For Peat's Sake: The Power of Imagination in Expanding the Solution Space for Sustainable Peatland Governance

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Glossary

Solution Space = The realm in which opportunities and constraints dictate adapting to climate risks, which are shaped by a variety of dimensions (biophysical, cultural, socio-economic, and political/institutional)(Haasnoot et al., 2020).

Imaginative Logics = Imaginative logics refers to a set of principles that guide creative thinking to envision new possibilities or solutions, often in complex or challenging scenarios. It involves thinking beyond conventional or current frameworks to imagine what could be, encouraging innovative approaches to problem-solving (Pelzer & Versteeg, 2019).

Peatland Subsidence = The lowering of ground in peat-rich areas due to peat oxidation, compaction, and shrinkage, usually caused by lower groundwater levels (Wösten et al., 1997).

Transformative Approaches = Strategies aiming for systemic changes across various sectors to address environmental challenges. These approaches are inclusive, adaptive, and integrative with diverse pools and sources of knowledge towards, e.g., SDGs or other sustainability goals. Responses range from solid support (especially from those prioritising urgent sustainability action) to resistance (usually from those with interests in the status quo) (Visseren-Hamakers et al., 2021).

Abstract

Peat meadow areas in the Netherlands are experiencing significant degradation due to intensive agricultural practices, leading to land subsidence, greenhouse gas emissions, and loss of biodiversity. Traditional governance and policy frameworks have prioritized economic interests over ecological needs, often implementing technical solutions that address symptoms rather than root causes. This reflects a broader "crisis of imagination," where stakeholders struggle to envision and embrace alternative, sustainable futures. There is an urgent need for transformative approaches that can fundamentally change land use practices and achieve sustainable peatland management. This study explores how imaginative approaches can help stakeholders envision and adopt new strategies for adapting to and mitigating degradation in peat meadow areas. Utilizing the concept of imaginative logics as conceptualized by Pelzer and Versteeg (2019), the research engaged stakeholders in the Middelburg-Tempel polder—a polder facing pressing challenges of significant land subsidence and peat degradation—through semi-structured interviews incorporating imaginative exercises. The methodology included a literature review to establish the current state of peatland governance, expert consultations to refine the framework for potential solutions, and a case study involving local farmers, residents, and other stakeholders. Imaginative logics were operationalized into concrete interview prompts, and dialogic interviewing techniques—such as counterfactual prompting and reflective questioning—were employed to engage participants in creative and reflective discussions. By aligning the interviews with different imaginative logics, the study aimed to stimulate participants' imagination and encourage consideration of transformative land-use practices. The findings indicate that imaginative approaches can broaden the range of possible solutions by facilitating self-reflection, challenging entrenched perspectives, uncovering underlying barriers, and promoting collaborative dialogue. However, deep-seated polarisation, emotional resistance, and immediate practical concerns among stakeholders hinder the effectiveness of these approaches. The study identified four key elements identified through imaginative approaches to help expand the solution space for peatland management: 1. **Building trust and addressing emotional barriers**: establishing a foundation of trust and acknowledging stakeholders' feelings are crucial for open dialogue. 2. **Reorienting economic viability towards sustainability**: restructuring economic models to prioritize sustainability alleviates pressures that lead to unsustainable practices. 3. **Enhancing governance through stakeholder engagement**: involving local stakeholders in policymaking ensures that policies are practical and context specific. 4. **Valuing local knowledge and strengthening community cohesion**: integrating local insights and fostering strong community ties enhance the capacity for sustainable land management. The study concludes that while imaginative approaches can significantly contribute to sustainable peatland management by unlocking the collective imagination necessary for transformative action, their success depends on first addressing foundational barriers such as polarisation and trust deficits. The findings provide a viable pathway toward sustainable management of peat meadow areas and show that emotional and social dimensions should be addressed on the same playing field as technical solutions.

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1 Introduction

1.1 Peatlands Under Pressure

Some specific regions in the Netherlands are characterised as densely populated, intensively used peat grounds. These peatlands must be drained to be viable for agriculture, yet this process induces significant ecological challenges (PBL, 2016). The drainage decreases the pore water pressure, and stress increases on the peat material. Over time, the peat becomes denser and compacts, leading to land subsidence and peat oxidation, which emits greenhouse gases that amplify environmental concerns about atmospheric CO_2 and N_2O concentrations (Erkens et al., 2016). To study these immediate pressures requires some historical and cultural pretext of peatlands in the Netherlands.

1.2 From Peat to Prosperity: Roots of Dutch Agricultural Identity

Around 1,500 BC, high groundwater levels (GWLs) and a warmer climate led to the formation of peat along the western edge of the country (Nationaal Park De Alde Feanen, n.d.). The Dutch used peat as fuel until the late 19th century before being replaced by oil, gas and electricity grids, and peat was no longer an economically viable energy source (Gerding et al., 2015). But until that time, in many areas where peat *extraction* took place, peat was harvested right down to an underlying clay layer. Currently, these are the reclaimed land areas, where arable farming takes place. In areas where *drainage* was predominant, the soil subsided and oxidized, making the current peat soils too wet for arable farming. An alternative for the wet peat soils was keeping grassy meadows for holding cattle and grazing. In combination with the proximity to cities and accessible transportation routes through canals and ditches, the dairy industry found its footing with valuable cheese and milk and became the dominant agricultural system (Gonçalves, 2020). This created an immense milk surplus, dubbed "the milk lake". To work around this, the consumption of dairy products was heavily stimulated in public health programs with strong advertising campaigns spreading the message "Melk is Goed Voor Elk"[1] and with cartoon figures like Joris Driepinter [2]. This development resulted in the dairy industry becoming part of Dutch heritage, with the symbolism of grazing cows in lush fields near dikes and windmills contributing to the global renown of Dutch dairy products. The dairy industry exacerbated peatland degradation because it requires constant grazing land for cows, leading to more frequent drainage and intensive land use.

[1] English Translation: Milk is Good for Everyone

[2] By drinking three pints of milk daily, the original Joris Driepinter was capable of impressive feats, such as lifting an elephant.

1.3 Sustainability Concerns and Mitigation Measures

Besides being an ecological phenomenon, peat degradation represents a direct challenge to different land users, with substantial socio-economic implications. Due to the Netherlands' extensive coastline and low-lying terrain—its unique geographical and environmental features—land subsidence has a disproportionately significant effect on the country. The degradation causes land subsidence which not only threatens the structural integrity of infrastructure but also increases flood risks in the low-lying areas, especially as sea levels rise. The oxidation of drained peat soils leads to substantial emissions of greenhouse gases, including CO_2 and N_2O. Moreover, peatland degradation is interconnected with other environmental issues such as water availability and water quality. For instance, saltwater intrusion complicates agriculture by impacting soil quality and crop viability. Seepage from Pleistocene aeolian sand deposits interacts with GWLs (Tarolli et al., 2023)

To mitigate these challenges, tighter control of GWLs is essential. This involves enhancing existing agricultural systems to operate under higher GWLs and developing new agricultural practices suitable for conditions of high GWLs or even inundation. Technical measures—such as controlled drainage systems, subsurface irrigation, and water table management—offer potential strategies to reduce land subsidence and greenhouse gas emissions. These interventions are relatively low-risk and allow for the continuation of existing dairy farming practices; however, they can only reduce, not completely halt, the degradation processes.

Alternative land-use options, particularly paludiculture—the cultivation of biomass on wet and rewetted peatlands—are emerging as potential solutions to stop land subsidence entirely (Davies, 2023). Crops like narrowleaf cattail and willow can be cultivated under inundated conditions, providing raw materials for a bio-based economy and delivering ecosystem services related to water management and nutrient cycling (Geurts & Fritz, 2018). However, these practices are still in the pioneering stage and require further research to manage challenges such as controlling methane and nitrous oxide emissions during inundation (Wils et al., under review)

A gradual transition between traditional farming and natural peatland ecosystems can be envisaged, promoting diversification of land use in the Dutch peatlands. This approach necessitates thoughtful interventions that carefully balance trade-offs between various interests and uncertainties. Reducing land subsidence and greenhouse gas emissions from peatlands is feasible but requires a comprehensive strategy that integrates technical solutions, policy measures, and shifts in agricultural practices. The limitation of these measures is that most offer relief from the symptoms of peatland degradation, but do not address the root causes of peatland degradation. Their effectiveness may diminish overtime as climate change accelerates. Therefore, there is a growing recognition that transformative approaches are necessary to fundamentally change land use practices and achieve sustainable peatland management.

1.4 Transformative Approaches

Transformative approaches are strategies aiming for systemic changes across various sectors to address environmental challenges (Visseren-Hamakers et al., 2021). These approaches are inclusive, adaptive, and integrative, with diverse knowledge sources. They encounter resistance and support, reflecting the conflict between urgent sustainability issues and vested needs and interests in the status quo. In peatlands, transformative approaches could have enormous potential to fundamentally change the way we look at land use practices to achieve sustainable management.

Bakker et al. (2023) also point out that alongside transformational approaches, there is a failure to achieve sustained change due to the negligence of personal and nonmaterial aspects of such changes. This neglects the "inner" dimensions of sustainability, achieved through a more bottom-up approach. An example could be a small-scale transformative approach that profoundly connects stakeholders with their thoughts and rationale for managing their lands in ways that affect worsening peatlands. The authors contend that the inner dimension is foundational to sustained transformative change.

In essence, the core sustainability issue is the ongoing degradation of Dutch peatlands due to intensive agricultural drainage practices, primarily for dairy farming. This degradation leads to land subsidence, increased flood risks, substantial greenhouse gas emissions, and challenges related to water availability and quality. While technical measures offer some mitigation, they predominantly address the symptoms rather than the root causes and may become less effective over time as climate change accelerates. Therefore, there is an urgent need for transformative approaches that fundamentally change land use practices to achieve sustainable peatland management.

1.5 Relevant Scientific Debates and Knowledge Gap

Given the limitations of current technical measures and the urgent need for transformative approaches, it is valuable to consider the peat meadow issue from the perspective of the **solution space**. The peat meadow issue has been extensively discussed in literature focusing on environmental challenges and technical solutions (e.g., Erkens et al., 2016; PBL, 2016; Tarolli et al., 2023), but there is less emphasis on broader, systemic approaches that encompass long-term climate adaptation strategies. Therefore, considering the peat meadow issue through the lens of the solution space presents a promising avenue for developing more sustainable management practices.

The solution space is a conceptual framework that encompasses the range of possible actions and strategies available to address complex problems like climate change and peatland degradation. It is a broader approach to thinking about long-term climate adaptation, where the effectiveness and applicability of various measures are assessed. The solution space is shaped by many factors, including environmental changes, cultural shifts, economic conditions, and governmental or institutional changes (Haasnoot et al., 2020). It essentially creates an understanding of how to

better handle climate change by recognizing what influences this area and how it can be represented visually and multi-dimensionally. Some changes within the solution space are planned (new laws or technical innovations), and some happen outside of direct control (climate change effects or cultural shifts).

Conceptually, beginning with the expansion of the solution space offers a promising approach to addressing the sustainable management of peatlands. This expansion calls for engaging stakeholders in thinking about, working on, and discussing the solution space. However, traditional ways of transferring knowledge—such as reading reports and attending presentations—have not been transformational or emotionally engaging enough to stimulate significant change (Candy & Dunagan, 2017). Transformational and engaging alternatives, like serious gaming or scenario workshops, have emerged. Nonetheless, challenges arise in securing the involvement of crucial stakeholders, as seen in the attempts by van Liemt (2021) and van Mulken et al. (2023) which were limited by the willingness and availability of key participants.

Knowledge Gap

While the solution space approach is potentially valuable in addressing the sustainable management of peatlands, there is room to enrich it. Specifically, there is a need to explicitly incorporate the extent to which stakeholders can imagine a different, more transformative future. Current approaches have not sufficiently addressed the 'inner' dimensions of sustainability, which involve personal and non-material aspects of change Bakker et al. (2023). Moreover, various authors suggest that humanity faces a "crisis of imagination," lacking the narratives and stories necessary to comprehend and address large-scale environmental challenges like climate change and land subsidence (Morton, 2013). This crisis limits our ability to envision alternative futures and hampers transformative change. Therefore, research is needed to explore strategies that can enhance stakeholders' imaginative capacities to expand the solution space and overcome this crisis of imagination.

1.6 Research Aim, Main Question, and Sub-Questions

This research aims to contribute insights that help enlarge the solution space for more sustainable peatland management in the Netherlands by exploring the actual and potential role of imagination in envisioning more transformative futures.

This foundational objective forms the basis for the following research question:

How can imaginative approaches expand the solution space for adaptation and mitigation of degradation in peat meadow areas?

The following sub-questions will help answer this question:

Nr	Sub-Question
1	To what extent does peatland governance consider the critical biophysical characteristics of peatlands in the Netherlands for sustainable land management?
2	What factors do experts prioritise when defining a more nuanced solution space?
3	Which factors were identified in the Middelburg-Tempel polder through applying imaginative approaches?
4	What does this teach us about the potential of imaginative logics to increase the solution space?

These sub-questions are interconnected and collectively address the main research question by building upon each other:

- **Sub-question 1** establishes the baseline by examining the current state of peatland governance and how well it incorporates the critical biophysical characteristics necessary for sustainable management. This provides foundational knowledge about existing practices and policies.
- **Sub-question 2** incorporates expert perspectives, identifying the factors they prioritise when defining a more nuanced solution space. This helps in understanding the professional and technical considerations that shape current and potential strategies.
- **Sub-question 3** explores new factors that can be identified through imaginative approaches to expand the solution space. By engaging with imaginative thinking, this question seeks to uncover innovative ideas and possibilities that may not emerge through traditional methods.
- **Sub-question 4** reflects on the insights gained from the previous questions to assess the potential of imagination in increasing the solution space. It evaluates how imaginative approaches contribute to broader and more transformative strategies for peatland management.

By sequentially addressing these sub-questions, the research systematically explores both the current state and the potential for expanding the solution space through imaginative approaches. Together, they provide a comprehensive answer to the main research question by identifying how imagination can play a crucial role in developing adaptive and mitigative strategies for peat meadow degradation.

1.7 Research Context

This thesis is part of the NWA-LOSS project (Living on Soft Soils, funded from the National Science Agenda), a multidisciplinary research initiative aimed at addressing land subsidence in the Dutch. The project seeks to identify suitable mitigation, adaptation, and compensation measures, as well as governance and legal approaches necessary for effective decision-making and implementation. By contributing to NWA-LOSS, this research aligns with broader efforts to develop context-sensitive solutions for the sustainable management of peatlands.

1.8 Overview

Following this introduction, **Chapter 2: Conceptual and Analytical Framework** explores the foundational theories and models related to transformative land management, the solution space framework, and imaginative logics. **Chapter 3: Methodology** outlines the research design, detailing the approaches used for data collection and analysis across the study's sub-questions. **Chapter 4: Results** presents the empirical findings, organized by each sub-question, including the alignment of peatland governance with biophysical characteristics, expert perspectives, and the application and evaluation of imaginative logics in the Middelburg-Tempel polder case study. **Chapter 5: Discussion/Recommendations** contextualizes these results within existing literature, highlighting theoretical and practical implications, and reflecting on the effectiveness of imaginative approaches. Finally, **Chapter 6: Conclusion** synthesizes the key insights. The thesis is supplemented by appendices that include essential documents such as interview guides, consent forms, and data analysis tools, ensuring a comprehensive exploration of how imaginative approaches can expand the solution space for sustainable peatland management in the Netherlands.

2 Conceptual and Analytical Framework

This section reviews the essential theoretical concepts introduced earlier—transformative approaches and governance in land use, the solution space, and imaginative logics—and lays the foundation for the empirical research. First, the conceptual framework is presented, discussing the relevant literature and key concepts. Then, the analytical framework is outlined, explaining how these concepts inform the empirical research.

2.1 Conceptual Framework

2.1.1 Transformative Approaches and Governance in Land Use

Transformative approaches are strategies aiming for systemic and fundamental changes across various sectors to address environmental challenges, moving beyond incremental adjustments to

existing practices (Visseren-Hamakers et al., 2021). They differ from non-transformative, or incremental, approaches, which focus on improving efficiency or implementing technical fixes within the current system without altering underlying structures or paradigms.

At one end of the spectrum, **non-transformative approaches** involve technical measures that adjust existing practices to mitigate negative impacts without changing the core system. Examples include:

- **Technical Measures**: Implementing controlled drainage systems, subsurface irrigation, or water table management to reduce land subsidence and greenhouse gas emissions while maintaining current agricultural practices.
- **Efficiency Improvements**: Enhancing the efficiency of dairy farming operations to reduce environmental impacts without altering the fundamental nature of the industry.

While these measures can provide temporary relief or slow degradation, they often address symptoms rather than root causes and may not be sufficient in the face of accelerating climate change.

At the other end of the spectrum, **transformative approaches** involve fundamental changes to land use, business models, and governance structures. Examples include:

- **Alternative Land Use**: Transitioning from intensive dairy farming to paludiculture or other forms of sustainable agriculture compatible with high GWLs, such as cultivating wetland crops like cattail and willow, or restoring peatlands to their natural state.
- **New Business Models**: Developing economic models that value ecosystem services, carbon sequestration, and biodiversity conservation, providing financial incentives for sustainable land management practices. This could involve payment for ecosystem services schemes or carbon credits for peatland restoration.
- **Governance Reform**: Implementing policies and institutional changes that prioritize long-term environmental sustainability over short-term economic gains. This includes engaging multiple stakeholders in decision-making processes, fostering collaborative management approaches, and redefining value systems to incorporate ecological considerations.

Transformative approaches are necessary to achieve more sustainable peat meadow areas because they address the underlying drivers of peatland degradation. By rethinking land use practices, economic incentives, and governance structures, transformative approaches can facilitate the adoption of practices that preserve peat soils, reduce greenhouse gas emissions, and enhance biodiversity. They enable a shift from short-term, economically driven decisions to long-term, ecologically responsible practices.

In contrast, non-transformative approaches may only offer temporary solutions that do not prevent ongoing degradation. For example, technical measures may reduce the rate of land subsidence but do not stop peat oxidation or address the economic pressures driving intensive dairy farming . Therefore, while both approaches have roles to play, transformative approaches are crucial for fundamentally changing land use practices and achieving sustainable peatland management.

Why Transformative Governance is Needed

To implement transformative approaches effectively, **transformative governance** is essential. Transformative governance involves new ways of governing that facilitate systemic change, including:

- **Adaptive Management**: Embracing flexibility and learning in policy-making to respond to changing environmental conditions and new knowledge.
- **Participatory Processes**: Involving stakeholders at all levels in decision-making to ensure that diverse perspectives are considered and to build consensus for change.
- **Cross-Sector Collaboration**: Coordinating actions across different sectors (e.g., agriculture, water management, environmental conservation) to address interconnected challenges holistically.

By adopting transformative governance, it becomes possible to overcome the limitations of current market-driven and regulatory systems that often perpetuate unsustainable practices (Westerink et al., 2019). It allows for the creation of policies and institutions that support transformative approaches, enabling the shift towards more sustainable peat meadow areas.

Furthermore, regulatory environments may limit operational flexibility. Combined with collective mentalities among farmers characterized by resistance to change—such as resistance to nitrogen laws (Boztas, 2023)—this creates a multifaceted lock-in involving financial, social, psychological, and regulatory facets. **To achieve more sustainable peat meadow areas, transformative governance is necessary because it enables the shift from short-term, economically driven decisions to long-term, ecologically responsible practices** (Van Den Ende et al., 2024). By reorienting policies and incentives, transformative governance can address the root causes of peatland degradation, promote sustainable land management, and facilitate the adoption of practices that preserve peat soils, reduce greenhouse gas emissions, and enhance biodiversity. It involves engaging multiple stakeholders, redefining value systems, and implementing innovative approaches that prioritize environmental sustainability alongside socio-economic well-being.

2.1.2 The Solution Space

Solution Space

Addressing complex challenges like climate change and peatland degradation requires comprehensive approaches that consider long-term adaptation strategies. Various frameworks exist to guide such efforts, focusing on assessing and expanding the range of possible actions and solutions. One such framework is the **solution space**, developed by Haasnoot et al. (2020).

The solution space is a conceptual model that maps out the opportunities and constraints for adaptation to climate risks, shaped by various dimensions such as biophysical, cultural, socio-economic, and political/institutional factors. It provides a structured way to understand how different factors influence the capacity to adapt and how this space can change over time.

At the beginning of their work, Haasnoot et al. (2020) emphasize that while numerous approaches address long-term climate adaptation, their solution space framework offers a dynamic perspective that integrates multiple dimensions. They **explicitly invite others to expand and specify the solution space approach**, encouraging researchers and practitioners to adapt the framework to different contexts and enrich it with additional dimensions.

Du et al. (2022) have taken up this invitation and expanded the solution framework by strengthening the legal and governance dimensions. They propose ways to apply the solution space with these enrichments, highlighting how laws, policies, and governance structures play critical roles in shaping adaptation options. For example, they illustrate how legal constraints can limit the solution space by restricting certain actions or how innovative governance mechanisms can expand it by enabling new forms of collaboration and decision-making.

Understanding the Solution Space Framework

Figure 1 illustrates the generic concept of the solution space. In this figure, the solution space is depicted as a physical area—the grey shaded region—that represents the set of feasible adaptation options at a given time. The diagram resembles a metro map, where different 'lines' symbolize various adaptation pathways or strategies.

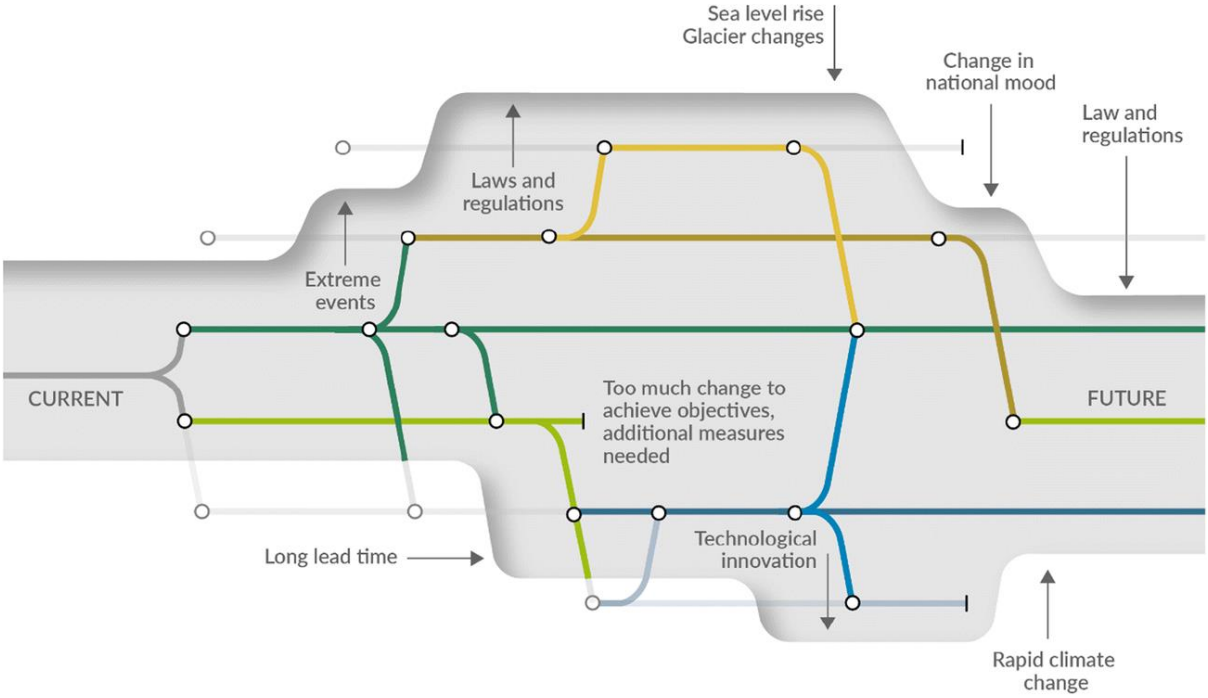


Figure 1:The Solution Space Concept (Haasnoot et al., 2020)

In the figure:

- **The Grey Area (Solution Space):** This represents the 'physical' space of possible adaptation actions. It can expand or shrink over time due to various factors. An expanded solution space (larger grey area) means more options are available for adaptation, while a contracted space (smaller grey area) indicates limited options.

- **Metro Lines (Adaptation Pathways):** The coloured lines represent different adaptation pathways or strategies that stakeholders can follow. Each line offers a route through the solution space toward desired adaptation goals.

- **Nodes and Switches:** Points where lines intersect or branch represent decision points where stakeholders might need to switch from one pathway to another. This switching may be necessary if certain options become unfeasible due to changes in the solution space.

The solution space framework emphasizes that adaptation is dynamic and influenced by multiple interacting factors. As conditions change—through planned actions like policy implementation or exogenous factors like climate impacts—the solution space can expand or contract. For instance:

- **Expanding the Solution Space:** Introducing new technologies, policies, or social innovations can remove constraints and open up additional adaptation options. For example, investing in research on paludiculture could make this land-use option more viable, thereby expanding the solution space.

- **Contracting the Solution Space:** Increasing environmental pressures, such as accelerated sea-level rise or stricter regulatory constraints, may eliminate certain adaptation options, thus shrinking the solution space.

In some cases, stakeholders may need to **switch to another 'metro line'**—that is, adopt a different adaptation pathway—if their current path becomes untenable. This flexibility is crucial for long-term adaptation planning, allowing stakeholders to navigate uncertainties and changing conditions.

By using the solution space framework, researchers and practitioners can:

- **Systematically explore adaptation options:** Identify what is currently possible and what might become possible in the future.
- **Understand barriers and opportunities:** Analyse how different factors constrain or enable adaptation actions.
- **Develop adaptive strategies:** Create flexible plans that can adjust to changes in the solution space over time.

Application to Peatland Management

In this research, the solution space framework serves as the groundwork for exploring sustainable peatland management. By specifying the framework for the peat meadow area, we can identify and describe the main features influencing peatland management in the Netherlands. This involves mapping out the biophysical constraints (e.g., soil characteristics, hydrology), cultural factors (e.g., historical land use, community values), socio-economic conditions (e.g., market forces, economic incentives), and political/institutional dimensions (e.g., policies, governance structures) that shape the solution space for peatland adaptation.

Figure 2 presents a customized version of the solution space diagram, tailored to the specific context of peatland subsidence with general knowledge combined with insights from Juutinen et al., 2020; Müller & Joos, 2021; Poczta et al., 2023.

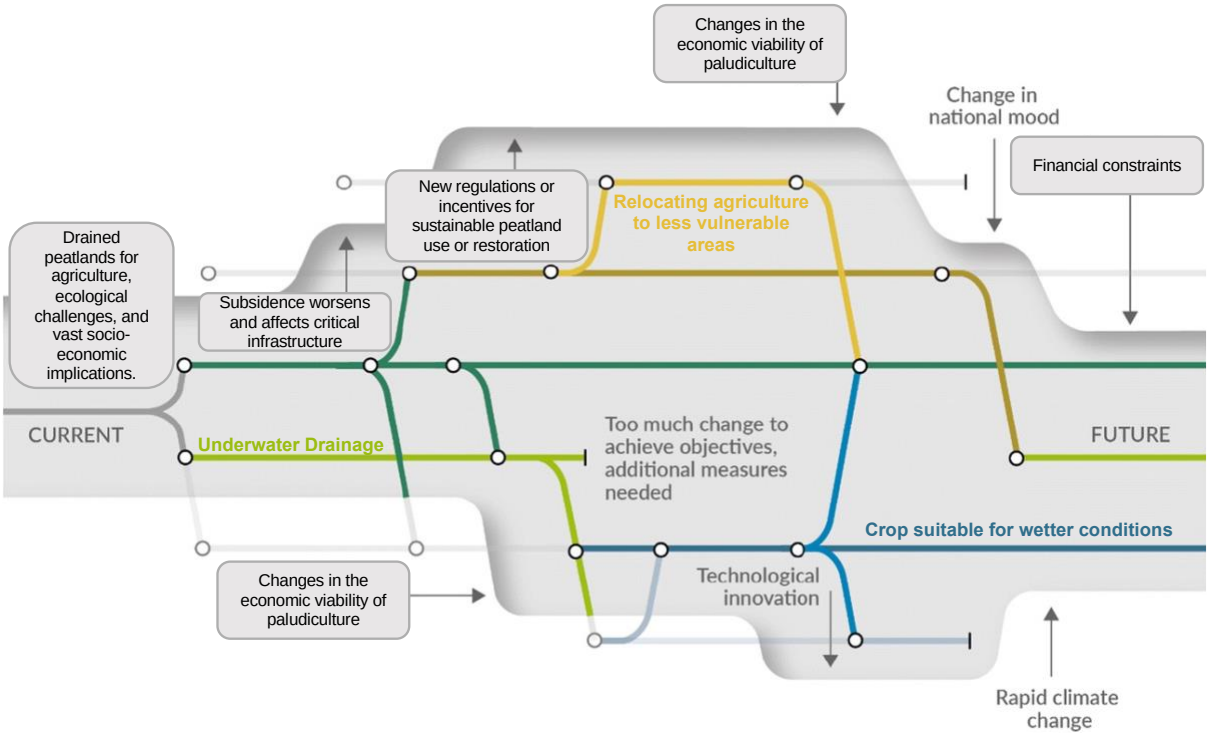


Figure 2: Solution Space for Peatland Degradation (adapted from Haasnoot et al., 2020)

In this figure:

- **Customized Grey Area:** Reflects more specific opportunities and constraints relevant to peatland management, such as the feasibility of different land-use practices under varying GWLs.

- **Adaptation Pathways:** Represent potential strategies for addressing peatland subsidence, such as maintaining current drainage practices (green), transitioning to paludiculture (blue), or relocating agriculture (yellow).

- **Decision Points:** Highlight moments where stakeholders might need to reconsider their strategies due to changes in the solution space, such as new regulations or shifts in market demand.

By expanding and specifying the solution space for peatland management, this research contributes to a deeper understanding of how imaginative approaches can enhance adaptation strategies and facilitate transformative change.

2.2 Imaginative Logics

Imaginative logics are conceptual tools used to enhance the ability to envision transformative futures, thereby expanding the solution space for addressing complex environmental challenges. Pelzer & Versteeg (2019) define imaginative logics as "the set of principles underlying or constituting an imaginative intervention, by means of which an abstract phenomenon is made present to the audience." These logics help move beyond the dominant focus on technocratic futures or interventions, which often characterize climate change planning with instrumental approaches (e.g., smart cities, self-driving cars, infinite energy loops, and resource reuse).

The concept of a "crisis of imagination" suggests that society lacks the narratives and stories necessary to comprehend and address large-scale environmental challenges like climate change and land subsidence (Morton, 2013). This crisis limits our capacity to envision alternative futures and, consequently, restricts the range of possible actions. It is an assumption of this research that the restrictive presentation of futures or scenarios limits the capabilities of imagination and action, and vice versa; limited imagination and action lead to a restrictive presentation of futures and scenarios. Therefore, when stakeholders can imagine a different future, the solution space is enlarged.

Pelzer & Versteeg (2019) identify five types of imaginative logics, each with distinct characteristics and approaches to fostering imagination. These logics emerged from their empirical research using a Post-Fossil City Contest as a case study to investigate the effectiveness of futuring interventions in promoting a transition to a less carbon-dependent society. The finalists' ideas helped the authors develop the notion of imaginative logics, categorized as follows:

Table 1: Typology of the Five Imaginative Logics (Pelzer & Versteeg, 2019)

Logic	**Image of the Future**	**Intended Audience Reaction**	**Pitfall of Logic**	**Typical Form**
Doable	Closed (one proposal)	Feel connected to a (common) goal	Can close off valuable alternatives	Clear direction and a relatively closed narrative
Juxtaposing	Closed (usually up to four alternatives)	Learning about trade-offs and dilemmas	Selecting the right alternatives is complex and delicate	Gear attention to dilemmas and trade-offs through extreme scenarios
Defamiliarizing	Relatively open	Relate to a new or insufficiently	Difficult to connect to solutions	Use a familiar place, situation, or practice

		considered issue		and introduce new issues
Guerilla	Relatively open	Feel confused, even shocked	Ambiguous nature makes it harder to get a message across	Use recontextualization to surprise, merging fact and value
Procedural	Open	Set one's own imagination to work	Time and cost-intensive; difficult with large groups	Develop the generative conditions under which people can imagine

- **Doable Logic:** This approach presents a single, well-defined proposal for the future, aiming to connect the audience to a common goal. It offers clear direction through a relatively closed narrative, making it easy for people to understand and rally behind. However, it can potentially close off valuable alternatives by focusing too narrowly on one solution.

- **Juxtaposing Logic:** This logic presents multiple alternatives (usually up to four) to encourage the audience to learn about trade-offs and dilemmas involved in decision-making. By highlighting extreme scenarios, it draws attention to the complexities of selecting the right alternatives. The pitfall lies in the difficulty of choosing among options, as the process can be complex and delicate.

- **Defamiliarizing Logic:** This approach uses familiar places, situations, or practices but introduces new or insufficiently considered issues to make the audience relate to them differently. It aims to draw attention to aspects that may have been overlooked. The challenge is that it may be difficult for the audience to connect these unfamiliar issues to concrete solutions.

- **Guerilla Logic:** This logic seeks to surprise and provoke the audience by recontextualizing familiar concepts, merging fact and value to create a sense of confusion or shock. While it can be effective in disrupting conventional thinking, its ambiguous nature may make it harder to convey a clear message.

- **Procedural Logic:** This approach is entirely open-ended, designed to set the audience's own imagination to work by developing the generative conditions under which people can imagine. It encourages active participation in envisioning the future. The pitfall is that it can be time and cost-intensive and may be difficult to implement with large groups.

This research's novelty lies in applying these imaginative logics as a foundation for exploring and broadening the solution space. A positive seed is planted when people are more engaged in futures conversations, as opposed to written scenario reports or future planning presentations (which conceived low engagement and limited reflexive insight). Furthermore, a

community or cooperative's collective intelligence and imagination can emerge. The logics do not have to be feasible or effective in practice, but the mere fact that the outcomes of this method are not unimaginable means they should be given more credit or thought. This form of (sometimes radical) imagining gives a better sense of what is at stake in the ideal world (Haven, 2014, p. 249).

3 Methodology

3.1 Methodological Orientation

This research employed a mix of conceptual and interpretative methodologies, as outlined in Robeyns (2022) research toolbox, within a case study framework. The conceptual aspect involved a deep engagement in understanding and defining the solution space and other key concepts related to peatland management. The interpretative aspect involved dialogic interviewing and interpreting participants' perceptions and values to explore the potential for expanding the solution space through imaginative approaches.

3.2 Research Design

The study was structured around four sub-questions, each addressed through specific methods:

1. **Sub-question 1:** To what extent does peatland governance consider the critical biophysical characteristics of peatlands in the Netherlands for sustainable land management?

2. **Sub-question 2:** What factors do experts prioritize when defining a more specified solution space?

3. **Sub-question 3:** Which factors were identified in the Middelburg-Tempel polder through applying imaginative approaches to expand the solution space?

4. **Sub-question 4:** What does this teach us about the potential of imaginative approaches to increase the solution space?

This study is designed within the context of the NWA-LOSS project, which emphasizes a transdisciplinary approach to addressing the wicked problem of land subsidence in the Netherlands. Under the supervision of Dries Hegger and Tom Wils from NWA-LOSS, this thesis contributes to the project's aim of developing context-sensitive measures for sustainable peatland management.

3.3 Data Collection and Analysis

3.3.1 Sub-question 1: Literature Review

To address Sub-question 1, a comprehensive literature review was conducted to characterize Dutch peatlands and their management from hydrological and governance perspectives. The aim was to establish a foundational understanding of the current state of peatland governance and how it incorporates critical biophysical characteristics.

- **Data Sources:** National geological surveys (e.g., bodemdata.nl, dinoloket.nl), environmental agency reports, academic journals, policy documents, and previous theses related to peatland management.

- **Search Strategy:** Literature searches were conducted primarily in Dutch, using search terms such as *veenvorming geschiedenis Holoceen Nederland* (peat formation history Holocene Netherlands), *veenweidegebieden* (peat meadow areas), combined with keywords like *waterregulatie* (water regulation), *bodemdaling* (land subsidence), *CO_2 uitstoot* (CO_2 emissions), *wetgeving* (legislation), and *duurzaam landgebruik* (sustainable land use). These searches yielded around 60 sources, a diverse body of literature consisting of: environmental agency reports, peer-reviewed academic journal articles, policy documents, and previous theses related to peatland management.

- **Data Analysis:** The collected literature was systematically analyzed to identify key themes and patterns in peatland governance and management practices. This involved synthesizing information on hydrological characteristics, governance frameworks, management strategies, and challenges facing sustainable peatland management in the Netherlands.

3.3.2 Sub-question 2: Expert Consultations

To address Sub-question 2, expert consultations were conducted to tailor the general solution space framework to the specific context of Dutch peatlands. The goal was to deepen the understanding of the solution space and highlight the most influential factors according to expert insights.

- **Expert Selection:** Experts were selected through convenience and snowball sampling within the network of supervisors and researchers associated with the NWA-LOSS. This ensured access to knowledgeable individuals specializing in governance, law, and scenario development relevant to peatland management.

- **Data Collection:** Semi-structured interviews were conducted with two experts:

    - **Mandy van den Ende** (Governance)

- **Martijn van Gils** (Law)

Prior to the interviews, key topics and questions were prepared to guide the discussions effectively. Detailed notes were taken during the conversations to capture the experts' insights.

- **Data Analysis:** The information gathered from the expert consultations was integrated into the solution space framework, incorporating their perspectives on external factors (e.g., policy changes, technological advancements, socio-economic conditions) and planned actions (e.g., restoration projects, water management strategies). This enriched the solution space by specifying it for the Dutch peatland context.

3.3.3 Sub-question 3: Case Study in the Middelburg-Tempel polder

Sub-question 3 involved a case study in the Middelburg-Tempel polder to explore how imaginative approaches can expand the solution space for peatland management.

Initially, the research intended to use the imaginative logics framework both to structure the interview questions and to analyze the results, categorizing participants' responses according to the five types of imaginative logics—Doable, Juxtaposing, Defamiliarizing, Guerilla, and Procedural—as conceptualized by Pelzer and Versteeg (2019). The aim was to examine how these different logics manifested in stakeholders' perspectives and assess their how they could aid in expanding the solution space.

However, during the course of the study, it became apparent that applying the imaginative logics framework to analyze the results was not feasible. The nature of the responses and the dynamics encountered during the interviews revealed that participants often struggled to engage with the imaginative exercises as intended. Instead of producing responses that fit neatly into the categories of the imaginative logics, participants frequently returned to discussing immediate concerns, underlying tensions, and practical challenges facing the community.

As a result, the imaginative logics were primarily employed to stimulate creative thinking during the interviews rather than serving as an analytical framework for the results. By structuring the interview questions around the five types of imaginative logics, the goal remained to probe participants' imaginative capacities and encourage them to consider transformative land-use practices. The focus shifted to understanding the barriers and factors that influence stakeholders' ability to engage in imaginative thinking about sustainable peatland management.

Data Analysis Approach: Given that the imaginative logics framework was not utilized for analyzing the results, the data analysis was conducted using an inductive thematic approach. After transcribing the interviews, an open coding process was employed to identify significant themes and patterns that emerged naturally from the data. This inductive method allowed for a grounded understanding of participants' experiences and perceptions without being constrained by

predefined categories. By analyzing the data in this way, the research uncovered key factors that influence the expansion of the solution space through the application of imaginative approaches.

Case Selection and Limitations: The Middelburg-Tempel polder was selected because it is a representative area within the Dutch peat meadow regions, characterized by significant land subsidence issues due to its low elevation. This made it an appropriate case for studying the impacts of peatland degradation and exploring potential solutions. Additionally, the area's relevance to the NWA-LOSS project aligned with the expertise of the supervisors, providing an opportunity to contribute to the broader research objectives of the project. However, the specific socio-economic and environmental context of the Middelburg-Tempel polder—given its extreme depth and unique characteristics—may limit the generalizability of the findings. The challenges identified in this area might be more pronounced or differ in nature compared to other peat meadow regions. While the findings highlight typical issues relevant to peatland management, caution should be exercised in generalizing the results to other settings without considering local dynamics. The Middelburg-Tempel polder serves as a revelatory case study, highlighting typical issues and potential solutions relevant to peatland management.

Participants: Eleven participants were recruited from the Middelburg-Tempel polder, including local farmers, residents, and other stakeholders. The selection aimed to capture diverse perspectives, ensuring a comprehensive understanding of local views and experiences. Below is a table of respondent codes and their roles and responsibilities.

Respondent	Role/Responsibility
LR1	Local resident
LR2	Local resident
F3	Farmer
RO4	Restaurant Owner
LR5	Local resident
LR6	Local resident/museum guide
LR7	Local resident/museum guide
F8	Farmer
LR9	Local resident
LR10	Local resident/leisure farmer
LR11	Local resident/leisure farmer

Operationalization of Concepts: Recognizing that participants might not be familiar with the concept of imaginative logics, these were operationalized into concrete and accessible conversation

topics. Questions were crafted to align with different imaginative logics, aiming to stimulate participants' imagination and encourage them to consider transformative futures without technical jargon. For instance:

- **Using Doable Logic:** "Imagine that starting next year, there are government subsidies available for farmers who adopt sustainable water management practices. How might this influence your approach to farming?"
- **Using Juxtaposing Logic:** "Suppose that due to environmental regulations, traditional dairy farming is no longer permitted in this area. What alternative land uses or livelihoods could you envision?"
- **Using Defamiliarizing Logic:** "If the peatlands were viewed not just as farmland but as vital ecosystems offering other benefits, how might that change your relationship with the land?"

The full interview guide can be found in **Appendix C.**

Data Collection: Semi-structured interviews were conducted in person between June 3rd and June 23rd. The interview guide was informed by the solution space framework and the typology of imaginative logics by Pelzer & Versteeg (2019). Questions were open-ended, facilitating in-depth discussions and allowing participants to express their thoughts freely.

Interview Approach: To foster a collaborative and reflective environment, dialogic interviewing techniques were employed. Interactional strategies, such as probing questions and counterfactual prompting, were used to dig deeper into participants' responses. A full description of interactional strategies can be found in **Appendix D**.

Data Analysis: Interviews were transcribed and subjected to thematic analysis. An initial coding process identified significant themes and patterns, which were then grouped into broader themes reflecting participants' experiences and perceptions. This process aimed to uncover factors that could expand the solution space through applying imaginative approaches. A full coding tree of relevant excerpts can be found in **Appendix E.**

3.3.4 Sub-question 4: Synthesis and Reflection

To address sub-question 4—evaluating the potential of imaginative approaches to expand the solution space—the research conducted a reflective analysis of the interviews, focusing on a meta-level on participants' engagement with the imaginative logics introduced during the conversations. The interview transcripts were assessed on how stakeholders responded to prompts designed to encourage out-of-the-box thinking about sustainable land management in the Middelburg-Tempel polder. This analytical process allowed us to assess the extent to which imaginative approaches can expand the solution space in contexts characterized by complex social dynamics. The findings were

compared with the context of Pelzer and Versteeg's (2019) study to understand situational differences, and empirical observations were synthesised with relevant literature on community engagement and conflict resolution to formulate recommendations.

3.4 Ethical Considerations

Participants were fully informed about the research objectives and procedures through information letters and consent forms (see **Appendix A and Appendix B**). Confidentiality and anonymity were assured, and participants were reminded of their right to withdraw at any time. The researcher's role was to create an empathetic and safe environment, encouraging open dialogue and treating participants as collaborators rather than subjects.

3.5 Data Analysis Overview

- **Literature Synthesis (Sub-question 1):** Findings from the literature review were integrated to establish a comprehensive understanding of current peatland governance and management practices.
- **Expert Integration (Sub-question 2):** Insights from expert consultations were used to refine the solution space, incorporating specialized knowledge to specify it for the Dutch context.
- **Inductive Thematic Analysis (Sub-question 3):** Since the imaginative logics framework was not used for analysis, the interview data were analyzed using an inductive thematic approach. This involved open coding to identify significant themes and patterns that emerged from the data, providing a grounded understanding of participants' perspectives.
- **Synthesis and Reflection (Sub-question 4):** The findings were synthesized to assess the potential of imaginative approaches in increasing the solution space, discussing implications for theory and practice.

4 Results

This chapter presents the empirical findings, organized by each sub-question. It includes the alignment of peatland governance with biophysical characteristics, expert perspectives, and the application and evaluation of imaginative logics in the Middelburg-Tempel polder case study.

4.1 Results Sub-Question 1: Alignment of Peatland Governance with Biophysical Characteristics

Introduction

In addressing the first sub-question, the research explores the extent to which peatland governance in the Netherlands considers the critical biophysical characteristics necessary for sustainable land management. The research begins by examining the hydrological and geological characteristics of Dutch peatlands, followed by an analysis of the current governance frameworks, conservation and restoration efforts, and targets and schemes related to peatland management. Finally, this section provides a concise conclusion regarding the alignment between governance practices and the biophysical characteristics of peatlands.

4.1.1 Hydrological and Geological Characteristics

Formation and Composition

In the western peat meadows of the Netherlands, located in Noord-Holland, Zuid-Holland, and Utrecht—also referred to as the "Green Heart" of the Netherlands—peat meadows constitute a significant part of the landscape and are primarily used for dairy production (Verhoeven, 2012). These peatlands have experienced significant losses in biodiversity, soil quality, and water retention capacity over time due to drainage for agriculture and forestry (Bos et al., 2011). Similar peat meadows are also used for dairy production in the northern provinces of Friesland and Drenthe. The peat meadows in the west have a dual agricultural and recreational function for visitors from nearby cities, while the north has a more rural character centred around agricultural production. The tendency towards larger farms is expected to continue in this region (Verhoeven, 2012). The distribution of peat in the Netherlands can be seen in Figure 3.

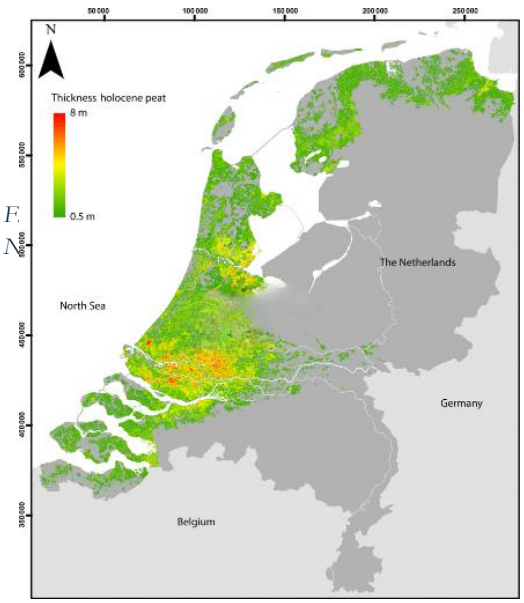


Figure 3: Map of Peat distribution and its thickness in the Netherlands. Adapted from Koster et al. (2020)

The peatlands in the Netherlands developed shortly after the Last Glacial Period (c. 115,000 – c. 11,700 years ago) (Marshall, 2010). Rising temperatures and melting ice led to extensive wetlands, which were oxygen-depleted and acidic, causing dead plants to accumulate over centuries to form thick peat layers (De Hondsrug, n.d.). Peat forms in areas with high rainfall and low temperatures, creating waterlogged, anaerobic (oxygen-poor) soil conditions (Rydin et al., 2013). These conditions inhibit the complete decomposition of plant material, leading to peat's gradual buildup over time. This peat can accumulate to great depths, sometimes over 10 meters, in temperate regions like the Netherlands (Lindsay & Andersen, 2016).

Variations in Different Areas of the Netherlands

Peat deposits in the Netherlands vary in thickness, depth, and composition depending on local geological and geomorphological conditions:

- **Southwestern Netherlands:** Here, peat deposits are primarily part of the Hollandveen Formation, which consists of thick stacks of early-to-middle Holocene peat and brackish clay. The alternations between the layers are due to marine conditions. These deposits are found onshore and offshore, generally lying below -15 m NAP[3] with maximum depths around -25 m NAP. Further north towards Hoek van Holland, the deposits become increasingly brackish (Hijma, 2017).

- **Northern Netherlands:** Peat deposits here are also primarily part of the Hollandveen Formation. However, compared to the southwestern areas, these northern peat deposits tend to be thinner and more intermixed with clay and other sediments (Erkens et al., 2016).

- **Groene Hart / Noord-Holland:** In the Groene Hart, peat layers are often thicker than those in the northwestern and southwestern areas, sometimes reaching 6-8 meters. The regional average thickness is 2-4 meters (Brouns, 2016). Unlike its coastal counterparts, the formation displayed fewer alternations between clay and peat and was formed in freshwater conditions. The peat in this region formed after the Last Glacial Period due to rising sea levels and groundwater tables, creating ideal peat formation conditions.

4.1.2 Water Regulation and Management

The importance of halting the drainage of peat soils lies in mitigating greenhouse gas (GHG) emissions and reducing land subsidence. Raising the water table is thus a clear solution. For a noticeable effect, it must be managed on a large scale in continuous areas (Franks & Mc Gloin,

[3] Dutch Ordnance Datum

2007; Parry & Charman, 2013). It has been suggested by Norris et al. (2021) that the optimal GWL for optimal peat health is approximately 30 cm below ground level in spring and 20 cm below ground level in other seasons. The efforts to keep these levels on such a large scale are referred to as landscape-scale or ecosystem approaches to peat management. Oxidation and decomposition of peat accelerate when the water table falls below optimal levels (Querner et al., 2012).

However, actual GWLs in peat meadows are about 0.5 m in summer and 0.6 m in winter (Verhoeven, 2012). These are the managed target levels needed for agricultural purposes or to support cattle. Water is pumped out when the water levels are 0.02 m above the target levels, and vice versa when the water is 0.02 m below the target levels. Farmers have created their own pumped drainage areas (small sub-polders). This is a rigid system, and in recent years, it has been proposed to replace it with a more flexible or dynamic regime, with less water being supplied (so there would be less to pump out). This would allow the water levels to fluctuate within a broader range (0.1 m above or below the target level), potentially resulting in even lower GWLs (Querner et al., n.d.). However, lower GWLs could lead to more subsidence, especially in areas with peat, because peat shrinks when it is not saturated with water

Additionally, the Netherlands features areas at different depths below sea level, with the country including regions that are up to 2.5 meters below mean sea level (MSL) in the northwest. Consequently, the 21 polders in the surrounding region each uphold distinct, precise, and carefully determined target surface water levels, where even a few millimeters or centimeters can significantly affect the peat and its surroundings.

The result is a complex water system with numerous areas, all with different drainage levels (Querner et al., 2012). A core issue here is that the **"function of the land decides the water level"** instead of allowing **"natural water levels to decide the function of the land."** While logical from a biophysical standpoint, many stakeholders might dispute that this is what should happen. This approach makes a large-scale strategy for peat management extremely complex.

4.1.3 Subsidence, Emissions, and Seepage

In areas where peatlands are drained (e.g., for agriculture), high subsidence rates occur, approximately 0.5–10 cm/year. This is a significant rate, as the peatland reacts to the lack of water by shrinking and compacting. The drained peatland releases significant amounts of carbon dioxide (CO_2) , contributing to GHG emissions. The emissions from drainage are predominantly CO_2 (Evans et al., 2021). Approximately 3% of the annual anthropogenic CO_2 emissions in the Netherlands come from peat soil oxidation. A one-millimetre subsidence due to oxidation results in about 2.3 tons of CO_2 per hectare annually, totalling around 4.2 million tons of CO_2 per year (Akker et al., 2012).

To combat peat oxidation and retain water in peatlands, water levels are increased in many areas. This helps reduce CO_2 emissions, and if peat-forming vegetation recovers, the area can gradually

start capturing CO_2 again. In this aspect, peatlands are resilient and can reestablish their carbon sequestration capabilities relatively quickly (Loisel & Gallego-Sala, 2022).

An option for rewetting peatlands is cultivating Typha (a type of cattail crop used for insulation production), which can significantly reduce GHGs. However, Typha cultivation is not economically competitive with Dutch dairy production (de Jong et al., 2021). Under a business-as-usual trajectory, global peatlands will continue to be exploited for uses other than their natural state (Girkin et al., 2023).

Rewetting peatlands also has potential downsides: rewetting can release methane (CH_4) , which is 28 times stronger than CO_2 in terms of global warming potential. This is particularly true when nutrient-rich peat soils are rewetted, mostly in former (and, in the Netherlands' case, mostly still current) agricultural areas. Nitrous oxide (N_2O) can also be released in nitrogen-rich areas, which has an even 300 times greater climate impact than CO_2 (Armour et al., 2021). Furthermore, the restoration of biodiversity and hydrological function remains minimal, even after a decade (Loisel & Gallego-Sala, 2022).

Another aspect of the Netherlands' geography is how groundwater seepage significantly affects 60% of peatlands, releasing up to 150,000 kg of salt per hectare yearly into surface waters (de Louw et al., 2011). Drainage and lowering of groundwater tables exacerbate seepage and evaporation(Querner et al., n.d.), leading to the salinization of surface waters, shallow groundwater, and root zone soil water(de Louw, 2013). This harms sensitive peatland ecosystems and species, such as meadow birds (de Mulder, 2019).

4.1.4 Governance and Administrative Characteristics

Peatlands have specific water management requirements due to their unique biophysical characteristics. Effective governance must consider these requirements to ensure sustainable land management. However, the anthropogenic activities—such as living, farming, and industry—that take place on peatlands often conflict with the ecological conditions needed for peatlands to flourish. This situation highlights the need for a flexible and ambitious holistic regulatory framework that addresses these complexities.

Regulatory Framework

The peatland management regulatory framework in the Netherlands consists of both European Union (EU) and Dutch national-level legislation governing the use and conservation of peatlands:

- **National Level:**
    - **Nature Conservation Act:** Aims to protect ecosystems and biodiversity in peatlands.

- **Water Act:** Focuses on water management practices to minimize soil subsidence.

- **EU Level:**

  - **Natura 2000:** Most legal obligations for peatlands focus on strict protection within Natura 2000 areas, established to conserve Europe's most valuable and threatened species and habitats, including peatlands (van Gils, 2024).

  - **Water Framework Directive:** Provides a framework for protecting and improving Europe's water resources, including peatlands.

  - **LULUCF Regulation** (Land Use, Land-Use Change, and Forestry) and the **Climate Act:** Address land use impacts, including those on peatlands.

In addition to these legal instruments, voluntary guidelines promote responsible peatland management. For example, the International Peatland Society (IPS) has developed the **Strategy for Responsible Peatland Management** (SRPM), offering guidance on sustainable practices.

Measures and Instruments

Adapted from a presentation and personal communication with Martijn van Gils (2024), an overview of the governance measures and legal instruments currently employed to address soil subsidence is provided. These measures operate at two levels: municipal/provincial and Regional Water Authority (RWA) levels.

Table 2:An overview of current governance measures and legal instruments currently employed to address soil subsidence. Adapted from personal communication and presentation from Martijn van Gils (2024)

Governance Measures for soil subsidence in rural peatlands	(Agricultural) land use and spatial planning (municipality or province)			Water management (RWA)	
	- Adapting current agricultural land use. - De-intensifying (reducing cattle per hectare). - Using lightweight cattle and other methods of soil cultivation.	- Changing agricultural land use - Changing cropland to grassland - Paludiculture (cattails, reed, cranberries, etc.)	- Assigning different functions to agricultural land - Changing agricultural land to nature reservations (recreation) - Changing agricultural land to a built-up area	- Advisory organ to governments - Raising water levels - Fixating water levels - Reclustering water level areas ('peilvakken') - Aligning water levels with drainage systems	- Installation of drainage stems (either governing body or farmer) - Regulated and subsidized by RWAs and provinces
Legal instruments to address these measures	(Agricultural) land and spatial planning (municipality or province)			Water management (RWA)	
	Assigning different functions to agricultural land in zoning plans or (instruction rule) in provincial regulation	Restricting methods of soil cultivation or cultivation of crops in zoning plans or provincial regulation: general rules (prohibition or injunction), instruction rules, permit requirements, and assessment rules for permits. Prescribing changes of agricultural use in zoning plan or (instruction rule in) provincial regulation.		Amending water level decisions ('peilbesluit') Policy: raising water levels only if farmer has not installed drainage systems Permit for water level deviation by private actor ('peilafwijkvergunning') regulation of drainage systems in RWA regulation	

Conservation and Restoration Efforts

The Netherlands currently lacks specific numerical targets for peatland restoration. However, the EU Nature Restoration Law proposal sets a clear target for restoring 70% of EU-drained peatlands by 2050 (European Commission, 2022). This has been translated into Dutch legislation with the following targets for drained peatlands in agricultural use:

- **By 2030:**
  - Restoration measures on at least 30% of the area.
  - At least a quarter of the restored area must be rewetted.
- **By 2040:**
  - Restoration measures on at least 50% of the area.
  - At least half of the restored area must be rewetted.
- **By 2050:**
  - Restoration measures on at least 70% of the area.
  - At least half of the restored area must be rewetted.

The Netherlands' approach to peatland restoration, as outlined in the translated targets from the EU Nature Restoration Law, is a step in the right direction but falls short in several key areas. The targets set within the Netherlands are less ambitious than the original EU proposal, which called for 70% restoration of drained peatlands by 2050 with a greater emphasis on rewetting, which is crucial for peatland restoration (Henson, 2024). Furthermore, the law does not clearly define "restoration measures." This ambiguity allows for insufficient interventions to be counted towards the targets, potentially undermining the overall goal of peatland restoration(*EU Nature Restoration Law*, n.d.).

Targets and Schemes

Working towards these EU-set targets requires extensive collaboration and collective action. A study by Evans et al. (2021) underscores the potential of reducing CO_2 emissions—a rise in GWLs (GWL) by 10 cm within a peat layer would reduce emissions by at least 3 tonnes of CO_2 per hectare per year. Following this argument, a GWL rise of 10 cm in all cultivated Dutch peatlands would reduce CO_2 emissions by 0.6 million tonnes per year, achieving 60% of the Dutch Climate Agreement target for 2030 (Wils et al., under review).

More collaboration is needed in the agricultural sector, where many farmers have diverse motivational profiles regarding implementing rewetting and adaptation measures. Some are more open to change, while others resist such changes. While the Netherlands has a long history of collaboration and collective action in the agricultural sector, there is currently no direct evidence of farmer cooperatives specifically addressing peatland management as part of their collective efforts.

To illustrate, the voluntary initiative **"Valuta voor Veen"**[4] is a project aimed at CO_2 emission reduction through increasing GWLs in peat areas. It is a compensation scheme offering three options for farmers to rethink their land management:

- Maintaining higher GWLs in peat meadows with nature-inclusive agriculture.
- Adopting paludiculture, which involves farming wet crops.
- Transitioning land use from agriculture to nature conservation areas, all contributing to higher water retention and reduced emissions.

Another approach to policy intervention has been disseminating information through leaflets and, more recently, online platforms like the "Peat Portal" and the "Peat Compendium". However, this method of passive information sharing is relatively inexpensive but overly reliant on the assumption that landowners or farmers possess a personal interest and motivation in nature conservation. This is a significant oversight, potentially limiting the effectiveness of such interventions.

4.1.5 Conclusion for Sub-Question 1

In conclusion, while the existing regulatory frameworks at both national and EU levels acknowledge the importance of peatlands and aim to protect them, the current governance structures only partially consider the critical biophysical characteristics necessary for sustainable land management. The emphasis often remains on water management and agricultural productivity, sometimes at the expense of ecological considerations. Anthropogenic activities frequently conflict with the ecological requirements of peatlands, indicating a gap between policy and practice. Conservation and restoration efforts, along with targets and schemes, show some progress but are hindered by less ambitious goals and a lack of clear definitions. Therefore, there is a need for more integrated and holistic governance approaches that align with the biophysical realities of peatlands.

[4] English Translation: Peat Currency

4.2 Results Sub-Question 2: Expert Perspectives on Specifying the Solution Space

4.2.1 Introduction

This section addresses the second sub-question

What factors do experts prioritize when defining a more specified solution space?

To answer this, insights from expert consultations are presented, involving researchers from the NWA-LOSS research consortium. Their perspectives on governance challenges are discussed, alongside policy coherence, and societal values influencing peatland management.

4.2.2 Expert Perspectives on Governance Challenges

Limitations of Current Governance Structures

Martijn van Gils, a legal scholar specializing in environmental law, provided insights into the role of Regional Water Authorities (RWAs) in peatland management (M. van Gils, personal communication, 14 May 2024). Mr. van Gils indicated that RWAs have an interesting but limited position in this issue because most European and international legislation is aimed at the national government, not decentralized entities like RWAs. This limits their effectiveness in implementing comprehensive peatland management strategies.

Furthermore, RWAs primarily focus on water level planning, which alone cannot sufficiently impact peatland subsidence. There is a need for wider considerations involving land use or spatial planning, or a more integrated process in managing peatlands and their resources. While RWAs are well-positioned to contribute to these broader efforts, they are not the designated agencies for such initiatives.

Policy Incoherence and Fragmented Landscape

Chen et al. (2023) echo this need for broader considerations in their study on the climate-friendly use of European peatlands. They spotlight a critical gap in the Netherlands' approach to peatland management. While incentive-based policies are widely promoted as the key to transitioning toward sustainable practices, the current incentives are ineffective in reducing emissions. High potential exists for incentive-based policies, but creating them is difficult due to regulatory barriers stemming from policy incoherence—a lack of coordination between sectors like agriculture, nature conservation, water management, forestry, energy, and climate policy. The result is a fragmented policy landscape that hinders progress.

Similarly, the Dutch government's approach through the Common Agricultural Policy (CAP), which influences the National Program for Rural Development (NPLG) and the national strategic

plan, continues to implement agri-environment schemes offering incentives for more sustainable practices. However, these initiatives are primarily voluntary and risk marginalization. An integrated strategy is paramount to transcend fragmented and voluntary efforts, necessitating a paradigm shift that recognizes peatlands not merely as land but as vital ecosystems integral to climate resilience.

4.2.3 Societal Values and the Status Quo

Expert Commentary on Societal Challenges

Mandy van den Ende, a researcher in environmental governance, provided insights into the societal, political, and economic contexts influencing peatland management (personal communication, May 22, 2024). She emphasized that market-driven policies and neoliberal values maintain the status quo. Economic interests consistently take precedence over environmental responsibility at all levels, and the capitalist drive in transformative management strategies is evident and narrow-focused. The existing system seems to cling to conventional methods, prioritizing agricultural and industrial productivity.

Ms. van den Ende noted that neoliberal values—individualism, laissez-faire economics, and deregulation—permeate much of policymaking. Long-term conservation efforts often struggle against profit maximization due to unclear or insufficient financial benefits. She highlighted the societal tension between self-interest and collective care: the extent to which people choose and care for themselves versus others.

Letting go of possessions or wealth, or what people think they are entitled to, is frightening. When the majority are willing to sacrifice—such as by paying extra taxes or relinquishing wealth—but one individual refuses, it creates a sense of unfairness. This reaction is rooted in subconscious social comparison, where observing someone avoiding the same responsibility can evoke feelings of injustice.

She argued that the broader societal ethos of 'every man for himself' drives many decisions. What is needed is not just policy change but a profound, almost spiritual transformation to shift from viewing ourselves as disconnected individuals to recognizing our interdependence with the natural world. A moral reckoning is necessary to confront the reality of exploitation. All climate crises around the world are symptoms of a more profound existential crisis. There must be a rejection of the narrative that individual prosperity is the ultimate goal and a redefinition of collective values regarding ecological harmony and community well-being.

4.2.4 Conclusion for Sub-Question 2

Experts prioritize several factors when defining a more specified solution space for peatland management:

- **Integrated Governance Approaches:** There is a need for a shift from fragmented, sector-specific policies to integrated strategies that encompass land use, water management, agriculture, and conservation.

- **Policy Coherence and Collaboration:** Addressing regulatory barriers and enhancing coordination between different sectors and governance levels are crucial to facilitate effective measures.

- **Effective Incentives:** Developing incentive-based policies that genuinely motivate stakeholders, particularly farmers, to adopt sustainable practices is essential.

- **Societal Transformation:** Recognizing the influence of neoliberal values and market-driven policies, there is a call for a shift from individualism to collectivism and a moral and spiritual transformation towards greater environmental responsibility.

These factors highlight the complexities in expanding the solution space for peatland management and underscore the importance of addressing both governance structures and underlying societal values.

4.3 Results Sub-Question 3: Applying Imaginative Logics to stakeholders in the Middelburg-Tempel polder

4.3.1 Introduction

In addressing the third sub-question—**"Which factors were identified by this study through imaginative approaches to expand the solution space?"**— imaginative logics were employed as a methodological tool to stimulate creative thinking among stakeholders in the Middelburg-Tempel polder The aim was to uncover new perspectives and potential strategies for sustainable peatland management by encouraging participants to envision alternative futures and consider possibilities beyond conventional approaches.

However, during the interviews, it became apparent that the discussion was often stifled by underlying issues that repeatedly surfaced. Instead of engaging in free and creative thinking about sustainable strategies, participants frequently returned to unresolved concerns such as social divisions, economic pressures, and power dynamics. These recurring themes indicated that certain barriers were impeding stakeholders' ability to think imaginatively about the future of peatland management.

The presence of these unresolved issues suggests that before stakeholders can engage in open and creative discussions, there is a need to address the foundational challenges they face. Just as Maslow's hierarchy of needs posits that basic needs must be met before individuals can achieve higher levels of thinking and self-actualization, the stakeholders in the Middelburg-Tempel polder may require solutions to other concerns before they can participate fully in imagining radical futures.

In the following sections, the factors identified through the imaginative logics approach are presented, organized into four key themes:

1. **Polarisation**
2. **Economic Viability and Sustainable Development**
3. **Power Dynamics: Governance, Industry, and Local Realities**
4. **Local Knowledge and Community**

For each factor, the results from the interviews are detailed, the findings are analysed, and the implications for expanding the solution space are discussed. As a reminder, here is the overview of the respondents and their corresponding codes and role/responsibility.

Respondent	Role/Responsibility
LR1	Local resident
LR2	Local resident
F3	Farmer
RO4	Restaurant Owner
LR5	Local resident
LR6	Local resident/museum guide
LR7	Local resident/museum guide
F8	Farmer
LR9	Local resident
LR10	Local resident/leisure farmer
LR11	Local resident/leisure farmer

4.3.2 Factor 1: Polarisation

Introduction

The first factor identified through the application of **imaginative logics** is **Polarisation**. By employing imaginative approaches in the interviews—such as asking participants to envision alternative futures for the Middelburg-Tempel polder and reflect on their relationships with other stakeholders—deep-seated divisions within the community were uncovered. These divisions between local farmers, government agencies, and other stakeholders emerged as significant barriers to expanding the solution space for sustainable land management.

In this section, the findings from the interviews related to polarisation are presented. The findings were analysed and their implications for the solution space discussed. This structure allows the systematical exploration how imaginative logics helped identify polarisation as a constraining factor.

Results

In and around the Middelburg-Tempel polder, the theme of (overcoming) polarisation is a pivotal issue for its community and is present in nearly every discussion on land management. In many cases, an experiential divide exists between local farmers' practical, experience-based knowledge and the more abstract or science-based approaches of government agencies and nature organisations. Polarisation in this context is not a peripheral phenomenon but a central barrier to progress. Respondents emphasised that bridging this gap requires more than just goodwill; it requires genuine effort and patience to understand each other. As LR11 (a local resident) put it,

"coexisting and having different visions is important. Everyone can say what they want, but collaboration is essential." LR10 (a local resident) echoed this sentiment and agreed, showing optimism about the future as transforming towards a collectivist society.

Some interviews highlighted the **emotional toll of polarisation**. F8, a farm owner, poignantly described feeling unjustly labelled as "killers," with their love for animals and their cattle being called into question. "It is hurtful, and it truly saddens me," they shared, and shed light on the personal pain that arises from these deep divisions and stereotypical thinking patterns. F3, also a farm owner, reflected on how their colleagues, especially younger entrepreneurs, feel like "they can never do it right. They are considering quitting due to a lack of prospects." They further emphasised how this perceived judgement from all stakeholders in land management is distressing for the community.

This is further complicated by the **deep-rooted resistance perceived among some farm owners**. LR5, a local resident, observed how "farmers are currently so conservative that I do not see them participating (in alternative crops for high GWLs). They have held on to centuries-old traditions." The respondent further underscores the tension between preserving the old and embracing the new as an aspect of the polarisation.

The role of government policies in this theme also came up – LR5 pointed out the **disconnect between policymakers and those directly affected by land management decisions** and how "the government makes decisions behind a desk without understanding the ground realities." When discussing a government directive for raising GWLs in a particular area of the Middelburg-Tempel polder, F3 commented that "the (government official) probably does not realise what (raising GWLs) would mean because it just leads to more methane emissions." A broader sense of frustration with top-down decision-making processes that seem out of touch with local realities. This sentiment will also be discussed in Factor 4: Local Knowledge and Community.

Analysis and Discussion

Interestingly, when bringing up local or specific issues in the Middelburg-Tempel polder, the conversation quickly moved to broader and more systemic problems and their shortcomings. Discussions devolved into generalisations, with statements like "they should just…" or "why don't they…" being typical. This lack of solution-based (or, one could even argue, empathic) thinking uncovers an **inability to engage in meaningful dialogue**. The interactional strategies were not as effective as intended to enable participants to express and move beyond these feelings. In any case, the biggest perceived obstacle to collaboration and overcoming polarisation is, ironically enough, the "other party".

We can understand this observed dynamic through the lens of **epistemic injustice**, where a person's knowledge is devalued due to (unconscious) biases against the group they belong to. This is not, by definition, a fault—the human brain has an innate tendency to divide the world into "us"

and "them" categories. It was evident from the interviews in the stark distinctions made in conversation between farmers, environmentalists, and government workers, each viewing the other with some degree of suspicion.

Addressing these divides begins with the concept of **embeddedness** (integrating social relations and local context into land management). Factor 4: Local Knowledge and Community discusses this further.

On a meta-level, what is also interesting here is how the comments *about* polarisation also *contribute* to polarisation. A comment (though made in jest) made by two respondents on how "farmers with upside-down flags ought to be sent to the guillotines" still illustrated the intensity of feelings that can arise in these discussions. The irony is palpable—discussions about polarisation often spiral into the very hostility they aim to discuss, thereby becoming a part of the phenomenon.

Implications for the Solution Space

The polarisation between stakeholders, particularly local farmers and government agencies, constrains the solution space for sustainable land management. Attempting to apply imaginative logics helped identify this factor by highlighting how divisions hinder collaborative efforts and the development of new solutions.

Constraining Factors

- **Experiential Divide:** The gap between local farmers' practical knowledge and governmental bodies' abstract, science-based approaches creates misunderstandings and mistrust.
- **"Us vs. Them" Mentality:** Social divisions are reinforced, making collaboration difficult.
- **Emotional Toll:** Polarisation leads to feelings of being judged or marginalized, reducing willingness to engage with other stakeholders.
- **Stereotypical Thinking:** Negative perceptions and stereotypes deepen mistrust among different groups.

By recognizing and addressing these constraining factors, there is potential to expand the solution space. This requires efforts to build mutual understanding, value different types of knowledge, and foster empathic communication.

4.3.3 Factor 2: Economic Viability and Sustainable Development

Introduction

The second factor identified through the application of **imaginative logics** is **Economic Viability and Sustainable Development**. By engaging participants in imaginative exercises—such as envisioning alternative economic models for peatland use and contemplating the future of their community—deep-rooted economic pressures that constrain sustainable practices in the Middelburg-Tempel polder were uncovered.

In this section, the findings from the interviews related to economic challenges and opportunities are presented. Then, the findings are analysed and linked to concepts like path dependency and embeddedness. Finally, the implications for the solution space are discussed, highlighting how economic factors constrain or could potentially expand sustainable land management options.

Results

The problematic nature of **contemporary consumer behaviour** was a recurring concern. LR1 critiqued supermarkets' pricing strategies, directly impacting the viability of farming practices in the region. "Albert Heijn prices organic milk unrealistically, which only benefits Albert Heijn. Supermarkets are a part of the problem." LR10 voiced frustration with Dutch supermarkets' current supply chain system, describing it as overly long and focused purely on profit margins, forcing farmers to "intensify production just to make ends meet". However, LR10 also sees a silver lining and mentioned how "buying more locally" through milk taps and local farm shops already reduces the strain. F3 and LR1 mentioned that another benefit of selling these farm products directly to consumers is creating and fostering that connection between farmers and local residents again. LR6 remarked on the dependence on tree nurseries around the Middelburg-Tempel polder in light of the need for higher GWLs, claiming "(they) cannot just leave, because people depend on [the jobs the industry creates and the supply of trees]".

The region's economic realities were emphasised by LR7, stating that "to earn a living, you have to get bigger, bigger, and bigger,". Historically, the Middelburg-Tempel polder had much more livestock but shifted to tree cultivation, which was more profitable. LR5 recognises the **trade-offs agricultural workers must make to make ends meet** and further discusses the economic pressures involved – like the need to invest in expensive equipment and forthcoming repair costs. LR6 echoes this in that there is no other way to go than to get bigger - or to disappear. This relentless pressure was also commented on by LR10, and the "orders and profits cycle" leads to extreme land use and drainage, which further challenges land use in the future. F3 was also vocal about this, implying that smaller-scale farms with around 100 cows should be able to make a decent living. They continued to affirm that the scaling up of companies was the most significant undesirable change in the area and how farms are "3 to 4 times as big as 30 years ago…. I do not know when the end is in sight, but this growth needs to stop."

Developments in housing, schools, and roads in and around the Middelburg-Tempel polder are also worth mentioning– the new infrastructure needed to accommodate the influx of new families in the region is an added strain to the weight of the growth and intensification of the land use. To RO4 (restaurant owner), LR5 (local resident) and LR9 (local resident), the rising affluence in the area brought both up and downsides. LR9 discussed the upside as a change for the better, where the influx of new people gave more support for safer road and traffic situations, making "the area an attractive and safe place to live." LR5 had done some work for some relatively wealthy individuals in the area who were building and renovating their homes and criticised how those individuals sometimes only sought to create more wealth for themselves (implying they might not be as concerned with their surroundings as LR5 themselves firmly are). The discussions of such patterns in local communities are continued Factor 4: Local Knowledge and Community. RO4 was glad about the new developments and the heightened patronage along with it, with more fishers, hikers, and cyclists in the area visiting their restaurant – but as a business owner and not a resident, the level to which they felt inclined to have their say in the managing and planning of the area was relatively low.

Analysis and Discussion

The tone of the conversations, when respondents were probed on their views and imaginations on alternative economic ways for peatlands to be used, was that of resignation. The inevitability of scaling up was largely attributed to external factors and suggested a deep-seated belief and acceptance that survival within the current economic system necessitates relentless expansion.

The notion of path dependency arises here, where future choices are limited due to current economic constraints, effectively entrapping any businesses on the land. The overwhelming focus seems to come down to meeting market demand. This raises the (not unbeknownst) question of the fairness and justice of the current system. A more balanced system, with equity for farmers and support for small-scale farming, should have precedence, but that is nothing new… The respondents were largely aware of this lock-in. Nevertheless, the research on path dependency in peatland management is vast, growing, and innovative and hopefully will gain more traction in regional and agricultural news/journalism.

The disconnect to the surroundings by some existing or new residents coming into and around the Middelburg-Tempel polder could have significant implications for the area's future. The stewardship of the land is sometimes solely born by the farmers. One could suggest that the challenge is to configure more embeddedness in the area, a concept that integrates social relations and local contexts into the decisions about the land. The more robust network of local residents and business owners, scaling their needs to what can be found within a ten-kilometre range of where they live, would very much strengthen the local economy and relationships within and around the Middelburg-Tempel polder. Positive reactions to shorter supply chains and sympathy for farmers pressured to intensify suggest potential for reorienting focus from international demand to regional needs. Bringing stewardship back to every household in the Middelburg-

Tempel polder was favoured by many respondents, although challenges like time, resources, and planning were acknowledged. Implications for the Solution Space

Implications for the Solution Space

Economic pressures and market forces constrain the solution space for sustainable land management by forcing unsustainable practices and limiting farmers' ability to adopt more sustainable approaches.

Constraining Factors

- **Pressure to Intensify Production:** Market demands and large-scale industrial farming influence compel farmers to scale up, often unsustainably.

- **Unsustainable Land-Use Practices:** Economic constraints favour short-term profits over long-term sustainability, leading to practices like excessive drainage and land intensification.

- **Financial Burden on Small-Scale Farmers:** Rising costs of farming equipment and maintenance create financial barriers for smaller farms.

- **Dominance of Large Retailers:** Supermarkets and long supply chains dictate prices, squeezing out smaller, local producers and disconnecting consumers from the origins of their food.

4.3.4 Factor 3: Power Dynamics: Governance, Industry, and Local Realities

Introduction

The third factor identified through the application of **imaginative logics** is the **Disconnect Between Policymakers and Local Realities**, highlighting the complexities of **Power Dynamics** among governance structures, industry players, and local stakeholders. By engaging participants in imaginative exercises—such as envisioning ideal policies or reflecting on how governance could better serve their community—significant frustrations with how higher-level decision-making clashes with practical realities in the Middelburg-Tempel polder were uncovered.

While this factor overlaps with the earlier discussion on polarisation, the critical difference lies in its focus on the disconnect between policies made at higher levels and their practical implications, rather than on social and cultural divisions among stakeholders.

In this section, the findings are presented from the interviews that illuminate these power dynamics. These findings are analysed, discussing the triangle dynamic between government, agro-industry, and individual farmers. Finally, the implications for the solution space are explored, identifying constraining factors and potential pathways to address them.

Results

A recurring theme in the interviews was frustration about higher-up decision-making clashing with the practical realities of farming in peatlands. This sentiment was summarized by LR5, who stated, "The government makes decisions behind a desk without understanding the ground realities." This perception held true for all respondents whose vocation was local or related to the land in and around the Middelburg-Tempel polder (F3, LR5, F8, LR10, LR11).

When respondents were prompted to consider existing or hypothetical policies through imaginative questioning, discussions often highlighted how officials misunderstand farming life. F3 mentioned that when officials use or propose instruments like the "Kalenderlandbouw-Kalender"[5] they do so "without having any idea what they are talking about." They further explained how certain politicians "push too hard without any fundamental knowledge on certain matters," forcing farmers to work with impractical and uninformed policies, for example, regarding water use.

[5] English translation and definition: Calendar farming is a method where farmers are required to sow and harvest their crops on specific dates in a year

An example cited was a government directive for raising GWLs in a certain area of the Middelburg-Tempel polder. F3 commented that "the government official probably does not realize what raising GWLs would mean because it just leads to more methane emissions." This reflects frustration with policies that, while well-intentioned, may have unintended negative consequences due to a lack of practical understanding.

This frustration extended to broader agricultural policies, where landowners, residents, and workers felt sidelined. Environmental agencies were also a cause of concern and were criticized for inconsideration towards local impacts. LR10 mentioned how "Natuurmonumenten have a lot of money and want to control everything," signifying the power imbalance many residents or farmers feel in the area. They further remarked that "[Natuurmonumenten] keep busy, and they create useless jobs for each other, while some earning their income from agriculture struggle to make a living."

A lack of trust was another recurring theme—in governments, local municipalities, and environmental agencies. In Boskoop, LR5 explained how local infrastructure is sub-par to the needs of the growing tree plantation industry and the need for locals to navigate roads safely: "We have been asking for a new bridge for 20 years, but the municipality says it is too expensive." They expressed that "nothing ever changes," and the prolonged arguing has left them feeling resigned to the status quo.

Conversely, there was also criticism of the disproportionate power wielded by large agricultural and farmer organizations. LR1 highlighted the importance of challenging these organizations' actions, acknowledging their deep political involvement in the system, including water boards and municipalities. They raised the question of whose interests these groups ultimately serve.

LR5 also expressed a lack of trust towards nature protection and conservation agencies. A local water pollution issue near their residence led them to approach Staatsbosbeheer[6] and the RIVM[7], who refused to "get involved" and told LR5 it "was not their job," leaving them feeling ignored and let down. Echoing LR1, they wondered, "Who else can you turn to?"

[6] Society for Preservation of Nature Monuments in the Netherlands is a Dutch nature conservation organization that buys, protects, and manages nature reserves in the Netherlands.

[7] National Institute for Public Health and the Environment

Analysis and Discussion

The interviews revealed a significant disconnect between policy creation and the everyday realities of local stakeholders. This disconnect is compounded by complex power dynamics involving government entities, the agro-industry, and individual farmers.

Participants often struggled to identify who is responsible for certain policies or who holds the power to effect change. This lack of clarity hinders their ability to challenge decisions at the appropriate level. The blurred lines between industry and individuals make it difficult to discern objectives and hold entities accountable.

Moreover, individual farmers often bear the brunt of issues for which the agro-industry may be responsible. The agro-industry, being a closed and highly private sector, can simultaneously act as a helping hand and an oppressor. Farmers may feel caught in the crossfire, unsure of who is on their side and who benefits from current policies.

A specific example is the infrastructure issue in Boskoop. LR5 discussed the long-standing request for a new bridge, which the municipality claims is too expensive. While the bridge would serve local needs, its primary users are the "mega trucks from mega agri-industry." This raises questions about responsibility and fairness: Why should the agro-industry reap benefits from local infrastructure without sharing the burden?

The pressure that farmers feel between government regulations and economic demands from the agro-industry, compounded by the challenges of farming on peatlands, creates a sense of being overwhelmed. Emotional and generational tribulations surrounding these factors make being a "good" farmer seem increasingly difficult. These dynamics can be linked to the concept of **structural power imbalances**, where some entities wield disproportionate influence over things that affect all entities.

Implications for the Solution Space

The disconnect between policymakers and local realities, along with complex power dynamics, constrains the solution space for sustainable land management.

Constraining Factors

- **Top-Down Decision-Making:** Policies are made without adequate input from local stakeholders, leading to impractical or counterproductive measures.
- **Lack of Trust:** Erosion of trust between local communities and government or environmental agencies hinders cooperation and the implementation of effective policies.
- **Power Imbalances:** The disproportionate influence of large agricultural organizations and the agro-industry overshadows the needs and voices of small-scale farmers and local residents.

- **Accountability Issues:** Blurred lines of responsibility make it difficult for stakeholders to challenge policies or hold entities accountable.

4.3.5 Factor 4: Local Knowledge and Community

Introduction

The fourth factor identified through the application of **imaginative logics** is the importance of **Local Knowledge and Community** in sustainable land management. By engaging participants in imaginative exercises—such as envisioning their ideal future for the Middelburg-Tempel polder and reflecting on the role of community in land stewardship—challenges arising from the fragmentation of rural communities and the undervaluing of local knowledge were uncovered.

This factor was identified as participants shared their imaginations of a sustainable future, emphasizing the significance of local insights and strong community ties. Their reflections revealed how the erosion of these elements constrains the solution space for sustainable land management.

In this section, the findings from the interviews that highlight the role of local knowledge and community cohesion are presented. These findings are then analysed, discussing the implications of community fragmentation and generational disconnects. Finally, it is explored how these factors constrain the solution space and suggest potential pathways to address them.

Results

Through imaginative questioning, participants were encouraged to think about a future where their community thrives alongside sustainable land management practices. The interviews consistently highlighted the potential of local knowledge and the need to strengthen the position of farmers within the Middelburg-Tempel polder.

Both farmers and non-farmers recognized that those who live and work in the area possess unique insights into agricultural and environmental needs, rooted in practical understanding and history. When asked to imagine effective environmental initiatives, all farmer respondents remained unconvinced about proposed ideas in practice.

F8 remarked, "We are open to it, but in practice, the ideas just are not realistic. It's easy to come up with ideas in theory, but they do not work on the ground." They emphasized that "people who are born and raised here are the best options for knowing what is needed in the area. Land subsidence will worsen, and the land will be ungovernable" without their input.

F3 explained how their upbringing and lifelong work on the land fostered a deep understanding of its limitations: "This place is very special to me. I was born here and raised here. The ground is not ideal, but in your lifetime, you learn to deal with it." These sentiments underscore the value placed on lived experience and local expertise.

The need for local knowledge extends beyond land management to the broader community of the Middelburg-Tempel polder. LR9 discussed the importance of physical gathering places—

churches, village bulletin boards, community centres—to foster cohesion within the area. They noted that newer residents often become preoccupied with their own families or work, as opposed to involved residents who are "rooted and engaged."

F3 echoed this, explaining that communities in agricultural areas were historically more tightly knit than they are now. "When I was young, there were more farm kids in the class. Now, my children are often the only farm kids among their peers," signifying the alarming pace at which rural communities have weakened over the past 20-30 years.

Through these imaginative discussions about the future of their community, participants highlighted concerns about the fragmentation of rural life and the challenges it poses for sustainable land management.

Analysis and Discussion

The interviews reflect a marked shift in the social dynamics of rural farming communities. What were once tightly knit societies have become fragmented, with farmlands now seen as scattered remnants of a communal past. The bonds that traditionally defined rural life have changed, leaving individual farmers isolated—not just from each other, but from the larger society that benefits from their work.

This fragmentation raises critical questions about how place-based values can be reconciled with changing demographics and values in the Middelburg-Tempel polder. Farmers view their work as deeply intertwined with the land, aligning with the philosophical approach of Virtue Ethics. Their vocation reflects their moral character and long-standing virtues, such as stewardship, craftsmanship, and responsibility, rather than being solely concerned with outcomes.

As LR2 put it, "Farmers explain their surroundings differently than just nature or aesthetics," implying that they embody their work and surroundings. Their roles and knowledge cannot be replaced by external organizations or people, and they may feel threatened when outsiders propose changes without fully understanding local contexts.

This leads to the broader question**: Who really knows what is best for the land?** Farmers argue that decisions made by outsiders lack the practical understanding necessary to protect and manage the land effectively. On the other hand, government agencies and scientific institutions bring research-backed knowledge and broader perspectives, identifying patterns and threats that may not be apparent at the local level.

The challenge lies in finding a middle ground. While it is tempting to dismiss farmers as resistant to change or lacking scientific understanding, such views overlook the valuable contributions they can make. Equally, adhering strictly to traditional methods without considering scientific advancements would be short-sighted.

This dynamic ties back to the first factor of **polarisation**. Until we can bridge the divide between local wisdom and scientific insight, creating a genuine synthesis of both, claims of serving a "bigger purpose" in sustainable land management ring hollow. The imaginative logics approach revealed that participants desire a future where their knowledge is valued and integrated with external expertise.

Implications for the Solution Space

The decline of local knowledge, community fragmentation, and generational disconnects pose critical challenges to expanding the solution space for sustainable land management. These factors weaken the local capacity to implement sustainable practices and undermine the potential for collaborative efforts.

Constraining Factors

- **Feeling Overlooked:** Local farmers feel that their insights are often ignored in favour of top-down approaches, leading to mistrust and disengagement.
- **Community Fragmentation:** The weakening of social cohesion and loss of traditional knowledge-sharing diminish the collective ability to manage land sustainably.
- **Disconnect of New Residents:** Newer residents who are not engaged with agricultural or local practices reduce the overall sense of stewardship over the land.
- **Loss of Intergenerational Knowledge Transfer:** Fewer young people remain in farming or connected to rural communities, leading to a loss of valuable skills and traditions.

Conclusion for Sub-Question 3

Although the intended application of imaginative logics didn't produce a discussion of imaginative futures, this study did uncover four factors that **constrain** the solution space (in its current and future state). But, if **addressed**, they have the **potential to expand** the solution space for sustainable land management in the Middelburg-Tempel polder.

Polarisation: The divide between local farmers' practical knowledge and the abstract, science-based approaches of government agencies has led to mistrust, reinforced social divisions, and emotional strain on both sides. **If addressed through empathetic dialogue and emotional understanding**, where stakeholders can openly express their concerns and engage in meaningful conversations, the "us vs. them" mentality could be overcome. Creating safe spaces for discussions that value both emotional and intellectual perspectives fosters trust and collaboration, allowing for the development of joint, creative solutions.

Economic Viability and Sustainable Development: Economic pressures force farmers to engage in unsustainable land-use practices. However, **if addressed by reorienting economic models to prioritize sustainability and equity**, the pressure to scale up operations and adopt unsustainable practices could be reduced. Supporting local markets, shortening supply chains, and providing financial incentives for sustainable practices would allow farmers to embrace environmentally friendly approaches without sacrificing financial stability.

Power Dynamics: Governance, Industry, and Local Realities: The disconnect between policymakers and local stakeholders creates impractical policies and deepens frustration. **If addressed by improving transparency and balancing power through better engagement of local stakeholders**, this issue can be mitigated. Ensuring that local realities are considered in decision-making can rebuild trust and accountability, making policies more practical and tailored to the region's needs.

Local Knowledge and Community Cohesion: The erosion of traditional knowledge-sharing and community cohesion weakens the capacity for sustainable land management. **If addressed by integrating local knowledge into decision-making** and strengthening community ties, rural communities can become more resilient and better equipped to manage land sustainably. Empowering local voices and fostering intergenerational knowledge transfer will enhance the region's long-term sustainability.

4.4 Results Sub-Question 4: Evaluating the Potential of Imaginative approaches

4.4.1 Introduction

In addressing **Sub Question 4—"How effective are imaginative approaches in expanding the solution space for sustainable land management in the Middelburg-Tempel polder?"**—we aimed to evaluate the application of imaginative logics during the interviews to explore whether they could help stakeholders envision alternative futures and expand the solution space.

Imaginative logics, as outlined by Pelzer and Versteeg (2019), seek to move beyond technocratic perspectives towards more creative and empathetic engagement. The goal is to challenge entrenched thinking and imagine new, feasible futures that resonate with local stakeholders.

4.4.2 Results

Application of Imaginative Logics in the Middelburg-Tempel Polder Context

During the interviews, imaginative logics were incorporated by asking participants to discuss and envision their alternative futures for the Middelburg-Tempel polder and reflect on their roles within these futures. The intention was to encourage out-of-the-box thinking and open up new possibilities for sustainable land management.

However, it was found that in the context of the Middelburg-Tempel polder, the application of imaginative logics was met with significant challenges. The respondents often struggled to engage with the imaginative exercises. Instead of exploring new possibilities, conversations frequently reverted to existing frustrations and systemic issues.

Barriers to Effective Application

Several factors hindered the effectiveness of imaginative approaches:

1. **Deep-Seated Polarisation:** As identified in the previous findings, there exists a persistent "us vs. them" mentality among stakeholders. This polarisation made it difficult for participants to engage openly with imaginative scenarios, as they remained entrenched in their existing viewpoints and distrust of other groups.

2. **Emotional Strain and Resistance to Change:** Stakeholders expressed strong emotions, including scepticism and resignation. For example, when asked to imagine collaborative futures, some farmers voiced feelings of being misunderstood and unfairly judged, which inhibited their willingness to consider alternative perspectives.

3. **Focus on Immediate Concerns:** Participants were preoccupied with immediate challenges such as economic pressures, policy disconnects, and community fragmentation. These pressing issues overshadowed the ability to think creatively about the future.

4. **Lack of Trust and Dialogue:** The absence of meaningful dialogue and trust between stakeholders impeded the openness required for imaginative thinking. Without a foundation of trust, participants were reluctant to engage in speculative discussions that required vulnerability and openness to new ideas.

Comparison with Pelzer and Versteeg's Context

The context of the Middelburg-Tempel polder differs significantly from the setting in which Pelzer and Versteeg (2019) applied imaginative logics—a university-led contest for envisioning a post-fossil city. In their setting, participants were already engaged in a collaborative and creative process, likely with fewer entrenched conflicts.

In contrast, the Middelburg-Tempel polder is a real-world community with deep-rooted divisions and immediate practical concerns. This difference highlights that the effectiveness of imaginative logics is highly situational and may require adaptation to the specific context.

4.4.3 Implications

Challenges to Theoretical Assumptions

The findings challenge the optimistic assumption that imaginative logics can readily transform polarized contexts. While theoretically expansive, imaginative approaches may not be effective in settings where foundational issues such as trust, communication, and mutual understanding are lacking.

Recommendations

To address the barriers and enhance the potential of imaginative approaches, the following strategies are proposed:

1. **Localized Trust-Building Exercises:** Before introducing imaginative logics, create platforms where stakeholders can engage without preconceived judgments. Activities that build trust and understanding can lay the groundwork for more open dialogue.

2. **Empathetic Engagement Practices:** Incorporate exercises designed to humanize opposing perspectives. Techniques such as storytelling, shared experiences, or empathy workshops can help reduce polarisation and foster mutual respect.

3. **Pilot Imaginative Logics in Practical Contexts:** Apply imaginative approaches to small-scale, practical initiatives that are directly relevant to stakeholders' immediate

concerns. Success in these areas can build credibility and demonstrate the value of imaginative thinking.

4. **Address Immediate Concerns First:** Recognize and address the foundational issues that preoccupy stakeholders. By alleviating some of these immediate pressures, stakeholders may become more receptive to engaging in imaginative exercises.

Origin of Recommendations: These recommendations are informed by both the findings of this study and relevant literature on community engagement and conflict resolution (e.g., Lewicki & Tomlinson, 2014; O'Leary & Bingham, n.d.). They represent a synthesis of empirical observations and theoretical insights.

Conclusion

In conclusion, while imaginative logics hold potential for expanding the solution space in sustainable land management, their effective application in contexts like the Middelburg-Tempel polder requires preliminary steps to address deep-seated barriers. Building trust, addressing immediate concerns, and fostering empathetic engagement are essential prerequisites for successful imaginative interventions.

4.5 The New Solution Space Visualised

4.5.1 System Rationality and Living Environment Rationality

The original **Solution Space** framework from Haasnoot et al. (2020) effectively maps out adaptation options across biophysical, cultural, socio-economic, and political dimensions. However, it primarily operates within the realm of "**System Rationality"**, which emphasises structured, logical approaches to policy-making and technical interventions. **System Rationality** focuses on efficiency, optimisation, and the implementation of best practices within established frameworks.

In contrast, **"Living Environment Rationality"** highlights stakeholders' lived experiences, values, and social contexts. This perspective underscores the importance of human factors—such as trust, empathy, and emotional well-being—in shaping adaptation strategies. Transitioning to different policy pathways may appear straightforward from a system rationality viewpoint. However, imaginative logic has demonstrated that Living Environment Rationality often presents significant challenges to such transitions. For example, a system may technically be able to switch to another 'metro line' —that is, adopt a different adaptation pathway—if its current path becomes untenable. But what happens when the stakeholders lack cohesion and the ability to envision alternatives beyond their current world? The metro line or station becomes figuratively inaccessible, closed, or out of order.

This fragmentation highlights the necessity of integrating individuals open to imagining and driving change toward a healthier peat landscape. These individuals and community are indispensable in bridging the gap between rigid system rationality and Living Environment Rationality's flexible, context-sensitive nature, facilitating a successful transition.

4.5.2 Building on Haasnoot et al. (2020)

The new proposed revised solution space in Figure 5 expands on the original framework from Haasnoot et al. by incorporating the real-world challenges of stakeholder dynamics in the Middelburg-Tempel polder. It acknowledges that technical interventions alone could be insufficient in contexts where emotional strain, polarisation, and a lack of trust prevail.

4.5.3 Reading the Revised Solution Space

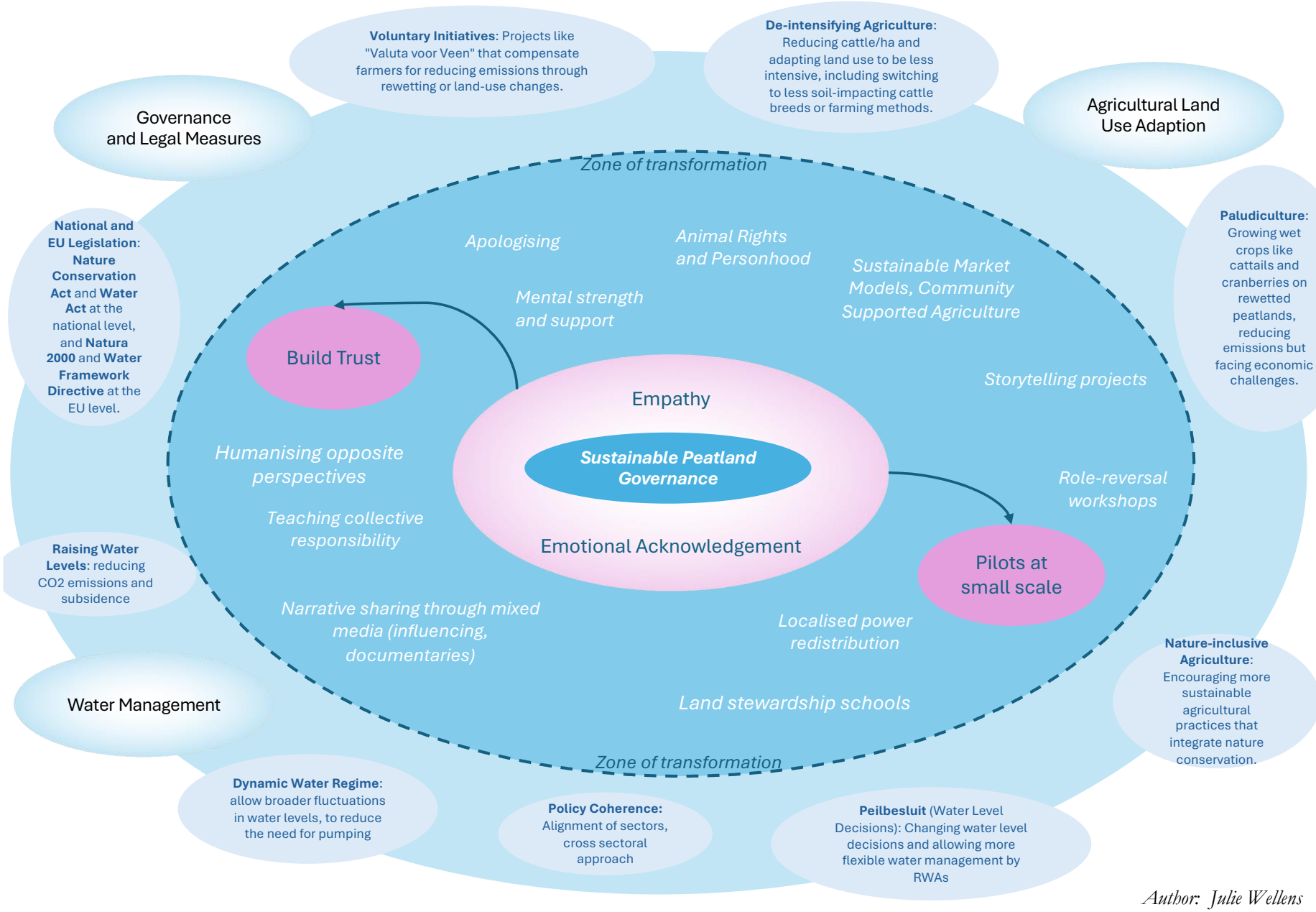
To understand how to "read" the revised solution space diagram it's important to first recognize that the core elements—trust-building, empathy, and emotional acknowledgment—are at the centre of the framework. These components are foundational because they directly address the polarisation and emotional strain that hinder collaboration and sustainable management in the Middelburg-Tempel polder.

- **Inner Circle (Core Elements):** The innermost part of the diagram represents the essential emotional and social work needed to bring stakeholders together. Without addressing these core issues—building trust, fostering empathy, and acknowledging emotional divides—the outer strategies (governance, agricultural adaptation, and water management) cannot be implemented effectively.

- **Middle Layer (Transformation Strategies):** The middle layer includes transformational strategies such as storytelling projects, role-reversal workshops, and local power redistribution. These are the practical initiatives designed to help stakeholders engage emotionally and socially, gradually expanding the solution space by fostering collaboration and mutual understanding. This all is within the 'zone of transformation' and is a place where transformative approaches are operationalised. These strategies originate from relevant literature on community engagement and conflict resolution in sustainability (Crane et al., 2011; Heras & Tàbara, 2014; Lewicki & Tomlinson, 2014; Milstein, 2009; O'Leary & Bingham, 2001)

- **Outer Strategies (Governance, Agricultural, Water Management):** The outer circle represents the technical and policy-based strategies that are necessary for long-term peatland management. However, these can only be successful once the inner emotional and social barriers have been "broken through" outwardly from the centre. The outer strategies depend on this core work of trust-building and emotional engagement to take hold and create sustainable change.

By focusing on the core social and emotional factors, this diagram provides a pathway for expanding the solution space in the polder, highlighting the importance of human dynamics in the broader context of technical and policy solutions.



Author: Julie Wellens

Figure 5: Revised Solution Space

5 Discussion and Recommendations

5.1 Introduction

This study set out to explore the factors that might help expand the solution space for sustainable land management in the Middelburg-Tempel polder and, more broadly, for developing long-term approaches to sustainable land management. By engaging with local stakeholders using imaginative logics—an approach developed by Pelzer and Versteeg that was deemed to have the potential to address the crisis of imagination—it aimed to uncover underlying challenges and opportunities for transforming peatland governance.

The findings reveal that while imaginative logics have theoretical potential to expand the solution space by fostering creative and empathetic engagement, their effectiveness is constrained by deep-seated polarisation, trust deficits, and immediate practical concerns among stakeholders in the Middelburg-Tempel polder. In this discussion, these findings are reflected upon in relation to existing literature, the theoretical and practical implications are considered, and insights into the research approach and potential pathways forward are offered.

5.2 Theoretical Implications

5.2.1 Expanding the Solution Space Framework

The concept of the solution space, as developed by Haasnoot et al. (2020), provides a framework for mapping opportunities and constraints for climate adaptation, shaped by biophysical, cultural, socio-economic, and political/institutional dimensions. This study contributes to this literature by proposing an enrichment of the framework, highlighting the importance of an additional dimension: the inner dimension of stakeholders' imaginative capacities and emotional readiness for change.

While Haasnoot et al. (2020) initially introduced the solution space, and subsequent expansions by Du et al. (2022) emphasized legal and governance factors, the findings suggest that stakeholders' ability to envision alternative futures—a key aspect of overcoming the "crisis of imagination" described by Morton (2013)—is critical in expanding the solution space. The deep emotional and psychological barriers identified in the Middelburg-Tempel polder context demonstrate that the solution space is not solely determined by external factors but is also shaped by internal, subjective experiences.

5.2.2 Challenges to Imaginative Logics in Polarized Contexts

Pelzer and Versteeg (2019) argue that imaginative logics can make abstract phenomena like the future present to audiences, facilitating transformative thinking. However, their work also underscores that the application of imaginative logics is highly situational and influenced by the staging of interventions.

This study extends this understanding by demonstrating that in contexts characterized by significant polarisation and mistrust, as in the Middelburg-Tempel polder, imaginative logics may not be readily effective. The theoretical assumption that imaginative approaches can easily catalyse transformation is challenged by the findings, suggesting that foundational work in building trust and addressing immediate concerns is necessary before such approaches can take hold.

5.2.3 Importance of Staging and Context

The contrast between the university-based contest setting in Pelzer and Versteeg's study and the real-world complexities of the Middelburg-Tempel polder underscores the crucial role of context and staging in applying imaginative logics. Effective interventions must be tailored to the specific audience, considering their readiness and the emotional and relational dynamics at play. In a region like the Middelburg-Tempel polder, with its rich history, it may be challenging to maintain sufficient emotional distance from a subject so "close to home", which can hinder imaginative thinking.

This observation aligns with findings from other studies emphasizing the need to adapt interventions to local contexts. For instance, the "IMAGINE" method developed by Plan Bleu stresses understanding the system, context, and key issues at a **local level** of an area before implementing any intervention (Lafitte, n.d.). The method also recognises stakeholder participation and the search for a common language as essential components of a future labelled as "participative prospective."

Similarly, Moore et al. (2015) demonstrate that successful complex interventions, such as HIV prevention programs, require careful consideration of **cultural norms and local conditions**; strategies effective in one setting may need significant adaptation in another, like how an intervention that works in urban areas needs substantial modification for rural communities.

By acknowledging the importance of context and tailoring imaginative interventions accordingly, practitioners can enhance their effectiveness and relevance. This ensures that imaginative logics are not only theoretically sound but also practically applicable in diverse and complex real-world settings.

5.3 Practical Implications

5.3.1 Addressing Foundational Barriers

The practical implications of the findings emphasize the need to address foundational barriers before attempting to implement imaginative approaches in sustainable land management. Strategies such as localized trust-building, emotional acknowledgement, apologizing, and empathetic engagement practices are essential to create a conducive environment for stakeholders to engage in creative and collaborative thinking.

In particular, the polarisation, resistance to dialogue, and emotional strain revealed in the interviews underscore that addressing these issues requires more than just ecological solutions, financial incentives, or legal frameworks. The emotional dimension—how people feel about their place and future—needs to be acknowledged and managed first to make other tools effective. Without this emotional groundwork, efforts to implement solutions may be met with resistance. And yes, while some researchers might view this as vague, unquantifiable, soft or qualitative, could this very dismissal be part of the reason we find ourselves in such a scrimmage on climate issues?

5.3.2 Policy and Governance

For policymakers and practitioners, recognizing the limitations of top-down, technocratic solutions is important. Even though the solutions bring a wealth of research-backed knowledge and a broader perspective to the table, the communication with local communities requires sensitivity to their experiences and concerns. Policies would ideally be co-created with stakeholders, incorporating local knowledge and addressing the immediate challenges they face.

5.3.3 Reimagining Engagement Strategies

Practitioners and researchers should consider alternative engagement strategies that prioritize building relationships and trust. This may involve smaller-scale initiatives that demonstrate tangible benefits, thereby gradually increasing openness to more transformative ideas. For example, adopting community-based participatory approaches can empower local stakeholders and enhance mutual understanding (Pretty & Ward, 2001). The use of neutral facilitators or mediators could help bridge divides and foster constructive dialogue (Ansell & Gash, 2008). Such facilitators can create safe spaces for dialogue, helping stakeholders to overcome mistrust and collaborate more effectively.

Moreover, there is a significant role for scientists and researchers through transdisciplinary research. By engaging in collaborative processes that integrate knowledge from various disciplines and stakeholder perspectives, researchers can contribute to co-creating solutions that are context-specific and socially acceptable (Lang et al., 2012). Transdisciplinary approaches enable the integration of scientific and local knowledge, enhancing the relevance and applicability of research outcomes. This collaborative effort can help address complex issues like those found in peatland management by involving all relevant parties in the process of knowledge generation and problem-solving.

Alternative engagement strategies suggested by others in similar contexts include:

- **Iterative and Adaptive Processes:** Implementing flexible engagement strategies that can evolve based on stakeholder feedback and changing circumstances (Robinson & Berkes, 2011).

- **Social Learning:** Emphasizing the importance of social interactions that lead to shared understanding within communities, rather than conflating it with participation or individual behaviour change (Reed et al., 2010).

- **Participatory Modeling and Visualization Tools:** Using tools that help stakeholders **visualize** potential outcomes and impacts of different management strategies. (Voinov & Bousquet, 2010).

By embracing these strategies, both practitioners and researchers can work together to bridge divides, build trust, and foster constructive dialogue.

5.4 Reflection on Research Approach

5.4.1 Validity Considerations

The context-specific nature of the findings raises questions about external validity. While the challenges identified in the Middelburg-Tempel polder may be present in other peatland regions, the degree and nature of these challenges could vary. Therefore, caution should be exercised in generalizing the results to other settings without considering local dynamics.

Similarly, the internal validity of the study pertains to the reliability and applicability of the findings within the Middelburg-Tempel polder itself. The specific characteristics of the polder and the stakeholders involved might have influenced the results. For instance, the depth of polarisation and the particular socio-economic conditions observed may have shaped the findings. If different individuals had been interviewed or if the sample size had been larger, the results might have varied. Therefore, it is important to consider whether the findings accurately represent the broader perspectives of stakeholders within the Middelburg-Tempel polder.

5.4.2 Methodological Reflections

The use of imaginative logics in interviews was innovative but encountered limitations due to the stakeholders' readiness to engage with such approaches. This reflects the importance of assessing the appropriateness of methodological tools within the specific context and being adaptable in research design.

The imaginative logics were originally developed and applied in a "safer" environment—a university contest setting—where participants were perhaps more open to creative exploration. In contrast, applying these logics in a real-world, emotionally charged setting like the Middelburg-Tempel polder presented unforeseen challenges.

One methodological choice was to avoid explicitly stating to respondents that the research was using imaginative logics, instead opting to formulate open-ended questions that encouraged discussion without making them feel pressured to engage in creative thinking. This approach

allowed for more organic conversations, where respondents did not feel obligated to "perform" imagination. The **upside** of this was that it reduced the risk of respondents feeling uncomfortable or insecure, fostering a more open and honest dialogue. However, the **downside** was that some participants may not have fully realized the intent of the exercise, which might have limited their engagement with the imaginative aspects. In hindsight, explicitly framing the discussion as a creative exercise could have helped focus the conversation on alternative futures and broadened the scope of responses. This could be a helpful next step to consider in future research, as it might enhance participants' engagement with imaginative thinking and yield richer insights into alternative sustainable land management strategies.

Additionally, the semi-structured nature of the interviews meant that participants' responses often influenced the direction of the conversation. Their answers **led the discussion**, sometimes steering it toward more immediate concerns, like social or economic pressures, rather than staying within the intended imaginative scope. While this helped capture genuine, pressing issues, it also constrained the potential to fully explore alternative future scenarios, as participants would frequently circle back to familiar challenges.

5.5 Recommendations for Future Research

5.5.1 Exploring the Inner Dimension Further

Future studies should go deeper into the inner dimension of the solution space, examining how emotional readiness, imagination, and psychological factors influence stakeholders' engagement with sustainable land management. Despite their significance, these dimensions are often underrepresented or not directly considered in traditional polder management approaches. Research could explore interventions that effectively address these inner barriers.

In this context, the work of Christine Wamsler on the inner dimensions of sustainability offers valuable insights. Wamsler, (2018) emphasises the importance of integrating personal transformation—values, beliefs, worldviews, and inner capacities—into sustainability efforts. She introduces the IMAGINE framework, highlighting the interdependence of inner and outer phenomena and the latent potential within individuals to enable transformative change. This framework provides a structured approach for researchers and practitioners to incorporate inner transformation into their work, which is crucial for achieving sustainability outcomes and formulating effective policy frameworks.

By integrating such perspectives, future research can develop more holistic strategies that address both the external and internal dimensions of sustainable land management. Approaches like mindfulness practices can enhance stakeholders' emotional readiness and openness to change (Wamsler & Brink, 2018), while transformative learning can facilitate shifts in perspectives and encourage critical reflection (Mezirow, 2000). By embracing these methodologies, researchers and

practitioners can better address the psychological and emotional factors influencing sustainable land management, ultimately expanding the solution space in meaningful ways.

5.5.2 Comparative Studies

Conducting comparative studies across different regions and contexts could enhance understanding of how imaginative approaches can be adapted and applied effectively. This could identify best practices and common challenges, contributing to more generalized knowledge.

5.5.3 Integration of AI

An alternative approach where imaginative logics could prove successful is through improved facilitation of dialogues aimed at reducing polarisation. This can involve human moderators or a combination of technology and human facilitation. For example, recent developments in AI have produced chatbots capable of engaging individuals with strong opinions in calm, fact-based conversations tailored to their beliefs. One study demonstrated a 20% reduction in conspiracy beliefs, with effects lasting two months (Lont, 2024). In land management, similar approaches could create non-judgmental spaces for discussion, offering neutral, empathetic responses that help soften polarized emotions, build trust, and promote more open, constructive conversations about peatland governance. However, it's essential to recognize that technology is a means to facilitate better conversations but not the only solution. Emphasizing the development of skills to conduct dialogues more effectively, whether through technology, human moderators, or a combination of both, can help manage emotional resistance. By exploring these methods, AI-supported imaginative logics and improved human facilitation could expand the solution space and encourage more empathetic dialogue.

6 Conclusion

This research set out to address a knowledge gap in sustainable peatland management by exploring how imaginative approaches can expand the solution space for adaptation and mitigation of degradation in peat meadow areas. The solution space framework, developed by Haasnoot et al. (2020), provides a means to map opportunities and constraints for climate adaptation, shaped by biophysical, cultural, socio-economic, and political/institutional dimensions. However, this framework has not sufficiently addressed the 'inner' dimensions of sustainability, which involve personal and non-material aspects of change, such as stakeholders' imaginative capacities and emotional readiness for transformation.

Humanity faces a "crisis of imagination" (Morton, 2013), lacking the narratives and stories necessary to comprehend and address large-scale environmental challenges like climate change and land subsidence. This crisis limits the ability to envision alternative futures and hampers

transformative change. Therefore, there is a critical need to explore strategies that can enhance stakeholders' imaginative capacities to expand the solution space and overcome this crisis.

By applying imaginative approaches, specifically the use of imaginative logics as conceptualized by Pelzer and Versteeg (2019), this study sought to engage stakeholders in envisioning alternative futures and expanding the solution space. Imaginative logics aim to move beyond technocratic interventions by fostering creative and empathetic engagement, encouraging stakeholders to challenge entrenched thinking and consider transformative possibilities.

The main research question guiding this study was:

How can imaginative approaches expand the solution space for adaptation and mitigation of degradation in peat meadow areas?

In the context of the Middelburg-Tempel polder, the study identified the following factors through imaginative approaches that can expand the solution space:

1. **Building trust and addressing emotional barriers**: establishing a foundation of trust and acknowledging stakeholders' feelings are crucial for open dialogue.

2. **Reorienting economic viability towards sustainability**: restructuring economic models to prioritize sustainability alleviates pressures that lead to unsustainable practices.

3. **Enhancing governance through stakeholder engagement**: involving local stakeholders in policymaking ensures that policies are practical and context specific.

4. **Valuing local knowledge and strengthening community cohesion**: integrating local insights and fostering strong community ties enhance the capacity for sustainable land management

However, the **effectiveness of imaginative approaches** is contingent upon addressing foundational barriers identified in the study:

- **Deep-Seated Polarisation:** A persistent "us vs. them" mentality inhibits open dialogue and collaboration. Without addressing this polarisation, imaginative approaches may fail to gain traction.

- **Emotional Strain and Resistance to Change:** Stakeholders often experience strong emotions and a sense of being misunderstood or unfairly judged, which can hinder their willingness to engage in imaginative thinking.

- **Immediate Practical Concerns:** Economic pressures and policy disconnects overshadow the capacity of stakeholders to consider long-term, transformative solutions.

In conclusion, imaginative approaches can significantly expand the solution space for adaptation and mitigation of degradation in peat meadow areas by fostering self-reflection, challenging entrenched thinking, and promoting collaborative dialogue. However, their success depends on first addressing foundational barriers such as polarisation, trust deficits, and immediate practical concerns. By integrating imaginative approaches with efforts to build trust, reorient economic models, enhance governance, and value local knowledge, stakeholders can unlock the collective imagination necessary for transformative action.

This holistic approach enables decisions that serve both the land and its people effectively. It leads to more resilient, equitable, and environmentally attuned land management practices that can sustainably address the complex challenges facing peat meadows. Ultimately, imaginative approaches, when grounded in trust and collaborative engagement, provide a powerful tool for envisioning and implementing the transformative changes needed for sustainable peatland management.

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Appendix A: Information Letter Template

INFORMATIEBLAD VOOR DEELNEMERS

Hoe vinden we meer opties om bodem daling aan te pakken?

Julie Wellens, student onderzoeker

Universiteit Utrecht

Datum: juni 2024

Wat is het doel van deze studie?

Het doel van dit onderzoek is om beter te begrijpen hoe we het beheer van veenweidegebieden in Nederland kunnen verbeteren. We willen dit doen door met belanghebbenden (zoals boeren, inwonenden, omwonenden, ondernemers, enz.) innovatieve en creatieve gesprekken te voeren.

Het onderzoek richt zich op het vinden van manieren en strategieën om duurzame landbouwpraktijken te bevorderen en landdegradatie te verminderen.

Wat moet ik doen als ik aan het onderzoek deelneem?

Als u meedoet aan het onderzoek, vragen we u om deel te nemen aan een interview. Tijdens het interview stellen we u vragen over uw ervaringen, kennis en meningen over het beheer van uw bedrijf en/of omgeving. We kunnen ook vragen of we het interview mogen opnemen om nauwkeurige gegevens te verzamelen. U bepaalt of u hier toestemming voor geeft. Uw antwoorden helpen ons om meer te leren over duurzame praktijken voor het beheer van veengebieden!

Hoe lang ben ik met het onderzoek bezig?

Het interview duurt ongeveer 20-30 minuten, met mogelijk kort schriftelijk/telefonisch contact achteraf. Als u graag op de hoogte gehouden wil worden van de uitkomsten van het onderzoek kunt u mailen naar Julie Wellens (de student onderzoeker, j.wellens@students.uu.nl).

Wat zijn de mogelijke risico's of ongemakken?

De risico's of ongemakken van deelname aan dit onderzoek zijn klein. U bepaalt zelf welke vragen u beantwoordt. U kunt zich soms ongemakkelijk voelen bij het delen van uw mening of informatie. Als dat zo is, mag u dit aangeven. U mag altijd vragen overslaan of stoppen met het interview. Alle informatie die we verzamelen, wordt vertrouwelijk behandeld en uw privacy blijft beschermd. Alle verzamelde informatie wordt anoniem verwerkt. Dus niemand komt te weten wat u gezegd heeft.

Zijn er mogelijke voordelen?

Uw antwoorden helpt ons om meer te leren over duurzaam veenbeheer en geeft u de kans om op een nieuwe manier na te denken over uw eigen praktijken en ideeën over landgebruik. De resultaten van dit onderzoek kunnen helpen om betere strategieën te ontwikkelen voor het behoud en gebruik van veengebieden. Dit kan op de lange termijn zorgen voor een beter milieu en een sterke economie in deze gebieden.

Zullen mijn persoonsgegevens en de informatie over mijn deelname vertrouwelijk behandeld worden?

Ja. Uw antwoorden zullen strikt vertrouwelijk behandeld worden en de digitale gegevens zullen in beveiligde computerbestanden opgeslagen worden op een Sharepoint in beheer van de Universiteit Utrecht die alleen voor de onderzoekers toegankelijk zijn. Geen enkele publicatie over dit onderzoek zal uw naam of enige andere informatie bevatten die naar uw persoon zou kunnen

leiden. De geanonimiseerde data (opnames en transcripten hiervan) zullen ongeveer 5 maanden worden opgeslagen zodat ze geanalyseerd kunnen worden. Na die tijd wordt de data vernietigd.

Wat zijn mijn rechten als ik aan het onderzoek deelneem?

Uw deelname aan het onderzoek is helemaal vrijwillig. U krijgt geen vergoeding voor uw deelname. U kunt ervoor kiezen om niet mee te doen of, als u wel meedoet, op elk moment stoppen zonder nadelige gevolgen. Dit mag zonder opgaaf van reden.

Met wie kan ik contact opnemen als ik vragen over het onderzoek heb?

Als u vragen, commentaar of bedenkingen heeft over dit project, dan kunt u contact opnemen met de onderzoekers. Neemt u dan contact op met Julie Wellens (j.wellens@students.uu.nl), Dries Hegger (D.L.T.Hegger@uu.nl) of Tom Wils (T.H.G.Wils@tudelft.nl).

Als je een klacht hebt over het onderzoek en je kunt niet bij de onderzoeker terecht, stuur dan een e-mail naar: etc-beta-geo@uu.nl. De persoon die deze e-mails ontvangt, werkt niet mee aan het onderzoek, dus je klacht wordt zorgvuldig behandeld.

Als je vragen of klachten hebt over privacy, kun je contact opnemen met de privacyfunctionaris via: privacy-geo@uu.nl.

Appendix B: Informed Consent Form

Toestemmingsverklaring

Ik, _____ stem toe mee te doen aan een onderzoek dat uitgevoerd wordt door Julie Wellens, onderzoeker van de Universiteit Utrecht.

Ik ben me ervan bewust dat deelname aan dit onderzoek met als titel "*Uitbreiding van de oplossingsruimte om bodemdaling in Nederlandse veengebieden aan te pakken door verbeeldingskrachtige logica*" geheel vrijwillig is. Ik kan weigeren deel te nemen, mijn medewerking op elk tijdstip stopzetten en de gegevens die verkregen zijn uit dit onderzoek terugkrijgen, laten verwijderen uit de database, of laten vernietigen. Indien ik niet (meer) deelneem heeft dat geen nadelige gevolgen voor mij en ik hoef hiervoor geen reden te geven. De onderzoeker draagt zorg voor een veilige dataopslag. Voor vragen over privacybescherming kunt u zich wenden tot Julie Wellens (j.wellens@students.uu.nl) of via privacy@uu.nl.

I. Doel van het onderzoek

Het doel van dit onderzoek is om inzicht te verkrijgen in hoe het oplossingsruimte voor het beheer van veenweidegebieden in Nederland kan worden vergroot door stakeholders te betrekken bij innovatieve en verbeeldende gesprekken.

II. Gegevens Verzameling

Er zal mij gevraagd worden om informatie, opvattingen, en denkwijzen over mijn werkzaamheden in de Middelburg Tempel polder. Er zal mij gevraagd worden of dit interview mag worden opgenomen.

III. Duur van het onderzoek

Het hele onderzoek zal ongeveer 20-30 minuten duren, met mogelijk kort schriftelijk/telefonisch contact achteraf over uw ervaring van het interview.

IV. Vertrouwelijkheid

De gegevens die verkregen zijn uit dit onderzoek zullen vertrouwelijk worden behandeld. Alleen de onderzoekers van de Universiteit Utrecht die werken aan dit onderzoek, hebben toegang tot uw gegevens en de gegevens worden verder met niemand gedeeld. Wij zullen niet uw eigen naam gebruiken in het onderzoek, maar een andere, verzonnen naam. Op deze manier is het interview moeilijk te herleiden tot u als persoon.

V. Contact en vragen

De onderzoeker zal alle verdere vragen over dit onderzoek beantwoorden, nu of gedurende het verdere verloop van het onderzoek.

Ik heb de voorgaande informatie gelezen, of het is aan mij voorgelezen. Ik heb de kans gehad om vragen te stellen over deze informatie en alle vragen die ik heb gesteld zijn naar tevredenheid beantwoord. Ik geef vrijwillig toestemming om deelnemer te zijn in deze studie.

Naam van Deelnemer_____

Handtekening van Deelnemer _____

Datum(*Dag/maand/jaar)* _____

Print Naam van Onderzoeker_____

Handtekening van Onderzoeker _____

Datum(*Dag/maand/jaar)* _____

Appendix C: Interview Guides

Interviewgids Middelburg-Tempel polder

Vragen Specifiek voor Landbewerkers/Boeren

Introductie:

- Leg kort het doel van het interview uit
- Benadruk het belang van de perspectieven van inwoners/landbewerkers/omwonenden bij het aanpakken van bodemdaling en beheer van veengebieden
- Verzeker vertrouwelijkheid en de vrijwillige aard van deelname – informed consent blad laten tekenen
    - Je mag altijd stoppen zonder reden van opgaaf
    - Je data zal volledig geanonimiseerd zijn
    - Alle gegevens zullen vertrouwelijk worden behandeld en opgeslagen
- Vraag naar toestemming interview opnemen

Rapport/Beginvragen:

Leefomgeving en Woonplezier

Kunt u mij wat vertellen over hoe lang u al in deze omgeving woont en wat u het mooiste vindt aan deze plek? Toelichting: Deze vraag helpt om een gesprek te beginnen over hun persoonlijke ervaringen en wat ze waarderen in hun leefomgeving.

Dagelijks Leven en Gemeenschap

Wat doet u als u buiten bezig bent op of rondom uw land?

Landgebruik en Werkzaamheden

Voor boeren: Kunt u mij vertellen over uw boerderij en de soorten gewassen of dieren die u hier heeft? Toelichting: Deze vraag helpt om meer te weten te komen over hun werk en de specifieke uitdagingen en trots die ze voelen in hun dagelijkse werkzaamheden.

Voor omwonenden: Wat voor soort tuin of land heeft u rond uw huis? Toelichting: Deze vraag helpt om te begrijpen hoe zij hun directe omgeving gebruiken en onderhouden.

Veranderingen in de Omgeving

Hoe heeft dit gebied zich veranderd sinds u hier woont? Toelichting: Deze vraag opent het gesprek over veranderingen in de omgeving en laat hen hun observaties delen.

Toekomstige Verwachtingen en Hoop

Wat hoopt u voor de toekomst van dit gebied? Toelichting: Deze vraag helpt om een positieve noot te raken en hun hoop en verwachtingen voor de toekomst te begrijpen.

Kernvragen

1. Aanpassen aan Veranderende Beleid

Vraag: Hoe zou u reageren als de overheid besluit om het waterpeil in de Middelburg-Tempel polder aanzienlijk te verhogen om verdere bodemdaling tegen te gaan? Wat zouden de grootste uitdagingen zijn voor uw bedrijf?

- Imaginative Logic(s): Procedural
- Solution Space Element: Policy and Regulatory Frameworks

Toelichting: We willen graag weten hoe u zich zou aanpassen aan drastische beleidsveranderingen zoals verhoogde waterpeilen. Wat voor impact zou dit hebben op uw landbouwpraktijken en welke stappen zou u ondernemen om hiermee om te gaan?

Alternatieve vraag / doorvraag:: Wat als de overheid beslist om uw landgebruik drastisch te beperken vanwege milieuwetten, bijvoorbeeld door het verbieden van bepaalde teelten? Hoe zou u hierop reageren en wat zijn volgens u redelijke compensatiemaatregelen?

2. Uitkoop en Alternatieve Rollen

Vraag A: Stel dat de overheid u een uitkoopregeling aanbiedt om uw land om te zetten in een natuurgebied, maar ook de mogelijkheid biedt om als beheerder van dat natuurgebied te werken. Onder welke voorwaarden zou u akkoord gaan met deze regeling?

Imaginative Logic(s): Doable

- Solution Space Element: Economic Incentives and Constraints

Toelichting: We willen begrijpen onder welke omstandigheden u bereid zou zijn uw boerderij op te geven voor een andere rol, zoals natuurbeheer. Welke voorwaarden zouden voor u essentieel zijn, zoals salaris, werkzekerheid of extra ondersteuning?

Alternatieve vraag / doorvraag:: Als u niet akkoord gaat met de uitkoopregeling en de overheid besluit tot onteigening, wat zou uw volgende stap zijn? Hoe zou u proberen uw bedrijf en toekomst veilig te stellen?

3. Gemeenschap en Samenwerking

Vraag: Hoe zou u reageren op een beleid dat samenwerking tussen boeren en de gemeenschap stimuleert om de polder duurzaam te beheren? Wat zou u nodig hebben om deel te nemen aan dergelijke initiatieven?

- Imaginative Logic(s): Procedural
- Solution Space Element: Stakeholder Engagement and Collaboration

Toelichting: We willen graag weten hoe u zich zou voelen over initiatieven die samenwerking tussen boeren en de bredere gemeenschap bevorderen. Welke steun of middelen zou u nodig hebben om actief deel te nemen?

Alternatieve vraag / doorvraag:: Wat als er een verplichte samenwerking komt waarin u en uw buren gezamenlijk verantwoordelijk worden voor het natuurbeheer in de polder? Welke uitdagingen ziet u en hoe denkt u dat deze kunnen worden overwonnen?

Afsluitend

Vraag: Zijn er nog dingen die u mee wilt geven of dingen waar we het niet over hebben gehad? Mag gerelateerd zijn aan dit onderwerp of tangentieel?

Toelichting: We staan open voor al uw ideeën en suggesties. Misschien zijn er dingen die we nog niet hebben besproken, of specifieke zorgen die u wilt delen. Uw feedback is erg waardevol voor ons onderzoek.

Conclusie

- Bedank de deelnemer voor hun tijd en inzichten.
- Herhaal het belang van hun bijdrage aan het onderzoek
- Voor vragen/contact kunt u altijd mailen of contact opnemen – staat in de informatiebrief
- Als u graag de scriptie wilt ontvangen of lezen, dan zal ik dat nu noteren en dan kunt u hem ontvangen zodra deze is goedgekeurd!

  E-mail adres noteren!

Interviewgids Middelburg-Tempel polder

Vragen Specifiek voor Bewoners/Omwoners

Introductie:

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- Benadruk het belang van de perspectieven van inwoners/landbewerkers/omwonenden bij het aanpakken van bodemdaling en beheer van veengebieden
- Verzeker vertrouwelijkheid en de vrijwillige aard van deelname – informed consent blad laten tekenen
    - Je mag altijd stoppen zonder reden van opgaaf
    - Je data zal volledig geanonimiseerd zijn
    - Alle gegevens zullen vertrouwelijk worden behandeld en opgeslagen
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Dagelijks Leven en Gemeenschap

Wat doet u als u buiten bezig bent op of rondom uw land?

Landgebruik en Werkzaamheden

Voor omwonenden: Wat voor soort tuin of land heeft u rond uw huis? Toelichting: Deze vraag helpt om te begrijpen hoe zij hun directe omgeving gebruiken en onderhouden.

Veranderingen in de Omgeving

Hoe heeft dit gebied zich veranderd sinds u hier woont? Toelichting: Deze vraag opent het gesprek over veranderingen in de omgeving en laat hen hun observaties delen.

Toekomstige Verwachtingen en Hoop

Wat hoopt u voor de toekomst van dit gebied? Toelichting: Deze vraag helpt om een positieve noot te raken en hun hoop en verwachtingen voor de toekomst te begrijpen.

Kernvragen

1. Impact van Beleid op Leefomgeving

Vraag A: Hoe zou u reageren als de overheid besluit om het waterpeil in de polder te verhogen, wat kan leiden tot natte tuinen of zelfs overstromingen in uw buurt? Wat zou u willen dat de overheid doet om de negatieve gevolgen te beperken?

- Imaginative Logic(s): Juxtaposing
- Solution Space Element: Policy and Regulatory Frameworks

Toelichting: We willen weten hoe u denkt over drastische beleidsmaatregelen zoals verhoogde waterpeilen. Welke zorgen heeft u over mogelijke negatieve gevolgen en wat zou u willen dat er gedaan wordt om deze aan te pakken?

Alternatieve vraag / doorvraag: Wat als de overheid nieuwe regels invoert die beperkingen opleggen aan uw woning of tuin om bodemdaling tegen te gaan? Hoe zou u dit ervaren en wat zou u verwachten in termen van compensatie of hulp?

---

2. Omkering naar Natuurgebied

Vraag A: Hoe zou u ertegenover staan als de Middelburg-Tempel polder wordt omgevormd tot een (semi-)natuurgebied om verdere bodemdaling en waterproblemen te voorkomen? Wat zijn volgens u de voor- en nadelen hiervan?

- Imaginative Logic(s): Guerilla
- Solution Space Element: Long-term Vision and Goals

Toelichting:We willen graag weten hoe u denkt over de transformatie van de polder naar een natuurgebied. Wat ziet u als de belangrijkste voordelen en nadelen, en hoe denkt u dat dit uw leven zou beïnvloeden?

Alternatieve vraag / doorvraag: Wat als de overheid besluit om dit plan zonder uw instemming door te voeren? Hoe zou u daarop reageren en wat zou u verwachten van de overheid in termen van communicatie en ondersteuning?

---

3. Gemeenschap en Betrokkenheid

Vraag A: Hoe belangrijk vindt u het dat de gemeenschap betrokken wordt bij beslissingen over het beheer van de polder? Wat zou u willen dat er gebeurt om uw stem en die van anderen in uw buurt gehoord te laten worden?

- Imaginative Logic(s): Procedural
- Solution Space Element: Stakeholder Engagement and Collaboration

Toelichting: We willen weten hoe u de rol van de gemeenschap ziet in beslissingen over het beheer van de polder. Wat vindt u belangrijk in termen van betrokkenheid en wat zou u willen dat de overheid doet om uw stem te horen?

Alternatieve vraag / doorvraag: Wat als er een gemeenschapspanel wordt opgericht dat regelmatig met de overheid overlegt over het beheer van de polder? Zou u hieraan willen deelnemen, en wat zou u als belangrijkste punten inbrengen?

Afsluitend

Vraag: Zijn er nog dingen die u mee wilt geven of dingen waar we het niet over hebben gehad? Mag gerelateerd zijn aan dit onderwerp of tangentieel?

Toelichting: We staan open voor al uw ideeën en suggesties. Misschien zijn er dingen die we nog niet hebben besproken, of specifieke zorgen die u wilt delen. Uw feedback is erg waardevol voor ons onderzoek.

Conclusie

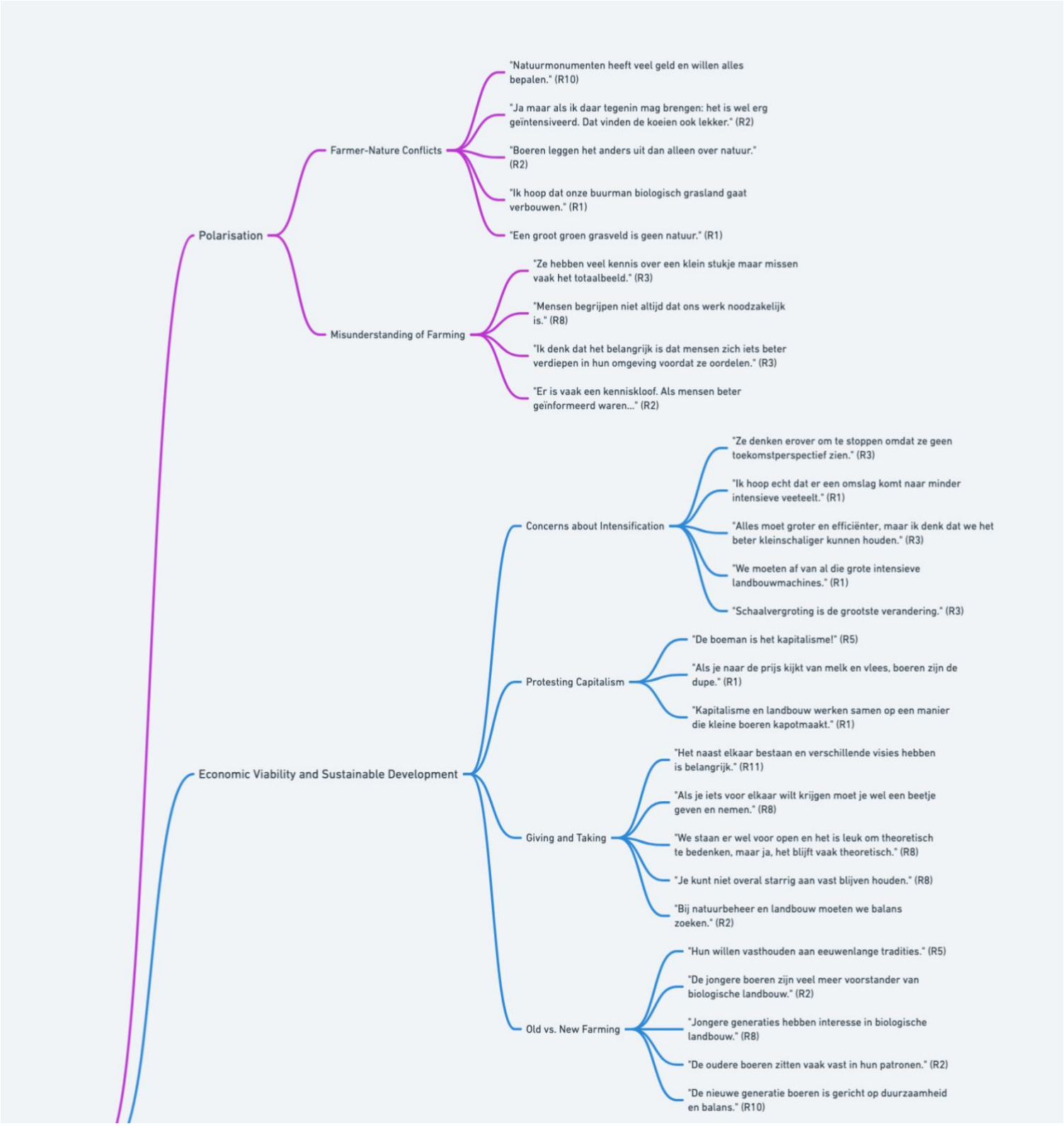
- Bedank de deelnemer voor hun tijd en inzichten.
- Herhaal het belang van hun bijdrage aan het onderzoek
- Voor vragen/contact kunt u altijd mailen of contact opnemen – staat in de informatiebrief
- Als u graag de scriptie wilt ontvangen of lezen, dan zal ik dat nu noteren en dan kunt u hem ontvangen zodra deze is goedgekeurd!

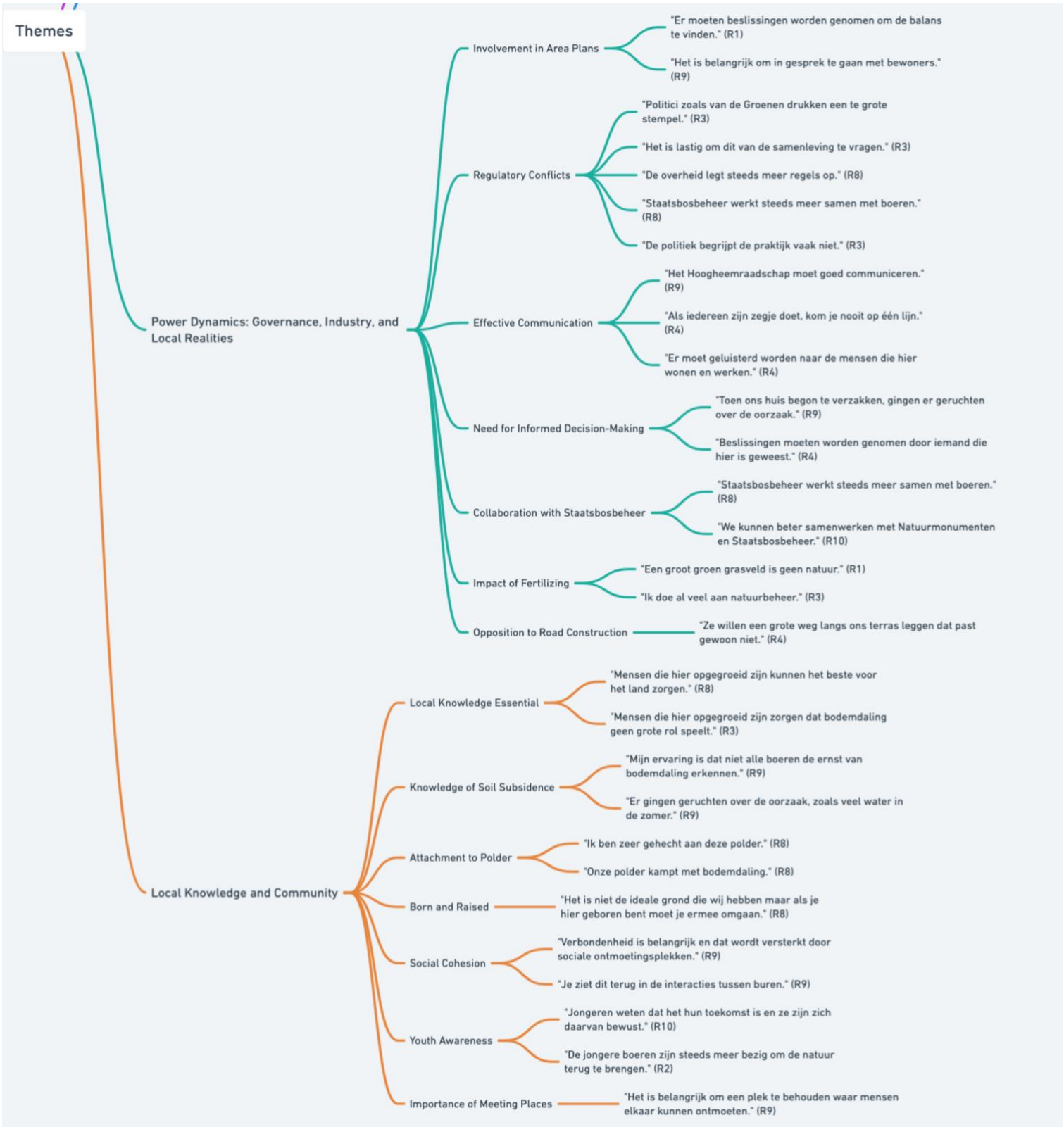
E-mail adres noteren!

Appendix D: Interactional Strategies

Strategies and Tactics	**Examples**
Probing questions	"Why?" or "Why not?"
Opinions	"Why do you think that is?"
Beliefs	"What do you think?"
Resisting problematic formulations	Avoiding finishing participants' sentences
Member reflections	Repeating participant's words back to them
Mirroring	"You were about to say . . . ?"
Calling out	Expressing understanding of/agreement with participant's opinion/point of view
Reassurance	
Counterfactual prompting	"If you had a magic wand, what would you change about the situation?"
Magic wand	"Can you imagine what it might be like . . . ?"
Imagining opposite	"What might be the advantages/disadvantages of such a perspective?"
Empathic consideration	"What might be the benefits/challenges for that person?"

Appendix E: Code Tree




Themes
Power Dynamics: Governance, Industry, and Local Realities
Involvement in Area Plans
"Er moeten beslissingen worden genomen om de balans te vinden." (R1)
"Het is belangrijk om in gesprek te gaan met bewoners." (R9)
Regulatory Conflicts
"Politici zoals van de Groenen drukken een te grote stempel." (R3)
"Het is lastig om dit van de samenleving te vragen." (R3)
"De overheid legt steeds meer regels op." (R8)
"Staatsbosbeheer werkt steeds meer samen met boeren." (R8)
"De politiek begrijpt de praktijk vaak niet." (R3)
Effective Communication
"Het Hoogheemraadschap moet goed communiceren." (R9)
"Als iedereen zijn zegje doet, kom je nooit op één lijn." (R4)
"Er moet geluisterd worden naar de mensen die hier wonen en werken." (R4)
Need for Informed Decision-Making
"Toen ons huis begon te verzakken, gingen er geruchten over de oorzaak." (R9)
"Beslissingen moeten worden genomen door iemand die hier is geweest." (R4)
Collaboration with Staatsbosbeheer
"Staatsbosbeheer werkt steeds meer samen met boeren." (R8)
"We kunnen beter samenwerken met Natuurmonumenten en Staatsbosbeheer." (R10)
Impact of Fertilizing
"Een groot groen grasveld is geen natuur." (R1)
"Ik doe al veel aan natuurbeheer." (R3)
Opposition to Road Construction
"Ze willen een grote weg langs ons terras leggen dat past gewoon niet." (R4)
Local Knowledge and Community
Local Knowledge Essential
"Mensen die hier opgegroeid zijn kunnen het beste voor het land zorgen." (R8)
"Mensen die hier opgegroeid zijn zorgen dat bodemdaling geen grote rol speelt." (R3)
Knowledge of Soil Subsidence
"Mijn ervaring is dat niet alle boeren de ernst van bodemdaling erkennen." (R9)
"Er gingen geruchten over de oorzaak, zoals veel water in de zomer." (R9)
Attachment to Polder
"Ik ben zeer gehecht aan deze polder." (R8)
"Onze polder kampt met bodemdaling." (R8)
Born and Raised
"Het is niet de ideale grond die wij hebben maar als je hier geboren bent moet je ermee omgaan." (R8)
Social Cohesion
"Verbondenheid is belangrijk en dat wordt versterkt door sociale ontmoetingsplekken." (R9)
"Je ziet dit terug in de interacties tussen buren." (R9)
Youth Awareness
"Jongeren weten dat het hun toekomst is en ze zijn zich daarvan bewust." (R10)
"De jongere boeren zijn steeds meer bezig om de natuur terug te brengen." (R2)
Importance of Meeting Places
"Het is belangrijk om een plek te behouden waar mensen elkaar kunnen ontmoeten." (R9)