

# Transition Processes in Dutch Spatial Planning and Water Management: A Shift to the Natural

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## Abstract

Climate change is causing more extreme weather conditions in the Netherlands. In response, local governments such as Provinces, Municipalities, and regional Water Boards are encouraged to explore more nature-inclusive ways to keep society safe from flooding and drought. This is considered a transition from the earlier belief that environmental and societal challenges can be solved solely through technical engineering. Instead, landscape-based, climate-adaptive visions offer alternatives on how Dutch regions can maintain water security while also incorporating space for biodiversity, climate mitigation, healthy livelihood and expanding populations. So far, not much is known about the challenges project leaders from different organisations and local governments are facing during the development and implementation of such visions. To address this gap, we used the concept of learning history to build an archive capturing the insider perspective of project leaders tasked with co-creating landscape-based, climate-adaptive visions for future spatial planning and water management across four regions of the Netherlands. By observing and interviewing project leaders, we noticed how co-creating long-term visions enabled more climate-conscious dialogues between local government authorities and civil stakeholder groups. Reflecting on this archive, we gained insights into the strategic challenges associated with adopting biophysical processes as a foundational framework for future spatial development and policy-making. Furthermore, we documented examples of tactical approaches employed by project leaders to navigate these challenges effectively.

## Keywords

climate adaptation; landscape-based visioning; Netherlands 2120; water management

## 1. Introduction

On the 17<sup>th</sup> of May 2022, the Dutch Minister of Public Housing and Spatial Planning sent a letter to the House of Representatives in which he announced that the soil-water system should be the guiding principle for future spatial planning policies (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022). Elaborating on this announcement, it was stated that the Dutch government should no longer rely on the belief that surroundings can be manufactured and technically manipulated without consequences. Recurring events such as flooding, desiccation, heat stress, biodiversity loss, and soil and water pollution have proven this, and will likely occur even more due to climate change. Therefore, to turn the tide and to achieve sustainable, healthy, and attractive living environments in the long term, it is important to “listen” to what the soil and water “have to say.”

The letter represents one of many signals that the Dutch government is breaking with the popular belief that spatial planning policy is no longer needed in the Netherlands because the layout of the country was finalised (“Nederland is af”). This belief emerged around the turn of the millennium and led to abolishing national responsibility for spatial planning and dissolving the Ministry of Public Housing and Spatial Planning in 2010. Several Dutch advisory boards, however, have since been addressing the need for the return of coordination of central spatial planning, and strengthening of the role of local governance (Algemene Bestuursdienst, 2021; Interdepartementaal beleidsonderzoek ruimtelijke ordening, 2021; Planbureau voor de leefomgeving, 2021; Raad voor de leefomgeving en infrastructuur, 2021; Raad voor het openbaar bestuur, 2021). Without exception, these reports also point towards the acknowledgement of ecological and environmental limitations, stating that if the goal is to build towards a sustainable layout of the country, governing institutions cannot ignore soil and subsoil boundaries. The idea is to respect the limits of the natural system with a long-term sustainable land management strategy instead of repressing undesired environmental dynamics with often temporal technological solutions (Baptist et al., 2019; Visser et al., 2019). However, using the natural system as a prerequisite for spatial planning and development would mean drastic changes in the Dutch landscapes, which would coincide with a need to restructure the roles of particular governing and/or executive institutions.

### 1.1. *Earlier Shifts in Water Management*

A similar shift in attention and attitude towards a more integral and eco-friendly approach has taken place before, when the implementing agency for the Ministry of Infrastructure and Water Management, called “Rijkswaterstaat,” welcomed ecologists and biologists to work alongside technical engineers on the construction of the Dutch Delta Works (van der Brugge et al., 2005). Biodiversity goals, next to water safety goals, became integrated with the work of Dutch engineers dealing with rising water levels and their mission to obtain safety for a society partly situated below sea level. Conditions for this turn of events have been linked to a wave of socio-political environmentalism (Disco, 2002; Lintsen, 2002). Even though this wave ended, Rijkswaterstaat has proceeded to combine ecological principles within technical engineering during the development and construction of the Sand Motor (Rijkswaterstaat, 2021) and the execution of the Room for the River programme (Rijkswaterstaat, 2019). In both projects, ecological principles were used to strengthen biodiversity and coastal or river defence. In the Sand Motor project, this was done by stimulating natural deposit processes that provide sand to beaches and dunes. In the Room for River programme, riverbeds were widened to capture or divert abundant rainwater and strengthen the resilience of biodiversity within floodplains. From the perspective of national water management, Rijkswaterstaat will

likely continue to play a key role in safeguarding the main Dutch aqua structures. However, when it comes to the local organisation of water management and the coming challenges regarding climate adaptation, responsibility also falls under the Dutch Water Boards.

### **1.2. Spatial Planning and the Role of Dutch Water Boards**

The Dutch Water Boards are democratically elected regional governments with similar sizes as provinces, but different geographical boundaries. Their primary task is to protect civilians from floods at a regional level. In the past, this has led to a focus on drainage, mostly for the benefit of agriculture. Nowadays, increasing droughts and heavy rainfall are pushing the agenda toward a different, more climate-adaptive and nature-inclusive view of water management on a local scale (Deltares, 2021). This includes a certain responsibility for land use beyond agricultural production, which also imposes new demands on the style and perception of water management. The role of Dutch Water Boards is therefore becoming broader, focusing more and more on the spatial conditions that are important for safeguarding consistent freshwater quantity and quality. This can be considered as a “transition” in local water governance.

## **2. Problem Statement and Research Questions**

The developments described in the introduction represent a significant societal shift towards a future where climate change is prevented, biodiversity is promoted, and water is managed adaptively. A transition generally goes through several phases: pre-development, take-off, acceleration, and stabilisation (or breakdown; see, e.g., Rotmans, 2005). Typical of the take-off and acceleration phases is the complexity of developments that, due to coincidental combinations, can take on a multitude of forms and directions. Until a breakthrough is reached and old regimes start to phase out, stakeholders often find themselves in a state of chaos (Visser et al., 2019). For example: In an evaluation of 14 innovative land consolidation and development processes, it was found that the innovation was often set in motion by unexpected and unpredictable occurrences outside the process itself and thus out of the scope of project leaders. Moments of acceleration were located at different scales that can vary from very personal or local to global (Timmermans, 2013). Another crucial aspect of a transition is the scaling and integration of local technical or social innovations into new practices, technologies, and institutions (Geels, 2011; van den Bosch & Rotmans, 2008). Usually, transitions are not initiated from a single point. Therefore, transition management (e.g., by local governments) occurs on multiple fronts, with a multitude of strategic, tactical, operational, and learning activities occurring in a dynamic and alternating manner (Loorbach, 2010). Much has been published on phasing, upscaling, and transition management, but mostly from an outsider’s perspective, looking back at the course of transition processes from a distance and trying to discover some general mechanisms in them.

The objective of this article is to present a supplementary perspective from the standpoint of project managers who are engaged in this type of process and are required to make strategic, tactical, and operational choices regularly, often with limited time for evaluation and learning. They lack the luxury of an overarching perspective and the capacity to exert influence beyond the limits of their project. Frequently, they must navigate their way forward with only a rudimentary sense of direction. They are working in an area full of pitfalls and risks, where long-term sustainability goals are continuously challenged with often unexpected societal changes (e.g., a pandemic breaks out). Vallance and Edwards (2021) describe this area (for urban planning) as tension between strategic planning and tactical urbanism. In our study, this refers to

the tension within the transition management cycle (Loorbach, 2010), articulated here as the tension between strategic transition challenges and tactical and operational ways to deal with those challenges. As this can be a major problem in practice, we examined how project leaders deal with those tensions in four cases in the Netherlands. In particular, we focus on two questions:

Strategic question: What are major developments and areas of tension that may boost or hinder the shift to the natural, i.e., taking biophysical processes as a starting point for future spatial developments and policies? This question relates to the possibility of building long-term coalitions with other developments in society.

Tactical question: What are the tactical elements that contribute to acting successfully in the area between transition goals and operation? This question relates to utilising transition-enabling factors and mechanisms.

### 3. Methodology

#### 3.1. Data Gathering

Every project followed developed future visions in which landscape properties play a prominent role in their benefits to avoid/minimise climate change effects (Pedroli et al., 2021; van Rooij et al., 2021; Timmermans et al., 2022). The goal of our research, however, was not to assess or evaluate the visions themselves, but to investigate the experience of trying to mobilise and being in the middle of a (potential) transition. In this regard, we perceive the role of project leaders (either from scientific and/or governmental institutions) as important transition intermediaries who facilitate niche-regime interaction through their capability to tactfully convey how strategic transition challenges will require a more nature-based governance style (Ehnert, 2023). Our research, therefore, concerns how project leaders actually *do* future planning instead of the plan itself, including how they can figure out the context of situations and improvise in case of unexpected events (e.g., Forester, 2023). To gain insight from this insider's perspective, we have adopted a qualitative, inductive approach. The approach includes observing six senior project leaders in their daily work in connection to the development and promotion of landscape-based, climate-adaptive visions, and questioning them twice a year through semi-structured interviews. Three of the project leaders that were studied were employees of Wageningen University & Research (WUR), two were employees of Dutch Water Boards, and one was an employee of the municipality of Arnhem. All project leaders have been anonymised. During the interviews, a topic list was used, comprising preliminary, open-ended questions aimed at exploring their perceptions of factual events that occurred throughout their projects. Specific attention was given to what, according to them, could point towards a shift or transition in different domains of their work. Linking to the framework for steering transition experiments (van den Bosch & Rotmans, 2008), questions were asked to determine whether new ideas or ways of acting had emerged (deepening), whether visions had to be adapted due to often unexpected events (broadening), and whether these visions were leading to new interventions or new coalitions (scaling up).

### 3.2. Data Analysis

All observations, transcripts, and reflections were collected between 2020 and 2022 and stored in an online log. This log served as a chronological archive, or “learning history” (Kleiner & Roth, 1997), of the transition process towards landscape-based, climate-adaptive visions. According to Kleiner and Roth (1997), a learning history consists of a narrative with three layers. The first layer includes the actual events in a project and contains facts such as dates, decisions, technical research, and moments of participation. The second layer includes the perceptions of different people in the project; it includes, for example, interviews on key moments. This may involve collecting multiple perspectives by interviewing different people. The third layer is the reflective one; it involves observations from people outside the process, such as, in this case, an anthropologist. An example of the application of this method is illustrated in Figure 1.

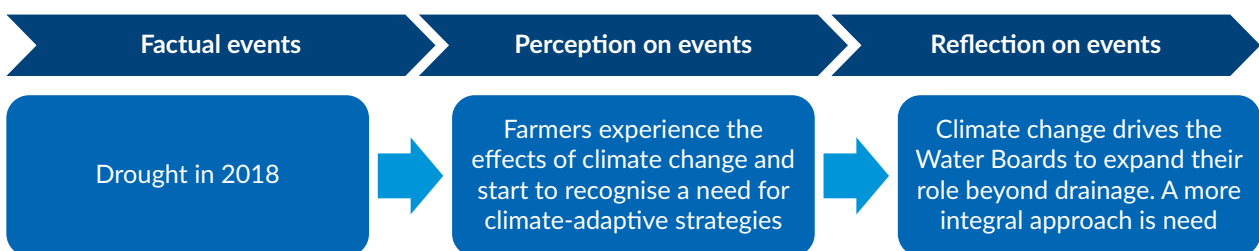
After each year of the research, the log was studied by the authors of this article to identify key moments where decisions and/or actions towards taking biophysical processes as a starting point for future spatial developments and policy were either hindered or made. Referring to common transition management cycles (Loorbach, 2010), factors and elements leading up to these moments were later categorised as strategic (long-term) transition challenges and tactical approaches used by project leaders deal with them.

### 3.3. Position of the Researchers and WUR

In all four cases, WUR was involved either as commissioner or as co-creative partner of landscape-based, climate-adaptive visions. The results of this article are the product of a separate project, designed to monitor and reflect on the process of developing landscape-based, climate-adaptive visions and the effects these visions can enable. Researchers in this separate project were involved in two ways: either as a linking pin between all the projects or as observers and/or qualitative researchers working on the sidelines.

## 4. Case Studies

Table 1 below presents a characterisation of each case that was followed and the associated interviewee or interviewees. Each case involved several co-creating partners that had their own respective roles. For the interviews, we approached project leaders that were either connected to a Water Board or WUR. In the case of “Arnhem 2120,” we interviewed the program leader that was responsible for commissioning the project. Though he did not formally act as project leader, his responsibilities were similar.



**Figure 1.** Example of the application of the learning history method as developed by Kleiner and Roth (1997).

**Table 1.** Characterisation of the cases selected and interviewees.

<b>Case study</b>	<b>Vallei and Veluwe Water Board: 2120 Vision</b>
<b>Collaborating organisations</b>	<b>Partners in co-creation: 26 Municipalities, 2 Provinces, Vallei and Veluwe Water Board, North Gelderland Security Region, Vitens drinking water company, WUR</b>
<b>Role of interviewee</b>	<b>Project leader of the Vallei and Veluwe Water Board</b>
<p>In 2018, the “Manifest Region Vallei en Veluwe” put together a Climate Impact Atlas of the Vallei and Veluwe region as a start to set up a regional Climate Adaptation Strategy. In 2021, a project was initiated to compile a Vallei en Veluwe 2120-vision, based on the capacity of the regional landscape system. The 2120-vision was compiled in co-creation between experts of the Manifest Region and WUR. In expert ateliers, trend analyses have been done on themes that felt urgent because of foreseen friction between long-term needs and actual developments. The themes included regional water systems, housing, nature development, regional economy, agriculture, recreation, and drinking water. Intermediate results were presented to local and regional politicians every half year to open their eyes to the long-term consequences of today’s decisions.</p>	
<b>Case study</b>	<b>Rivierenland Water Board: Landscape soil map in support of environmental policy</b>
<b>Collaborating organisations</b>	<b>Partners in co-creation: Rivierenland Water Board, the Province of Gelderland, WUR</b>
<b>Role of interviewees</b>	<b>Rivierenland Water Board project leader and WUR project leader</b>
<p>The Rivierenland Water Board lies in the heart of the Dutch Delta, between the major Rhine and Waal rivers. WUR has previously worked with the Water Board to produce a landscape soil map, designed to make the Water Board better equipped to give input into spatial planning development challenges in the region from a water system perspective. The map has not yet been accepted internally. Some relevant aspects are still missing (piping and underground sandbanks/aquifers), and the Water Board is undergoing a transition from acting in a monitoring role towards having a more steering role based on the capacity of the natural system. The objective of the project is to complete the landscape soil map, linking it to new action perspectives for the Water Board, and then establish a long-term horizon vision known as Rivierenland 2120.</p>	
<b>Case study</b>	<b>North-East Brabant, long-term vision of stream valley landscapes</b>
<b>Collaborating organisations</b>	<b>Partners in co-creation: WUR, the Province of North Brabant, the AA and Maas Water Board, the Dommel Water Board Brabant, the Southern Agriculture and Horticulture Organization, the Central Brabant Public Health Service, local authorities covert by ARK Nature</b>
<b>Role of interviewee</b>	<b>WUR project leader</b>
<p>WUR has been commissioned by the North-East Brabant Stream Valley Landscapes Working Group to produce three long-term perspectives for the region. The scenarios are based on five design principles: water in balance; capturing and infiltrating water in elevated areas; moving water out of low-lying areas; mitigating extremes by creating more surface space and ensuring water quality. The scenarios have formed the basis for initiating action perspectives as a follow-up to the project.</p>	
<b>Case study</b>	<b>Arnhem 2120</b>
<b>Collaborating organisations</b>	<b>WUR, the Municipality of Arnhem</b>
<b>Role of interviewee</b>	<b>WUR programme leader and Municipality representative</b>
<p>As an extension to the 2120 map of the Netherlands (Baptist et al., 2019), the programme director of the Climate Resilience Team at WUR assigned a research team to make a more detailed map of a city area in the year 2120. Because of its height and soil diversity, the research director offered the municipality of Arnhem the opportunity to serve as a case study. Five main principles were applied during the explorative study: nature inclusiveness, the natural system as a base; optimal water use around the city; circularity and climate-positive resource management; inclusiveness and liveliness of the city centre; and health. The Arnhem 2120 project was fully funded by the directive of the WUR Environmental Science Group.</p>	

## 5. Results

### 5.1. Strategic Transition Challenges

During the time of research, the interviewed project leaders encountered tensions between long-term climate adaptation goals and current spatial and/or environmental policies, or institutionalised practices. We found that such tensions can lead to mutual counteraction but also to mutual support, posing strategic transition challenges. We identified five tension fields with corresponding challenges. We will describe these and then elaborate on how they either hindered or supported the project's overall aim, which was to engage in a dialogue about spatial planning according to the capacity of natural systems.

#### 5.1.1. Drastic Changes in Spatial Planning Concepts

The first challenge stems from the tension between the current geographical order and the need for its fundamental renewal. The interviewed project leaders felt the need to develop drastic new spatial planning concepts compared to the current situation. A striking example is the process of establishing a challenging future vision of Arnhem 2120 (Timmermans et al., 2022). Besides a great water-storing and energy-generating lake and additional residential areas in National Park “de Hoge Veluwe,” the proposal to abandon the residential area of “Arnhem South” was considered by the officials involved as highly controversial. A municipal representative had expressed concerns about the large gap between the developed vision of the future and the current situation several times during the vision development process. His main concern was that the vision would get scrutinised by his colleagues if major changes were presented without some type of warning.

“There are sensitivities, and I want those sensitivities expressed before the design exercise starts” (Municipal representative, June 2021). The WUR project team, however, felt this did not reflect the goal of the project and refused to be influenced by political sensitivities. Finally, at the presentation of the result, and to the relief of the municipality's representative, the alderman ended up expressing nothing but enthusiasm. The researchers accounted this to the fact that the decisions that had been made for the vision could all be traced back to an explanation based on natural soil and substrate conditions: something irrevocable. The period of 100 years also placed the vision “at a safe distance” to generate creative dialogue instead of debate. The project's goal was not to provoke demolition of the current spatial situation, but to raise the awareness of the municipality that decisions about the built environment should be made with long-term ambitions. “We are here to show how we think what a sensible direction is, without saying it should be that way” (WUR programme leader, June 2021).

#### 5.1.2. Science, Governance, and Political Responsibility

A more abstract challenge relates to the tension between substantive insights of professionals and day-to-day politics: who is willing to carry the responsibility to take up signals from scientific visioning? In all projects, some initial hesitancy was detected from the perspective of local authorities because they were afraid to be held accountable for “reaching the vision,” even though the vision was meant to initiate a substantive debate on the consequences of climate change. In the case of Arnhem 2120, some of this hesitancy was taken away by the fact that the municipality did not act as the official commissioner of the project. This gave the vision more neutrality since there was no governmental or political involvement. For the projects (partly) commissioned by

the Water Boards, however, this tension field offered a major potential hurdle between the Water Board and their agricultural constituency. During our research, farmers were protesting government plans to address the so-called “nitrogen crisis” (next subsection). Therefore, there was a significant lack of essential stakeholder support for major government interventions. One respondent even dropped out of the learning history case study because they felt that participating could jeopardise their position within the Water Board. Seen from the perspective of the researchers and designers, there were some moments of doubt concerning whether the visions could be interpreted as too overwhelming or too unrealistic and could potentially lead to a lack of involvement or a tainted relationship with their client. “It’s not a policy vision, this goes beyond policy, it’s quite understandable that it can cause tensions” (WUR project leader, June 2021).

The research teams, therefore, strived to base the vision development on the so-called “MAYA” principle: most advanced, yet acceptable. The application of this principle, however, was mostly intuitive.

### 5.1.3. Nitrogen Crisis

This challenge concerns the breadth of the task, i.e., the tension between concentrating on the spatial aspects versus broadening to other issues. Broadening offers generally more solution opportunities but makes the challenge more complex and, therefore, perhaps more difficult to solve. This is particularly relevant to the problem of the impact of excess nitrogen on biodiversity. Nitrogen surplus is threatening biodiversity in many Dutch natural areas. In May 2019, the Dutch Council of State declared that a significant proportion of building projects had to be stalled, and farms close to nature reserves had to drastically decrease their nitrogen emissions to meet European nitrogen regulations (Raad van State, 2019). Many industrial farmers started rioting against the subsequent plans for livestock and fertiliser restrictions. As a result of these events, some of the Water Board project leaders expressed that they felt they should also connect their vision to the nitrogen crisis. “It’s all still fairly fluid at the moment. We are still playing chess on different boards” (Water Board project leader, April 2021).

The strategic reasoning for connecting to the nitrogen crisis was to potentially qualify for subsequent subsidies by offering (nature-based) solutions. More tactically, concerns about whether other proposed solutions could potentially counter climate-adaptive interests were also mentioned.

### 5.1.4. Housing Shortage

This challenge concerns a fundamental contradiction around construction tasks. Here, building in quickly available places is opposed to building in places that are more suitable from a climate-adaptive viewpoint. At the time of research, the “Dutch housing shortage” was placed high on the political agenda. This caused project developers to push municipalities for building permits so they could cater to the cabinet’s ambition to build 100,000 new houses. Some also pushed for permits along river floodplains, despite being discouraged by the Water Boards. This changed, however, when in February of 2021, heavy flooding in the southern province of Limburg caused an estimated 1.8 billion euros in damages. This suddenly caused a tilt in the bargaining positions of the Water Boards.

“Fortunately, it’s no longer crazy if I talk about residential safety; it is also keeping residents increasingly busy” (Water Board project leader, April 2021). Instead of getting warded off by engineers and project developers,



Water Boards starting to get invited to the table of spatial planning and building commissions. The idea of climate-adaptive building was steadily becoming the norm instead of a hurdle.

#### 5.1.5. Terrestrial Turn in Perception Versus Practice

The fifth strategic challenge stems from the tension between ecocentric and anthropocentric thinking. This plays a role in the background of all the cases. Anthropocentric thinking often involves the search for technical solutions, while the relationship between humans and nature remains the same. However, more and more people are striving for ecocentric solutions, in which nature has its own place. In its most far-reaching form, we recognise this as “terrestrial turn.” The terrestrial turn in the philosophy of technology, as described by Lemmens et al. (2017), represents the idea of an independent role for “earth” in choices about human interventions, which implies a major turn in the culture of spatial planning endeavours. The general acceptance that not everything can be “solved” with technology alone, and that the natural environment should be acknowledged in a broad scheme of problems affiliated with climate change, has only recently truly begun to take shape. The fact that ecological events such as drought are causing major socio-economic effects means that the “earth” is quite literally manifesting itself within our social reality. Or like one of the Water Board project leaders quoted: “As a Water Board, we have to crawl onto the land more and more often due to drought” (Water Board project leader, April 2021).

We understand this as a new phase in a wider transition, in which we are aware of our role in the Anthropocene and welcome ecosystems as partners in building towards a more balanced and sustainable landscape. It remains too soon to tell, however, if this newfound cultural paradigm can also induce a new culture of practice for the Dutch Water Boards. As mentioned before, it plays a role in the background but is not explicitly mentioned in debates within Water Boards.

#### 5.2. Reflection on Strategic Transition Challenges

Creating a landscape-driven, climate-adaptive vision can encourage policymakers and policy implementers to make climate-conscious decisions. If a vision is set in a faraway future, it can offer freedom to step away from current-day issues and explore the possibilities of nature-inclusive innovation. A landscape-driven, climate-adaptive vision can act as a guideline for long-term policy strategies, but also as a ground for reconsideration in sometimes unforeseen contemporary situations, such as large construction assignments or environmental crises. However, such visions do not act as a blueprint. In addition to “listening to what soil and water have to say,” democratic institutions such as the Water Boards, Provinces, and Municipalities should also consider public opinion. Public opinion at the time of our case studies favoured less government intervention, especially the opinion of an influential part of the agrarian sector. Public opinion can differ between local situations, making it even more complicated for the Water Boards to take a coordinated leadership role. Therefore, widening the playing field is essential to not only make a paradigmatic “shift to the natural,” but also a pragmatic shift. A summary of the strategic transitions tensions that were observed is presented in Table 2.

**Table 2.** Strategic transition challenges in connection to landscape-based, climate-adaptive visions.

Strategic transition challenge	Observations regarding landscape-based, climate-adaptive visions
Drastic Spatial Planning	Long-term visions and discussion of them can increase the adaptivity of lower-level governments. Though they may feel far reached, they can provide an understanding of landscape risks that inform current-day decision-making processes.
Science, Governance, and Political Responsibility	There can be tension between the public, politics, policy and professionals. This should be made explicit, without glossing it over. In practical implementation, apply the MAYA principle.
Nitrogen Crisis Housing Shortage	Unexpected circumstances can accelerate new coalitions if they are seen as an opportunity to broaden the strategic agendas. Linking interests widens the scope of opportunities.
Terrestrial Turn in Perception	Dutch Water Boards are working towards a paradigmatic breakthrough by embracing the soil and subsoil system as a basis for future spatial planning.

### 5.3. Tactical Elements in the Transition Process

While setting up the projects, developing the visions, and presenting the visions, project leaders mentioned several developments which were caused by, or led to, tactical actions. We perceive these as tactical elements and important lessons learned to stimulate a transition process towards a more natural and integral view of local water management.

#### 5.3.1. Drought as a Game Changer (Use Temporary Natural Conditions)

As mentioned before, the Dutch Water Boards have a longstanding tradition of working in service of agrarian interests. Their current role is to monitor spatial development and their internal methods and expertise are still focussed on maintaining this role. Any serious form of policy formulation, strategic planning, and decision-making in favour of rigorous climate adaptation has not been widely adopted yet. A significant change, however, occurred when long periods of drought and unusually heavy rainfall in 2018 led to an unexpected scarcity of agrarian produce (van Asseldonk et al., 2020). Although the drought did not necessarily affect the income of farmers, project leaders felt that it did cause an increase in acceptance for exploring the opportunities of a transformative approach to climate adaptation because it made climate change feel more real. The 2018 drought was therefore often used as a compelling example of the effects of climate change and was often pointed out during presentations of the visions:

Then they said drought is a problem. And if we all keep approaching it from our own silos, we won't get anywhere. So, they have approached us as a coalition to come up with a proposal on how we should tackle this drought problem together. These have been absolute turning points. (Water Board project leader, November 2020)

#### 5.3.2. Long-Term Visioning (Use Accepted Long-Term Visions by Others)

All respondents mentioned the *Nature-Based Future for the Netherlands in 2120* (Baptist et al., 2019) as an important vehicle for transporting their message in favour of transformative climate adaptation. Primarily because the "NL2120" vision offers a non-threatening, extra long-term perspective. It is non-threatening

because the ways of reaching the vision are open-ended. This leaves room to integrate different sectors within and beyond the spatial development division. It is extra long-term because the vision is set for 100 years. This is fundamentally different from common visioning procedures (making long-term plans for the coming 10, 20, or 30 years, after practical implications and measurements are formulated) because the vision is so far in the future, that the feasibility of practical implications and measurements are no longer a precondition. Societal conditions will undoubtedly be radically different and, therefore, ideas might not seem too advanced anymore. This sets the mind free of current definitions and limitations of social reality. There is only one precondition: climate change. The NL2120 vision made the abstract consequences of climate change more distinct and tangible, but without only pointing towards potential doom scenarios. Rather than acting as another warning instrument, the NL2120 vision offers a framework which enables a positive outcome of a future under climate change:

There is little understanding of how the big system works now, and that story needs to be told. You need a vehicle for that. In my perception, a map of 2120 captures the imagination. And there are stories to go with that. (Water Board project leader, November 2020)

### 5.3.3. Natural Basis (Use Layered Concepts)

Transforming a water management system will apply to—and affect—different layers of the social and physical “systems” (Meadows, 2008). One way of visualising this is in different layers, in which the bottom layer represents the slow-moving, natural state of affairs, and the top layers represent the built environment and every use of space (e.g., Visser et al., 2019). Respondents have all incorporated this layered approach in their climate-adaptive vision and recognise integrated thinking as a priority. However, not every respondent reported the same level of prioritisation from other stakeholders. Examples were given that their ambitions were perceived as too overwhelming, or unnecessary because stakeholders did not yet recognise any urgency for drastic change. However, addressing how above-ground activities are linked to underground situations was generally well received. The relative success of this approach was ascribed to the perceived objectivity of the soil and subsoil system: It is what it is. Moving social dynamics, therefore, offers a better starting point for potential transitions than trying to further manipulate the physical conditions.

### 5.3.4. Timing and Place (Use Accidental Circumstances)

Prescribing a transition is often too complex or difficult because transitions are prone to uncertainties. Therefore, phases in transitions are often pointed out in hindsight. However, some respondents managed to make good use of unexpected situations. For example, one of the Water Board project leaders used the fact that it was heavily raining on the day of her presentation, illustrating what weather conditions could be expected in the future. Another WUR project leader was very well equipped to convince his project’s importance by incorporating certain needs of his target audience (e.g., the housing assignment or nitrogen crisis). He called this an “unconscious competency.” What he refers to are not only social skills that enable a person to sense what motivates others but also the capacity to turn an idea into a potential solution that addresses a person’s needs at that moment; a skill that was also recognised by the Water Boards. “Who do you talk to, and how do you talk, thinking from the other person’s point of view and connecting to that. And that is a quest” (Water Board project leader, November 2020).

A more pragmatic situation where someone used timing as a technical tool was when a project leader built up momentum for her project right before regional elections. Endorsing her project became part of creating political favourability. Lastly, one project manager also mentioned that picking out an unconventional place for her presentation caused people to remember her presentation more clearly.

#### 5.3.5. Language as Means of Mobilisation (Use Boundary Concepts)

Where the NL2120 served as a source for new ideas, the actual transition process manifested mainly in the way project leaders and civil servants started to communicate within their work domain. Instead of focusing on specific parts of the water management system and following a sectoral approach, respondents encouraged stakeholders to zoom out in search of a broad spectrum of elements connected to the soil and subsoil state of being. This resulted in the “function follows water level” argument as opposed to the idea that the water level can be adjusted to a desired function of a certain space. More theoretically, a discourse coalition shifted, and a new discourse coalition emerged (Hajer, 2005). In successful situations, different types of discourses (e.g., rational and emotional discourses, or technical and social discourses) merge seamlessly into each other (de Haas, 2006). Within this process, civil servants and project leaders play an important role as translators, ensuring that everyone understands the problem and the proposed direction for solutions. “I often feel like a translator. A translator between construction experts, hydrologists, and civil engineers who design the projects in the region. So, you try to transfer information into knowledge for the right target groups. That’s a big challenge” (Water Board project leader, November 2020).

#### 5.3.6. Digital and Real-Life (Use Personal Interaction)

It is a general trend to work more digitally. In the four cases, however, this seemingly led to a lack of personal exchange between people working in different fields. Our respondents saw this as an obstructing factor in creating added value through cooperation across the borders of work fields. Proponents of working in an office space emphasised the advantage of “coffee machine talk,” where they can bring colleagues up to date on their work and create more interest. Networking was also much easier to do in real life than via a computer screen. That said, they also admitted they enjoyed the flexibility that working digitally offers.

#### 5.3.7. Small Wins (Use Small Interventions on Decisive Issues)

A project leader mentioned they noticed an increase in top-down deals being made about transformative change. However, in their opinion, those deals rarely lead to an impact in the practice field. “Many deals are being made. Something gets concluded from these deals, but their impact and knock-on effects remain very limited. There needs to be a better flow in that” (WUR project leader, June 2021).

Sometimes, according to some project leaders, more impact was made bottom-up, via incremental initiatives or “small wins.” The idea of small wins is that modest changes can culminate into bigger transitions (Termeer & Dewulf, 2019). Small wins are perceived as easy to grasp, energising initiatives, rather than large encompassing interventions. They are points of leverage that can bring about a change in an entire system. In this respect, small wins are more than so-called low-hanging fruit. Some respondents noticed small wins were enabling their transition ambitions by triggering local participation and social inclusion around topics related to climate adaptation. Two examples were a community initiative for improving green landscaping in the village of Winsum and local initiatives for decreasing paved surfaces in the city of Bunschoten.

#### 5.4. Reflection on Tactical Elements

Although the tactical elements we distinguished are different in nature, the order indicated above is not arbitrary. Drought relates to disruptive physical developments that raise entirely new challenges, while long-term visioning and taking a deeper look relate to percipient problems and solutions to those occurring challenges. They also represent an attitude showing eagerness to look beyond day-to-day reality. For choosing actual actions, the interviews show that a smart selection of time and place is essential, with language and face-to-face contact playing a major role. For the actions that are eventually taken, realising small wins is important. These elements are summarised in Table 3. The elements are not stages in an incremental form of planning. They should be seen as nodes in a braiding river where streams coming together reinforce each other (de Haas, 2022).

**Table 3.** Tactical elements identified in the four cases.

Tactical element	Transformative impact
Drought as a game changer	Showcasing examples of climate change relevant to a particular audience to embed the urgency of climate adaptation in mainstream developments
Long-term visioning	Creating new definitions of reality; opening up to possibilities
Natural basis	Connecting physical and social environment
Timing and place	Adaptability to unpredictable events
Language as means	Mobilising participants; developing transition agendas
Digital or live	Speeding up or deepening collaboration efforts
Small wins	Realising impact

## 6. Conclusions

Five strategic transition challenges emerged during the rollout of the projects we followed. Strategic challenges often appeared relatively unexpectedly and were perceived as limiting factors at first but proved to offer opportunities for coalition building in the future. The tension between vision outcomes and current spatial layouts urged for more consideration of the long-term effect of climate change regarding spatial planning policy and implementation. This includes decisions about the placement of buildings in response to the Dutch housing shortage, and natural solutions in response to the nitrogen crisis. A hindering factor was that strategic challenges often came with high political priority and great societal pressure. This can either delay or boost a transition process depending on whether what was envisioned can incorporate a response to the urgent situation.

Various tactical elements were found in the area between transition and, to some extent, operation. We say to some extent because initiatives for physical climate-adaptive alterations of the Dutch landscape remain small. However, major shifts have been detected in acknowledging climate change challenges and incorporating natural elements in technological innovation. The role that long-term visions play is to promote climate consciousness in daily practices, but more so to provoke alternative ways of thinking, taking the natural system into account. Several practical tactics have been used to promote the visions, like choosing notable locations, strategising the timing of the vision presentation, real-life interaction, and picking out elements from the vision that address a certain audience's needs. However, using these tactics is not necessarily a "recipe for success." Instead, they should be perceived as small rapids in a larger transition flow.

## 7. Discussion: Supporting Transitions With Transdisciplinary Learning Histories

The methodology we chose for this research may seem unconventional concerning common transition research. Instead of studying the transition mechanisms in hindsight, we decided to view the transition process from an insider's perspective. Through this approach, we hope to contribute to building a "learning history" (Kleiner & Roth, 1997) on transition processes. Learning histories are records of factual events and different perceptions and reflections on recurring processes. Monitoring such processes offers in-depth insights from personal experiences. The emphasis, therefore, does not lay on the "truth" but on collecting diverse perceptions of lived realities.

To understand more about transition processes generally, we encourage other researchers to contribute to building a transdisciplinary learning history on transition processes. In several parts of this article, we have mentioned addressing an audience's needs to create more support and involvement within a transition process. We argue that using qualitative methods, such as learning history, contributes to understanding the needs of different stakeholders in complex or chaotic situations and can, therefore, contribute to accelerating transition processes. Eventually, the more a transformative vision matches experienced problems and needs, the more it can mobilise support for change.

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### Conflict of Interests

The authors declare no conflict of interests.

### Data Availability

Qualitative data, including anonymised interview transcripts and subsequent learning histories, are kept by the authors and can be accessed upon request.

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