farmer". Most farmers present were either organic farmers or farmers who no longer made a living as a farmer and were instead in public office. An attendee even joked the organisers could have gotten any Belgian from the countryside to act as one.

To a degree there was an overall feeling of a tokenistic inclusion of farmers, and as far as we know, all those who were present as farmers were from organic and regenerative farms. And the heavy emphasis on data driven, technological solutions which were scalable and applicable to any farm, did seem disconnected from either solution which were accessible and rooted in local context or the problems landowners and managers are facing. The dominance of policy and scientific actors in setting the agenda, tone and direction of research and solutions combined with no serious discussion about farmers, the "soil guardians", and their neglected conditions and communities, arguably undermined the claims for openness and co-creation the mission aims for.

The post event report informs that there was a total of 280 present participants, with 1300 following online. 140 of the participants presents were affiliated with a Mission project.

Organisation type	Attendance	Attendance (approx. number of people)
Research Community	18%	50
Higher Education	15%	42
NGO, civil society & associations	12%	34
EU Institutions	11%	31
Private Sector e.g. supply, retail, service providers	10%	28
Public Research Agencies	8%	22
Policymakers	7%	20
Farmers	4%	11
Others e.g. Foresters, artists, soil advisers, investors, philanthropic, cultural	4%	11
Others	*11%*	*31*

Figure 7 Self-made table of attendants per organisation type, data extracted from post-event report (Mission Soil Platform, 2025, p. 49)

The event does reflect the predominance the research community, both from universities and public agencies, totalling 26%. Combined with higher education and civil society organisations, these kinds of organizations were more than half of participants. This reflects a strong interest from research, education and civic stakeholders whilst farmers and the private sector remain quite underrepresented. In informal talk with representatives from the soil advisory sector they highlighted the value of this kind of research and initiatives but still felt like the research was mostly for high level academic gaps, rather than relevant for their clients. Furthermore, they argued that they lacked the resources to compete in the tender calls may have to consider being included in consortia led by prestigious universities e.g. Wageningen, though that undermined the potential of using the research for their clients. At some point in the event, a speaker confirmed that there were 200 applications for the LL projects. As five projects won, this means that there is approximately 2.5% success rate, or 1 out of 40 projects get approved.

European Soil Mission Week – 12th November 2024 – Co-creation Workshop

The first day included four co-creation workshops. Each workshop focused on a different theme: Soil Health in Agriculture, Healthy Soils for Healthy Communities, Soil protection and remediation for contaminated sites. The author attended the latter.

The panel discussion highlighted the enormous difficulties between balancing regulation, costs, knowledge gaps and ethical and political questions, reflecting a strong intersection of technical, regulatory and ethical dimensions. After the discussion, the attendants were divided in approximate six or seven groups of five to seven participants each. The co-creation exercise was quite dynamic and involved plenty of discussion among the participants about the drivers,

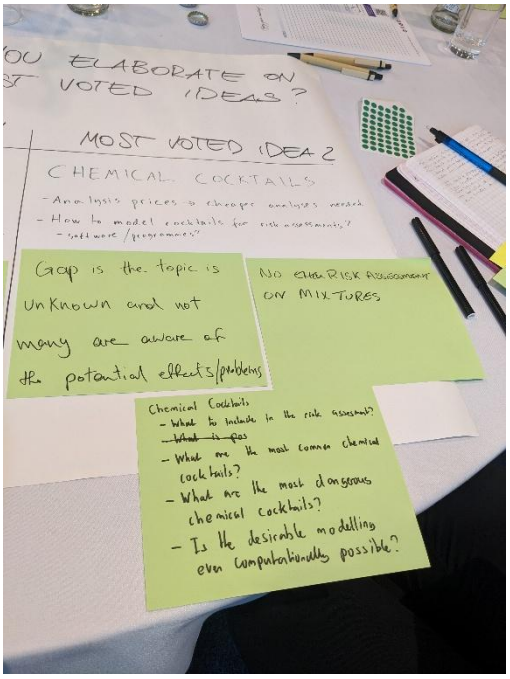

Figure 8 Overview of ideas in the workshop

challenges and potential solutions to soil remediation. Our session was hosted by Dr. Jones, lead soil scientist of EUSO. Many participants did not feel fully qualified to discuss the highly technical topic of soil remediation in polluted sites, though were invited to provide our own perspectives and reflect about the problem broadly, such as business, regulation and ethics. Aside from the facilitator, only one participant seemed to have their own ideas about the issues with chemical contamination due to their scientific background. Eventually, each facilitator shared the key ideas voted by the participants and the host of the sessions, aggregated the results and presented these with the hosts of the other co-creation workshops to the broader audience. Furthermore, the input from these workshops would be used for the Mission, though it remained unclear how and for what.

PREPSOIL Final Event: Facilitating the deployment of the Mission Soil across European regions 26th May 2025

Organised by PREPSOIL, this one-day event brought together PREPSOIL officers with their stakeholders and open to the public. Hosted at the headquarters of the European Committee of the Regions, the event focused on driving regional action. Discussions centred on the institutional and territorial challenges of integrating the Soil Monitoring Law, the strategic role of regional Soil Health LLs in fostering collaborative innovation, the inclusion of civil society in soil health initiatives, and the development of national capacities and expertise to support mission goals.

The panels were conformed by EU and national officers, researchers, LL researchers and practitioners from the food system. The audience also included representatives from the European Parliament as well as private citizens.

Each panel and the ensuing Q&A with the audience highlighted insightful stakeholder dynamics. The Soil Monitoring Law panel highlighted the importance of raising awareness around the citizenship and the farmers. One of the panellists, a representative of Latvian farmers, emphasized the concern that was surging among farmers, especially as even experts within his own country were still not sure what was exactly “healthy soil” and therefore, how the Soil monitoring law would apply in their country. During the Q&A the representative of the European Parliament requested clarification to the DG ENV officer if any direct obligations were being created for the farmers, highlighting that right wing parties were spreading rumours that the law would target farmers. The DG ENV officer insisted that no direct obligations are put on the farmer. However, this highlighted the overall confusion surrounding the implementation and the concern on how the law impacts farmers.

Many of the insights and issues from practitioners and LLs came from their own experiences with farmers. There was abundant anecdotical evidence than conventional methods of engaging and communicating did not work and LL facilitators, in their own way, figured different ways to engage

Figure 9 PREPSOILL's event at European Committee of the Regions (May, 2025)

with farmers. Some highlighted that whether the farmer was a landowner or land manager, was extremely relevant, emphasizing the different reasons to care for the soil. Some shared how there is a vibrant ecosystem of farmer "influencers", highlighting the importance of trust when farmers look for advice. Others suggested the importance of LLs to be embedded in pre-existing farmer collectives as well as spending substantial and quality time in these communities to understand their position and what they are going through.

In many ways, this reflected a sharp contrast with PREPSOILL's approach to support LLs. In their panel, they presented an overview of the tools which were developed for the LL, such as the Soil mission alignment assessment tool and business model canvas, and for the Mission the LL Atlas and LL Taxonomy. These tools help harmonise the mission's scientific experimentation as well as develop the technical capacities of the LLs. However, most of the issues and questions related to stakeholder management and co-creation, especially farmers and rural communities, remained unengaged. Interestingly, the LL taxonomy is based on soil science indicators and has no social or cultural dimensions.

Lastly, a recurring discussion point throughout Q&A was the idea of narrative and there were open and intense discussions on how to frame the issue of soil health. Whilst there seemed to be a solid consensus that soil literacy at schools was the main mechanism of change in raising awareness, many researchers complained that the Soil mission needed a "polar bear", a "DiCaprio" or a "Greta Thunberg" and openly questioning what the mission can do in this sense. Some voices emphasized that relying exclusively on the educational system and the long-term benefits of soil literacy, did not address many of the issues surrounding soil health in the short and middle term. In private discussions, many participants felt that there was a disconnect between what was being discussed in panels and events and what were the real issues on the ground.

5.3 Interviews

This subsection summarizes perspectives collected from various stakeholders through in-depth interviews. It explores perceptions about the inclusiveness and effectiveness of the EU Soil Mission, identifies influential and marginalized actors, and outlines significant issues and structural barriers perceived by participants that influence the Mission's objectives and stakeholder dynamics.

On the EU Soil Mission's success at including stakeholders

Most interviewees agree that the mission has just started and is still soon to contemplate success. All agree that the mission is showing a lot of openness to different actors whilst mission leadership is trying to include different voices. However, interviewees who are peasants and farmers, such as C3, C4 and C5, remain sceptical. C4 highlights that the multi-stakeholder

approach seems to prioritise procedure over transformative potential, whilst C5 emphasizes that if participation is just symbolic, just "talk, talk", this will lower significantly their expectations of the Mission's potential.

B1, a Mission Board Member, and B2, an EU employee who works with the Mission, believe that LLs are seen as particularly innovative approaches which allow for local and regional inclusion and on the ground participation. However, B1 and LL representatives, A2, A3 and A4, highlight that there are no standardised approaches on how to specifically make LLs participatory and inclusive, relying on local coordinators' s own approach.

C2, a start-up CEO, states that from an inclusion perspective, people cannot be involved in something they are unaware of. They discuss how soil remains largely "unsexy" and unappealing for most actors in the food system as well as broader society and the economy.

Most Influential Actors

There was not a consensus on who holds the most influence, with some interviewees arguing that there is a lot of balance among different players. Influence is still very context dependent and distributed: each stakeholder has a different role and purpose.

Those who identify the EU institutions, clearly understand that European Commission set the rules and coordinate the overall innovation system. Many interviewees do not necessarily see this as problematic, but those who do, such as B1, emphasize the advisory role of the Mission Board and their limited capacity to influence. Farmers such as C3 and C5 emphasize how the Mission is shaped by scientific and bureaucratic actors who lack the tools and mindset for genuine societal mobilisation, whilst C4 criticised how the multi-stakeholder approach seems procedurally fair but limited for significant change.

Many interviewees emphasized the oversized role of academia and research, both in participants e.g. research institutes, and in the Mission's outcomes. Interviewees A1, A2, A3 and A4, who are part of LLs, describe researchers as comfortable with the command of scientific language, experience with Horizon funding, being part of established networks and as shapers of project agendas and outcomes. The central roles of research institutes and universities in consortium and project coordination and decision-making reflect their capacity to dedicate time and resources to meetings, planning, and documentation, resources not readily available to many actors, especially farmers or other grassroots actors.

Interviewees who are more involved in agricultural innovation, such as C1, a bio-tech startup CEO, described how established agribusiness companies played an essential role in the direction of innovation in soil health due to their importance in farming products, direct contact with farmers and their distribution systems. C4, a food sovereignty activist, also highlighted the influence of corporate networks and lobbies in Brussels' policymaking.

C1 reframed the answer by focusing on who had the most influence on soil health (instead of who was the most influential in the mission): the farmers. The farmers decide what goes into the soil and therefore, the most influential actors on farmers, are the companies selling the fertilisers and pesticides which make soil unhealthy. How they use their influence in the food system can seriously impact the success of the Soil Mission. This point was further reinforced by A4, who argued that the most crucial actors are farmers, landowners and land managers, since they can enact the much-needed practices.

Lastly, A1 highlighted how there was seemed to be a preference for an "ideal" type of farmer at events as speakers, shaping the perception of many non-farmers what being a farmer is. These tended to be "young" farmers from organic and regenerative farms as well as good communicators in digital, business, scientific and political issues related to farmers. C5 similarly emphasized that there was a preference for "progressive" farmers.

Underrepresented and/or Excluded Actors

Most interviewees agree that farmers are central and yet constantly marginalised– especially smallholder, conventional farmers (B1) or those who do not engage in niche or regenerative practices (A1). Interviewees highlight how the enormous diversity in farmers, from small organic farms to large scale commercial operations, poses a major challenge for representation (C5). C3, an organic farmer, highlighted how only a "few hundred" farmers are involved in the Mission and how the Mission's outreach to different kinds of soil stewards, such as urban gardeners or private landowners is non-existent. C5, a first-generation landowner who practices sustainable farming, highlights how in their opinion less than 30% of Mission participants are "actual farmers". They lament the "demonization" of larger, industrial-scale farmers, as well as overlooking experienced, older farmer and generational challenges in European farming. A3, who is involved in a LL, was surprised to see how farmer cooperatives were hardly involved or seen as critical players.

C4, who identifies as a peasant, emphasized the political issues of rural communities remained underrepresented, and therefore small family farmers, landless youth and new farmers were rarely considered. Similarly, C4 as B2, who works for the Mission, highlighted that gender imbalances. C4 emphasized the patriarchal dynamics within the food system, led to women being underrepresented. B2 emphasized the importance of being gender inclusive within the participation spaces and communication related to the Mission.

A1, who is involved with a LL, described how experience and perspectives of a farmer is always "mediated" by cooperatives, political parties, industry representatives, media and researchers. Furthermore, some interviewees highlighted how focusing on early adopters or progressive voices can lead to exclusion of those who have different economic and operational realities and ideological ideas. Furthermore, different kind of actors: such as vocational schools, civil society groups, technology providers and advisory consultant are needed but remain underrepresented and uninvolved.

Both B1 and B2, emphasized that actors involved in different ways of organising and researching remained underrepresented. B1, an EU Soil Mission board member, identified that citizens and organizations who were innovating in social approaches towards soil health, did not fit neatly in the Horizon Europe requirements and therefore, could not be involved directly in the Soil mission. Similarly, B2 identified how the Mission was still struggling to integrate social scientists and humanities researchers. Despite their acknowledged importance, they remain underrepresented.

Other underrepresented actors, include start ups and SME. C2, a soil start-up CEO, described how they are ignored and that they must fight for every inch to be even considered. B1 considered that the Mission should be much more active with actors who are part of the food system supply chain. Also, A4 and C4, identified consumers as being the last link in the chain, and who are going to be impacted but remain uninformed and involved. A1 discussed how regional authorities can be excited or apathetic to work with Soil mission projects, emphasizing how some public authorities do feel that Brussels sets a "mandate" and then they must be involved.

Lastly, some interviewees, such as A2, allege that lack of diverse values and mindsets as well as focusing on certain outcomes will naturally disenfranchise many potential actors. Both A2 and C2, believe many actors in the food system feel alienated from the "EU Project" and do not wish to collaborate either because of ideological reasons or EU projects are perceived as complex, bureaucratic and prone to lose autonomy.

Overlooked Issues in the Mission

Many interviewees brought up issues related to Horizon Europe; the main policy programme used for the EU Soil Mission. They highlighted several limitations. Firstly, Horizon Europe seems to be quite limited in scope of who and what kind of innovation in soil health. B1 emphasized how bottom-up experimentation was quite limited, especially for innovation which locally or regionally grounded, and which seemed complicated to scale to other parts of Europe. C3 and C4 highlighted how there were too many procedural barriers for farmers. Similarly, C1 also identified how Horizon projects require an intense and high commitment for a low-probability reward. For an organisation like a start-up, it was preferable to spend resources on their own operations. Overall, this seems to indicate that only certain projects and ideas backed by certain actors are suited to apply to Horizon projects.

Secondly, Horizon Europe seems to impose many procedural requirement and expectations, that some suggested add pressure to the LL and stifle co-creation ambitions, community-building, relational work and many other aspects of LLs which are difficult to quantify but necessary for long term success. Interviewees from LL stated that during implementation there is more focus towards deliverables and soil monitoring from the Mission. A3 suggests that these supervisory overhead risks being burdensome and limit time and attention for other aspects of the project. Both A2 and A3 highlight that the challenges of inter-regional, inter-discipline, multi-stakeholder and entrepreneurial, are not yet understood and appreciated by the Mission. B2, further reinforces this point by emphasizing that social science perspectives and disciplines, which could prove useful for LL, still are under-emphasized in processes and practices.

All interviewees related to LL, discussed the difficulties of building trust and relations with farmers. A1 highlights how farmers must be seen as equal partners in designing and producing knowledge and practices instead of stakeholders who must be convinced of the right "tools and science". Arguably, co-creation and co-production was limited by the already agreed deliverables, expectations and Horizon requirements. Furthermore, A2 discussed how the Mission's approach to standardising the LL increases the uncertainty of how much co-creative space is possible on the ground. This limits the capacity of LLs to organise and adapt the LL towards farmers and other actors.

Thirdly, some interviewees argue that Horizon Europe's approach creates a temporal misalignment between expectations and the realities of soil health. B1 suggested how scientific projects with 5-year timelines are structural constraints to long-term transformative efforts. A2 believes Horizon's five-year timeframe may be at odds with soil's slower rhythm creating a potential mis match between mission results and the natural rhythm of soil e.g. regenerative agriculture. They highlight how even ideal conditions would not be able to evaluate the performance of the best soil solution. If you only have four years, that means four seasons to test. Considering how soil evolves and is influenced by many factors, A2 argues that Horizon Europe's approach may be "… a bit out of sync with the cycle of life". Considering many other issues related to Horizon, they do suggest that there is a gap between the desired transformation and the actual mechanism provided.

Beyond Horizon, the Mission's communication and outreach strategy, was a topic of intense discussion. A1 discussed how cultural and artistic perspectives about soil were lacking. B2 emphasized how there were still issues reaching out to citizens in ways that fostered meaningful civic engagement. Many of the critiques were related to farmer outreach. B1, the Mission board member, believes this is essential as most soils in Europe are agriculture and most unhealthy soils are agricultural. C3 believes that there are two issues. Firstly, farmer realities, such as productivity and yields, are not part of the Mission. This means that the Mission and farmers do not share the same goals. Secondly, policy officers and scientists, regardless of intention, tend to lack capacity to communicate and engage with broader communities. For example, C3, C4, and C5, for different reasons do believe that the Mission's social media efforts can feel tokenistic and non-genuine.

Communication touched many different angles. C5 highlights the importance of avoiding simplistic narratives that paint certain farmers as "good" or "bad", signalling how the "demonization" of certain kind of farmers reduces their inclination towards collaborating with the Mission. C1, the bio-tech entrepreneur also emphasized that the Mission had to find ways to counter disinformation directed to soil friendly, sustainable pesticides and fertilizers, as these solutions lost trust within the farmer community.

Interviewees seems to be agreement that mission promotion is critical as many actors are not represented, simply because they are not aware. However, interviewees differ on what the issues are in communication and the best means e.g. social media, email or face to face. Specifically with farmers, information overload is a major concern, as well as farmers preferring to meet face to face people for projects, rather than emails, meetings or calls – which seems to be the most predominant way for the Mission.

Another set of overlooked issues is related to the bigger picture of soil health, economics and politics. B1 and C1 both highlighted that the business models surrounding regenerative agriculture, agroecology and other agricultural methods which are friendlier towards the soil, are struggling to be long-term feasible and scalable. C1, as does C5, also discussed the potential impact on yield of these approaches is still unclear, which could prove problematic in the long term. A4, who is involved in a LL, similarly is concerned how transitioning towards a much more sustainable food system can lead to higher prices, suggesting a potential backlash from consumers in the long term.

C4 is a peasant activist and therefore their interview introduced political perspectives which were not brought up in other interviews. Whilst both farmers and peasants work the land, peasant is considered a politicised identity in contrast to the far more political neutral farmer. C4 defends that soil health is connected to broader issues within the food system and is therefore, negatively impacted by land concentration, land grabbing and unequal access to land. C4 states that by ignoring political-economic structures and issues related to them, the Mission can only propose soil monitoring and techno-fixes, rather than genuine solutions. C4, like C2, both believe that traditional knowledge and practices is being ignored and lost. C2 further insists that whilst this knowledge would have to be adapted to changing climate, there is much to learn from it.

Structural Barriers to Inclusion in the Mission's Design and Implementation

For the Mission's design, C3, an organic farmer, was involved as part of the Mission Board (which ceased to be once the Mission was created with C3 continuing as an advisor) and identified many structural barriers. Firstly, the Commission is mostly populated by administrators, with policy and legal mindsets and backgrounds. The interviewee believes these kinds of professionals may not

be the most qualified to run a public engagement endeavour. Secondly, citizens and farmers are normally excluded from the actual agenda setting and decision making and are treated as advisors. However, how the advice is processed remains unclear, suggesting that even though citizens and farmers may be present in the room, their participation is symbolic. This is exemplified by the role of Soil Ambassador, who is a volunteer selected by the Mission, but is merely an unpaid, representative of the mission, with no real capacity to make an impact on the Mission. Thirdly, when the Mission Board suggested the Mission should be integrated in the CAP, the response was that the Mission had no jurisdiction over agricultural policy. This suggests a fragmented governance and siloed approach towards soil health. This is a similar criticism expressed by C4, who argued that how multi-stakeholder governance is framed is more akin to box ticking of actors and topics to create the appearance of inclusion. But the agendas are predefined and any substantive debate towards transformative outcomes is not possible.

This meant that the main vehicle for the Mission would only by through Horizon Europe, which many interviewees expressed frustration with from a diversity of angles. Horizon's procedures and requirements are considered too rigid. Whilst B1 respects the EU's commitment to fairness, excellence and procedural clarity over flexibility – in practice, this means that there is no margin to support promising, unconventional or weakly written proposals that may serve to further the Mission's goals. The short term, project-based nature of EU research funding is limiting long-term systemic change and is geared towards a particular kind of knowledge and outcome. B2 identifies how Horizon Europe's prioritisation for excellence is much easier to define in terms of STEM disciplines and quantifiable outputs, undermining other disciplines and projects which do not fit this quantifiable excellence.

This not only limits from a discipline perspective, but also what kind of actor. B1 identified innovative local and regional social initiatives have no funding process to participate in the Mission as their knowledge and practice do not fit the funding criteria. Similarly, C4 and A1, identify how grassroot organisations are not required to be part of research consortia or lack the resources themselves to compete, therefore not being able to participate.

Many interviewees discussed how the heavy bureaucratic process, reinforced by technical and institutional jargon, is itself a deterrent for most actors. Because of the difficulty, A1 explained how you can outsource much of proposal process and project management to professional services, suggesting that those who can afford these services, can rely on much more professional and competent to win proposals, regardless of ideas and content.

These proposals are resource intensive and without a way to finance the upfront costs, many organisations cannot participate. Furthermore, there is a high probability that you do not pass the call; therefore, all those costs are lost, and motivation may be lost for future calls. Both C2 and C3 describe how they have been part of consortia that have been rejected multiple times. C2, as CEO start-up, shared how it was much preferable to focus their resources on the operations of the start-up rather than try and participate.

Beyond the challenges of applying and winning a Horizon project, two barriers for participants: time (A1, A2, A3, A4, C1, C2) and the English language (A1, A2, C3, C4). High demands for time are required at every single level of involvement which can be quite challenging for most actors, from conferences, reporting results to the Mission, social media, stakeholder management, etc. EU Soil Mission burdens LLs with many requirements and deliverables, which limits the amount of time that be spent on the work itself and challenges emerging from the LL. A3 describes how once inside the project is live, there is a pressure to demonstrate impact and scalability, with

contrasts with a desire to be more participatory, local and adaptive. A4 informs they must have regular calls with both the REA and the SoiLL Start-up, to report on their progress both as a project of Horizon and the Mission, respectively.

Some interviewees were highly aware that the usual barriers of English, were much higher in rural settings (A1, A2, C3, C4). The highly technical and scientific content can be a challenge in your own language, let alone in a second language like English. English is needed participate in the Mission and communicate and share as well as to lead, coordinate and participate in the LL.

Lastly, many interviewees feel there is no awareness and communication strategy from the Mission. As C2 identifies, this means that being part of the right networks is extremely useful – suggesting another barrier for many actors who are "not in the know". This lack of communication strategy, especially with farmers, hints at the many challenges in communicating. C1, A1, A2, A3 highlight the importance of face-to-face communication, whilst C3 believes that much higher involvement of communication specialists helping the Soil mission. Both A2 and C2, believe the image of the EU is also an important factor to find partners for the LLs. The EU is probably far more unpopular among farmers than the average European.

5.4 The Soil Mission's Ecologies of Exclusion

The results from the event ethnography are mapped upon the structures which characterise the EU Soil Mission's Ecologies of Exclusion. Beyond the MIS, maps the institutional and socio-material constitutional structures, which are the EU and the food system, respectively. This is followed by the programming and performance structure, with the former divided between Mission Implementation and LLs. This division was required analytically as two separate ecologies were emerging: the relationship and tensions between the Mission and the LL, and within the LL themselves with their own stakeholders.

Table 6: Mapping of relevant themes from the coding on to the identified Ecologies of the EU Soil MIS

Category	***Sub - category***	**Constitutional Structures**		**Programming Structure**	**Performance Structure**	
		EU	**Food System**		**Mission Implementation**	**LLs**
Antagonists	***Institutional***	European Commission [I1, 2, 6, 8, 9, 10, 11; P9]		DG AGRI [I1, 7, 8; P3, 4, 10; E1] DG R&I [I1, 7; P3, 9; E1] DG ENV [I9] Mission Owner Group [I1, 7, 10, 11; P3] HE Committee [I7; P3, 9]	Mission Secretariat [P3; E1, 3] Research Executive Agency [I7; P3; E1] SOILL Startup [I4; P10; E1, 3] GNGO [I9	

				Member States [I7; P3, 4; E3]		
	Incumbents	Corporate Lobby [I9	Agrochemical [I1, 5; P4 Seed [I1, 5; P4 Retailers [I1; P4 Biofuel & Biomass [I1; P4 Commodity Traders [I1; P4 Food Processors [I1; P4			R &D Departments [I4,
	Academic			JRC [I6, 7, 8; P3; E1] Researchers & research institutes [I2,3, 4, 6, 8, 9, 11; P9; E1, 2, 3]	Solo [I7; E1]	Researchers & research institutes [I2,3, 4, 7 Consortia [I3, 6 Project Coordinators [I2, 3, 4, 7
Subjects	***Civil Society***		Civic organisations [I1,8; P5, NGOs [P3, 5 Urban Gardens [I8; P3, P5	Local Communities [I1, 3, 4, 8; P1, 5, 9; E1, 2, 3] Citizens [I8; P1,2, 3; E1, 2, 3] *Soil [P1, 2, 3, 6]* *World [P1, 2, 3]* *Future Generations [P1, 2, 3]* *Youth [I9; P1, 5]* Consumer groups [I1, 9, 11 Food justice org [I9		Consumers [I11
	Market		Consultants & Advisory [I4, i5	SME [I1, 6]		
	Institutional			Mission Board [I1,8; P3; E1]		Local governments [I2,
	Academic		Schools [P5 Vocational Schools [I4,	Social scientists, humanities & art academics [P9; E1]		
	End users		Farmers* [I2, 3, 4, 5, 7	Potential LL [I1, 8; P6, 9, 10; E1, 2, 3] Farmers* [I1, 7, 8, 9, 10, 11; P1, 2, 3, 4, 9; E1, 2, 3] Peasants [I9	LLs [I4; P6, 7, 9, 10; E1, 3] Farmers* [I2, 3, 4, 5, 7; P9; E1, 3]	Farmers* [I2, 3, 4, 5, 7
	Newcomers		SME Bio-tech [I5 Start-ups [I6	Innovators [I1, 5, 6; E1, 2, 3]		Strat-ups [I6, SME Bio-tech [I4,

				Youth [I9 New farmers [I9 Women [I7, 9		
Models	***Domination***	Horizon Europe* [I1,3, 5, 7, 8	Oligopoly [P4 Industrial Production Indicators [P4,	Horizon Europe* [I1,3, 5, 7, 8; P3, P9; E1] Mission budget Management [P3] Agenda Setting & Framing [I6, 7, 8, 10; P1, 2, 3, 9; E1, 2, 3] Lack of transparency in decision-making* e.g. scientific reports, citizen input, etc [I1, 7, 8; P1,2, 3, 5, 9; E3] Bureaucratic proceduralism e.g. multi-stakeholder forums [I9, 10	Horizon Europe* [I2,3,4, 8; P3] Top-down mandatory M&E [I2, 4; P10	
	Marginalisation	Language Barriers [I2, 4, 9 Complex, high cost & requirement proposals* [I2, 3, 4, 6; P6 Consortia requirements [I6; P5, 6 Disinformation [I5, Lack of established networks [I6,	Lobbying [I8 Industrial agricultural path dependency [I5; P4 Demand for high yields [P4 Demand for cheap food [P4 Export oriented production [I1; P4	Institutional worldview* [I1, 8; P1, 2, 3, 9; E1, 2, 3] Tokenistic participation [I1, 8, 9, 10; P9; E1, 2, 3] Pre-existing socio-economic structures [I1, 3; P4, 9] Techno-scientific knowledge* (indicators, metrics, quantification) [I3, 8; P1, 2, 3, 5, 6, 7, 9; E1, 2, 3] Policy & legal knowledge* [I8; P6, 7; E1, 2, 3] Institutional buy-in [I7, 8; P2, 3, 7; E1, 2, 3] “Demonisation” farmers [I10	Certification [P10] Preference for standardizable frameworks and measurements [P3,6, 7, 10; E1, 3]	Gatekeepers [I3, 4; P5, 6, 7 Techno-scientific language [I2, 5; P5, 6 Mediation & advisory [I2; P7, 8, 9 Framing & agenda setting [I2,3, 6 English proficiency [I2 Project management skills [I2, 4; P6, 7, 9 Pre-existing research & practice networks (I2, 5, 6; P5, 6 Project budget Management [I4; P9 Administrative complexities [I2, 3, 4; P6
	Bias	Self-perception of subjects [I2, 3	“Feed the world” narrative [P4	Preference science-based communication [P4, 5, 9; E1, 2, 3]		Stakeholder outreach [I3, 4, 6

		Lack of trust in EU institutions & incumbents [I3, 4, 6		Preference for quantifiable scientific-technical dimensions [P3,6 ,7, 8, 9 E1, 2, 3] Preference for "ideal" farmer* [I2, 7, 9; E1]		Preference for experienced and resourceful actors [I2, 5, 6; P5, 6
	Neglect	Inadequate support structures [I6, 10] Information overload [I4, 5 Lack of effective communication [I5, 8 Land ownership vs management [I9; E3]	Short term thinking [P4	Ignoring advice from stakeholders [I1, 8; P4] Inadequate integration of SSHA [I4, 8; P9]	Most stakeholders have multiple responsibilities and priorities [I3, 4, 5, 6; P7,9; E1, 3] High demand for requirements & deliverables, normally related to monitoring and evaluation [I4; P7, 9; E1, 3] Inadequate support structures [I4]	
	Overlooking	Lack of resources: time, attention, financial [I2,3, 4, 5, 8; P4, 5 Lack of incentives [I2, 3, 5, 8, 10; P4 Other stakeholders & priorities [I5, 6, 7 Institutional distance e.g euroscepticism [I2, 3, 4, 6		Simplified view on economics and soil health ignores benefits/costs/risks from implementation [P4, 9, 10; E1, 2, 3, 9] Importance of certain groups [P4, 9, 10; E1, 2, 3, 9]		
Objects	***Normative***	Farmer economic realities: pressure, debt, etc [I1, 5, 8, 10; P4 No support for under-resourced actors [I2; P9	Farmer economic realities [I1, 5, 8; P4 Chronological misalignment* [P4 No support for under-resourced actors [I2; P9	Land concentration & land access [I9 The willing* [I1,3, 8; P1, 2, 3, 5; E1, 2, 3] Focus on R&I, without considering social & cultural issues* [I1, 6, 7, 9; P4, 9; E1, 2, 3]	Techno-scientific knowledge and experience is prioritised [I3, 7, 9; P3, 4, 9	Farmer diversity* [I2, 8; P9 Stakeholders as equals [I2, 3, 4, 8; P9 Trust building [I3, 4, 8; P7, 9

				Focus on unilateral scientific communication and engagement through soil literacy [P1,3,5, 6, 7, 9; E1, 2, 3] SSHA & transdisciplinary are underfunded [P9; E1] Preference for "progressive" farmers [I2, 9		
	Epistemic			Discipline Hierarchization* [I1, 2, 3, 4, 7, 8; P4, 9; E1, 2, 3] Food System Dynamics* [I1, 3, 6, 8, 10; P4, 9; E1, 2, 3] Chronological misalignment* [I1, 3, 11; P4, 9; E1, 2, 3] Transformation is relational, emotional and political [I3, 4, 6; P4, 9; E1, 2, 3] Traditional knowledge [I6, 9; E1] SSHA & transdisciplinary are undervalued [P9; E1, 2, 3] Farmer & peasant led experimentation [I8, 9; E1, 2, 3]	Focus on quantifiable and tangible metrics [P3, 10] No space for knowledge that does not fit neatly into pre-existing metrics [P10]	Co-production of knowledge and framing [I2,4, 7; P4, 9 Techno-scientific evidence is prioritised [I3, 7; P3, P4, 9 Farmer diversity* [I2, 8; P9
	Directionality	Chronological misalignment* [I1, 3; P4, 9]		Reframing narrative around soil [I1, 3, 6, 9; P9; E1, 2, 3] Limited Transformation potential [I1, 3, 8, 9; P4, 9; E1, 2, 3]	Viable business models [I1, 8 Temporal Misalignment [I1, 3; P9 No targeted engagement [I1,2, 5, 8; P9	Co-creation limited by EU procedures, procedures & metrics [I4,11; P9]

				Monitoring is prioritised [I1, 4, 9; P1, 3, 6, 7, 9; E1, 3] Impact on crop yield [I1, 5 , 8, 10; P4 No harmonised, trustworthy soIL health framework to test solutions [I5, Lack of clarity of integration into existing EU agrarian instruments e.g. CAP [I8] Community and relationship building [I10	Not rooted in agrarian networks & communities [I4, 9, 10 Multi-disciplinarity is struggling in practice [I7; P9	

5.4.1 Constitutional Structures: Horizon Europe & Agro-Industrial Oligopoly

The constitutional structures existing beyond the EU's Soil Innovation system are two. Firstly, *Horizon Europe* as the Institutional Constitutional Structure. This structure acts as the formal boundary between the Mission and the rest of the soil innovation system and legitimises the intervention. However, this structure systematically excludes a vast variety of actors, including competent research and academic actors, most of whom never enter the mission arena at all. Secondly, the *Agro-Industrial Oligopoly i*s the main way to describe the socio-material constitutional structure, which reveals the deep economic structures that condition farmer behaviour and limit transformative possibilities in soil health.

5.4.1.1 Horizon Europe

Horizon Europe is the main institutional architecture, providing the procedures and the funding for the EU Soil Mission. Managed and directed by DG R&I, Horizon has been identified by different empirical sources as the main institutional constitutional stability.

Antagonists

The Horizon Europe Marginalised Ecology reveals a structural dynamic in which the very architecture of EU research funding mechanisms, particularly Horizon Europe, systematically reproduces exclusion – as identified by the Mission Board (2024). Therefore, the primary antagonists in this ecology are the institutional actors embedded in the programming structure, specifically the Directorates-General (DG AGRI & DG R&I). These antagonists made the explicit decision to implement the Soil Mission through Horizon Europe. Despite widespread claims that "…continuing with the status quo

is not an option" (2021b, p. 1) and therefore, missions must "...go beyond the existing instruments. EU Missions are designed to do things differently" (DG R&I, 2021b, p. 1,2), no substantial reforms have been enacted to address Horizon Europe's well known high barriers to entry. Furthermore, some interviewees such as C4, highlighted the suspicion that corporate networking and lobbying have access in different ways to the decision-making.

Using the predominant and established European instrument for research and innovation implies the Soil Mission continues to favour established, resourceful, experienced, elite academic institutions with the capacity to navigate its procedural, technical and scientific complexity. And even when these academic actors and their consortia apply there is no guarantee of success, as tender calls normally have multiple competitive applicants; excellent proposals getting rejected is the norm.

Subjects

Therefore, subjects of this ecology are actors who wish to participate in the Soil Mission's innovation ecosystem but are effectively locked out by Horizon Europe's structural requirements. These include small civil society organisations, farmer associations, start-ups, local knowledge holders, and other grassroots actors.

Models

This exclusion is reinforced in practice, because of the demand to conform to the strict epistemic criteria pre-defined by the Mission. The only dominating exclusion is the choice of the EU to use Horizon. Horizon Europe calls are characterised by their emphasis on formal eligibility criteria, quantifiable excellence, and techno-scientific rigour. This inherently benefits actors already embedded within academic, and policy networks and marginalizes the rest of actors, who must rely on academic actors to participate.

Subjects face numerous barriers: the tendering process is highly technical, demanding fluency in grant-writing, English proficiency, and scientific terminology, as well as experience in building international consortia. Very few actors which are not academic have the capacity and skills for this. Newcomers, such as start-ups, farmers and SME struggle to get involved if they are not part of pre-existing networks, lack resources or feel comfortable with English. There are also psychological aspects at play. Even those with valid and context-relevant ideas often perceive themselves as uncompetitive and incapable to compete with the "big players", leading to self-exclusion. The process becomes a game that only well-resourced research institutions know how to play. For many actors, especially those without institutional support, the decision to participate feels futile as a participant at the Soil Mission Week (E1) said: "... a waste of time, especially if you are going to lose anyway."

The result is a deeply skewed playing field where access is restricted not by the quality or relevance of ideas, but by procedural literacy, financial capacity, institutional alignment and lack of resources, such as time. For farmers and rural communities in particular, this model is even more exclusionary. They are not only unfamiliar with the administrative and linguistic demands of EU tenders, but often mistrustful of EU initiatives altogether, viewing them as bureaucratic, distant, and disconnected from everyday agricultural realities. This mistrust is compounded by the legacy of the Common Agricultural Policy (CAP), which many farmers experience as burdensome and misaligned with their needs.

In addition, Horizon's economic incentives are much more appealing to academia than the rest of actors. Many research institutes require and need to be effective at winning Horizon tenders,

because on many occasions academia is underfunded, whilst farmers and rural communities do not rely on Horizon funding for their livelihoods. Similarly, start-ups and SMEs must find sustainable and reliable sources of revenue, instead of investing capabilities in winning Horizon projects. This reflects how Horizon's economic incentives are skewed towards highly motivated and arguably, desperate, academics.

Objects

The excluded normative objects, such as fairness, equity, and accessibility, are sidelined by the prioritisation of competitive excellence and procedural fairness. Agricultural issues, such as access to land, food sovereignty and farmer struggles e.g. debt, pressure, remain ignored. Epistemic objects suffer as well: knowledge rooted in practice, local experimentation, and community-based learning is poorly recognised within Horizon Europe's evaluation frameworks. This is further reinforced by Horizon's default 5 years per project approach, which epistemologically ignores the temporal nature of soil systems (and the social dimensions related to them).

Directionality is constrained by the funding mechanism itself; even if the Soil Mission aspires to systemic transformation, its implementation through Horizon Europe reinforces conventional epistemic and disciplinary hierarchies and the "usual suspects" in academia (Mission Soil Board, 2024). Compounded with the conventional 5 year project approach, there is arguably a misalignment between the transformative potential of the mission and epistemic, normative and directional foundations of Horizon.

5.4.1.2 Agro-Industrial Oligopoly

This constitutional structure focuses on the dominant economic actors in the agri-food system who, despite being largely invisible in the Mission's policy documents (with the notable exception of the Foresight Report), exert systemic influence across the entire value chain and health of soil in agricultural land.

Antagonists

The primary antagonists in this strcuture are the incumbents of the industrial food system, agrochemical and seed companies, followed by food processors, commodity traders, and retail giants. These actors maintain structural power by dominating production systems, market expectations, and the technological and economic context in which farmers operate. They are absent from the governance of the MIS but central to the socio-technical landscape it seeks to transform. Their business models depend on practices that actively undermine soil health: large-scale monocultures, input-heavy farming, and export-oriented production. Farmers, in this system, are subordinated to an industrial logic that demands high yields at low costs, locking them into dependence on external inputs and competitive global markets.

Subjects

The subjects of this structure are the farmers and rural communities caught in this structural trap. Their choices and conditions are detached from the Mission's goals and are shaped an oligopolistic market structure that imposes economic and technological dependencies. Many farmers view EU initiatives with suspicion, perceiving them as irrelevant or overly bureaucratic, and as such, often disengage from participatory processes entirely as these, accurately, do not seem to engage with their own realities. Other subjects are start-ups and SME's who are not part of the incumbent oligopoly.

Models

The structure is defined by models of domination and marginalisation that operate through mutually reinforcing mechanisms. A key mechanism is path dependency, whereby historical trends, such as the shift toward labour-replacing mechanisation and input-intensive farming, have embedded large-scale, industrial practices as the norm. These practices are bolstered by export orientation, the expectation of cheap food, which drive by global supply chains and industrial processing, further reinforces the need for high-volume, low-cost production, crowding out more sustainable or localised alternatives.

Finally, the concentration of power across all nodes of the food system, from input production to retail, creates a series of chokepoints that limit farmer autonomy and distort market dynamics. These powerful actors influence public policy, research agendas, and even global trade norms, making it difficult for more regenerative or participatory approaches to gain traction or for farmers to be agents of change, as they risk impacting their livelihoods.

SME's and start-ups, with products and services that are challenging the agro-industrial status quo, struggle to compete with the scale and influence of incumbents. This is particularly important with bio substitutes for agrochemical products, who lack consolidated sale channels. If these companies are successful, they can be acquired by the incumbents, which then can proceed to shelf their products or not inform appropriately end users how to use them, sabotaging the viability of successful alternatives to agrochemical products.

Objects

The excluded objects in this ecology are profound. Normative concerns around justice, fairness, and the long-term viability of farming are sidelined. From an epistemic perspective, alternatives to industrial production criteria and knowledge, remain understudied and under practiced, precisely because of how dominating the current production paradigm is. Directional alternatives that prioritise addressing these structural and normative issues, which impact soil health and farmer well-being, are rendered marginal, overshadowed by the metrics of yield, productivity, and market efficiency. The ecological impacts are significant: industrial agriculture remains the leading cause of nutrient leakage, erosion, carbon loss, and biodiversity decline (Giuffré et al., 2021), precisely the issues the Soil Mission is meant to address yet is structurally constrained from confronting.

To conclude, the Incumbent Oligopoly Structure illuminates a core contradiction at the heart of the MIS: while it aims to regenerate soil health through innovation and participation, it leaves untouched the entrenched power structures that have created and maintain soil degradation as well as subordinate the agency of farmers to market logic. Without directly addressing this structure, the transformative ambitions of the Soil Mission remain fundamentally constrained.

5.4.1.3 Integrating Institutional and socio-material constitutional structures

The interrelation of Horizon Europe's marginalisation of many and diverse subjects and objects is compounded by the specific issue it aims to solve: soil health. Despite the mission's claims to target many kinds of soils, the main tensions and challenges are emerging specifically around Europe's food system and the agro-industrial oligopoly behind it.

The Horizon Europe and the Agro-Industrial Oligopoly Ecologies together define the constitutional stability of the MIS. Horizon Europe provides the institutional architecture that governs access to the Mission, filtering participation through rigid procedural, epistemic, and

financial criteria. At the same time, the agro-industrial food system constitutes the socio-material environment in which soil practices unfold, locking farmers and rural communities into debt, dependency, and market pressures.

These two ecologies are mutually reinforcing. Horizon's reliance on established academic actors and short-term project cycles tends to reproduce knowledge, framings, and solutions that are neutral or apolitical towards incumbent agro-industrial models. Conversely, the dominance of these incumbents means that alternative approaches lack the epistemic legitimacy and the means to enter the Mission space. And even when they do, their viability is constrained by a hostile market context that privileges yield, input dependence, and global competitiveness.

These institutional and social-material constitutional structures emphasize how despite no explicit exclusion, any kind of participation and inclusion, is conditioned and limited by the exclusion embedded in these systems. This interplay highlights a core paradox of the MIS: the very instruments of research and innovation that seek to reverse degradation and transform soil health, seem unable and/or unaware of the institutional and social-material constitutional structures which are both driving soil degradation and excluding the actors and ideas that seek to transform them. Metaphorically from the perspective of exclusion, we can understand Horizon Europe as a grand wall that only a few traverse whilst the Agro-industrial oligopoly as a heavy anchor that sinks alternatives.

5.4.2 Programming Structure: Black Box Institutional Structure

Antagonists

Within the programming structure of the EU Soil Mission, power is predominantly held by EU institutional actors, primarily DG AGRI, which acts as the Mission Manager, and DG R&I as Deputy Mission Manager. These Directorates-General exercise significant influence by shaping the mission's governance and determining how its goals are operationalised. The Mission Owner Group, consisting of several DGs impacted by the mission, and the Horizon Europe Programme Committee, composed of Member State representatives, further consolidate institutional authority. While these actors formally lead the mission's direction, their constellation also intersects with the EU's two major policy regimes: the Common Agricultural Policy (CAP) and Horizon Europe. This intersection produces a dense institutional web in which decisions are negotiated internally and often shielded from external scrutiny.

Subjects

From a subject perspective, the Mission Board emerges as the primary subject due to its strictly advisory role, lacking real authority in decisions related to the mission's design, governance, and implementation. This happens despite being branded as a leading stakeholder. Virtually all non-institutional actors are basically subjects, citizens, farmers, civil society organizations, SMEs, and broader stakeholder groups, are systematically excluded or marginalized from meaningful participation in the mission's core decision-making processes.

Models

From a model perspective, exclusion is not just about who makes decisions, but how those decisions are made and, in this structure, obscured. Hence the defining feature of this mission arena: the black box. Neither stakeholders nor the public can clearly trace how input, whether from consultation events or scientific reports, is incorporated into the mission's governance. Consultations with citizens and farmers for the design of the Mission are documented, but there

is little to no indication that their perspectives meaningfully shaped the mission's design or objectives. It is hard to accept and imagine that a significant number of farmers would be aligned with the Mission objectives as they are. The models of exclusion at play are dominated by institutional incumbency, which affirms existing roles, instruments, and procedures. The Soil Mission's reliance on Horizon Europe imposes a highly structured and inflexible framework, reinforcing the dominance of techno-scientific logic and administrative control. This reliance also legitimises a lack of transparency in agenda-setting and decision-making, as there is no transparency in what drives the research agenda.

Beyond domination, subtler models of exclusion further entrench this structure. Marginalisation occurs through a strong institutional worldview that frames soil degradation as a universal societal problem, thereby obscuring structural problems and deflecting accountability from those responsible. This worldview portrays all members of society as simultaneously responsible for, and empowered to fix, soil health issues, an apolitical framing that sidesteps the complexity and contestation that typically accompany wicked problems – which have been brought up by different experts and stakeholders since discussions about the Mission were emerging. This is reinforced by a preference for actors with institutional buy-in: primarily DGs and Member States, who are deemed the most critical stakeholders. Moreover, the continuous use of Horizon Europe, despite its known barriers for non-academic actors, underscores a deep bias toward techno-scientific expertise, pre-existing networks, and quantifiable results.

Neglect and overlooking further deepen exclusion. Many documents promote awareness, soil literacy, and citizen engagement, but this engagement is limited to scientific education and communication, rather than meaningful co-production. This reveals a neglect of genuine participatory design, where citizens and stakeholders could help define the problem itself, as recently argued by the Mission Board in their criticism of the current approach. Overlooking manifests in how critical knowledge systems and social dimensions are sidelined. The institutional framework implicitly assumes that willing participation equates to the ability to navigate Horizon Europe, sidelining those without the time, resources, or know-how to participate. Stakeholders without prior involvement in EU research, especially those from civil society, rural communities, or the SME, are left outside the system by default.

Objects

The excluded objects in this structure are numerous and consequential. Normative objects, such as justice, democratic legitimacy, and community well-being, are notably absent from the mission's goals and implementation plans. The overwhelming focus on technical indicators, harmonised monitoring, and "raising awareness" reflects a narrow epistemic framework that devalues context and practice-based experience and knowledge, such as farmers, or values-based perspectives, as social sciences, humanities, and arts (SSHA) are consistently underfunded and under-integrated. Epistemic diversity is further constrained by the demand for standardised outputs and performance indicators. This technocratic narrowing of valid knowledge excludes emergent capabilities within LLs, farmer-led experimentation, and co-productive practices that cannot be easily quantified. Additionally, objects relating to directionality, such as food viable business models, yield pressures, or alternative models of land use, are subordinated to a vague narrative of soil stewardship. There is a widespread sense among stakeholders, as reflected in interviews and event observations, that the mission's narrative has not been adequately rooted in the realities of rural communities or synchronised with major policies like the CAP or the Soil Monitoring Law.

Ultimately, the Black Box Institutional Structure reflects a governance model where inclusion is aspirational but remains to be operationalised and therefore opaque exclusion is the norm. It is characterised by dominant institutional antagonists, structurally disempowered subjects such as the Mission Board and wider public, and exclusionary models that range from overt domination to silent overlooking. The structure excludes not just actors, but entire ways of thinking about the soil crisis. Even though the framing aims to be inclusive and open to the whole society, the operationalisation hinges on this being a set of technical challenge to be solved by experts, rather than a complex socio-political issue that requires deliberation, negotiation, and pluralism. This significantly limits the transformative potential of the EU Soil Mission and cascades into the different ecologies within the performance structure

5.4.3 Programming Structure: Technocratic Implementation & Academic LLs

The Black Box Institutional Structure shapes the formal mission architecture through closed governance and opaque decision-making, setting the foundational *Programming Structure* responsible for implementation. Two ecologies have been identified. Firstly, the *Technocratic Implementation Structure* operationalises the Mission's criteria, goals and frameworks to scale and mature the LLs. This structure is reinforced because of the formal mandate of the Mission. Secondly, nested within this structure, the *Academic LL Structure* consolidates institutional and academic exclusionary dynamics at the level of experimentation.

5.4.3.1 Technocratic Implementation Structure

The implementation of the EU Soil Mission is structured through a dense and multi-layered organisational landscape composed of three main types of actors. First are the core institutional implementation bodies: the Mission Secretariat, situated within DG AGRI; the Research Executive Agency (REA), which manages the Horizon Europe project portfolio; and the SoiLL Startup, a specialised body focused on scaling, harmonising, and evaluating the Mission's LLs. Second are the LL projects themselves; each composed of five labs distributed across different European regions. Third are the broader Soil Mission projects, conventional Horizon Europe research and innovation projects aligned to specific objectives, such as SOLO (a soil science think tank), or targeted innovation efforts like AI4Soil.

Antagonists

The principal antagonists in this structure are both institutional and academic. Institutionally, the Mission Secretariat, though not frequently mentioned in interviews and rarely visible at events, is officially responsible for day-to-day coordination according to key policy documents. In practice, however, the most prominent and visibly active antagonist is SOILL Startup, whose influence spans events, stakeholder engagement, and the implementation operations. Alongside SOILL, the SOLO project plays a key antagonistic role from the academic side, by identifying research gaps in soil science that shape future mission funding and direction. The combination of SOILL's procedural authority and SOLO's epistemic authority reveals how technocratic knowledge systems are cemented to determine the operational contours of the mission.

Subjects

Subjects in this structure are primarily the LLs and their coordinators, as well as the LLs participating stakeholders such as local governments, SMEs, and farming communities. Although formally positioned as co-creators within the Mission narrative, in practice they operate within highly constrained parameters. These actors can be overwhelmed by the administrative

complexity and demands of participating in EU-funded projects, while simultaneously managing the delicate relational work of multi-stakeholder engagement across varied local contexts throughout Europe. The subject position here is defined by subordination to institutional procedures, criteria and expectations, where their creative autonomy is limited by the need to conform to pre-defined metrics and reporting frameworks. Considering that the M&E framework was developed in a Pilot group mostly conformed by experts, policymakers and Soil mission participants before the implementation started without any clear process to provide feedback to M&E framework itself, suggests certain rigidity. Combined with SOLO's academic approach to identifying gaps, there does not seem to be a formal and meaningful process to engage in bottom-up experimentation which can provide input to the operational and programming structures of the Mission.

Models

The dominant models in the Technocratic Implementation Structure revolve around top-down standardisation, performance auditing, and evidence-based compliance. SOILL M&E framework exemplifies this: it tracks the progress of LLs, assesses their impact, and promotes harmonisation through performance indicators and certification schemes. While these models aim to ensure quality and comparability across LLs, they also risk reducing complex social innovations to measurable outputs. The model of top-down adaptive governance, in which learning is structured around metric-driven feedback loops, prioritises procedure and measurable output over local experimentation and trust-building. As several interviewees highlighted, this environment creates strong pressures on LL coordinators to deliver outcomes that align with predefined goals, often at the expense of more relational work or context-specific innovations.

This implementation model implicitly excludes several objects. Normatively, it sidelines relational, cultural and political dimensions of co-creation, such as trust, social learning, and collective ownership, which are essential for place-based sustainability transitions. Instead, co-creation is reduced to a technical procedure, measurable, reportable, and certifiable. Epistemically, the prioritisation of quantifiable metrics crowds out alternative knowledge systems such as local knowledge, traditional farming practices, social sciences, and arts-based approaches are all marginalised within a narrow view of what counts as valid knowledge. Directionality is also constrained: the structure focuses on monitoring and harmonisation rather than allowing local actors to shape mission priorities or reframe the narrative of soil health in terms of wellbeing, equity, or systemic transformation. The LLs are thus expected to adapt to the mission's needs, rather than the mission adapting to the lived realities of its participants.

In sum, the Technocratic Implementation Structure of the EU Soil Mission is focused on procedure, operations, standards and measurable outputs. Whilst theoretically there is space for innovation and openness, so many criteria, requirements and frameworks are pre-defined, that the potential of participation, co-creation and innovation may be limited and excluded by subtle regimes of proceduralism and standardisation. These risks undermining the very innovation of solutions and collaboration of diverse stakeholders the mission aims to foster.

5.4.3.2 Academic LLs Structure

Antagonists

In the Academic LL Structure, power is subtly concentrated in the hands of research institutes and academic actors, who typically lead the project consortia responsible for implementing the

LLs. These consortia are predominantly composed of various research organisations, and the coordinators - often researchers themselves – can function as gatekeepers. While they do not dominate in the same way as institutional actors in the programming or implementation structures, they wield considerable influence through their control and access of resources, agenda-setting authority, and mediation between actors. Their established expertise in managing European projects, comfort in Horizon Europe procedures, and leading position in consortia formation reinforces their centrality in decision-making about what kinds of knowledge are pursued and which stakeholders are included in the LLs.

Subjects

Therefore, the subjects within this structure are the non-academic stakeholders who engage with the LLs, particularly farmers and rural communities. While formally invited into the process as co-creators, these actors often find themselves in subordinate positions. LLs, tasked with fostering experimentation and inclusion, struggle to engage these groups meaningfully. As many interviewees and event participants noted, farmers are both essential to the mission's success and, paradoxically, persistently difficult to involve. Other underrepresented actors, such as startups, schools, and local governments, are acknowledged as missing but perceived as less critical. Farmers, in contrast, occupy a uniquely ambiguous position: indispensable in principle, but systematically marginalised in practice due to many kinds of barriers.

Models

The prevailing models of exclusion in this structure emerge from a combination of academic gatekeeping and procedural constraints, imposed by the Technocratic Implementation structure. SOILL's M&E framework reinforces a performance-based governance model that limits the scope of genuine co-creation with other stakeholders. The standardisation of indicators, timelines, and expectations across LLs restricts the flexibility needed for building trust and adapting to local contexts, particularly with stakeholders like farmers, whose realities are diverse, dynamic, and often incompatible with rigid project timelines. The influence of academic actors, while often well-intentioned, reproduces a narrow model of innovation rooted in techno-scientific expertise. This leads to a form of procedural marginalisation, where LLs can become sites of compliance rather than experimentation, and where power asymmetries between researchers and stakeholders remain largely unaddressed.

Objects

These dynamics generate a wide range of excluded objects. Normatively, the LLs often struggle to treat other stakeholders, especially farmers, as equals. This impacts the relational and trust-based dimensions of collaboration, which are essential for long-term stakeholder engagement, particularly in rural communities Epistemically, farmers' experiential knowledge and other non-academic perspectives are undervalued, as they do not easily translate into scientific language or metrics which is how the LLs are being evaluated and monitored. The mission's directionality is constrained, and rarely discussed, how the LLs can tend to focus on fulfilling mission-aligned indicators rather than exploring alternative pathways or strategies. Business models that integrate soil health, strategies for engaging marginalised stakeholders, and interdisciplinary approaches remain difficult to operationalise under these conditions. As a result, the LLs struggle to move beyond narrow scientific framings of soil health, unable to meet the expectations of collective social and scientific transformation they were created for.

6. Results Interpretation

6.1 Contextualising the Problem-solution diagnosis

This section revisits the Mission's problem and solution framing, analysing how institutional narratives justify action and what these imply for participation. It contrasts dominant narratives with divergent perspectives from within and beyond the Mission.

Institutional Problem-Solution Diagnosis

The Mission Board frames soil degradation as an urgent and human-made crisis, with our current way of living directly responsible. It highlights that agriculture, industry, urbanisation, and food systems all play a role. These framing positions society as the main antagonist and calls attention to those most affected but unable to act, such as future generations, soil itself, and the wider world. This problem framing is echoed across all key documents and events, establishing the need for urgent and transformative action.

To justify the mission, DG R&I argues that business-as-usual is no longer acceptable and that the EU needs a new kind of instrument, beyond traditional policymaking: the Mission. The EU Soil Mission's has two main goals: setting up 100 LLs (LLs) and addressing eight specific objectives, all environmental, with one focusing on soil literacy. The implementation plan outlines the main barriers to achieving the specific objectives are gaps in knowledge and data, as well as inadequate access to these; research and technologies which are not adapted to the user and local context; a lack of monitoring soil health capacities; and lastly, insufficient awareness and practices for soil health. The mission considers that LLs and soil literacy is the way forward to overcome these barriers and improve soil health across Europe.

LLs are considered central and novel approach which act as real-world spaces for co-creation and innovation. They are meant to involve a wide range of stakeholders and be accountable to rigorous expectations of excellence, impact, and implementation. In addition, soil literacy is framed both as a challenge and an opportunity. Citizens are expected to become "soil stewards," contributing to awareness, legitimacy, and systemic change. The Mission emphasises engaging schools, arts, and community initiatives, but much of the effort seems focused on top-down education rather than meaningful participation.

Whilst in events and policy documents, the problem solution framing remained uniform, there weas arguably finetuning to the framing. For example, in the EU Mission Soil Week, soil degradation was not only presented as urgent and necessary, but linked to threats across food security, biodiversity, human wellbeing, and water cycles, establishing soil health as directly and indirectly a core element of Europe's stability and prosperity. In addition, soil was also described as a strategic asset, key to economic competitiveness and sovereignty. Similarly, instead of using the term "soil stewards", land managers, farmers, and citizens essential "soil guardians" whose long-term support is critical to making the mission work, helping Europe survive and thrive. Arguably this represents a shift from a more idealistic relation to soil, towards a more *real politik* relation – which resonates with trends and turns in our relationship to the food system as a response to the supply chain shocks from global crisis (Pellizzoni et al., 2024).

In many ways this reflects the pragmatism and expediency of the Mission managers and the Mission Board, which adapt and frame soil health to resonate with the current *zeitgeist*. For example, the first Mission board report in 2020 was produced during the Covid pandemic and

highlighted the potential of soil biome to "…provide future therapeutic solutions to secondary infections from Covid including antibiotic resistance" (Mission Soil Board, 2020, p. 14) to not be mentioned again. Similar examples exist across policy documents and events, where the Mission is re-framed slightly differently, such as leveraging digital technologies and AI, which highlights the need to be politically savvy to maintain institutional buy-in (Normann et al., 2024).

Divergences

However, this problem-solution diagnosis arguably has many issues. At the inception of the mission, the Foresight on Demand report offered substantively different problem-solution diagnosis which unlike the EU's general framing, directly names industrial agri-food incumbents as powerful antagonists shaping choices and institutions. It identifies farmers as the key actors in the transition, but also as those most impacted, particularly due to the short-term economic risks of soil-friendly practices. The report stresses that farmers need financial buffers and support to transition successfully, which is largely unaddressed in many of the Mission's policy documents. It indirectly exposes how institutional actors may have been sidelining scientific advice and failing to acknowledge key power dynamics, thus excluding not only farmers but also political and economic ramifications.

At the EU Soil Mission week, the EU's framing was openly challenged on two fronts. MEP Alexander Bernhuber criticised the urgent and existential framing as this indirectly blames farmers and creates a polarising situation between the institutions and the farmers. In addition, he highlighted that the digital solutions, databases and regulations are not the right solution, suggesting collaborating more closely with farmers. Mission Board Member, Dr. Anna Krzywoszynska questioned the lack of attention to the people directly caring for the soil and their knowledge and values, highlighting that while soil health is central, the wellbeing of rural communities neglected, ignoring that these are communities in crisis. They both present quite different perspectives. Mr. Bernhuber directly questions the technological and regulatory solutions, whilst Dr. Krzywoszynska is focused on normative and epistemic issues simmering in the Mission. But both are emphasizing that the Mission has fundamental issues of participation caused by and because of what they deem an incorrect problem-solution diagnosis.

A month after the EU Soil Mission week, the Mission Board did release a report criticising how the social sciences, humanities (SSHA) and the arts, remain under researched, underused and underrepresented and how this is impacting the performance and potential of the Mission. The Board highlights many of the issues with the current approach, such as excessively relying on the dominant "knowledge deficit model" and pushes for deeper integration of SSHA expertise from the outset of LL design. The Board warns that without serious structures to embed social and cultural understanding, claims of societal embedding are hollow. It calls for pre-funding mechanisms to include actors outside of well-established research institutions and networks, which are otherwise structurally disadvantaged by Horizon Europe's procedures.

This report may be an inflection point. The Board has mirrored the EU's problem solution diagnosis, where everyone is responsible for soil health and soil itself is a victim to our society and economic activities e.g. "We need to protect and restore soils. No soil should be left behind" (Mission Soil Board, 2023, p. 5). However, this late report hints the Board is identifying that the institutional diagnosis is rooted in an epistemic exclusion which inevitably leads to normative and substantive exclusions that required to be addressed. In addition, this report is aligned with the other divergences in that it is rooted in agriculture, rural communities and farmers.

Currently the institutional problem solution diagnosis is arguably challenged on four fronts. Firstly, soil health is not a civic and societal problem, but a problem of the food system, and therefore to be addressed primarily by the actors in the food system, not the whole of society. The focus on different types of soils, such as urban and industrial, ignores the reality that most soils are in agricultural land and that agricultural activities are the main driver for systemic soil degradation. Secondly, whilst most policy documents seem to indicate that all societal actors are considered relevant, some documents, at events and in interviews the main actors are not civic, industrial, urban or academic, but rural and agricultural. Thirdly, there are serious doubts from different stakeholders whether the issue is an absence of knowledge, data and solutions, and more the economic conditions surrounding agricultural production. And lastly, both in interviews and the Board, conclude that the current approach through Horizon is problematic, due to the formal and informal barriers to participation and the type of projects and knowledge that are produced.

6.2 Contextualising the Structural analysis

This section analyses how the structural dynamics identified empirically interact and shape the Mission's exclusionary and participatory dynamics, while also validating and extending them with insights from existing research and theory. This section develops the EU Soil Mission's Ecology of Exclusion.

6.2.1 Institutional & Socio Material Constitutional structures

During the research, Horizon Europe emerged as the most influential institutional constitutional stability. Across interviews and events, participants consistently identified its procedural rigidity, evaluation criteria, and techno-scientific orientation as shaping who, what, and how participation materialised in the Mission. Horizon Europe sets the operational rules of participation, but the evidence suggests it does not fully explain the logics of exclusion. There is a case to be made that its use is symptomatic of a deeper institutional design choice rather than the main cause of institutional exclusionary dynamics within the MIS.

The main socio-material constitutional stability identified is Europe's agro-industrial food system, which drives most soil degradation through an export-oriented, agrochemical-dependent production model. Farmers are central to soil management, and the Mission's activities ultimately converge on agricultural practices and land management. Yet, despite this material reality, the Mission is explicitly not formally integrated with the CAP or targeting the food system. The result is a paradox: discursively, soil health is framed as a civic and societal challenge. Materially, the crisis stems from the agricultural regime. Institutionally, it seems the Mission structurally designed not to address the very regime that drives the problem of soil degradation.

The MIS's programming structure has been described as the Institutional Blackbox due to the opaqueness of its internal processes and decision making. Much attention has been placed on Horizon Europe's shortcomings. Yet the decision-making that led to choosing Horizon Europe in the first place is rarely scrutinised. This suggests that the opaqueness of this process is taken for granted rather than fundamentally challenged. This hints at a deeper institutional constitutional stability. While this research could not fully map it, the symptoms of its existence are widespread.

For example, there is not a transparent process of how input is processed and considered, such as from citizens and farmers during the consultation process for mission formulation as well as

the nebulous role scientific perspectives play, such as the Foresight report and the Mission Board's itself. This is crucial because much of the legitimacy of the Soil Mission, as other missions, is rooted in open consultation processes and scientific research (Rosa et al., 2021).

Furthermore, the Institutional Blackbox challenges the idea as the Mission arena as a dynamic space with different stakeholders (Elzinga et al., 2023; Janssen et al., 2023). This hints how the Mission is rooted and driven in the EU's bureaucracy arena, where experienced, pragmatic high-government officials familiar with the policy process negotiate behind closed doors (Normann et al., 2024), with decision-making ultimately determined by the interests of DGs and Member States (Janssen et al., 2023).

Contrary to concerns in mission literature about vested interests blocking transformative change (Elzinga et al., 2023), the Soil Mission shows a striking absence of incumbents, with exclusion instead driven by institutional dominance. Within the Soil Mission, incumbents' influence does not seem to be widespread concern, probably due to the dominance of EU institutional actors, with academic antagonists arguably acting as subjects and economic incumbents surprisingly absent. Whilst both the input and inner mechanisms of the Blackbox Institutional Structure are obscure, the output is a clear pre-defined directionality towards certain kind of actors and knowledge (Bulah et al., 2024; Parks, 2022) and domination in the pursuit of this direction, rather than co-creation with other stakeholders (Klerkx et al., 2024).

The dominance of the Mission's programming structure by institutional actors, the limited advisory role of the Mission Board as scientific and civic actor and the absence of incumbents, suggest a deeper constitutional stability which legitimises institutional antagonists fully in control, with no need of incumbents to intervene to protect their interests. While interviews highlighted Horizon Europe as the dominant institutional stability, the literature suggests this is only one layer of a much deeper institutional logic shaped by the historical intersection of the EU, national and agricultural interests.

This entanglement between the EU, Member States and Big Agricultural interests is thoroughly documented and researched (Candel & Daugbjerg, 2025; Cotta, 2024; Fiala et al., 2024; Marek & Tosun, 2023; Omar & Thorsøe, 2024). In the 1990s, this led to the concept of *agricultural exceptionalism* – which characterised the agricultural sector as different from other economic sectors and therefore should be heavily supported and regulated by the EU and Member States, mainly through CAP (Candel & Daugbjerg, 2025). The current EU cannot be understood without the development of CAP, which in 1985 boasted 73% of the EU's budget (PBO, 2019). In the same way that the current European agri-industrial system cannot be understood without CAP, suggesting a institutional-socio-material constitutional stability which cannot be easily distinguished. Candel and Daugbjerg's recent research on whether the EU seemed to be entering a post-exceptional food system, state in their conclusions:

> "*Our findings present a nuanced picture. While we noted an increase in, and diversification of, food system sustainability concerns in policy discourse, along with some institutional openings and broader consultations with interest groups, these changes did not constitute a clear break with the past. Crucially, the Farm to Fork and Biodiversity strategies did not lead to substantive policy changes; proposals were either stalled or diluted, leaving the exceptionalist legacy largely intact.*" (2025, p. 5)

Furthermore, the authors highlight how these attempts can be characterized as "shallow post-exceptionalism, introducing new ideas and incremental changes without fundamentally altering

the EU agri-food policy framework" (2025, p. 5). This institutional constitutional stability that was not identified in the empirical results could explain why the Soil Mission is not meant to be part of CAP or to address explicitly the food system. Exclusion in the Mission is not simply a product of Horizon Europe's design, but of deeper institutional and socio-material entanglements rooted in the EU's agri-food exceptionalism. Arguably, this has determined the normative, epistemic, substantive and instrumental grounds on which the Soil Mission emerges and directs its innovation system.

6.2.2 The Programming Structure – the *Institutional Blackbox*

The MIS's Programming structure, identified as the *Institutional Blackbox,* is not autonomous, but rather an expression of institutional constitutional structures. Therefore, the Programming Structure is limited to reproduce many of the domination, marginalisation and bias models present in both CAP and Horizon Europe's institutional constitutional structures. These cascade into the MIS's implementation structures, which are needed to exclude actors and ideas that could challenge this CAP constitutional stability. The Programming Structure has the power to set the narrative and agenda surrounding soil health innovation, which the empirical results attest to: the use of urgency (Reale, 2021), pragmatism (Normann et al., 2024), de-politicization (Klerkx et al., 2024), securitization of food production (Pellizzoni et al., 2024) and overall abstract, ambiguous, broad framing of the crisis in soil health, may be done as a "…preferred political strategy, to circumvent conflicts or contestation along core values, and to support acceptance on a broad basis"(Wanzenböck et al., 2020, p. 484).

This could be understood as potentially an attempt at *de-wickedification*, aiming to re-frame the problem as if all of society is equally responsible, that all we need is more science and awareness, a normative simplification which marginalises perspectives and experiences which lead to uncertainty, contestation and complexity (Kirchherr et al., 2023) which could challenge CAP. Specifically, the absence of any discussions related to power dynamics within the agri-food value chain and how this may connected to soil degradation (Clapp et al., 2025; Giuffré et al., 2021; Hector et al., 2025) seem to limit the EU Soil Mission to a ambitious, large scaler soil health research experiment open to the public (Panagos et al., 2024).

This line of reasoning does not seek to suggest that EU policymakers coalesced with the Member States and agro-industrial incumbents, who consciously decided to situate the Soil Mission away from CAP and within Horizon Europe. Instead, this line of reasoning suggests that there is a deeper, well documented and researched, constitutional stability where CAP is politically untouchable and not subject to transformative agendas unless agreed upon by institutional and incumbent antagonists. Incumbents and Member States arguably do not have to proactively act to protect CAP from the EU. However, this means that the Soil Mission is designed within the explicit limitations of Horizon Europe and implicit untouchability of CAP - undermining any genuine and explicit capacity to innovate and transform the food system.

The very choice of the institutional antagonists of using the Horizon Europe program as the main instrument for missions, without reform or openness to what kind of research, the selection process of projects, the evaluation criteria and the relation between bottom-up experimentation and top-down governance implies that the same normative, political and epistemological principles remain intact, to the point that five missions with different kind of challenges are indistinguishable in their approach (Wanzenböck et al., 2020). This "business-as-usual" approach, which simply upgrades and increments existing EU instruments, reflects a difficulty in materialising the normative weight the EU invokes to justify missions into substantive

epistemological and politically relevant approaches (Kattel & Mazzucato, 2025; Laatsit et al., 2025). Arguably, the Soil Mission's is burdened by explicit and implicit institutional logics which pre-determine what kind of direction, regardless of the input of citizens and scientists, whilst unable to deal with the very realities of the socio-material system it implicitly is addressing. A variety of actors, especially farmers, have their agency to innovate in soil health curtailed and limited by the technical, technological and economic conditions of industrial agrarian production. Therefore, the programming structure reproduces exclusion by translating CAP's untouchability into Horizon Europe's technocratic frame, narrowing participation and depoliticising soil health.

6.2.3 Performance Structure – *technocratic implementation, academic LLs*

These insights recontextualise the structural analysis, especially in who is able to participate and how implementation is developing. Horizon Europe is not filtering *the willing* – those who seek to revert soil degradation – but is choosing winners – the best proposals of those who can participate in the first place (Kirchherr et al., 2023). Mazzucato's idea of the willing takes for granted that there is genuine institutional intent to direct and facilitate transformation. But since the Soil Mission's development as an innovation system open to participation, is characterised by a systemic exclusion of the *willing* – their ideas, issues, methods, perspectives - and only the "usual suspects", the academics, have had a reasonable chance at winning proposals and participating in the mission.

There are different aspects of the mission that can counter this line of reasoning: research projects as consortia and the ethos and practice of LLs as open to all kind of actors. Consortia are far more geared towards participation and diversity of actors (Wiarda, Sobota, et al., 2023) and the LL approach is more open to the public and stakeholders, such as farmers (Bouma & Veerman, 2022). However, the selection process has relied on pre-existing techno-scientific institutions (Klerkx & Rose, 2020; Kok & Klerkx, 2023; OECD, 2024b) as well pre-defined technocratic problem and solution framings (Wanzenböck et al., 2020), which means consortia still have to design proposals and LLs according to these institutional framings in order to have a chance of winning. As interviewees from LLs (A1, A2, A3, A4) have highlighted, in practice they all still struggle to work with non-academic actors, especially farmers, and there are many limitations to genuine co-creation. A4 discussed the paradox of co-creation: when you apply to a proposal, co-creation is a risk, as different stakeholders may struggle to develop a coherent, winnable proposal. Therefore, it is preferable to win the proposal first and then you can approach other actors. But by then many aspects have already been defined and there is much less flexibility than expected to accommodate to different actors. This means that the very conditions of entry into implementation already narrow the possibilities for genuine bottom-up participation. Consortia and LLs, though diversifying, still narrow the potential solutions and approaches which can emerge within the actual Mission's implementation as well as the kind of stakeholders who participate.

This logic permeates during implementation. As many interviewees have discussed (A2, A3, A4) SoiLL Startup shifts LLs into sites of standardisation rather than experimentation. (SOILL, 2025). SoiLL Startup's goal is to be the support structure for 100 LL through "capacity, building, knowledge exchange, promotion and regular monitoring to ensure the network effective contribution to the Mission Soil goals" (SOILL, 2024c, p. 5). The Mission Goals are environmental targets, not social, implying that the focus is harmonising the LL to meet these goals. Therefore, while they may generate new practices locally, these practices are reformulated to fit the

Missions previously agreed reporting procedures. The richness and heterogeneity of local experimentation are thus flattened into abstracted knowledge products - policy briefs, deliverables, datasets and tools - that circulate within the Missions' technocratic machinery rather than within farming communities. In effect, despite calls for context-based knowledge and co-creation, implementation becomes less about opening plural pathways of innovation and more about producing scalable, comparable, and governable knowledge (SOILL, 2024c, 2025).

Therefore, contradictions between ambitions and reality re-emerge at the level of implementation in the LL. Co-creation is invoked but rarely enacted. LLs are presented as open, but entry into them is conditioned by agreements to previously established processes and goals. Local experimentation occurs, but its outputs are channelled through reporting structures that strip them of their contextual and relational meaning. Implementation is thus characterised by participation without power: stakeholders may be included in activities, workshops, or consultations, but the directionality of the Mission remains pre-defined.

However, this does not mean that implementation is devoid of agency. Many coordinators, researchers, and facilitators – who are academics and professionals, such as project managers - actively try to meet both ambitions and requirements of the Mission. And struggle doing so, balancing competing priorities. They experiment with ways to engage farmers more meaningfully, to build trust, or to embed projects in local realities, and on some occasions, such as A4, manage to open procedures with the Mission to discuss a new project agreement to accommodate new actors. These efforts reveal that exclusion is not totalising, and different approaches are possible. Yet these remain marginal and exhausting for those involved. The Blackbox thus cascades downwards: structural exclusions at the programming level are reproduced and reinforced in the everyday practices of implementation, proactively by SoiLL Startup, and begrudgingly by LL coordinators and facilitators.

Taken together, this suggests that the Soil Mission's implementation is not the emancipatory counterpoint to its programming structures, but their extension. LL despite their participatory promise, function primarily as instruments to translate institutional directionality into practice, rather than as genuine sites of co-creation. The implication is that exclusion in the EU Soil Mission does not merely occur at the level of design, but is actively produced and reproduced through implementation, constraining the agency of farmers, citizens, and other actors to influence LL direction specifically and indirectly, the Mission's trajectory.

In summary, the three layers of the structural analysis reveal how exclusion is structurally embedded within the EU Soil Mission and its innovation system. At the deepest level, the entanglement of CAP exceptionalism and Europe's agro-industrial food system creates an institutional and socio-material stability that limits the Mission's scope from the outset. This stability is expressed through the programming structure, the Institutional Blackbox, which reproduces exclusion by translating political untouchability into technocratic instruments and depoliticised framings. Finally, these dynamics cascade into the performance structure, where LLs and consortia embody participation in form but exclusion in function - spaces of engagement that ultimately reinforce pre-set directionality. Even though the Mission is not formally targeted at the food system, its capacity to research and innovate is constrained by the material and social conditions within the food system as well as Horizon's shortcomings. This undermines its ambitions and capacity to collaborate meaningfully with many actors beyond academia, but especially with farmers and rural communities. From this perspective, the Ecologies of Exclusion of the EU Soil Mission's operates not as an anomaly but as a constitutive feature of the Mission's

structural design, shaping who participates, which knowledges count, and what forms of innovation are possible and desirable.

6.3 Functional Analysis

This final section unpacks the implications of exclusion for different actors, particularly farmers, and explores its impact across the normative, epistemic, substantive, and instrumental rationales for participation, as well as what this means for the mission.

Normative Exclusion

Arguably, the MIS relies politically on the "untouchability of CAP", to present an apolitical normative framing through Horizon Europe. The goals are not to address the impact of the food system on soil degradation – even though most of the energy, attention, focus and issues within the MIS are focused on the food system – but the urgent crisis of soil degradation, throughout Europe, through research and innovation.

This exclusion functions mainly at two levels: firstly, any issues related to the politics of the food system and its impact on soil degradation are not explicitly addressed and therefore, ignored, or simply out of scope of the MIS. Secondly, this justifies a research and innovation approach which is techno-scientific, perceived as neutral, and simply framed as raising knowledge, expertise, solutions and literacy surrounding soil issues. This "de-wickedness" strips the Mission of complexity and contestedness and denies actors who propose alternative framings recognition and legitimacy.

This depoliticization is reinforced by the Mission's emphasis on civic engagement, which produces three major normative deficits. Firstly, the Mission frames "citizens" as the main actors of change, especially towards raising awareness and soil literacy. However, the EU's conceptualisation of the citizen is inherently exclusionary, as the citizen is idealised to be suitable and appropriate for the purpose of the Mission (Limbeek et al., 2025) – mainly educators and communicators of the soil science – and not as political agents, with their own perspectives, issues and concerns about soil degradation. Citizens can play a role in food system transitions, beyond the limitations set by the Soil Mission, such as empowering food citizenship (Simoglou et al., 2025), activism within food systems (N. Rao et al., 2025) and the overall role of citizens in European food policy and transitions (Cotta, 2024).

Secondly, by discursively prioritising the "citizen" over the "farmer", the issues, diversity and realities of rural communities, agricultural production and soil degradation, are rendered invisible, leading to situation where we expect farmers to care of soil health but not willing to discuss land justice, economic precariousness or social justice. Whilst citizens tend to be more concerned about justice, sustainability and climate action, farmers and rural communities' care more about jobs, economic growth and the impact of these transformations on their livelihoods (Conti et al., 2025; Fiala et al., 2024; Tosun et al., 2024; Tschersich & Kok, 2022). Farmers cannot opt out of soil health responsibilities as citizens can. They are directly accountable for maintaining soil while navigating economic pressures, insecure livelihoods, and contested production models (Wojtynia et al., 2021). The absence of explicit support for farmers, despite their designation as "soil guardians" highlights a lack of normative commitment to those most affected by soil transitions.

Thirdly, while the Mission stresses open consultations and co-creation as sources of legitimacy, the core processes of decision-making - such as project selection and Horizon Europe's rigid

criteria - remain opaque and controlled by policymakers and benefitting the "usual suspects" in academia. As the Mission Board states that the current selection of participants is "... privileging a narrow group of well-networked research organisations"(2024, p. 14). Citizens and farmers are invoked rhetorically, but in practice, participation remains inaccessible for the vast majority of actors who wish to participate.

Taken together, these dynamics undermine the Mission's democratic legitimacy and claims to social justice. Normatively, participation has been reduced to symbolic gestures that depoliticise citizens, sideline farmers, and rarely able to question policymakers or researchers.

Substantive Exclusion

The tensions revealed by the institutional problem–solution diagnosis and the ecologies of exclusion highlight a key substantive weakness of the EU Soil Mission: it lacks a coherent and stress-tested theory of change that convincingly connects its participatory efforts with its desired outcomes. While research on EU Missions has identified the need for causal mechanisms linking goals with transformative change (Wieser et al., 2025), the reality of implementation falls short. All five missions appear to rely on an almost identical theory of action, regardless of their very different challenges. As Mazzucato and Kattel (2025) argue, the EU's normative turn has not been matched by an epistemic turn - there has been no significant change in how knowledge is mobilised to enact normative claims. This point is discussed further in the following section on epistemology, but Mazzucato and Kattel's work still serve to pinpoint the lack of an approach to mobilise knowledge to produce the desirable environmental, social or economic goals within EU Missions.

Within the Mission's discourse, glimpses of "ideal" theories of action can be found, but these collapse under scrutiny. At the PREPSOILL event, schools were frequently identified as primary agents of change. While education may indeed yield benefits in the long term, it is disconnected from the Mission's urgent timeline: soil health cannot be restored by 2030 through measures that will only bear fruit decades later. Similarly, citizen engagement and soil literacy are commendable, but the Mission offers no clear causal pathway by which these efforts contribute to tangible improvements in soil health. Indicators used by SoiLL, such as the number or type of participants in LLs, remain disconnected from core goals like reversing soil degradation or establishing 100 active LLs. This reflects a disoriented theory of change that underestimates the structural conditions and time horizons needed for impactful solutions and action.

These weaknesses are rooted in exclusion. The exclusion of diverse perspectives - particularly farmers, SSHA disciplines, and alternative food system framings - means that the Mission's causal logics have never been stress-tested beyond the small group of insiders who have developed it (Wanzenböck et al., 2020). As a result, assumptions about what actions will generate outcomes remain mainly hypothetical, therefore fragile and ungrounded. Furthermore, the exclusion of normative issues and social-scientific knowledge narrows the scope of available solutions. Missing insights into livelihoods, justice, and socio-cultural dynamics mean that the Mission's approaches remain thin and underdeveloped, lacking the resilience to withstand complexity, contestation, and uncertainty in Europe's food systems, which it will inevitably encounter.

In this sense, substantive exclusion undermines not only the credibility of the Mission's solutions but also its transformative potential. Without widening the epistemic and normative basis of its problem – solution pathways, the EU Soil Mission risks building outcomes that are technically ambitious but substantively limited.

Epistemic Exclusion

Within the MIS, exclusion is primarily driven by epistemic narrowing, formalised through Horizon Europe. This is arguably the most visible exclusionary mechanism in the Soil Mission, and it cascades into both normative and substantive deficits. As discussed in Section 6.2.3, Horizon Europe's epistemological foundations and procedures seem to be at odds with the very idea of the willing. The willing are essential for mission-oriented innovation policy (Mazzucato, 2018a, 2021), though some have argued that missions do end up choosing the winners – like any industrial innovation policy (Brown, 2021; Kirchherr et al., 2023). Other authors have discussed that its not so much the winners or the willing, but rather, those who participate are those who are able (Limbeek et al., 2025). This research would further conclude that the Mission is not choosing winners but rather defaulting to Horizon Europe's usual winners and therefore, the usual epistemologies.

It is quite difficult to pinpoint why exactly this is the case. There is abundant research signalling the issues with the Horizon Europe approach, as Wanzenbock et al, succinctly summarise:

> *"As long as the modalities of research and innovation funding programmes remain by and large the same as they have been for the past 30 years, the gap between ambitious long-term and higher order goals associated with societal challenges, on the one hand, and the prescription of specific topics as defined in work programmes, on the other hand, will continue to be too wide and too difficult to reconcile to lead to the kind of transformative and solution-oriented innovations needed to tackle grand societal challenges." (2020, p. 485)*

Wanzenböck et al. highlight several criticisms, based on studies and expert groups set up by the European Union to evaluate its mission programmes. Firstly, the EC employs the same technocratic approach for all five missions, assuming a convergence of problem and solution framings. Secondly, the extremely small number of stakeholders involved in the definition of problems and solutions narrows how to conceive the problem and its solutions significantly. Thirdly, strategy and research topics have been pre-defined and there is little to no space for experimentation and reflexivity. Lastly, relevant, significant and strengthened policy coordination is required so that research and innovation are effectively scaled and diffused to trigger meaningful change (Wanzenböck et al., 2020, pp. 485–486).

This aligns substantively with many of the findings within this research and explains the narrowness in research and innovation, characterised by the knowledge deficit model (Mission Board, 2024). The limitations of this approach arguably reinforce normative and substantive exclusion. The food system is particularly wicked, as there is a wide variety of stakeholders and issues, emphasizing how complex and contested the transition can be (Fiala et al., 2024; Wojtynia et al., 2021) as well as uncertain (Candel & Daugbjerg, 2025; Daugbjerg & Feindt, 2017). There is no denying that there are serious normative issues, such as the democratic deficit (Tschersich & Kok, 2022) and issues of justice (Wiarda et al., 2025), as well as substantive (Conti et al., 2025; Marek & Tosun, 2023; Uyarra et al., 2025).

Within the mission, these issues are exacerbated and pronounced due to the epistemic exclusion of social sciences, humanities and arts at the heart of the EU Soil Mission (Mission Soil Board, 2024). The reflexivity within the Mission is limited to technical standardisation, through SoiLL's M&E framework, and scientific gaps, through SOLO, which limits any capacity to process based on social, cultural, ethical or political realities which emerge on the ground. This is something

that the social sciences and humanities are particularly well equipped to deal with, but remain underutilised and underfunded, limiting any impact they could have

This epistemic exclusion implies that issues that potential stakeholders hold dear cannot be recognised, acknowledged, worked with or attempt to include as something to be solved, if they do not fit the pre-defined operational criteria for valid research output. This means that the Soil Mission cannot expand its normative horizon as well as no openness to new information, realities and perspectives that could lead to more effective solutions. From a substantive perspective, due to this epistemic rigidity, the Mission is losing valuable participation which could lead to different outcomes, which are far more aligned with the Mission's goals in the long run (OECD, 2024a).

This epistemic narrowing reinforces normative and substantive exclusion. Normatively, by marginalising social sciences, humanities, arts, and farmers' experiential knowledge, the Mission forecloses recognition of justice-related claims: issues of land, livelihoods, and rural agency are rendered invisible. Substantively, by excluding perspectives that could question or enrich the Mission's approaches, outcomes remain thin, untested, and poorly aligned with the realities of food systems.

Time exemplifies this connection the strongest. Interviewees consistently highlight how ill-suited Horizon Europe timelines are for innovation in food systems. Soil remediation cannot be conclusively demonstrated in four seasons, yet this is the average project length. Claims that reversing soil health trends by 2030 is achievable (DG R&I, 2021c) clash with evidence of the slow, complex rhythms of soils and the economic barriers faced by farmers (Marselis et al., 2024). Without research that integrates many disciplines, such as agricultural economics, and other relevant perspectives, such as related to livelihoods or temporal dynamics, the Mission risks delivering outcomes that are scientifically sound but limited in practice.

The research indicates that these tensions are becoming more evident. The Mission Board's recent requests to advance pre-funding mechanisms, more open and reflexive processes in the design, creation and scaling of LLs as well as the integration of SSHA into these processes, hints at the unsuitability of the current research and innovation frameworks to meet the emergent needs of the MIS. These proposals signal an awareness that epistemic exclusion is not merely a technical matter but one that crystallises normative deficits and substantive limitations.

Instrumental Exclusion

Instrumentally, exclusion weakens public trust, legitimacy, and stakeholder commitment by creating the *appearance* of openness while withholding meaningful power. The EU Soil Mission has been accompanied by visible participatory instruments, such as consultations, co-creation workshops, LLs, and outreach campaigns. Even though these provide the experience of participating, how exactly participation has influenced the Mission's design, direction or governance overall, remains unclear. This instrumental exclusion mirrors *illusive inclusion,* which is "when inclusion is ensured but the outcome is not different from that of being excluded" (Joseph, 2014, p. 75). Whilst we cannot argue counterfactuals – if participation had never occurred, would the Mission still be designed the same? – because there are other missions which are structurally similar from a research and innovation perspective (Wanzenböck et al., 2020; Wieser et al., 2025), suggesting that currently, public consultations and board members are not influential in the design or governance of its missions.

My own experience as a participant in a co-creation workshop on soil remediation for polluted sites illustrates this dynamic. While I was formally included in the process and the facilitator informed us that our input would be used, I was unsure about how - or whether - my contributions had been considered in subsequent decision-making. This lack of clarity, transparency or feedback reflects a broader pattern: participation is instrumentalised to create the appearance of openness, while insulating core decision-making processes from external influence.

This pattern is visible across multiple aspects of the Mission. The Mission Board was framed as central to the Mission's design and implementation, but its role is advisory within the boundaries set by the institutions. Similarly, "soil ambassadors," who symbolically embody participation and diversity, are unpaid volunteers with no influence over decision-making – despite their willingness to support further the Mission (C3). Many interviewees perceive these positions as symbolic (C3, C4, C5), arguably "tokenistic". Ironically, the most visible actors are thus those with the least power, while those with real authority remain largely unknown. This lack of clear leadership and accountability further undermines the Mission's legitimacy: it is never obvious who is responsible for the Mission's trajectory. When B2 was asked during the discussion how research topics are selected, they could not discuss the process. This further reinforces the idea of the MIS's Programming Structure as an Institutional Blackbox.

The same dynamic occurs with the LLs. While they are promoted as sites of co-creation, their design and outputs are heavily constrained by the prioritisation of harmonisation, standardisation, and measurable outputs over experimentation and dialogue. This mismatch between promise and practice can erode credibility and enthusiasm for participation. Stakeholders enter these spaces expecting genuine co-creation, only to find that many aspects have already been decided.

From this perspective, the Mission's diversity of stakeholders is more performative than transformative. The visibility of participation legitimises the Mission discursively but without redistributing decision-making power. As a result, participation becomes a tool for symbolic legitimacy rather than genuine engagement. Based on interviewee responses, this can produce fatigue (A2, A4), disillusionment (C3), and apathy (C3).

Taken together, the functional analysis demonstrates that exclusion within the EU Soil Mission is not incidental but systemic, operating simultaneously across normative, epistemic, substantive, and instrumental dimensions. Rather than merely limiting who participates, exclusion reshapes the very terms of participation: depoliticising actors, narrowing the epistemological basis of knowledge, weakening the robustness of outcomes, and instrumentalising engagement for legitimacy. This dynamic crystallises the paradox of the Mission: while most soil degradation originates in the food system, the Mission is not designed to explicitly confront the politics of food and agriculture, instead channelling its efforts through a depoliticised research and innovation agenda. This is aligned with the perception that attempts to reform EU agricultural policy remain incremental, with new ideas, broader consultations and more actors involved, but without trying to fundamentally transform (Candel & Daugbjerg, 2025). From this perspective, exclusion is a needed structuring force within the MIS to delimit the Mission's transformative potential.

7. Conclusion & Discussion

This chapter brings together the core insights of the research, revisiting the initial research questions and reflecting on how they have been addressed through the case of the EU Soil Mission. It discusses the conceptual and scientific contributions of the thesis, its societal and policy relevance, and its methodological and empirical limitations. Finally, it outlines key directions for future research to continue deepening the understanding of exclusion within mission-oriented innovation systems.

7.1 Answering the research questions

To conclude, this section revisits the research questions that guided the study and synthesises the main findings. Rather than offering a full summary of all results, the goal here is to clearly articulate how the thesis has answered the questions posed at the outset and what insights have been generated through the analytical and empirical work

How do exclusionary dynamics materialise in Mission-oriented innovation systems?

1. How can exclusion be conceptualized for Mission-oriented innovation systems?
2. What are the Ecologies of Exclusion within the EU Soil Mission's-oriented innovation system?

This research set out to investigate how exclusionary dynamics materialise in Mission-oriented Innovation Systems (MIS), driven by a growing dissonance between the inclusive aspirations of Mission-oriented Innovation Policy (MIP) and the exclusionary outcomes observed in practice.

The first sub question: ***How can exclusion be conceptualized for Mission-oriented innovation systems?*** Building upon the literature review and theoretical work from Chapter 2, the Chapter 3 develops the *MIS Ecologies of Exclusion* framework by adapting Chilvers' et al. Ecologies of Participation and integrating it with Elzinga's et al. MIS analytical framework. Chilvers' et al. provided the inspiration for elements that would populate the framework. These were antagonists (actors who enact exclusion), subjects (those excluded), models (mechanisms of exclusion), and objects (knowledge, values, or issues excluded). In addition, the concept of systemic constitutional structures was reconceptualised into institutional and socio-material constitutional structures. Like Elzinga's et al. concept of regime, this helps identify the systemic characteristics of the institutions which legitimise the MIS as well as the socio-material system the MIS is aiming to intervene in.

To operationalise the EoE–MIS framework, the analysis draws on Elzinga et al.'s three steps - problem–solution diagnosis, structural analysis, and functional analysis, which is repurposed to diagnose exclusion within a mission. The problem–solution diagnosis interrogates how problems and solutions are framed by the main antagonists and with what consequences for alternative perspectives or knowledge systems. Structural analysis then maps how exclusion manifests across the identified institutional and socio-material constitutional structures, programming structure, and performance structures, identifying the antagonists, subjects, and objects that populate each structure and the models through which exclusion is enacted. Taken together, these steps reveal the interrelated patterns of exclusion that crystallise into a broader ecology of exclusion

The functional analysis shows that exclusion in missions operates across four dimensions, which mirrored the four rationales for participation, and hence how the functioning of exclusion shapes

participation. Normative exclusion denies or marginalises rights to participate e.g. undermining justice, democracy, and legitimacy. Epistemic exclusion sidelines certain knowledge, values, or experiences e.g. narrowing the epistemological base of solutions. Substantive exclusion weakens the effectiveness and robustness of outcomes e.g. by omitting perspectives that could improve, or challenge proposed policies. Finally, instrumental exclusion uses the appearance of participation but excludes nonetheless e.g. participation is tokenistic or symbolic, serving the interests of antagonists rather than the mission's wider goals.

The framework was applied to the case study of the EU Soil Mission to answer the second sub-question: ***What are the Ecologies of Exclusion within the EU Soil Mission's-oriented innovation system?*** The framework combined empirical results from policy documents, event ethnography and interviews with a variety of actors related to the Soil Mission, with an abductive approach to contextualise the results with existing literature and theory. The empirical results are in Chapter 5, followed by the final answer to the sub-question in Chapter 6.

The problem-solution diagnoses initially revealed a problem and solution framing driven by the EU's institutional antagonists, framing soil degradation as an urgent, human-made crisis caused by our economic activities. Agriculture, urbanisation and industrialisation are worsening soil health, and the Mission is a novel EU instrument, which will reverse soil degradation by 2030 through 100 LLs. However, divergences are emerging from this framing on four fronts.

Firstly, soil degradation is fundamentally a problem of the food system, yet the Mission continues to present it as a civic and societal issue, downplaying agriculture's role as the main driver. Secondly, while official discourse suggests that all societal actors are relevant, in practice agricultural and rural actors emerge as central for success, exposing inconsistencies in participation claims. Thirdly, the emphasis on knowledge and data gaps obscures the structural economic conditions of agricultural production, which stakeholders argue are the real barriers to soil-friendly practices. Finally, Horizon Europe's procedures introduce systemic barriers that privilege established techno-scientific institutions and disciplines and limit the integration of social sciences, humanities and arts.

The structural analysis identifies the Ecologies of Exclusion within the EU Soil Mission's innovation system emerging from the interplay of institutional and socio-material constitutional structures and which the programming and performance reproduce, but with their own manifestations. At the deepest level, exclusion is rooted in the entanglement between the EU's CAP's exceptionalism and Europe's agro-industrial food system. This constitutional stability is historically co-produced institutionally and socio-materially, constraining the Mission's scope from the outset: although soil degradation is largely driven by industrial agriculture, the Mission is explicitly not integrated with CAP and avoids directly addressing the food system. This paradox frames soil health as a civic challenge while leaving the material drivers of degradation largely untouched, embedding the structural exclusion of explicit and specific transformative aims of this very food system, in the very foundations of the Mission.

These constitutional structures are expressed and reproduced through the Mission's programming structure, which we have deemed the Institutional Blackbox. Here, exclusion is reproduced through opaque decision-making, technocratic rules, and depoliticised framings that channel directionality towards certain kinds of actors and knowledge while sidelining others. Citizens and farmers may be consulted, but how their input influences outcomes remain unclear, and the Mission Board's advisory role is tightly constrained. At the implementation level, these exclusions cascade into the consortia that apply to participate and if they win, into their projects

and LLs. Although some coordinators attempt to open space for genuine engagement, LLs often function less as sites of co-creation and more as mechanisms to translate institutional priorities into practice. Taken together, the Ecologies of Exclusion in the EU Soil Mission are not accidental by-products but constitutive features of its design, shaping who can participate, which knowledge counts, and what innovations are possible.

Lastly, the functional analysis answers the final question, within the EU Soil Mission: ***How do exclusionary dynamics materialise in Mission-oriented innovation systems?*** The functional analysis of the EU Soil Mission shows that exclusion materialises not as isolated shortcomings but as systemic dynamics operating across four dimensions. Normatively, exclusion strips the Mission of complexity and contestedness by avoiding the wickedness of the food system and CAP. This leads to a depoliticization of soil health into a neutral research and innovation problem, framed through Horizon Europe's knowledge deficit approach. This denies legitimacy to actors who frame soil degradation outside of this framing, whilst sidelining farmers and narrowing citizens to soil literacy roles rather than political agency. Substantively, exclusion manifests in a weak and fragile theory of change. By disconnecting participatory efforts from outcomes, the Mission assumes that awareness and literacy will improve soil health without causal pathways or realistic timeframes. The absence of diverse perspectives - farmers, rural communities, SSHA disciplines - leaves its solutions underdeveloped, fragile, and poorly stress-tested. Epistemically, exclusion is most visible through Horizon Europe's technocratic procedures, which tend to reward the "usual suspects" of academia and techno-scientific epistemologies, narrowing the scope of valid knowledge. However, the lack of meaningful integration of social sciences, humanities, and experiential perspectives limits the Mission's capacity to deal with normative and substantive exclusion. Instrumentally, exclusion is enacted by creating participatory forms without accessing to decision-making power. Consultations, co-creation workshops, LLs, and symbolic roles like "soil ambassadors" provide the appearance of openness while insulating core governance from external influence. This can gradually lead to fatigue, disillusionment, and apathy towards the Mission's leadership and the EU's institutions.

Taken together, these dynamics suggest that exclusion in mission-oriented innovation systems does not merely limit who can participate but reshapes what participation means and what it can achieve. Exclusion depoliticises, narrows, and instrumentalises participation, reducing significantly the scope with which a Mission can engage with normative, epistemic, and substantive rationales of engagement - thereby structuring the Mission's potential innovation pathways itself.

Within the specific case of the EU Soil Mission, the paradox is that while most soil degradation stems from the food system, the Mission avoids confronting its political and economic drivers, instead operating through a depoliticised research and innovation agenda. In this way, exclusion becomes a constitutive force: necessary to maintain institutional coherence but simultaneously delimiting the Mission's transformative potential. This is arguably a process of "closing down" (Stirling, 2008), which denies the values and benefits of participation on multiple grounds. Exclusion in MIS fundamentally denies any space for social contestation about what is the problem to be solved, what solutions, who is developing the solutions and how resources are used, and ultimately this denies the pathway to learn, to deliberate and to reckon with the conditions and issues where innovation takes place (Pesch, 2024)

7.2 Scientific relevance and theoretical development

This thesis makes two primary theoretical contributions to the literature on participation in transitions, specifically mission-oriented innovation systems. First, it integrates Chilvers et al.'s *Ecologies of Participation* with Elzinga et al.'s analytical framework for *Mission-oriented Innovation Systems* (MIS). This integration yields a more grounded yet dynamic framework - MIS Ecologies of Exclusion (MIS-EoE) - capable of capturing both the systemic complexity and structural embeddedness of exclusion. This integration is born out of necessity as there was no framework which could neatly address the identified research problem. While Chilvers' framework provides a valuable relational and co-productive lens, it often lacks concrete application in a clear, bounded unit of analysis. Conversely, Elzinga's MIS framework offers strong analytical clarity on the multiple functions and their dynamics of the different structures within the MIS, allowing to evaluate a MIS's performance holistically. But may lack the depth to focus specifically on a particular set of functions and their dynamics, such as participation. By combining the two, the MIS-EoE framework can ground Chilver's ecological approach into Elzinga's analytical framework, reinforcing each other's strengths.

Second, this research makes an original conceptual move by reorienting the analytical focus from inclusion to *exclusion*. Rather than asking who participates and how, the framework examines who does not participate and why not. This reverses the normative, substantive, instrumental and epistemic reasons for increasing participation, and maps and explores how this is happening in the first place and what are the impacts. In doing so, it reveals the conditions under which participation fails to materialise, providing a tool for evaluating missions against their own normative aspirations. By reverse-engineering the presence and power of participation through the mapping and impact of absence of actors, perspectives and values, the MIS-EoE framework complements Elzinga's intention to assess the performance of missions while interrogating their legitimacy, openness and effectiveness.

The framework contributes to ongoing scholarly conversations in transition studies, mission-oriented innovation policy and Industrial Ecology. In relation to the foundational work of Mazzucato, Elzinga, and Hekkert, this research does not reject but rather complements their efforts. These scholars have themselves acknowledged the complexity and contestedness of participatory innovation governance. The MIS-EoE framework adds analytical clarity to the inclusion agenda by exposing how structural exclusions are normalised in mission governance, opening the question whether exclusion is inhibiting transformative capacity – and to those who wish more, the analysis can be the starting ground to improve the MIS itself. Furthermore, this research also invites critical reflection on whether some challenges - such as the instrumentalising of participation, the epistemic exclusion of social science and humanities, or the obscure dominance of institutional and incumbent antagonists - are case-specific or reveal deeper design flaws in the mission concept itself. While this thesis refrains from resolving that question definitively, it opens the door for further inquiry.

The MIS-EoE framework is not only theoretical but also adaptable for applied research. It can be used to test whether other missions (e.g., in health, climate, or energy) are truly including the actors they claim to engage. Through its structured typology of antagonists, subjects, models, and objects - combined with a multi-method approach involving documents, interviews, and ethnography - it equips researchers to trace both visible and invisible exclusionary dynamics. This makes the framework useful for comparative research and policy evaluation across different missions and institutional contexts.

Finally, this research speaks directly to disciplines such as transition studies and Industrial Ecology. While both claim to be interdisciplinary, they often maintain a technocratic and scientific bias, privileging quantitative modelling and engineering solutions over social complexity and political legitimacy. By offering a rigorous and structured way to analyse the social dimensions of innovation, this research contributes to the growing push for more holistic and politically aware approaches to transitions. In doing so, it aims to enhance both the academic quality and the practical viability of mission-driven social and sustainability transformations.

7.3 Societal relevance, policy implications and challenging the status quo

This research holds substantial societal relevance, particularly for the legitimacy, effectiveness, and long-term sustainability of mission-driven innovation. Participation is often framed as a normative ideal, but it also carries deep instrumental, substantive, and epistemic value. Missions depend on diverse actor engagement not only to gain trust and public support but also to navigate the complexity of wicked problems and arrive at more just and viable solutions. By turning the analytical lens toward *exclusion*, this research helps reveal why participation often remains shallow or ineffective - and where systemic barriers persist. The Ecologies of Exclusion framework offers an explanatory power often missing in participation studies, enabling policymakers, researchers, activists to identify blind spots and begin contesting them.

In the case of the EU Soil Mission, exclusion is not simply a matter of who is absent but of what *ways of knowing* and *valuing* are marginalized. Normative and epistemic exclusions were found to be deeply interwoven, leading to substantive deficiencies in mission performance and widespread stakeholder disillusionment. The findings underscore that participation is not simply about being invited to the table - it's about being empowered to shape what is being discussed.

For EU mission designers and policymakers, this points to a need for fundamental change. First, the limitations of Horizon Europe as a structuring framework must be acknowledged and, where needed, redesigned. Strategic dialogues should be held at the outset to define problems inclusively, with institutions acting as facilitators rather than gatekeepers. Applying a framework like Ecologies of Exclusion during the planning phase could help identify pre-existing injustices and tailor interventions accordingly. Moreover, actors critical to mission success - like farmers in the Soil Mission - must be prioritized not merely on normative grounds but because their inclusion is substantively essential.

A rather important point was the role of academics and science in the Soil Mission. An important source of legitimacy is the scientific foundations that justify the intervention. This is further reinforced using Horizon Europe and the privileging of conventional academia in the funding. At risk of oversimplification, but there is a reason why the MIS-EoE framework's starting position for academics as part of the antagonists rather than subjects. However, this case study suggests a far more ambivalent position which I further reflection in this section.

Despite scientific literature, such as the Foresight Report, clearly indicating that soil degradation is driven by the agro-industrial chemical model, due to agricultural exceptionalism, this could not be framed this way. From a power perspective, academics, scientists and researchers, are probably one of the most powerless insiders, reflected in their position as advisors, rather than power brokers or policymakers. Academic still enjoy credibility and respect that many other actors are not afforded, but it is also true that currently institutional antagonists benefit from the scientific legitimacy.

The case to be made is that scientists, researchers and experts, should demand better. It is encouraging to see members from the Board speaking out as well as the Board publishing reports that challenge the dominant institutional framing. This should be far more vigorous and common at earlier stages of policy design and purpose. Scientists, academics and experts have a privileged position, and they should be much more aware of how institutional and incumbent actors might try to use scientific prestige and capacity in their favour, whilst they should also be aware and consequential of their own responsibility to science and other actors, who are not afforded the same position.

Ultimately, this reminds me of one of the final scenes from the celebrated movie "Oppenheimer" (2023). Once the atomic bomb is created, Oppenheimer is naively hopeful that as the main architect of the bomb, the U.S. President will listen and institutionalise the scientific perspectives and opinions on how to use the bomb. In a memorable scene, Oppenheimer makes his case to President Truman. The President clearly states that there is nothing to worry about: "You have made the bomb, I will be one that uses it". Oppenheimer, clearly not comfortable, clearly struggling with the consequences of his actions, leaves the room, only to hear the President say: "Make sure that crying baby does not show his face around here again". In my opinion, this scene holds some truths about the relationship between academia and science with power, which is resonant and relevant in liberal democracies. Obviously, no scientist and academic in the design or implementation of the Soil Mission has been involved with the atomic bomb, but the power dynamics are arguably still the same and academics should be far more aware of when they are being used for policy aims that they might be uncomfortable with and act consequently.

This is particularly important for Industrial Ecologist as sustainability transitions and innovations become increasingly politicised and normatively laden. It will be important and critical not only to produce knowledge which deals with the physical and engineering aspects of sustainability, but to understand the social and political implications and to be able to collaborate with actors and stakeholders that our discipline has not really prepared us for, as well as be wary when our discipline, knowledge and methods are used in ways that are at odds with our commitments.

Therefore, if exclusionary dynamics are not addressed, the risks are severe. Loss of trust, delegitimization of public institutions, and ineffective interventions can combine into a downward spiral. The failure of one mission may jeopardize the credibility of future ones. In contrast, a more reflexive, inclusive approach can enable missions to fulfill their promise: to serve as bold, democratic instruments for transformative change.

7.4 Limitations

This research faced both methodological and conceptual limitations, largely shaped by the early stage of the EU Soil Mission and the experimental nature of the integrated framework. From a methodological perspective, the case study focused on a Mission still in its at the beginning of its implementation phase. Many LLs were only just getting started, and the implementation process was still fluid and undefined on the ground. As a result, the analysis could only meaningfully focus on the foundational period of the Mission and the first phase of the implementation - how it was initiated, structured, and communicated - rather than its full implementation or long-term outcomes.

One of the clearest limitations was access to two of the most important groups in the Mission's ecology: institutional and incumbent actor. Institutional actors, especially EU officials or Mission Board members, were often difficult to reach or unavailable for interview. Incumbents were

unexpectedly absent and barely referenced by interviewees, policy documents and in events. Only two interviewees explicitly mentioned them (B1, C1). The first interviewee mentioned the absence of the food value chain, indirectly referencing agri-business, as a gap in the Mission's approach, whilst the second explicitly mentioned the power of agri-business in distributing chemical solutions to farmers and deciding how to integrate new products into their existing business. The research indicates that their absence is mostly due to the mission's approach, but nonetheless, the main perspective about the food system and incumbents is mostly rooted from one scientific report. The need to interview stakeholders with at least some prior awareness of the Mission limited the pool of potential participants. This likely excluded many actors who are relevant to soil health and sustainable transitions but who are not yet meaningfully connected to the Mission.

Conceptually, the integration of the Ecologies of Exclusion framework with Mission-Oriented Innovation Systems was largely successful but not without difficulty. Mapping stakeholders and problem framings across the MIS structures required significant interpretation, as neither policy documents nor interviewees explicitly referred to the analytical categories of "programming" and "performance" structures. For example, assumptions had to be made about whether an interviewee was speaking from within the system (e.g., LL participants) or from outside it (e.g., farmers unaffiliated with Mission structures). Positioning antagonists, subjects, models, and objects across these structural layers was complex and emergent, requiring ongoing reinterpretation and at times revealing distinct exclusionary logics that did not easily align.

This interpretive challenge extended to the ethnographic analysis of key events. While valuable, the event observations were carried out individually. A collaborative approach involving fellow researchers could have helped cross-validate interpretations, align on key takeaways, and reduce the risk of confirmation bias. The same applies to the framework application more broadly working with others familiar with the framework could have added a level of reflexivity and precision that is harder to achieve alone. Lastly, there is arguably too many results and much more time could be spent synthesising, processing and reinterpreting to significantly reduce the results, without sacrificing the integrity of the analysis or the conclusions. In retrospective, the intent was to avoid a monodisciplinary account and attempt to embrace within my means the "intersubjective inter-organism" that I expected the Soil Mission to be, but as Pesch emphasizes we must acknowledge the "wildness" of this organism (2024, p. 179). Reflecting, I was probably not fully ready for that wildness, and I believe the results and analysis reflect that to a degree. However, I do hope this endeavour has helped advance an understanding on how to make the organism a bit more responsive to moral values.

These limitations do not invalidate the findings but rather highlight areas where future research and collaborative inquiry could significantly strengthen the analytical precision and empirical reach of the framework.

7.5 Future Research

This research opens multiple avenues for further investigation. One promising direction would be to apply the Ecologies of Exclusion (EoE) framework to the other EU Missions. This would allow for comparative analysis across missions and reveal which exclusionary dynamics are unique to the EU Soil Mission and which are systemic to the Horizon Europe architecture. Comparing sustainability-focused missions with others (e.g., climate, cancer, or cities) could also offer insights into whether participation and perceptions of participation differ significantly depending on the mission's domain.

Another opportunity lies in further refining and operationalising the EoE framework itself. In this study, the problem–solution diagnosis was exploratory in nature. However, future research could develop a more structured discursive approach—such as critical discourse analysis—to compare the public framing of the mission with the actual participatory dynamics unfolding on the ground. This would help to better capture how exclusion is exercised not only through institutional structures but also through the framing, language, and narratives embedded in mission design and governance.

Future research could also expand the analysis beyond the programming and performance structures, conceptualising antagonists, subjects, models, and objects in a broader systemic context. Doing so would require a revised methodology, including a wider selection of policy documents and at least two sets of interviews: one targeting those actively involved in the mission and another capturing perspective of those uninvolved or unaware. This would help to surface structural exclusions that emerge from institutional blind spots, entrenched assumptions, or lack of outreach.

Three specific thematic directions stand out for further research. First, there is an urgent need to develop ways to test, simulate, and evaluate the viability of the underlying hypotheses of change that missions are built on. Given the long timeframes needed to see systemic improvements in areas like soil health, future studies could explore integrated modelling (environmental, economic, and social) as well as participatory back casting approaches. These could foster greater transparency, collective input, and adaptive realism in setting goals and designing pathways.

Secondly, far more work is needed to address the epistemic and normative exclusions around farmers. This thesis has not been able to fully account for the enormous diversity of farmers across Europe. Future research should investigate this heterogeneity more deeply, exploring how different farming cultures, values, and socio-economic conditions shape their engagement with the Mission. This can help demystify the idealised figure of the “soil guardian,” refine participatory strategies, and ultimately foster more socially grounded innovation.

Thirdly, these two approaches combined could potentially lead qualitative and significant innovation that moves away from Horizon Europe’s techno-scientific approach and is much more centred around the farmer and adjusted to the current soil health problem. This could be quite exciting as it could potentially break with this hegemonic approach. When the Apollo program was created, brand new industries had to be birthed to meet that unprecedented ambitious goal. However, agriculture is probably the one thing on this Earth where across every continent, civilization, society and community, millions of people have been innovating for thousands of years how to grow food in a hundred kinds of soils. Maybe soil health requires an approach and an innovation system much more aligned with diverse, multiple and systemic “small wins” (Bours et al., 2022; M. Rao et al., 2024; Termeer & Dewulf, 2019), rather than deploying big science for big problems (Kattel & Mazzucato, 2025).

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Appendix I: Event Ethnography

E0: Event Ethnography Handbook

Event Ethnography is used to apply the first iteration of the Ecologies of Exclusion Mission oriented Innovation Systems. This document will record observations throughout the event. This document is divided by the sessions, containing the following sections to document:

- General observations will consist of writing down useful information about the EU Soil Mission
- Exclusionary dynamics
    - A table to document subjects, objects, models or antagonists
    - Other exclusionary dynamics e.g.
        - Who are the dominant voices? Who seems to be marginalized or excluded?
        - Are there any noticeable power imbalances?
        - How are decisions made? Who is involved in those processes?
        - Are there any explicit or implicit expressions of exclusion?
        - What themes are being emphasized? What is being left out?
        - Are there any dissenting opinions or alternative perspectives being silenced or ignored?

In addition:

1. Plenary sessions are online and available to the public, therefore these can be revisited after the event to validate or verify observations
2. Regarding general observations, except for plenary speakers, no other speaker will be directly identified in this document and will remain anonymous
3. Regarding notes about exclusionary dynamics, no individual will be personally identified
4. Break-out sessions are not recorded and require participation, so notes will be taken by hand and recorded later in this document – individuals will remain confidential and anonymous
    a. Check with organizers to inform participants in the break-out session to require consent
5. Informal Conversations – engage transparently with participants with open-minded questions that could helpful. Document in the corresponding section.
6. Reflections – write 300 words which serve to synthesize the experience and summarize main thoughts
7. Synthesis – one and a half pages, that is basically the results.
    a. Check how other ethnography studies report their findings
    b. Return from Brussels – first ethnographic results

E1: EU Soil Mission Week - Synthesis & Observations

The European Mission Soil Week 2024 conference brought together a diverse group of stakeholders, including policymakers, researchers, farmers, and artists, to discuss the pressing issue of soil health and the progress of the EU Soil Mission. The conference highlighted the importance of soil health for climate, biodiversity, human health and food security, as well as framing soil health as a pillar for future competitiveness and sovereignty. In addition, the participants emphasized the need for collaborative efforts to protect and restore degraded soils.

The general themes that emerged from the conference include:

- The critical role of research and innovation in developing and implementing solutions for soil health.
- The importance of the EU Soil Mission in providing a framework for collaboration and implementation and one of the leading vehicles for change within the emerging European architecture of soil policies and legislation.
- The need for a comprehensive approach that considers the social, economic, and environmental dimensions of soil health.
- The importance of engaging with farmers and citizens to ensure the success of the mission.

Day 1: November 12th

High-Level Session:

- Diego Canga Fano, Acting Deputy Director-General, DG AGRI
- Joanna Drake, Deputy Director-General, DG RTD
- Alessandra Zampieri, Director, Sustainable Resources, JRC
- **Themes:**
    - Critical role of soil in climate resilience, biodiversity, and food security.
    - Urgent challenges: erosion, pollution, loss of organic matter, urban expansion.
    - Need for generational renewal in farming, improved digital skills.
    - Mission Soil alignment with broader EU environmental goals.
- **Stakeholder Insights:**
    - Emphasis on including farmers, foresters, researchers, policymakers.
    - Highlighted urgency due to recent natural disasters, soil erosion issues (24% EU soils affected).
    - Potential exclusion dynamics: Smaller or less digitally skilled farmers might face barriers to participation.

Keynote Speech - Anne-Catherine Dalcq Minister of Agriculture, Rural Affairs, Nature, Hunting, Fishing and Forests, Walloon Ministry, Belgium

Themes: Importance of practical, sustainable soil management, tackling soil degradation through innovative agricultural practices and increased soil organic matter.

The Mission Soil: State of Play - Kerstin Rosenow, Head of Research and Innovation Unit, DG AGRI; Head of Mission Soil Secretariat

- **Themes:**
    - Progress in soil policy, substantial EU investments (~EUR 500 million).
    - Mission Soil focuses on 100 LLs (LLs), circular economy, biodiversity, carbon farming.
    - EUSO Soil Degradation Dashboard as a pivotal tool for monitoring.
- **Stakeholder Insights:**
    - Farmers concerned with practical knowledge access; tension between "doomsday messaging" and practical approaches.
    - Notable absence: explicit discussion of organic farming; later clarified as implicitly integral.

Enablers and Challenges for LLs (LLs)

Panellists:

- Luis Sanchez Alvarez, DG AGRI (Moderator)
- Tristano Bacchetti De Gregoris, SAE Innova (GOV4ALL Project)
- Cristina Carlos, University of Trás-os-Montes and Alto Douro (LIVINGSOILL Project)
- Erik Sindhoj, Research Institute of Sweden AB (iCOSHELLs Project)
- Sonia Pietosi, European Institute of Innovation and Technology Food South (LILAS4SOILS Project)
- Emiel Elferink, Van Hall Larenstein (SOILCRATES Project)
- Giulia Campodonico, European Network of LLs (SOILL Support Structure)

- **Themes:**
    - LLs presented as critical for localized innovative solutions.
    - Projects emphasized social-ecological integration, systemic challenges, soil literacy, carbon farming.
- **Stakeholder Insights:**
    - Stakeholders involved include farmers (large and small-scale), industry, research institutes.

- Inclusion of large farms as risk-takers crucial for scaling practices to smaller farms.
- Explicit discussion of social/cultural barriers to changing agricultural practices.

“Farmers don’t trust researchers. Advisors are essential.” (Francesc Domingo)

“Stakeholder management is the key; social sciences need more prominence.” (Erik Sindhoj)

Soil Protection and Remediation Breakout Session > See E2

Making the Soil Monitoring Law Work

- **Themes:** Importance of harmonized monitoring, role of Soil Monitoring and Resilience Directive, challenges in policy implementation and stakeholder collaboration.
- **Panellists:**
  - Mirco Barbero, Team Leader, Soil Protection, DG Environment
  - Esther Goidts, Senior Adviser, Ministry of Environment and Agriculture, Wallonia
  - Arwyn Rhys Jones, Deputy Head, Land Resources and Supply Chain Assessments Unit and EUSO Project Leader at the European Commission's JRC

Closing Remarks

- **Themes:** Importance of practical and inclusive soil policies, dialogue between farmers and policymakers, bottom-up approaches, recognition of pioneering soil health initiatives through the LLs ceremony.
- **Panellists:**
  - **Alexander Bernhuber**, Member of the European Parliament
    Emphasized the importance of practical solutions and dialogue between policymakers, landowners, and farmers; cautioned against oversimplified messaging on soil conditions and advocated for bottom-up policy approaches.
  - **Peter Wehrheim**, Head of Unit, Bioeconomy & Food Systems, DG RTD; Deputy Mission Manager
    Highlighted the diverse themes discussed, linking soil health to broader EU sustainability goals and recognizing innovative contributions through Horizon Europe.

Day 2: November 13th

Keynote Speech – Architecture and Soil Health

- **Themes:**
  - Integrating architectural practices with natural systems, sustainable materials, embedding buildings into landscapes.
- **Stakeholder Insights:**

    - Emphasis on architects and urban planners as stakeholders typically excluded from soil-health discussions.

Human-Soil Relations

Speakers, notably Anna Krzywoszynska (University of Oulu), highlighted the socio-economic pressures on farmers, emphasizing that soil care requires attention to community health and farmer wellbeing, not only technical soil health metrics.

- **Themes:**
    - Importance of interdisciplinary approaches including social sciences and arts.
    - Calls for systemic transformation, improved farmer livelihoods, and broader soil literacy.
- **Stakeholder Insights:**
    - Highlighted farmers facing economic and mental health struggles; implicit exclusion of farmers without direct policy or financial support. Farmers are under immense psychological and economic pressure.
    - Artists and social scientists positioned as essential yet currently peripheral stakeholders. Transdisciplinary and artistic approaches offer alternative engagement methods and narratives.

“We are losing our soil guardians because we are entering communities that are already in crisis.” (Anna Krzywoszynska)

Mission Soil Ambassadors

- **Themes:**
    - Grassroots advocacy for regenerative agriculture and community engagement.
- **Stakeholder Insights:**

Focus on locally embedded ambassadors, suggesting previous marginalization of small/local initiatives.

Ethnographic Observations on inclusion & participation

Included Stakeholders:

- EU policymakers, soil scientists, large-scale agriculture businesses, LL project coordinators, urban planners, architects, interdisciplinary researchers (social scientists, artists).

Potentially Excluded/Marginalized Stakeholders:

- Smaller farmers (limited access/resources), rural communities in contaminated or less economically viable areas, historically polluting industries with unclear remediation responsibilities, digitally disadvantaged farmers, and traditionally marginalized disciplines such as social sciences and arts.

Power Imbalances & Decision-Making:

- Noticeable dominance by policymakers, large-scale farmers, and researchers with established EU ties.
- Decisions centralized around EU policy alignment, funding criteria, and scientific benchmarks, potentially marginalizing local or grassroots knowledge and non-mainstream practices.

Absence of farmers

Firstly, many of the participants emphasized the importance of involving farmers. However, at multiple points certain participants highlighted tensions with the farmers.

- *Problem framing* – there seems to be a tension between scientists and policymakers with "farmers" about how to discuss the problem of soil degradation. The MEP highlighted how this framing can lead to the famers to feel like they are to blame about the current state of soil. This framing has also been deemed "doomsday"
- *Solutions must be context specific and accessible* – many participants reiterated that the tools, frameworks and methodologies developed must be useful for farmers. However, many of the solutions presented to monitor and evaluate soil health seem excessively tech reliant and data heavy.
- *Lack of farmer diversity* – of the few farmers present, they all were organic farmers. Considering that approximate 10% of arable land is for organic farming, many kind of farmers were absent from the conference.

Secondly, the bottom-up approach, especially in the LLs, resonates with Mazzucato's idea of the "willing" but seems to lead to replicate existing structural dynamics of exclusion within the European food system. Farmers who are innovators, young and/or within existing European research networks are much more experienced with EU research procurement processes as well as much more inclined to start a LL project than the average European farmer.

Thirdly, highlighted by Dr. Anna Krzywoszynska's speech (from 01:24:02 to 01:38:24), how much we do not understand the current situation of farmers and rural communities:

"We are entering in communities that are in crises, which means people that are in crises"

Also eloquently stated, we are "losing our soil guardians". Rarely in the discussions around soil health, there is any emphasis put on the current socioeconomic conditions and the negative impact this has on farmers and land managers. There is an implicit assumption that with the right knowledge and the right tools in the hands of the farmers, soil degradation will be reversed. Farmers are assumed to be responsible for soil health, which is assigning them another responsibility. But rarely are the socioeconomic and psychological conditions of farmers seriously considered within the solution framing or transformative potential of the EU Soil Mission.

Natural Science and high-level Policy were predominant

The conference appeared to be dominated by scientific and policy experts, with the risk of neglecting the practical challenges and knowledge gaps faced by farmers and other stakeholders on the ground as well as stakeholders that could have different approaches, such as artists. In

informal conversations, participants from advisory companies as well as other companies from the private sector, did find there was too much focus on research. Lastly, there are concerns about how the social sciences remain underutilised compared to the natural science. However, within the projects presented there seemed to be a balance between natural and social science innovation.

The Mediterranean and Western regions are overrepresented

Most projects seem to be concentrated in Spain, Portugal, Netherlands and France. This is not surprising, considering that all four countries have leading agricultural sectors in Europe, but this leads to challenges at many levels: certain national perspectives and experiences will predominate, and more context specific research will emerge from these countries. Participants highlighted this was probably due to the bottom-up approach.

Project Proposal process has multiple challenges

The EU Soil mission highlighted that many proposals for projects were not accepted. In informal discussions, participants mentioned how much energy, time and attention was required for one proposal, some suggesting these were too "bureaucratic" at times. Considering this high demand of human resources and the high probability of being rejected, some preferred to not compete.

Personal Reflections

One thing that struck me was how much the whole event felt like it could have been a start-up summit or a hedge fund pitch. Everything,from the lighting to the stage setup, the slick slides, the videos, the messaging,was extremely polished. It had that tech-conference vibe: clean visuals, smooth transitions, strategic optimism.

It gave off this strong sense of "we've got this",like the mission is already a success, or at least too professional to fail. Even when the content was about serious environmental or social challenges, the tone stayed positive and controlled. Problems were framed more as opportunities for innovation than anything political or messy.

Participation was everywhere,but it felt performative. We heard a lot about 300 participants, Soil Ambassadors, diverse actors... but there was something curated about it all. Like the inclusion was being shown to us, more than being experienced. It felt like the people in the room were already aligned with the values being promoted.

Even the photographs used in the presentations were striking,crisp, balanced, professional. Nothing felt out of place. Which, in a way, made everything feel slightly distant. The emotion, the uncertainty, the messiness of real change wasn't visible.

I also caught myself feeling very at ease in that environment,comfortable in the flow of things, understanding the references, speaking the same language. And that made me wonder: how many people wouldn't feel that way? And how much of the room's confidence came from the fact that it was full of people like me,people who already know how to perform that kind of participation?

E2: Panel & Co-Creation Workshop on Soil Remediation

Event: European Mission Soil Week

Date: November 12, 2024
Session: Soil Protection and Remediation of Contaminated Sites
Time: 13:30 – 15:30
Location: BluePoint Brussels, Belgium

Panel Discussion Summary: Strategies for Contaminated Sites

This panel explored technical, political, and regulatory aspects of soil contamination and remediation. Speakers included members of the Mission Soil Board, EU officers, and representatives from the Common Forum on Contaminated Land.

Key Themes:

- **Persistent Pollutants & Feasibility Limits**
  The panel underscored the difficulties of remediating long-lasting contaminants like petroleum and heavy metals. The *ARAGORN* project was cited as an example of shifting from total clean-up to containment. Regulatory frameworks often set thresholds that are too stringent to be feasible in practice, leading to the adoption of the ALARA principle ("As Low As Reasonably Achievable") in some cases.

- **Mapping and Accountability Challenges**
  Many polluted sites remain unmapped, and where multiple actors or historical pollution are involved, identifying responsible parties becomes legally and administratively difficult. The "polluter pays" principle is difficult to apply effectively in these cases.

- **Economic Constraints & Legal Complexity**
  The cost of clean-up is often prohibitive, especially in rural areas with low economic return. In urban areas, as shown in a case study from Lyon, higher land value provided the incentive for a successful multi-stakeholder remediation strategy. Rural areas, however, lack these financial drivers.

- **Innovation and LLs**
  Technological progress (biosensors, bioremediation, etc.) offers promise, but implementation is hindered by fragmented regulation and funding. LLs were presented as platforms for locally adapted experimentation, though their systemic integration remains limited.

- **Socio-political Framing**
  Discussions emphasized that remediation decisions are inherently political. Determining what contaminants matter, where to act, and how to weigh costs vs. benefits requires negotiation beyond scientific rationale.

"We might need to accept 'dead zones' as a practical approach." (Xenia Trier)

Co-Creation Workshop Synthesis

Theme: Soil Protection and Remediation
Facilitator: Dr. Jones (EU Soil Observatory)
Format: Small-group co-creation exercise (~6 groups of 5–7 people)

The workshop aimed to inform the Soil Mission's 2026–2027 work programme. After introductory presentations, participants were guided through a co-creation process structured in two main questions: (1) identifying research and innovation gaps; and (2) elaborating on top-priority ideas.

Key Ideas from My Group:

- **"Triple T" – Turn Trash to Treasure**
  Proposed business models for waste reuse and soil repair. Emphasized circular economy frameworks, but noted a lack of funding and investor engagement.
- **Chemical Cocktails** *(Top-voted idea)*
  Highlighted the scientific challenge of mixed-contaminant effects. Current risk assessments are siloed and cost-prohibitive. Proposed creating a centralized library of known chemical interactions and their risks.
- **Safe and Sustainable by Design Chemicals** *(Top-voted idea)*
  Urged a shift to prevention by designing low-risk materials. Emphasis on cross-sector collaboration between chemical engineers, regulators, and soil scientists.
- **Nutrient Level Mapping via Remote Sensing**
  Addressed the gap between field realities and soil science. Advocated for satellite-supported data collection to enable context-specific nutrient application.
- **Soil Awareness and Responsibility**
  A participant shared a real-world case of illegal dumping, linking it to low societal awareness and lack of regulatory clarity. Called for public soil literacy campaigns and clearer frameworks of accountability.

Cross-Group Themes (Reported by Workshop Hosts):

- Harmonization of monitoring tools and sampling methods
- Soil–water–climate interlinkages (referencing flood risks in Valencia and Greece)
- Uncertainty over contamination thresholds across Member States
- Need for business models post-remediation (land use planning, value recovery)
- Ethical/political questions: What is monitored? Who decides?
- Better legal enforcement of "polluter pays" principle

Ethnographic Reflection on Participation and Inclusion

As a participant-researcher, I noted several dynamics that shaped the co-creation exercise:

- **Expertise Gap & Symbolic Participation**
  Despite invitations to contribute, most participants (myself included) lacked technical

expertise in soil contamination. While facilitators encouraged open-ended contributions, there was limited space to challenge dominant frameworks. Technical knowledge remained centralized.

- **Ambiguity of Impact**
  It was unclear how input from this session would shape actual policy. Participants were told their ideas would inform future programming, but mechanisms of influence were not detailed. This undermined perceived legitimacy and transparency.
- **Power Dynamics in Knowledge**
  Only one participant in our group had direct technical experience with chemical contamination. Their perspective dominated, raising questions about whose knowledge counts in co-creation settings.
- **Broader Inclusion Questions**
  Many ideas, such as improving chemical design or mapping nutrient levels, rely on systems and capacities beyond the reach of smallholders or non-specialist stakeholders. Discussions risk reinforcing existing hierarchies of access and influence.
- **Value of the Process**
  Despite these limitations, the workshop sparked meaningful dialogue around regulation, ethics, and interdisciplinary solutions. It functioned as a boundary space,productive in surfacing gaps, even if not resolving them.

Personal Reflection

I was quite surprised to find out that the input of our conversations would be used for research and policy, though it remained largely unclear to me in what way. During the co-creation process itself, as I engaged and discussed with my fellow participants, I was quite happy to be part of this. I felt these were meaningful conversations, and I felt that my background in cybersecurity was quite useful to discuss matters of risk modelling and safety chemical as the same security principles could apply. I found the facilitator Arwyn jones extremely encouraging and open, orienting the discussions and introducing new discussion points. At some point he even discussed if we ever consider our consumer behaviour and production system as the main drivers to many of these issues – which I felt was subtle nod towards post-growth and degrowth philosophies, challenging the underlying logic of our economic systems.

However, as other groups presented their own results, and then the hosts had to produce their own set of aggregated results to the wider audience of the conference, I could not avoid feeling that a lot is lost in all these discussions, and genuine co-creation is not really possible as we arbitrarily decide what the common denominator connecting all distinct voices is, and we present that as the aggregated summary – which led to simplistic conclusion, such as “prevention of pollution to avoid remediation”, “standardisation of monitoring and remediation”, “soil literacy” and “fostering transparency, accountability, and active stakeholder engagement in remediation efforts” (Mission Soil Platform, 2025, p. 33) which are not already aligned with pre-existing policy and research ideas in the Soil Mission, but I do not think we needed a co-creation session to reach that conclusion. I could have told them most of these conclusions myself (and I am no soil remediation expert).

E3: PREPSOIL Final Event - Synthesis & Observations

Date: May 26, 2025
Location: Brussels, Belgium

Panel Discussion Synthesis

Panel 1: The Soil Monitoring Law – Expectations and Consequences

Key Themes & Tensions:

- **Scale vs. Practicality**
  A central tension emerged around balancing granular soil data with scalable action. Excess detail can paralyze implementation, while generality risks overlooking local specificities.
- **Farmer Obligations and Uncertainty**
  Considerable confusion surrounded whether farmers would bear legal responsibilities under the proposed directive. Even institutional actors lacked clarity, fostering fear, resistance, and political manipulation (e.g. right-wing disinformation).
- **Institutional Fragmentation**
  Multi-level governance challenges include uneven knowledge and administrative capacity across regions. Urban actors in particular noted a lack of technical expertise and research on urban soils.
- **Participation Deficit**
  Farmers' voices were often mediated by institutional actors, and the private sector was largely absent. Civil society actors were involved symbolically but lacked decision-making roles.

Notable Quotes & Interactions:

- “The regional level really needs the directive.” (Environmental Agency representative)
- “Farmers are not thinking about soil health, but about yields.” (Latvian advisor)
- “The European Commission is not engaging!” (Audience member challenging the EC representative)
- A general consensus recognized that while engagement mechanisms exist on paper, communication is failing in practice.

Panel 2: LLs for Regional Co-Creation

Key Themes & Tensions:

- **Trust Deficit and Emotional Disconnect**
  Farmers often distrust researchers and policymakers. Advisors,trusted intermediaries,are underused. Emotional and psychological dimensions of change (e.g.

shared responsibility, fear of new practices) were highlighted as more significant than technical ones.

- **Temporal Mismatch**
  Co-creation requires long-term engagement, while funding cycles and policy timelines are short and fragmented. Frequent meetings and informal interaction were seen as essential to overcome barriers.
- **Role Ambiguity in LLs (LLs)**
  There is a persistent lack of clarity regarding stakeholder roles, incentives, and governance in LLs. Some stakeholders feel overburdened or excluded.
- **Participation Issues**
  LLs are often limited by Mission Soil's predefined objectives. Co-creation becomes constrained rather than open-ended.

Notable Contributions:

- Importance of empathy: understanding farmer constraints and values was highlighted.
- Value of advisors: repeatedly called the "missing link" in the LL framework.
- Co-creation in practice must involve informal and frequent field-based interaction.

Panel 3: Giving Voice to Local Actions

Key Themes & Tensions:

- **Messaging Challenges**
  Soil lacks emotional resonance. Stakeholders called for "a soil Messi" or charismatic narrative champions. Copying climate change communication models (e.g. DiCaprio, polar bears) was criticized as naive.
- **Narrative Disconnect**
  Existing messaging strategies are too abstract or long-term. Education and children are framed as long-term levers, but this risks deferring urgent action.
- **Participation and Civil Society**
  Civil society and citizen-led initiatives (e.g. Communities of Practice, Soil Ambassadors) are under-supported and emotionally overburdened. Participation remains largely instrumental.

Notable Reflections:

- "Narratives are important – Ronaldo gets people interested!"
- "When everyone is important for system change, no one is."
- Participation without empowerment remains symbolic.

PREPSOIL Tools and Support Initiatives:

- **LL Taxonomy & Mapping**
  LLs are classified by land-use type and scientific orientation. A European Atlas of LLs was developed to encourage collaboration.
- **Capacity Building Tools**
  Training modules, stakeholder engagement guides, and business model canvases were introduced.
- **SOILL & SOILL-Startup**
  These initiatives provide a one-stop-shop for LL coordination, capacity-building, and scaling. Emphasis was placed on flexibility, fairness, and creating "landscape-level" experimentation systems.

Reflections:

- Tools are abundant, but deployment is described as "a social process," lacking coherence.
- LLs remain externally directed, raising questions about their autonomy and legitimacy in co-creation.

Final Observations & Ethnographic Reflections

Stakeholder Dynamics:

- **Mission Intelligentsia**
  A core group of policy advisors, researchers, and consultants dominate the framing and trajectory of the Mission. Farmers, SMEs, and landowners are peripheral, reactive actors rather than central co-creators.
- **LLs as Contradictory Spaces**
  LLs are expected to deliver transformation and experimentation but often lack support, legitimacy, or true participatory design. Co-creation is bounded by top-down frameworks.
- **Symbolic Participation**
  While stakeholders are engaged, few are empowered. This includes civil society, private sector, and most acutely, farmers.

Limits to Inclusion:

- Participation is skewed toward the "willing" and well-connected.
- Emotional and cultural realities are insufficiently addressed.
- Assumptions dominate that knowledge (via soil literacy or digital tools) will drive behaviour change, overlooking structural barriers.

Communication Challenges:

- Efforts to mimic climate change-style storytelling fall short due to lack of cultural traction and symbolic anchors in soil.

- Communication remains overly technocratic and abstract.

Analytical Reflections:

- The Mission Soil initiative represents one of the most ambitious and idealistic applications of the EU mission model. Yet, its success is hampered by structural contradictions between participatory ideals and technocratic implementation.
- “When everyone is important, no one is.” Stakeholder maps lack a clear centre of gravity.
- Inclusion is more aspirational than realized; bounded by pre-set goals, institutional inertia, and knowledge hierarchies.

Appendix II: EU Soil Mission Interview Handbook

This handbook ensures a structured, ethical, and consistent approach to conducting interviews. supporting transparency and replicability for future research.

Interview Structure

The interviews are semi-structured, lasting approximately 45–60 minutes. Core questions remain the same, the interviewer has the discretion to explore emerging topics based on the interviewee's responses.

Ethical Considerations

Informed consent All interviewees must receive an information sheet outlining the purpose, process, and use of the interview data. Written consent must be obtained before the interview begins.

Confidentiality All interviews will be anonymized, with data stored securely. Personal identifiers will be removed from transcripts.

Right to Withdraw Interviewees may withdraw at any time without providing a reason, before, during and after the interview.

Interview Process

Pre-Interview

Contact interviewees, using the following template:

Dear ***<interviewee name>,***

How are you doing? Hope you are well. My name is Javier Trescoli, student of Msc industrial Ecology from the Netherlands. For my graduation project I am researching ***participation dynamics and their challenges in missions*** *with the* ***EU Mission "A Soil Deal for Europe" as a case study.***

I am currently reaching out to different stakeholders to gather a diversity of perspectives and experiences on the tensions for participation in the mission. Due to your role ***<insert role>*** *, I would like to interview you, as your perspective would be insightful and deepen the understanding of the mission's participation dynamics.*

The interview:

- *The interview would last between 30-45 minutes.*
- *Questions would be sent a week ahead + consent form*
- *The interviews would be online,* ***recorded*** *and* ***transcribed***
- *Your responses would be* ***confidential*** *and* ***anonymized****.*
- *No direct quotes would be used* ***unless previously agreed****.*

Ideally, the interviews should take place between end of March and mid-May. ***These interviews are my priority so I will be as flexible as possible to accommodate to your agenda.***

Furthermore, if the research can be in any way useful to your own personal mission, would be happy to discuss further.

Would you be interested? If not, is there anyone else who might be? If you any questions, clarification or simply wish to discuss further, please reach out. Also feel free to also reach out to my personal phone number +3XXXXXXXXXX

Many thanks for your time and attention,

Javier Trescoli

Agree on a meet-up time and send a Teams link.

If accepted, provide further details on the research purpose and interview format if required. A week before the interview, send a reminder, information sheet about the research, the written informed consent and the questions, so that the interviewee has time to process and prepare for the interview.

During the Interview

1 - 5 minutes Be nice, be polite. Begin by summarizing the purpose of the study and confirming consent. Clarify any remaining doubts.

- Inform that the conversation will be recorded on Teams and make sure you have their verbal consent in the moment
- Select on Teams the start recording and transcription option

5 – 30 minutes Ask the following open-ended questions.

Item	Question	Rationale
1	The EU Soil Mission aims to be inclusive. How successful do you believe the mission has been in achieving this goal? *Feel free to provide your own definition of inclusion*	General overview of inclusion and participation of the mission. This sets the stage by capturing the interviewee's perception of the mission's inclusivity.
2	Who do you think are the most influential actors in the EU Soil Mission? How and/or why do they exercise their influence?	Inquiring about **antagonists** and their **models**. This question helps identify who and how power is exercised
3	What actors do you think are not adequately represented? How and/or why this happens?	Inquiring about **subjects** and how they are **excluded**. It aims to uncover who is being left out and the reasons behind it.
4	Are there any technical or social issues that you think are not being adequately addressed? How and/or why this happens? *Technical issues are a state of affairs that negatively impacts technology, business or science e.g. certain solutions are not being considered, knowledge gap is not being addressed* *Social issues are a state of affairs that negatively affects the personal or social lives of individuals or the well-being communities or larger groups within a society*	Inquiring about **excluded epistemic and normative objects**. This question explores objects which the interviewee considers might not adequately included

	For example, values, worldviews, technologies, business models, experiences, forms of knowledge, etc...	
5	What barriers, if any, do you perceive in the mission's structure or approach that might be limiting inclusion?	Inquiring into **models** of exclusion (e.g., domination, marginalization, bias, neglect, overlooking). This helps uncover structural or procedural barriers that may reinforce exclusion.

30 – 40 minutes Ask any follow-up questions and invite through reflection through the following question:

"Is there anything else you think is important to mention or to discuss?"

This gives an opportunity to the interviewee to add or introduce new thoughts.

Post Interview

40 – 45 minutes Wrap up, be grateful and explain the following steps:

- Reiterate how the results will be analysed and remain anonymised and confidential
- How the data will be stored and what are their rights
- Agree on future involvement e.g. share research

Data Handling

1. After the meeting, go to the Chat or Calendar event where the meeting was scheduled. You'll see:
    a. Recording (a video file)
    b. Transcript (a text file you can download or edit)
2. Save the files to Teams Thesis database
3. Remove identifiers from the transcript (names, locations, company mentions) to protect participants' privacy.
4. Review the transcript with the video to make sure that the transcript reflects the conversation

Appendix III: Coding Handbook (Atlas.ti, v25)

The following handbook aims to ensure consistency and rigor in the qualitative analysis of policy documents, ethnographic observations and interview transcripts using ATLAS.ti (version 25, Web + Desktop). The analysis combines deductive coding by applying predefined codes extracted from mission literature with inductive coding to uncover new patterns and themes. The following handbook supports transparency and replicability to future research efforts.

Codebook Development

- **Deductive Code** has been documented in the following table, with a description and examples to guide analysis.

EoE	Type	Description	Example
Antagonist	*Institutional*	Public sector actors who decide and broker the MIS	
Antagonist	*Incumbent*	Economic actors who have influence within policy-making due to their sectorial relevance	
Antagonist	*Academic*	Actors from the research sector who collaborate and validate institutional and incumbent position and interests	
Subject	*Civil Society*	Civil Society actors who are excluded or underrepresented in MIS, normally with social and civic goals	
Subject	*Institutional*	Public sector actors who are excluded or underrepresented in MIS	
Subject	*Market*	Economic actors who are excluded or underrepresented in MIS	
Subject	*Academic*	Academic actors who are excluded or underrepresented in MIS	
Subject	*End Users*	End users of the mission who are excluded or underrepresented in MIS	
Subject	*Newcomers*	New actors introduced by the mission but who lack resources, networks and influences to participate effectively	
Model	*Domination*	Explicit and direct exclusion exercised by institutional antagonists	
Model	*Marginalisation*	Implicit and direct exclusion exercised consciously by institutional, academic and incumbent antagonists	
Model	*Bias*	Implicit and indirect exclusion exercised inadvertently by institutional, academic and incumbent antagonists	
Model	*Neglect*	Exclusion by institutional antagonists by inadequately including subjects	
Model	*Overlooking*	Exclusion by institutional antagonists by inadvertently not considering excluded subjects and objects	
Objects	*Epistemic*	Issues on how to understand and what knowledge is valid	
Objects	*Normative*	Issues on the values and worldviews of the mission	
Objects	*Directionality*	Issues on the direction of the mission	
Objects	*Mission Governance*	Issues on how missions manage issues and the implementation of the mission	

- **Inductive Codes will r**emain open to identifying new codes that emerge from the data. At the end of the research these codes will be documented including their definitions and representative examples into separate coding lists, in order to differentiate from the deductive codes.

Coding Process

1. The unit of coding is one sentence. If more sentences are necessary, the unit of coding can be extended.
2. Apply deductive codes first.
3. As you encounter information that doesn't fit these codes, create inductive codes to capture these insights. Make sure these codes are documented in separate lists than deductive codes.

Analysing Relationships

- **Linking Codes:** Explore and document explicit connections between codes. For instance, when identifying an antagonist, examine and code any associated models, subjects, or objects mentioned in proximity. This approach will help in identifying recurring themes and patterns.
- **Network Views:** Use ATLAS.ti's network function to visually map relationships between codes. This visualization can reveal underlying structures and dynamics within your data.

Coding consistency, documentation and reporting

- **Code Co-occurrence:** When a segment of data pertains ***explicitly*** to multiple codes (e.g., an antagonist employing a specific model affecting certain subjects), apply all relevant codes. This practice will help in analysing intersections and relationships between different codes.
    - If there is an implicit connection to another part of the text – leave a comment in the quotation.
- **Memo:** Use Atlas.ti to record reflections, decisions, and context during coding. This practice enhances transparency and aids in tracking the evolution the coding process.
- **Codebook Maintenance:** Continuously update your codebook to reflect new inductive codes and any refinements to existing codes.
- **Reporting Findings:** Distinguish between findings derived from deductive and inductive coding as this will provide insights into the effectiveness of the theoretical framework and highlight important discussion points.