Navigating the Currents of Change:

An analysis of Policy Change and Flood Risk Management after the 2021 Limburg Floods

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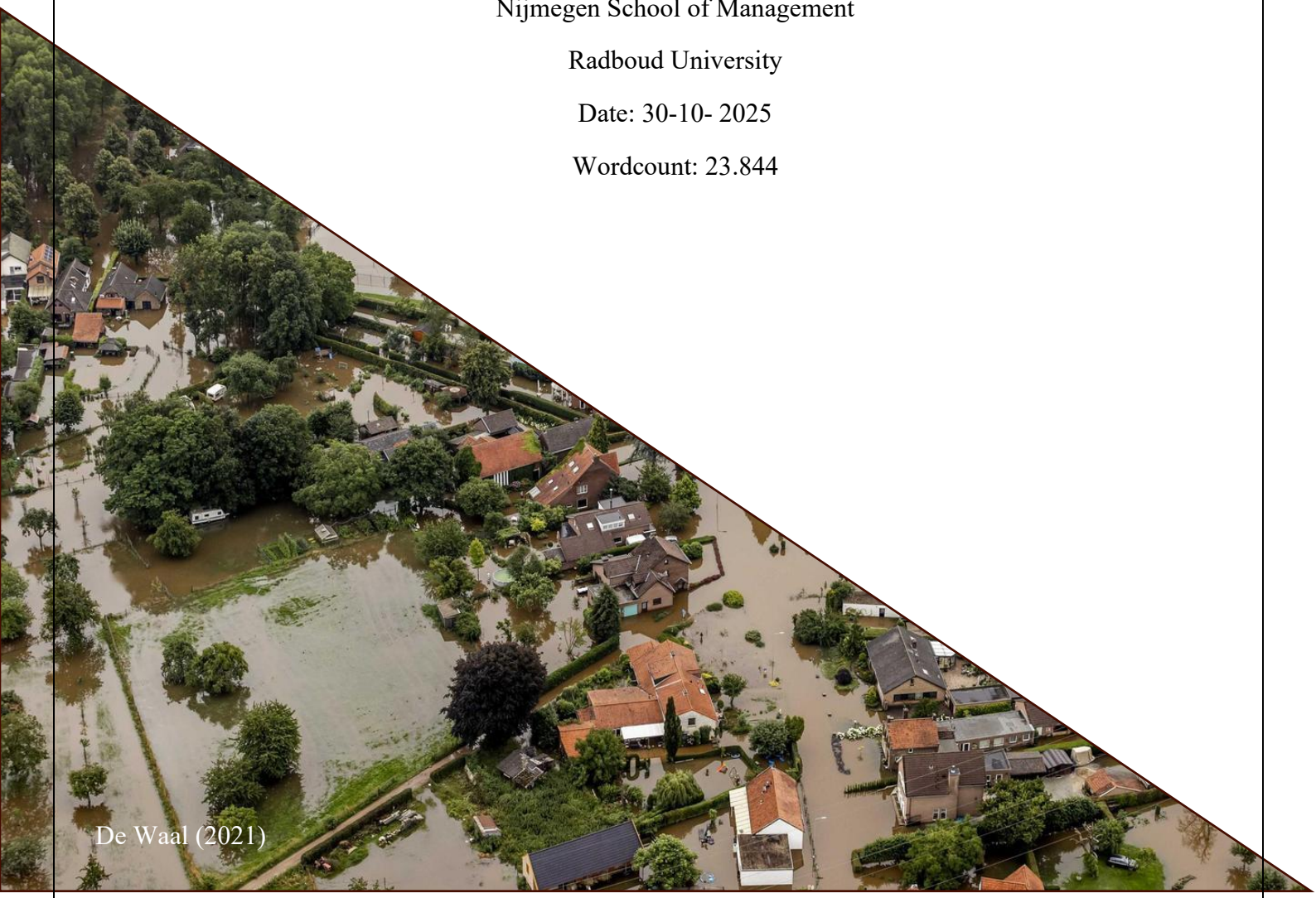

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Preface

This thesis research is written as part of the master Spatial Planning at Radboud University. The purpose of this thesis is to shed light on whether or how policies related to flooding and flood risk management have evolved specifically in the Netherlands after the disastrous flooding event of 2021 that affected the Netherlands and its neighboring countries. Additionally, this thesis aims to unravel the mechanisms that helped or hindered changes in flood policies and flood risk management.

Nowadays, floods are unfortunately becoming more common due to the changing climate. Flooding events still result in unfortunate consequences such as fatalities and material damage. This has led to the realization that floods cannot be entirely prevented in the future, and thus, societies will have to learn to live with water. Flooding events such as the 2021 summer flooding serve as learning lessons to improve such policies. This has inspired me to explore these learning lessons and how they are translated into policies. It is important to keep adapting and evaluating flood policies and flood risk management to reduce flood risk, as only then can the consequences of flooding be reduced.

The writing process came with its challenges, such as difficulties with research directions, finding enough respondents for interviews, and the usual lack of motivation. But despite these challenges, it was a rewarding process that brought me more knowledge on the topic of flood risk management and doing research in general. Therefore, I would like to thank my supervisor, Corinne Vitale, for guiding me through the writing and research process. I would also like to thank the respondents who were so kind as to make the time to share their knowledge and opinions to help form the research.

Enjoy!

Summary

Past and current anthropocene activities have resulted in increasing flooding frequency and magnitude, bringing increasing risks worldwide, with severe impacts and consequences as seen during the 2021 Limburg flooding. These flooding events create the opportunity for policy learning to improve flood risk management practices and reduce future flood risks. However, little research has been conducted on how the 2021 Limburg flooding specifically has resulted in the revision of flood-related policies and flood risk management strategies. Thus, a qualitative study was conducted in the form of 12 interviews and policy document analysis to help analyze potential policy change within Dutch flood risk management after the 2021 Limburg flooding, and how the changes reached the political agenda. The results showed that the flooding event led to major suggestions for change within Dutch flood risk management through the Beleidstafel Wateroverlast en Hoogwater, by highlighting shortcomings within flood risk management, gaining widespread attention, receiving political support and pressure from citizens and stakeholders, prompting major suggestions for change within the Multi-Layer Safety concept. However, obstacles can arise during the implementation process due to inadequate resources in the form of budget, personnel, and expertise to execute the suggested policies; as well as opposition towards certain measures from citizens themselves or certain action groups.

Contents

1.0 Introduction

1.1 Topic introduction

Past and current Anthropocene activities are contributing to current global warming through greenhouse gas emissions. Global temperature is observed to have increased by 1.09 degrees Celsius since 1850-1900, and is expected to increase in the near future, causing widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere, impacting global climate (Intergovernmental Panel on Climate Change [IPCC], 2023). Climate change is increasing extreme events such as heat waves, heavy precipitation, droughts, cyclone activities, and increased sea levels with a frequency of now more than once per day (McBean & Rodgers, 2010) with severe consequences for human safety, economic stability, and environmental sustainability (Hitz & Smith, 2004; Schulte et al., 2016; Tol, 2018).

Given this background, floods are the most common type of extreme event. The occurrence as well as the magnitude of floods have significantly increased over the past years (EM-DAT & UCLouvain, 2024; Jonkman et al., 2024), currently resulting in almost 23% of the world's population facing significant flood risk (Rentschler et al., 2022). Communities in low-lying areas, river basins, or coastal regions are especially vulnerable (Wallemacq et al., 2015), with flood risk expected to increase further due to climate change and population growth (Jongman et al., 2012). On one hand, population growth will push people to live in areas prone to floods due to a lack of space. It is expected that 40% of the global urban land will be located in areas highly prone to flooding (Güneralp et al., 2015). On the other hand, climate change will lead to an increase in the frequency and intensity of precipitation, which contributes to the increased risk of flooding events (Hirabayashi et al., 2013).

1.2 Problem statement

Expected increase in flooding frequency and magnitude brings increasing risks worldwide (Jongman et al., 2012). Impacts and consequences involve loss of life, displacement, and infrastructural, economic, and environmental damages. While fatalities have decreased in middle and high-income countries despite the increase in flooding events, displacements, and physical and economic damages have risen (Merz et al., 2021).

In 2021, a major flooding event hit the Netherlands, Germany, and Belgium as a result of heavy rainfall. All three countries experienced severe economic and physical impacts or loss of life (Deltares, 2023). This event revealed shortcomings within Dutch flood risk management, such as inadequate warnings and emergency response, a lack of river flood knowledge, issues within risk management, risk reduction, and preparedness (Endendijk et al., 2023; Fekete & Sandholz, 2021; Jonkman et al., 2023; Pot et al., 2024; Thieken et al., 2023). Furthermore, issues were detected within the recovery phase, as it was lacking in speed of compensation and insurance payout to those affected (Endendijk et al., 2023; Jonkman et al., 2023), which was an already recognized issue before the flood (Kaufmann, Doorn-Hoekveld, et al., 2016). Because of this recent event and the expectation that the frequency and magnitude of such events and their

related impacts continue to rise, urgent attention is needed to make flood-prone areas resilient to flooding through adaptation efforts (Dovers & Hezri, 2010) to reduce vulnerability to flood risks.

Institutions, or systems of formal and informal rules shaping policies and behaviour, play an important part in providing the framework within which organizations, such as government agencies, water boards, NGOs, etc, operate and make decisions regarding flood risk management approaches and policies after flooding events to decrease future flooding impacts. However, little research has been conducted on how this event has resulted in the revision of flood-related policies and flood risk management strategies to address the shortcomings and reduce flood risk in the future. Insight into the process of flood risk management changes can help influence it and create better policies or strategies (Penning-Rowsell et al., 2017). This limited attention can be attributed to the fact that it is a fairly recent event, which has made research on the topic difficult to analyze. However, as sufficient time has now passed, it enables us to conduct such research in light of the flooding of 2021.

1.3 Research aim and research question(s)

Major flood events can serve as critical moments for reassessing adaptation strategies (Birkland, 1997; Baumgartner et al., 2018). In the context of flood risk management, such reassessment is important as ensuring that adequate flood risk management is in place is essential in reducing flood risk and impacts (European Commission, n.d.). Flood events can potentially expose vulnerabilities within flood risk management, providing institutions with the opportunity to address these shortcomings in the form of policy change. Thus, analysing policy change or stability can help create an understanding of institutional response to flood events and improve flood risk management to enhance future resilience.

Building on this, this thesis aims to gain insight into institutional responses to flooding events and whether flood risk management has changed or remained stable. Additionally, it aims to gain insight into the processes in the form of facilitators or barriers behind policy change or stability within Dutch flood risk management. This analysis applies the Multiple Streams Framework (MSF). This framework can help understand how and why policies change or remain stable through three elements: (1) problem stream, emphasizing the attention a certain problem (flooding) receives, (2) policy stream, centered on the available policy solutions and their viability, and (3) politics stream, which focuses on the institutional and cultural context and its influence on certain policy outcomes.

To address the multiple aims mentioned above, the following research questions and sub-questions have been formulated with guidance from the MSF and its components:

1. How has flood risk management evolved after the 2021 flooding event in the Netherlands?
2. How did this evolution in the form of policy stability or change of flood risk management occur after the 2021 flood event?

- *Problem stream*: How was the flooding event and Dutch flood risk management framed?
- *Policy stream*: How viable are the policy suggestions made within Dutch flood risk management after the flood event?
- *Politics stream*: What was the public and political opinion on the flood and Dutch flood risk management?
- *Policy entrepreneurs*: What was the role of policy entrepreneurs in shaping Dutch flood risk management after the flood event?
- *Policy window*: How did the streams, with the help of potential policy entrepreneurs, facilitate or hinder changes within Dutch flood risk management?

1.4 Scientific relevance

Flood policies and flood risk management evolution have been widely studied throughout a longer period of time (Garrelts & Lange, 2011; Kaufmann, Doorn-Hoekveld, et al., 2016; Mees et al., 2018; Meijerink, 2005). Nevertheless, the literature on how flood events, and specifically the 2021 flooding, trigger institutional responses within flood policies and flood risk management is scarce. This thesis addresses this gap by investigating a fairly recent flooding event, the 2021 flood, and exploring whether and how Dutch flood risk management has changed or remained stable.

Also, institutional perspectives are common within flood risk management evolution studies to gain insight into the role of institutional structures, actor coalitions, and governance dynamics. applying theoretical frameworks such as the Advocacy Coalition Approach, Multiple Streams Framework, Policy Arrangement Approach, or the Punctuated Equilibrium Approach (Albright, 2011; Kaufmann, Doorn-Hoekveld, et al., 2016; Kaufmann, Lewandowski, et al., 2016; Mees et al., 2018; Meijerink, 2005). However, according to Sjöstedt (2015), the literature lacks the underlying institutional dynamics of flood risk management changes or stability. Although research on flood events can highlight shortcomings within flood risk management (Albright, 2011; Kaufmann, Lewandowski et al., 2016), little attention is given to whether and how institutions improve these insights and under which circumstances.

Thus, by analyzing both how flood risk management has changed after the 2021 flood and why institutions have responded in such a way with the help of the Multiple Streams Framework, this thesis hopes to contribute to a deeper understanding of the institutional dynamics underlying the response after the 2021 flood.

Lastly, most studies regarding the 2021 flood focus on technical or quantitative assessments of Dutch flood risk management, such as the performance of the flood defense systems (Koelewijn et al., 2023; Mutlu et al., 2023; Strijker et al., 2023). However, these studies provide no insights into how institutional dynamics play a role in flood risk management. Qualitative methods, such as document analysis, case studies, and interviews, would be better tools to explore policy stability and change and its underlying institutional mechanisms. This has been proven by previous studies to be a useful approach to do so (Albright, 2011; Kaufman, Doorn-Hoekveld,

et al., 2016; Kaufman, Lewandowski, et al., 2016; Mees et al., 2018; Meijerink, 2005). Thus, in line with previous research, this thesis will also make use of qualitative methods to explore institutional responses to the 2021 floods.

1.5 Societal relevance

Floodings have wide-scale economic and societal impacts, due to their extensive and rapid character. Floodings are events that are not bound to specific regions; it is a worldwide phenomenon affecting both developing and developed regions. They contribute to one-third of global extreme events, with pluvial floodings affecting 39 million individuals annually and expected to affect 144 million people annually by 2050 (Planbureau voor de Leefomgeving [PBL], 2018). In 2024 alone, river floods led to 6884 fatalities, displaced over 30 million people, caused or exacerbated food insecurity in certain places, and destroyed vital infrastructure such as roads, railways, and bridges, and electricity infrastructure (van Dijk et al., 2025).

The 2021 summer flooding demonstrated the negative and disastrous potential of such events. Housing, businesses, crops, recreation, and infrastructure all received significant damage. 239 lives were lost on the German and Belgian side, and more than 750 individuals were injured (Deltares, 2023). The economic damages for the total area impacted were estimated at €1,8 trillion. Germany experienced the most direct damage, estimated at €33.4 billion (Prognos, 2022). Belgium has damages estimated at €2.5 billion, and the Netherlands €433 million (Deltares, 2023), a significant increase compared to the 1993 and 1995 floodings, which caused €201 and €126 million in damages (Expertise Netwerk Waterveiligheid [ENW], 2021).

These wide-scale societal impacts of flooding events underline the urgent need for flood risk management that is both effective in reducing the risk of flooding and also adaptive to changing environmental and societal conditions (European Commission, n.d.). Therefore, it is important for the societies affected by flooding that institutional responses, including flood risk management strategies, are not only effective but also able to evolve when needed. Thus, the societal value of institutions/organizations to create flood risk management strategies that are up-to-date with current flood risk lies in their potential to reduce long-term flood risk and enhance the resilience of communities.

2.0 Literature review

2.1 Flood Risk and Flood Management

2.1.1 Flood risk

Flood risk can be seen as the likelihood and potential consequences of flooding occurring in a particular area. It encompasses both the probability of flooding and the severity of its impact,

not only on individuals, but also on the built environment, economies, and ecosystems (Schanze, 2006). Flood risk is commonly conceptualized as made up of three components: hazard, exposure, and vulnerability.

Hazard

Hazard refers to the natural process that cause flooding, such as, heavy rainfall, storm surges, river overflow, or coastal inundation. Hazards are tied to the likelihood of a certain risk happening as it is characterized by frequency, intensity, and duration (Schanze, 2006). Currently, climate change is an important contributing factor to increasing the frequency, intensity, and duration of flood hazards, which thus heightens the likelihood of flooding happening, leading to increased flood risk (Kron, 2005).

Exposure

Exposure refers to the presence of physical attributes that can be affected by flooding, such as individuals, built environments, and ecosystems (Kron, 2005). Exposure relates to the consequences of flooding rather than the probability of it happening. As population growth continues, this increases exposure as more individuals, built environments, and ecosystems can be affected by flood events (Kron, 2005).

Vulnerability

Like exposure, vulnerability refers to the consequences of flooding. It differs from exposure, as exposure is focused on the quantity of affected, and vulnerability is related to the susceptibility of the affected to damage. Vulnerability depends on the resilience, preparedness, and adaptive capacity of individuals and ecosystems, and it is influenced by factors such as socioeconomic status, building quality, emergency response capacity, and governance systems (Schanze, 2006). Kron (2005) gives multiple reasons for increasing vulnerability throughout history. These include a lack of awareness of flooding and that previous physical items were more resistant to water or could be more easily moved to safer places. Especially the lack of awareness has contributed to the vulnerability to flooding, increasing as often lessons are not learned from flooding events, or safety measures are taken for granted.

When combined, the elements of hazard, exposure, and vulnerability create a formulaic representation in which flood risk is often expressed as (see Figure 1):
Flood risk = Probability (Hazard) x Consequences (Exposure + Vulnerability) (Klijn et al., 2015; Kron, 2005).

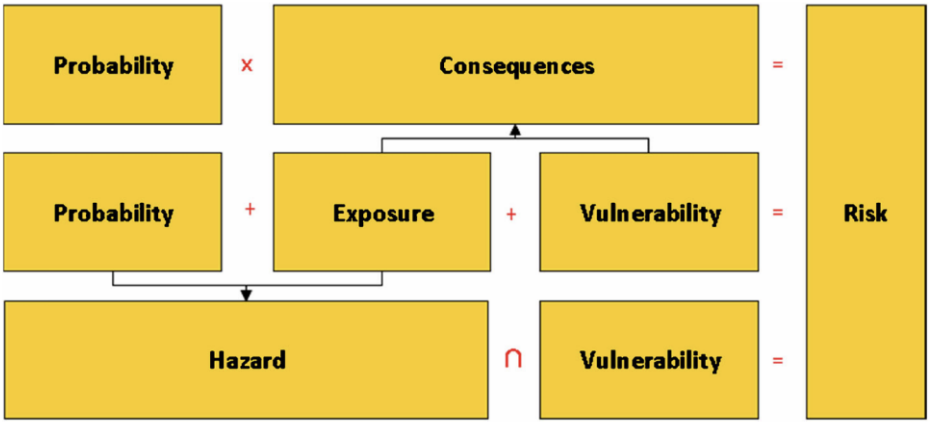

Figure 1. Elements that make up flood risk (Klijn et al., 2015).

2.1.2 Flood (risk) management

'Flood management', which can be described as "the general method involved in flood prevention and subsequent flood loss" (Tariq et al., 2020, p.6) has proven to be an essential part of reducing the risk of flooding. The literature emphasizes two main approaches towards flood management: the standard-based approach and the risk-based approach. The risk-based approach or 'flood risk management' can be defined as the "continuous and holistic societal analysis, assessment and mitigation of flood risk" (Schanze, 2006, p. 233). Formerly, the standards-based approach was the cornerstone of flood management (Sayers et al., 2013). The standards-based approach is aimed at flood defense based on a standard defense design (Dieperink et al., 2016; Hegger et al., 2016; Merz, Hall, et al., 2010) in the form of structural solutions such as dams, flood walls, and dikes (Sayers et al., 2013). However, scholars recognize that solely relying on structural measures cannot entirely eliminate flood risk. Besides, structural measures are costly, have long development periods (Kryžanowski et al., 2014), and they have a certain threshold that can be broken (Kreibich et al., 2022). Additionally, it is recognized by some that structural measures are unfairly distributed within society, especially in those places and groups vulnerable to flooding (de Bruijn et al., 2022; Chan & Liao, 2022).

The limitations of the standard-based approach have led to countries facing flood risks seeing the potential of risk-based flood management in reducing flood risk. 'Flood risk management' is not a new concept, as practices have a longstanding evolutionary history since the earliest civilizations until current practices (Sayers et al., 2013). According to Kundzewicz et al. (2018), this includes employing structural and non-structural measures, engaging stakeholders, and fostering resilience in affected communities. The risk-based approach recognizes that flood risk cannot be entirely eliminated; rather, the focus should be on reducing vulnerability (Sayers et al., 2013). It complements the aim of flood defense through structural measures of the standard-based approach with flood risk prevention, mitigation, preparation, and recovery (Dieperink et al., 2016; Hegger et al., 2016; Merz, Hall, et al., 2010). To do so, it is important to include non-structural measures, such as floodplain zoning, early warning systems, community awareness programs, emphasizing sustainable and adaptive solutions, and an integrated approach between

both to compensate for the risk that structural measures cannot reduce (Sayers et al., 2013). This allows for a more holistic approach combining both hard-engineered structural and non-structural management measures needed to reduce the risk of flooding.

Flood risk management strategies

Within the literature, different strategies of flood risk management have been described (see Table 1). In general, the emphasis within flood risk management approaches includes protection, prevention, mitigation, preparedness, and recovery (Dieperink et al, 2016; Hegger et al., 2016; Oosterberg et al., 2005). These strategies address flood risk by aiming to reduce the elements of exposure, hazard, and vulnerability that, combined, define flood risk. Both protection and prevention philosophies are to "keep water away from people". Protection, or 'flood defense,' decreases flooding probability through structural measures such as dikes, dams, embankments, and weirs. Prevention is centered around decreasing exposure through methods such as land use and spatial planning measures that prohibit or discourage development in areas at risk of flooding. Mitigation aims at decreasing the consequences of floods through measures inside the area vulnerable to floods, such as water retention, flood-proof buildings, nature-based solutions, etc. The strategies of preparedness and recovery highlight the notion that flood risk can never be entirely eliminated. Therefore, these strategies are often connected to the saying of "living with floods" (Tariq et al., 2020). Preparedness refers to mitigating the consequences of floods by being prepared for a flood through, for example, flood warning systems, disaster management, and evacuation plans. Lastly, a good and fast recovery after a flood event is essential to regain stability. This can be achieved through, for example, reconstruction or rebuilding plans as well as compensation or insurance systems (Dieperink et al., 2016; Hegger et al., 2016; Oosterberg et al, 2005).

Table 1. Flood risk and flood risk management strategies (Adapted from Driessen et al., 2018)

Flood Risk Management							
Flood risk	Hazard		Exposure		Vulnerability		
FRM strategies	Protection	Prevention	Prevention	Mitigation	Mitigation	Preparedness	Recovery
Examples	Dikes, dams embankments	Restrict building in flood-prone areas	Restrict building in flood-prone areas	Flood-proof buildings, water retention in urban areas	Flood-proof buildings, water retention in urban areas	Flood forecasting, warning systems, evacuation plans	Reconstruction plans, compensation/ Insurance systems

2.2 Flood risk management in the Netherlands

The Netherlands has an extensive history of flooding and flood risk management, with the establishment of the first water boards and dikes dating back to the 13th century (Kennisdomein, 2022). These dikes were not as advanced as those nowadays, but they demonstrate how early on the Dutch paid attention to the problem of flooding. In Dutch history, three major flooding events have occurred: in 1916, 1953, and most recently in 2021.

It is known that the flooding events of 1916 and 1953 gave heightened attention to the issue of flooding, resulting in flood protection improvements. The flooding event of 1916 led to the introduction of the *Zuiderzeewet,* consisting of a plan to the closing of and *'inpoldering' (the draining of a piece of land surrounded by water by building a dike and pumping away the water)* of the Southern Sea; the establishment of the *'stormvloedseindienst'* a organization responsible for timely warning dike administrators and other parties in case of threats from storm surges; and dike strenghtening (Kennisdomein, 2022).

The flooding event of 1953 led to the restoration and improvement of the dike system, and the building of new flood defenses such as storm surge barriers, water locks, and dams (Kennisdomein, 2022). Furthermore, it prompted the government to introduce the *Delta Plan,* which advised closing off all major sea arms, to shorten the coastline and implement flood protection standards, eventually leading to the Flood Protection Act in 1995, which provided a legal basis for flood protection standards and 6-year assessments of the flood defenses (Van Alphen, 2016).

In 1993 and 1995, two near-misses occurred that led to a major shift in the Dutch approach from a standards-based approach towards a risk-based approach (Bosoni et al., 2023), as highlighted by van Buuren (2019, p. 201):

"Most importantly, a paradigm shift was realized from a prevention-oriented policy towards a more risk-based orientation".

First, in 2005, 'Room for the River'*(Ruimte voor de Rivier)* was created, which aimed at enhancing the discharge capacity of rivers and nature development to enhance water storage capacity (van Buuren, 2019). Second, the 'Multi-layer safety' (*Meerlaagsveiligheid*) approach was introduced in 2009 in the Dutch National Water Plan (STOWA, n.d.), pushed by the European Floods Directive, which wanted spatial planning integration within water management in EU member countries (Bosoni et al., 2023; Kaufmann, Mees, et al., 2016). The Multi-Layer Safety approach (MLS) expands the focus on flood protection in the form of primary flood defenses and includes spatial adaptation and crisis management to decrease both the probability and consequences of flooding (see Figure 2). The first layer functions to protect against and prevent floods through primary structural flood defenses. Spatial planning forms the second layer and is centered around spatial adaptation to flood risk. Through these spatial adaptation measures, it is the aim to reduce the consequences of flooding in case the first layer is not able to protect against water. Lastly, the last layer is crisis management, which includes evacuation plans or warning systems in case of flooding. This layer becomes active when a

flood occurs, and both flood protection and spatial adaptation are ineffective (Bosoni et al., 2023).

Despite its introduction, the Netherlands still holds onto its traditional approach towards primary flood defences. Thus, they prioritize the first layer of flood protection and view the second and third layers as support (Kaufmann, Doorn-Hoeveld, et al., 2016). Only the first layer has legal standards, but this is not the case for the second and third layers. This means that the second and third layers are not required to quantify their contribution to water safety (Kolen et al., 2010). Additionally, flood prevention has been placed as part of the first layer, in which prevention is also done through flood defences (Kaufmann, Doorn-Hoekveld, et al., 2016).

Lastly, in 2010, the 'Delta Programme' (*Deltaprogramma)* was introduced by the Dutch Government as a response to the rising threat of climate change and its consequences for the water domain (Van Alphen, 2016). Co-shaped by the government, provinces, municipalities, water boards, *Rijkswaterstaat*, and several societal organisations, the Delta Programme describes how the government aims to protect the Netherlands through three central themes: (1)Water Safety, to protect those areas prone to flooding through flood risk management strategies, (2) Freshwater, to implement projects ensuring a sufficient and adequate supply of fresh water and (3) Spatial Adaptation, to shape the Netherlands to become climate-resilient and water robust (Rijksoverheid, 2025; Slomp et al., 2014). This process is led by the Deltacommissioner, which operates independently and whose task it is to ensure that plans are finished within the timeframe and stimulates the collaboration between all the parties involved (Slomp et al., 2014).

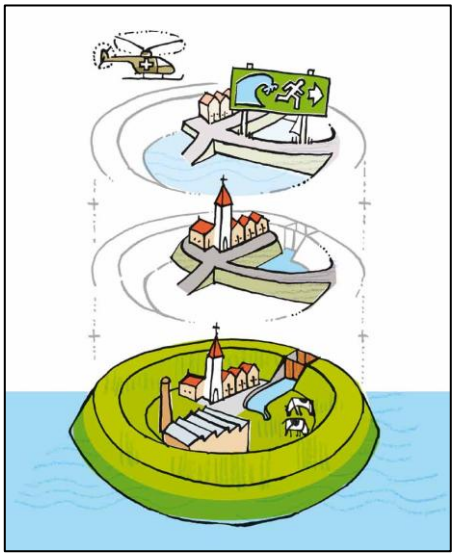

Figure 2. Different layers of water safety (Bottom = layer 1, middle = layer 2, top = layer 3) (STOWA, n.d.)

2.3 Institutionalism

2.3.1 Institutionalism and its approaches

Institutionalization refers to "the construction and the preservation of day-to-day activities and interactions of actors in institutions, within a context of processes of societal and political change…. institutionalization is regarded as the process leading to the formation, deformation and reformation of policy arrangements."(Leroy & Tatenhove, 2000, p. 17). Institutionalism is relevant for analyzing policy stability and change as public policies are both part of and shaped by institutions (Capoccia, 2015). Policies represent governmental decision-making shaped by individual decisions and institutional structures, in which an institutional perspective can give insights into the evolution and dynamics within institutions, including public policies (Peters, 2016). (Peters, 2016). Institutionalism is recognized as one of the most successful paradigms in comparative politics and public policy analysis (Radaelli et al., 2012) and provides a popular and powerful explanation for both individual and organizational action (Dacin et al., 2002). Thus, an institutional perspective can help gain insights into the role of agency and the structure of institutions in shaping public policies, such as flood-related policies and flood risk management. Therefore, this thesis uses an institutional perspective to analyze policy stability and change within Dutch flood risk management, and the dynamics within policy-making that limit or facilitate policy stability and change.

Institutionalism is characterized by various branches that all agree on the role of both structure and agency in shaping the behaviors of individuals (Peters, 2016), but with different views on change and stability: historical, rational choice, sociological, and discursive institutionalism. These forms of institutionalism will be explained below:

Historical institutionalism

Historical institutionalism assumes that institutions are historically constructed, meaning that policy development is influenced by previously enacted policies. Historical institutionalism is therefore focused on the impact of long-term institutional path dependencies on policy-making, thus emphasizing how the sequence of events and previous decisions shape future possibilities and constrain the range of available policy options (Béland, 2009).

Rational choice institutionalism

The rational choice approach assumes that institutions are shaped by the behavior of rational individuals who strive to maximize their own interests. Simultaneously, these institutions are those that structure or limit the available options these individuals have to fulfill their interests (Schmidt, 2010). Koning (2016) argues that the rational choice approach offers the most straightforward explanation of institutional change. Institutions are stable when no actor can increase their utility, and on the other hand, can change if utility can be increased.

Sociological institutionalism

Sociological institutionalism focuses on how institutions interact with social norms, attitudes, and beliefs. Sociological institutionalism helps solve the limitations of the historical approach by including the role of actors and exogenous factors in shaping institutions. The sociological

approach can help construct the problems and issues that enter the policy agenda, and it can help identify what factors impact the policy agenda (Béland, 2009). Compared to the historical approach, sociological institutionalism emphasizes the importance of changing ideas and how this can change institutions. Additionally, it provides detailed insight into the factors contributing to the changes within institutions, such as exogenous factors like financial resources, other institutions, or the purposive behavior of actors through, for example, framing. (Koning, 2016).

Discursive institutionalism

Discursive institutionalism views institutions as being formed from the inside by the ideas and discourse of actors that are self-aware of these ideas and discourse (Schmidt, 2010). While the rational choice, sociological, and historical approaches are more rooted in explaining stability, discursive institutionalism is better at explaining change. Also, it assumes change comes from within the inside of institutions through the different ideas and discourses certain individuals have, rather than from outside factors (e.g., Extreme weather events, economic crisis, etc.) (Schmidt, 2010). Additionally, it helps explain the preferences and strategies of the actors from the rational choice and historical approach, and helps explain change through the norms and cultural attitudes of actors as emphasized by the sociological approach (Schmidt, 2010).

2.3.2 Institutions

Institutionalism involves institutions. These institutions are commonly described as "systems of established and prevalent social rules that structure social interactions" (Hodgson, 2006, p.2). The rules of institutions can be seen as playing a role in shaping the behavior of individuals, which can emerge formally in the form of rules, public policies, political regimes, and political economies, or informally in the form of norms, habits, or practices (Capoccia, 2015; Polski & Ostrom, 1999). Institutions differ from organizations, which are a product of how institutions are arranged, which includes certain actors that have a common set of goals and purposes (Polski & Ostrom, 1999).

Hodgson (2006) emphasizes how institutions can, with these formal and informal rules, both constrain and enable individual or collective actions and choices by defining appropriate or legitimate actions in specific contexts. These rules can thus limit certain behaviors while also opening up possibilities for new directions of action. Besides, institutions constrain and create power relationships, influencing who gets to be a part of decision-making processes and the outcome of policy (Bell, 2002). While these policies can be seen as products of institutional arrangements, they are not institutions in themselves. Rather, policies reflect how underlying formal and informal institutional rules shape and impact politics and policy development and outcome (Capoccia, 2015). In this way, institutions play a crucial role in shaping political behavior, policy development, and governance processes over time.

2.4 Policy stability and change

Policy dynamics emphasizes understanding change and stability within public policymaking, encompassing both the factors that drive policy change and those that contribute to policy stability (Bardach, 2006). They demonstrate how policies remain stable or change in response to political, social, economic, and environmental catalyzers (Florensa, 2004). Policy change is essential to keep track of the issues it tries to address, to innovate and learn from previous mistakes (Meseguer, 2005). Thus, insight into the process of flood risk management changes can help influence it and create better policies or strategies to adapt to current flood risk (Penning-Rowsell et al., 2017).

2.4.1 Policy stability & change

Policy stability refers to periods during which existing policies remain largely unchanged. Institutions are stable, recurring patterns of behavior; therefore, institutions are commonly characterized by stability and resistance to change, or 'equilibrium', resulting in stable public policies (Bell, 2002; Lowndes, 2010; Peters, 2016). Once institutions are established, they tend to reproduce to create stability in which behaviors and structures created by institutions will continue as long as the context remains the same (Florensa, 2004). Stability is often linked to a process of path dependency, in which decisions made in the past continue to influence future decisions and therefore constrain the choices that individuals will consider, creating a status quo (Florensa, 2004). This can lead to lock-in effects, where policies become fixed in place, making it difficult to make policy changes even when more efficient or beneficial alternatives are present (True et al., 2019).

However, institutional theories have often been criticized for solely explaining institutional stability due to their fixation on remaining stable or "the idea of persistence of some kind is virtually built into the very definition of an institution" (Mahoney & Thelen, 2010, p. 4). Nevertheless, many scholars have started using institutional theories for explaining change as well, which is believed "to tap the full power or potential of institutional theory" (Dacin et al., 2002, p. 45). Institutions serve both to drive change and to shape the nature of change across levels and contexts, but they also change themselves in character and potency over time (Dacin et al., 2002).

2.4.2 Critical junctures and Shock events

To better understand how flood risk management changes or remains stable, it is important to understand the circumstances under which policy change becomes possible. While some changes may be incremental and gradual, other changes are triggered by rapid, unexpected events or 'shock events', causing moments for rapid change often termed 'critical junctures'. Both concepts help explain how policy change or stability can occur.

Critical junctures

Within the literature, a debate exists regarding the speed of change. The gradual pace is seen as a continuing incremental process of adaptation of policies (Peters, 2016). However, some see policy change as occurring abruptly and fast, where stability is 'punctuated' by an abrupt mechanism, referred to as a process of 'punctuated equilibrium' (Amenta & Ramsey, 2010; Bell, 2002). During 'punctuated equilibrium', institutions "occasionally produce large-scale departures from the past" (True et al., 2019, p. 155). This abrupt change can be referred to as 'critical junctures' (Capoccia, 2015).

Collier and Collier (1991) define critical junctures as "a period of significant change, which typically occurs in distinct ways in different countries (or other units of analysis) and which is hypothesized to produce distinct legacies." Capoccia and Kelemen (2007) build further upon the definition of Collier and Collier by emphasizing the importance of agency and meaningful choice by defining critical junctures as "relatively short periods of time during which there is a substantially heightened probability that agents' choices will affect the outcome of interest." During this critical juncture, agents or 'actors' such as individuals, groups, or organizations with the authority, resources, or legitimacy to shape policies, have the option to choose multiple policy directions (Capoccia & Kelemen, 2007). For example, according to Capoccia and Kelemen (2007), both policy entrepreneurs and decision-makers, such as politicians, bureaucrats, and experts, can play a crucial role in critical junctures. Furthermore, non-state actors such as advocacy coalitions, social movements, and interest groups (Mahoney & Thelen, 2010), the private sector such as business elites, industry groups, and economic stakeholders (Hall & Soskice, 2001) are shown to shape outcomes during critical junctures. These options are not infinite, but are rather set by previous conditions that define and limit the possible options (Capoccia, 2016).

Shock events

These disruptions or critical junctures are set in motion by shock events (Amenta & Ramsey, 2010; Bell, 2002; Sorensen, 2024) such as economic crisis, political or social events, technological failures or accidents, public health emergencies, or environmental shocks like floods (Shastry et al., 2022; United Nations Office for Disaster Risk Reduction [UNDRR], 2017). In some cases, shock events can create a period of uncertainty and enable 'critical junctures' that act as opportunities for change, driving new approaches, reforms, or innovations within institutional settings and policies (Capoccia, 2015; Johnstone & Schot, 2023). Shock events are defined as sudden, significant, and unexpected occurrences that disrupt the normal functioning of a system, organization, or society (Gordell & Volgy, 2022). Shock events can be deemed as such when they exhibit three characteristics: (1) the event is unanticipated or unexpected by the actors involved, (2) the event results in dramatic and major disruption to current conditions, and (3) the event occurs suddenly and thus is different from evolving or slow-moving processes of change (Gordell & Volgy, 2022).

Multiple studies have shown how flood events, which can in some cases act as shock events (Allaire, 2018; Cardoso et al., 2008), can create critical junctures and lead to major changes within institutional arrangements, including flood risk management (Albright, 2011; Johnson

et al., 2013; Kaufmann, Lewandowski, et al., 2016; Penning-Rowsell et al., 2006). Flood events thus often serve as critical junctures that highlight the inadequacies of existing policies or systems and can catalyze institutional shifts toward more resilient approaches (Kaufmann, Lewandowski, et al., 2016). When extreme events such as flooding events cause changes within institutional and policy settings, this may be seen as a shock event itself, as it alters the functioning of a system, organization, or society. Therefore, in certain cases, flooding events can create shock events within flood risk management.

2.4.3 Theories to explain policy stability and change

Within the literature, several mainstream frameworks have been developed to analyze policy and stability. Popular theoretical foundations include the Punctuated Equilibrium Theory (PET), the Policy Arrangement Approach (PAA), the Advocacy Coalition Framework (ACF), and the Multiple Streams Framework (MSF).

The Punctuated Equilibrium

The PET, developed by Baumgartner and Jones in 1993, states that policy processes are characterized by long periods of stability but can be punctuated by sudden changes rather than incremental change, termed critical junctures. This change often results from external or internal processes such as shifts in attention and framing within policy subsystems. When policies are adopted, these policies will remain stable due to path dependency, incrementalism, and institutional inertia, which is a tendency to do nothing or remain unchanged, until a major disruption occurs, causing a punctuation in the state's equilibrium. This opens up opportunities for a major change in policy direction (Gordell & Volgy, 2022) where a range of options or pathways open to multiple actors, including those of policy entrepreneurs (Sorensen, 2024).

Thus, PET does take into consideration the role of policy entrepreneurs; however, not as strongly as the MSF and the ACF. It emphasizes collective action, such as mass mobilizations, a collection of interest groups, or groups of policymakers, over individual action, and it emphasizes outcomes of collective action rather than the strategies and behaviors prior to the outcome (Schlager, 2019). This limited scope means that it does not address agenda-setting and how problems and issues are constructed, and that it does not take into consideration the institutional dynamics that take place behind the surface (Koning, 2016). Also, the approach is not suitable for explaining policy choices by policymakers, such as the goals and issues of actors that they deem important and their strategies to gain support for policy alternatives (Béland, 2009).

Multiple Streams Framework

The MSF by Kingdon is widely used in comparative policy analysis to compare policies, programs, or systems across different contexts to understand their effectiveness, implications, and potential improvements (Béland & Howlett, 2016), and for analysing and understanding

the complex influences on the phenomenon of agenda setting, or why certain policy issues arise on decision-makers' agenda, while others do not across a variety of policy domains as well as different levels of analysis (Koebele, 2021). Rather than explain patterns of decisions, the MFS attempts to explain why policymakers adopt some policies and not others (Schlager, 2019).
The MSF can be explained and understood through three separate streams: problems, policies, and politics. These streams are not interlinked and therefore operate independently from one another, with each having its own context and complexity. However, if the timing is right these streams can be coupled with the help of policy entrepreneurs and create windows of opportunity, or, as Zahariadis (2016) defines it, as 'occasions for policy change', to create certain constraints and opportunities as well as a specific institutional environment within which certain policies are then formed (Jones et al., 2016).

The MSF emphasizes the role of individual action rather than the collective action of policy entrepreneurs in achieving windows of opportunity for major policy changes (Schlager, 2019). However, because of its centred view around the role of policy entrepreneurs in enabling change, it lacks the role of institutional arrangements in enabling or constraining change. The politics stream catches a grasp of institutional arrangement by looking into national moods, pressure-group campaigns, and administrative or legislative turnover, but it is rather limited (Schlager, 2019). Therefore, Schlager (2019) suggests that "incorporating institutional structure within the politics stream would allow the theory to capture critical traits of specific governing structures…" (p. 306).

Advocacy Coalition Framework

The ACF was created by Sabatier and Jenkins-Smith in 1988 and later revised in the 90s. The framework highlights the role of advocacy coalitions within policy subsystems and how certain internal and external factors operating outside of the policy subsystem constrain or give rise to opportunities for actors operating within (Sabatier & Weible, 2019). These advocacy coalitions can be seen as groups of actors that share beliefs and coordinate efforts to influence public policy with certain resources, thus potentially instigating change (Sabatier & Weible, 2019).
The ACF is interested in policy change over the long term rather than the short term, where it assumes that advocacy coalitions mainly remain stable, making major policy change a difficult task (Sabatier & Weible, 2019).

Compared to the MSF and the PET, it does not emphasize decision-making or policy options; rather, its goal is to explain policy changes in a subsystem over a long period and how this change is triggered. Compared to the PET, which identifies change as major, rapid events, the ACF states that change can occur both major and minor as well as gradual through policy-oriented learning or rapid through external perturbations or shocks (Sabatier & Weible, 2019). Contrary to the MSF, the ACF does give room for the role of institutional arrangements in causing potential major policy changes by highlighting policy subsystems' structures and dynamics through coalition opportunity structures that are a combination of cultural and

institutional features. These features then play a role in individuals' choices of strategies to cause policy change (Schlager, 2019).

Policy Arrangement Approach

The PAA helps analyze and understand both change and stability within policy arrangements. Arts et al. (2006) emphasize how the PAA can analyze both long- and short-term shifts in policy arrangements. Long-term changes within the PAA are connected to political modernization, while short-term shifts are triggered by external events (Arts et al., 2006), such as flooding events. The PAA uses four dimensions to analyze and describe policy processes: actors and coalitions, resources and power, rules of the game, and discourses. The first three dimensions are aimed at dealing with the organization of policy arrangements, while the latter deals with their substance (Liefferink, 2006). It gains its inspiration and expands further upon existing theories focusing on the meso-level, such as the advocacy coalition approach and several policy network approaches, allowing for a more encompassing and dynamic analysis of policy approaches (Liefferink, 2006).

The four dimensions do not operate separately but are interlinked. A change in one dimension often impacts one or more of the other dimensions within the approach, helping to capture the full dynamics of change within a given policy arrangement (Liefferink, 2006). However, the PAA also allows for analysis and describes the four dimensions separately within policy arrangements, with each perspective highlighting different aspects of the policy arrangement (Liefferink, 2006). Different interconnections between the four dimensions can result in both policy change and stability.

2.5 Conceptual model

This thesis applies the MSF to evaluate how policy stability and change have arisen for the Netherlands after the 2021 flooding event. The reasons for applying the MSF can be explained in three main points.

First, the MSF focuses on how the problem, policy, and politics stream align to open opportunities for change within the agenda-setting, a focus overlooked in frameworks such as the PET. This makes the MSF suitable for analyzing how specific events can trigger policy changes like the 2021 flooding event, and specifically how sudden events can shift problem recognition, views on policy solutions to these problems, and how politics influence whether changes occur or remain stable. Second, this thesis uses a short-term perspective of policy change, which is compatible with the MSF. Unlike other frameworks, such as the ACF and PET, which are centered around gradual processes of change, the MSF can help gain insight into rapid policy changes, as well as under which circumstances the changes either persist or fade. This makes the MSF a suitable framework for analyzing short-term responses. Third, the MSF emphasizes the role of agency through the dimensions of both the political stream, which

includes the views of political and societal actors, and policy entrepreneurs in creating policy stability or change, which is often underemphasized in other frameworks.

The conceptual model (see Figure 3) in this thesis builds on the insights of the original creator of the framework, Kingdon's (1984) foundational model of the three streams. The basis of the MSF will be expanded by incorporating insights from Jones et al. (2016), who have further expanded the framework by adding additional elements to its dimensions. These additions are based on revisions and insights of the original framework by Kingdon (1984) made by multiple scholars, providing an encompassing and elaborated version of the MSF.

Additionally, the framework incorporates strategies that policy entrepreneurs can use to create opportunities for change within the agenda-setting process. Many scholars have identified a wide array of strategies deployed by policy entrepreneurs. As such, strategies used by policy entrepreneurs have also been identified within the field of flooding policies and flood risk management. These strategies, identified by Meijerink and Huitema (2010), will therefore be central to identifying policy entrepreneur strategies within this thesis, making it highly useful and relevant for this thesis.

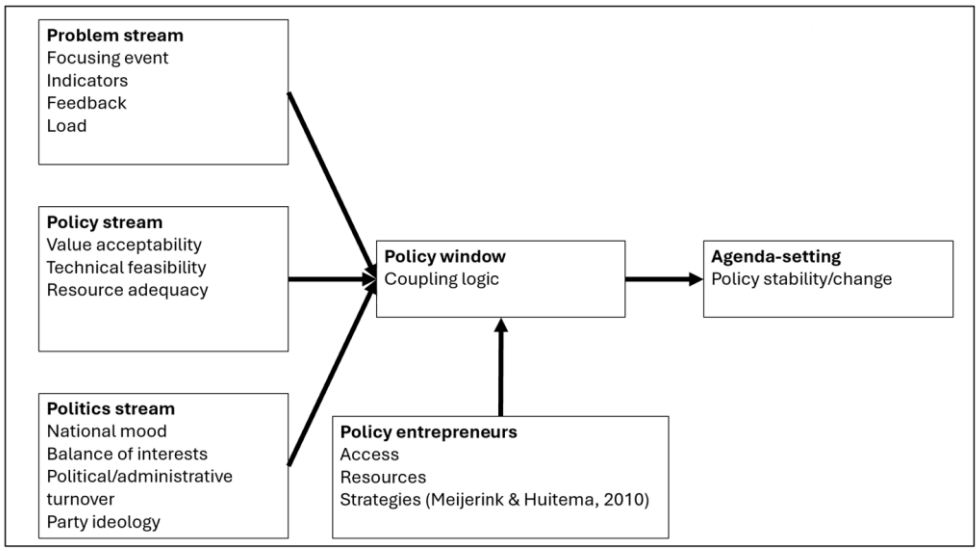

Figure 3. A conceptual model based on the Multiple Streams Framework of Kingdon (1984) and Jones et al. (2016) and policy entrepreneur strategies from Meijerink and Huitema (2010), (Author's creation, 2025)

2.5.2 Operationalization of the Multiple Streams Framework

To make theoretical concepts measurable, operationalization is needed. The process of operationalization consists of three steps: defining theoretical concepts, determining variables or the ways in which the concept can express itself, and lastly, how each variable can be measured through indicators (van Thiel, 2014). Below, an overview of the operationalization process is presented in Table 2. The operationalization is based on the MSF, in which the main elements or theoretical concepts that can lead to policy stability or change within the agenda-setting are defined and made measurable.

The components of the Multiple Stream Framework

The problem stream

The problem stream refers to a certain issue within a policy domain that receives the needed attention from policymakers. It is only when issues are perceived as problematic by policymakers that policies will be formulated as a result (Jones et al., 2016). Kingdon (1984) explains that *indicators, focusing events, and feedback* are means that can explain how policymakers learn about certain conditions, and these are then further defined as problems.

Indicators are used to measure the magnitude and change in conditions. A large magnitude and a change can lead to catching the attention of policymakers, thus convincing policymakers that a problem exists and requires change to resolve the issue. In the domain of flood policy and flood risk management strategies, statistics on flooding risk are often used as indicators to gain insights into flood hazard, vulnerability, and socio-economic impacts (Jongman et al., 2012; Merz, Kreibich, et al., 2010). This can, for example, include quantitative data on the prediction, such as flood frequency, or on its impacts, such as economic and infrastructural damages and casualties (Merz et al., 2007; Ward et al., 2020).

A *focusing event* is a sudden, harmful, and widely publicized event, such as a disaster, crisis, personal experience, or powerful symbol that draws attention to some conditions more than to others. But such an event has only effects unless accompanied by a firmer indication of a problem, by a preexisting perception, or by a combination with other similar events. Specifically, extreme events such as flood events can, in some cases, be focusing events that will lead to flood policy changes (Albright, 2011; Kaufmann, Lewandowski, et al., 2016).

Additionally, policymakers learn about conditions through *feedback* about the operation of existing programs, either formal or informal, in which negative feedback can trigger political attention. For flood governance, feedback can, for example, come from reports and evaluations on flooding policies and flood risk management strategies (Kaufmann, Doorn-Hoekveld, et al., 2016; Strijker et al., 2023).

Lastly, *load* refers to the capacity of institutions to deal with problems. If too many competing issues are on the political agenda, urgent issues such as flooding events might not receive the

needed attention (Jones et al., 2016). Therefore, quantifying which issues on the political agenda compete with those of flood-related issues can help give insight into the *load*.

The policy stream

The policy stream refers to the set of proposed solutions by experts and analysts to address particular problems, eventually narrowing it down to a subset of feasible options. Whether policy ideas are sustained and implemented is related to their *value acceptability, technical feasibility*, and *resource adequacy.*

Value acceptability happens when the values of the proposed policy solutions align with the values of the experts who create them. Policy solutions are thus more likely to be implemented if the content aligns with the social norms and values of the public and policymakers (Huitema & Meijerink, 2009; Kingdon, 1995). In the context of flood policies and flood risk management strategies, this could, for example, mean acceptance of certain strategies such as dikes or nature-based solutions.

Additionally, *technical feasibility* means that the presented solutions can realistically be applied with the resources available to solve the problem (Jones et al., 2016). For flood policies, this can include the ability to model risk accurately, use engineering standards, and adapt measures to fit their local geographical context. Additionally, past successful implementations also serve as reference points for technical feasibility (Hegger et al., 2016). However, these resources that are needed to apply solutions need to be available if the presented solutions are to be applied.

The presence of these resources thus refers to *resource adequacy* (Jones et al., 2016). In the domain of flood risk, this can include financial resources such as sufficient budget for the construction and maintenance of flood defences (Kaufmann, Doorn-Hoekveld, et al. 2016), human resources such as the needed expertise within the field of flood risk management (Wiering et al., 2018).

The politics stream

The politics stream refers to the institutional and cultural context in which the agenda-setting and decision-making process operates (Jones et al., 2016). Policymakers have to pay attention to the problem and be receptive to the proposed solution to turn it into a policy. Within the politics streams, *the national mood, interest groups, party ideology* (Jones et al., 2016), and *administrative or legislative turnover* (Kingdon, 1984) can play an important role.

The *national mood* is what the majority of people think about certain issues, values, or solutions relevant to the policy problem (Jones et al., 2016), which can be identified through public opinion polls and surveys (Pralle, 2009). If changes occur in the national mood of a country, policymakers are expected to react and adapt to this change (Jones et al., 2016). For example,

in the Netherlands, many view reducing flood risk to be a governmental task and do not see it as a major issue, as they feel protected by flood protection measures such as dikes (Kaufmann, Doorn-Hoekveld, et al., 2016).

Secondly, certain *interest groups* such as governmental actors, public agencies and expert bodies, ministries, regional and local authorities, and 'waterboards' (*waterschappen)*, can play an important role in bringing certain problems to the political agenda or inhibiting certain issues from arising. The Netherlands has the Ministry of Infrastructure and Water Management, which is involved in the creation of flood policies, and *Rijkswaterstaat*, which is responsible for the implementation of those policies. Furthermore, expert bodies and public agencies such as Deltares, Planbureau voor de Leefomgeving (PBL), etc., in the Netherlands help provide research and advice on flood policies and flood risk management.

Party ideology refers to the orientation of political parties within relevant institutions (Jones et al., 2016). A party's ideological orientation influences how it prioritizes certain issues, such as flooding, and which solutions it might prefer. For instance, parties that are more green-oriented might prefer nature-based solutions over traditional engineering solutions (Knill & Tosun, 2012). To gain insight into the ideologies of parties in relation to flood risk management, party manifestos, budget decisions, and voting behaviour can be useful.

A*dministrative or legislative turnover* can happen when changes occur within administrations or politicians that can significantly impact the outcome of the political agenda (Kingdon, 1984), such as that of flood policies and flood risk management. Thus, for example, monitoring changes within administrations and politicians through national or regional elections or shifts in leadership in national, regional, or local authorities can provide insight into administrative or legislative turnovers.

<u>Policy entrepreneurs</u>

Policy entrepreneurship connects agency in understanding policy change, where Mintrom (2019) refers to policy entrepreneurs (Pes) as ' political actors who seek policy changes that shift the status quo in given areas of public policy' (p. 103), which distinguishes PEs from institutional leaders, who are focused on maintaining stability (Petridou & Mintrom, 2021). PEs are presented as highly motivated individuals or small groups that draw attention to policy problems, present innovative policy solutions, build coalitions of supporters, and secure legislative action. In the flood policy domain, actors such as civil servants, researchers, waterboard officials, or NGO leaders can serve as PEs if they use their resources to influence change (Huitema & Meijerink, 2010). However, PEs can also operate outside of the political arena as noted by Kingdon (1984), who notes that these PEs "… could be in or out of government, in elected or appointed positions, in interest groups or research organizations. But their defining characteristic, much as in the case of a business entrepreneur, is their willingness to invest their resources – time, energy, and sometimes money – in the hope of a future return" (p.122). They are known to operate on a multi-level scale, attempting to transform policies within national, regional, local, and subnational scales (Gunn, 2017). These resources are essential for PEs to develop, advocate, and legitimize policy ideas. PEs with substantive

funding, expertise, networks, reputation, and time are more successful in advocating change (Huitema & Meijerink, 2010; Kingdon, 1984; Petridou & Mintrom, 2021).

Strategies of policy entrepreneurs

PEs can play a pivotal role in coupling the streams needed to form policy windows and thus potentially shape policy (Jones et al., 2016). This is done by coupling the problem stream and the policy stream together with the political stream. To do this, PEs have different resources and strategies to create windows of opportunity (Jones et al., 2016). The strategies PEs use have been researched in various policy domains (Brouwer & Huitema, 2018; Mintrom & Norman, 2009), including that of water policies. Meijerink and Huitema (2010) revealed that developing new ideas, building coalitions and selling ideas, recognizing and exploiting windows of opportunity, orchestrating and managing networks, and recognizing, exploiting, creating, and/or manipulating multiple venues in modern societies are of relevance within water policy changes. The development of new ideas refers to the development of policy alternatives for managing water, which can provide new directions in policies and water management and thus cause change. Building coalitions and selling ideas refers to the extent PEs collaborate and build coalitions, as this enhances the opportunity to manage policy change. Furthermore, for PEs to benefit from the windows of opportunity, it is important that they can recognize when such a window opens and that they know how to exploit this window of opportunity. PEs can do so by "linking solutions to problems and by working to get the resulting policy packages accepted by decision makers…" (Meijerink & Huitema, 2010, p. 5). Recognizing, exploiting, creating, and/or manipulating the multiple venues in modern societies encompasses three specific strategies: venue shopping, manipulating existing venues, or creating new venues. Venue shopping means that PEs will choose a venue where they can try to cause change. Manipulating existing venues means that PEs try to bypass those who resist change by having their coalition members represented. Lastly, they can create new venues as a way to introduce their policy ideas. The last strategy involves orchestrating and managing networks, which involves a wider range of actors relevant in the field of water issues who can both agree and disagree on policy ideas and objectives (Meijerink & Huitema, 2010).

Policy windows

When the three streams are coupled, this can create windows of opportunity to bring new policies to the agenda or constrain existing policies (Jones et al., 2016). Policy windows, therefore, create opportunities for certain actors both within and outside of governments to bring issues they care about to light (Béland & Howlett, 2016). Whether a policy window occurs is dependent on the *coupling logic,* which refers to the extent to which all three streams align to open windows of opportunity (Jones et al., 2016). If all three streams align with the help of PEs or something changes within the problem or political stream, this can provide opportunities for a policy window. This alignment of the three streams with the help of PEs depends on whether these entrepreneurs can match a recognized problem with a feasible and accepted solution and sufficient political support (Herweg & Zahariadis, 2018).

Table 2. Operationalization of the MSF, based on Kingdon (1984), Jones et al. (2016), and Meijerink and Huitema (2010) (Author's own creation, 2025)

Theoretical concept	Variable	Indicator
Problem stream	*Focusing event*	• 2021 flood
	Indicators	• Flood risk statistics
	Feedback	• Evaluations /reports of flood policies • Evaluations/reports on flood risk management strategies
	Load	• Quantity of flood-related issues • Quantity of non-flood-related issues
Policy stream	*Value acceptability*	• Political consensus around available policy solutions • Alignment with public values
	Technical feasibility	• Expert assessment • Adaptability to local environmental/geographical conditions • Existence of similar past implementations
	Resource adequacy	• Funding availability • Skilled personnel
Politics stream	*National mood*	• Public opinion polls/surveys • Protests, campaigns, and petitions
	Balance of interest	• Lobbying • Stakeholder meetings
	Political and administrative turnover	• National/regional elections • Staff turnover within relevant organizations
	Party ideology	• Party platforms and manifestos • Budget decisions • Coalition and alliance formation
Policy entrepreneurs	*Strategies*	• Developing new ideas • Building coalitions & selling ideas • Recognizing/exploiting windows of opportunity • Orchestrating and managing networks • Recognizing,exploiting, • creating and/or manipulating multiple venues
	Resources	• Funding • Expertise or insider knowledge • Networks • Reputation • Time and energy

Policy window	*Coupling logic*	• Presence of policy entrepreneurs • Alignment of the problem, policy and politics stream
Agenda-setting	*Policy stability and change*	• Policy document content

3.0 Methodology

3.1 Research Philosophy

Research philosophy refers to a system of beliefs and assumptions about knowledge development. It shapes the total research process, allowing you to design a coherent research process in which all elements of research fit together. Central to a research philosophy are the ontology, assumptions about encountered realities, and how you see and study your research objects, and epistemology, assumptions about knowledge, and how we can communicate knowledge to others (Saunders et al., 2019).

Saunders et al. (2019) identify five research philosophies within management research. These include positivism, critical realism, interpretivism, postmodernism, and pragmatism. Other scholars provide additional paradigms such as post-positivism, constructivism, and critical theory (Guba & Lincoln, 1994). These research philosophies are shaped by their epistemology and ontology. Moon and Blackman (2014) explain that one's ontology can exist on a scale from realism, meaning a researcher believes only one reality exists, or relativism, meaning multiple realities exist. When one is a realist, the epistemology is based on objectivism, referring to an objective reality existing in an object independent of the subject. When one believes in relativism, it is based on creating knowledge through subjectivism, or, in other words, that subjects impose meaning on an object. Lastly, when one sits between realism and relativism, the epistemology can be viewed as constructivism, referring to meaning created from the interplay between the subject and object, or in other words, the subject constructs the reality of the object.

This research adopts the philosophy of critical realism. Critical realism sees reality as not directly accessible through what we see and what we know about the phenomenon. Instead, it explains what we see and experience in terms of structures that underlie it. Critical realism aims to explain these structures through both qualitative and quantitative methods (Saunders et al., 2019). Critical realism fits within the research scope as the observation of policy stability and change can be shaped by underlying structures of reality, such as actors, rules, discourse, and resources. In the real world, policy change or stability can be observed, but the underlying structures, such as actors involved, rules, discourse, and resources that explain the phenomenon, are not directly accessible through observation and knowledge but have to be researched in order to reveal the structures. Therefore, this research will use the philosophy of critical realism as it tries to explain the observable phenomena by studying the underlying structures that shape the observable event.

3.2 Research approach

Social research can be theory building (inductive), theory testing (deductive), or a combination (abductive). When using a deductive strategy, you aim to verify or falsify an existing theory. With an inductive approach, the aim is to build a new theory by collecting data to explore a phenomenon, identify themes, and explain patterns. Lastly, an abductive approach combines both the deductive and inductive strategies, beginning with building a theory and followed by testing the same theory (Saunders et al., 2019).

This research applies a deductive approach to theory development. The research started with a literature review on relevant literature about the research subject and its main concepts. The conceptual model that resulted from the literature review is based on an existing framework rather than a self-developed framework. The aim is thus to use an existing theoretical foundation and test and apply it to the context of the 2021 flooding in the Netherlands.

3.3 Research design

The research design entails the general plan on how one will go about answering the research question(s). It includes clear objectives derived from the formulated question(s), specifying the source(s) from which data is intended to be collected, and how to collect and analyze the data. Furthermore, it encompasses the discussion of ethical issues and constraints (Saunders et al., 2019). The elements of the research design will be explained below, including the methodological choice, data collection, and analysis.

3.3.1 Research strategy

A research strategy is a plan for how a researcher will answer the research questions. Strategies like ethnography, action research, grounded theory, and case studies are a small section of strategies that are part of qualitative research (Saunders et al., 2019). This research applies a case study strategy, offering an in-depth inquiry into a topic or phenomenon within its real-life setting. This can lead to rich descriptions, the development of theory, and identification of what is happening and why (Saunders et al., 2019). While a case study can be both quantitative and qualitative, for this research, the case study design will solely be qualitative.

Case study selection: 2021 flooding

For this research, the topic or phenomenon to be studied includes policy stability and change after the 2021 summer flood within the Dutch context. The reason for researching the 2021 flooding is that it is a fairly recent event that has been underexplored in the field of institutional responses, while a technical perspective is dominated by emphasizing, for example, the performance of flood defenses. Furthermore, this flooding event was one of the most severe floods in decades. It has revealed shortcomings within Dutch flood risk management that need addressing to reduce potential future flood impacts. Such high-impact events can potentially

trigger changes within policies; however, the outcome of change does not always have to be the case. Therefore, this case study provides the opportunity to test theories of policy stability and change within flood risk management. Lastly, the flood not only impacted the Netherlands but also affected Germany, Belgium, and Luxembourg. However, for this thesis, it is chosen to solely focus on the Netherlands due to the wide availability of relevant documents and ease of language.

3.3.2 Methodological choice

Research can follow a quantitative, qualitative, or mixed-method research design. A quantitative research design examines relationships between variables, which are measured numerically and analyzed using a range of statistical and graphical techniques. Qualitative research studies participants' meanings and the relationships between them, using a variety of data collection techniques and analytical procedures, to develop a conceptual framework and theoretical contribution. These data collection techniques include sources that include words rather than numbers. Lastly, mixed methods combine both research designs, which can be done in multiple ways, leading to various forms of mixed methods (Saunders et al., 2019).

Within this research, a multi-method qualitative study will be conducted. While a deductive approach is often associated with quantitative research, it doesn't necessarily have to be the case (Fife & Gossner, 2024). Furthermore, within qualitative research, a distinction can be made between mono-method and multi-method qualitative studies. A mono-method qualitative study means that a single data collection method is used, compared to a multi-method qualitative study that uses multiple data collection methods and analysis techniques to conduct research (Saunders et al., 2019).

3.3.3 Time horizon

A research study can either be cross-sectional, where a particular phenomenon is studied at a particular time. In other words, it can be seen as taking a 'snapshot' of the phenomenon. or longitudinal, where the phenomenon is studied at multiple points in time (Saunders et al., 2019).

This thesis applies a longitudinal time horizon as longitudinal research has the capacity to study change and development (Saunders et al., 2019). This fits with the aim of analyzing potential policy stability and change within flood risk management. By using this approach, the goal is to explore whether the 2021 flood event has acted as a trigger for change within Dutch flood risk management. This approach to the time horizon aligns with the MSF, which emphasizes short-term windows of opportunity for policy change. By analyzing institutional and policy settings after the flooding event, this thesis can serve to analyze whether the flooding event opened a policy window for change.

3.4 Data Collection and Data Analysis

3.4.2 Primary data collection

Within qualitative research, in-depth or semi-structured interviews are common methods. It was chosen to conduct semi-structured interviews. Semi-structured interviews provide the interviewer with an interview guide with predetermined and written-down topics or questions, compared to in-depth interviews that do not include this but rather leave the interview process open to explore a phenomenon in depth (Saunders et al., 2019). Therefore, semi-structured interviews are more suitable for this research as several topics and questions are to be explored, rather than exploring a general phenomenon. These questions are aimed at understanding each element of the MSF (See Appendix A for the Interview Guide).

The aim was to find respondents who had sufficient knowledge and expertise in the field of Dutch flooding policy and flood risk management. These actors are chosen as they can provide insight into the mechanisms of the MSF and thus what has facilitated or hindered potential change. This led to a wide range of respondents, ranging from the national (ministry) to the local scale (municipality). These respondents were found via online research or via snowball sampling, where interviewees or potential candidates were asked if they could refer to other potential candidates.

The respondents were approached via email or LinkedIn. In total, twelve interviews were completed. The respondents are given a code name (I1-I12) to remain anonymous (see Table 3). The respondents who did not mind being public will only be mentioned when using quotes. All the respondents consented to the interview by filling in the consent form or giving additional oral consent during online interviews. Ten interviews were conducted online via Microsoft Teams, which automatically recorded and transcribed the meeting. The transcripts were checked afterwards and corrected for any mistakes. One interview was done on paper, and another interview was conducted on-site.

Table 3. Overview of interviews (Author's creation, 2025)

Interviewee code	Function	Date
1	Delta Commission	8/05/2025
2	Researcher WUR Wieke Pot	27/05/2025
3	Municipality Meerssen	11/06/2025
4	Province Limburg, work area manager Maastricht-Heuvelland, Programme WRL	11/06/2025
5	Provincie Limburg, policy officer water	11/06/2025
6	Ministry of Infrastructure and Water Management	16/06/2025
7	Waterstop.NU	18/06/2025
8	Rijkswaterstaat South-Netherlands	23/06/2025
9	WRL, advisor water awareness and water resilience	26/06/2025
10	OFL, Secretary	17/07/2025
11	Limburg Waterboard, developer Centrale Regiekamer	28/07/2025

12	Municipality Land van Cuijk, Senior advisor public space (climate adaptation)	01/08/2025

The analysis of the interviews consists of transcribing the audio recordings, meaning they will be reproduced verbatim as a word-processed account. The transcription will go through a process of data cleaning. This means making sure that the transcription is accurate by correcting any transcription errors. This was done by sending the transcription to those interviewed for them to check the content for accuracy. Computer-Assisted Qualitative Data Analysis (CAQDAS) can provide a helpful tool in fulfilling this task as it allows for the analysis of transcriptions. This was conducted with the help of Atlas. Ti. A thematic analysis is applied to the coding process of the interview transcripts. Thematic analysis is suitable for identifying, analyzing, and reporting themes. Additionally, a thematic analysis is suitable for data from multiple data sources (Saunders et al., 2019). Therefore, this type of analysis is fitting within this research as multiple data sources are used, and it can help identify themes that are linked to the framework used. The variables of the MSF conceptual model presented in Chapter Two simultaneously formed the codebook for the coding process in Atlas. Ti (See Table 2).

3.4.3 Secondary data collection

An in-depth desk research is conducted, consisting of documents related to Dutch flood policies and flood risk management approaches. A selection of policy documents is made, as analyzing all would not be manageable within the given time frame of conducting this research. Policy documents will be used from after the 2021 flooding to gain insight into how flood risk management is organized after the flooding event. How flood risk management is discussed in general throughout Dutch history has been explored in Chapter Two. Therefore, documents from before the flooding event will not be used within the analysis.

Various policy documents have been used to analyze changes made in the flooding policy and flood risk management. These policy documents include the *Beleidstafel Wateroverlast en Hoogwater*, the progress reports of the *Beleidstafel* of 2023 and 2024. Furthermore, various documents were used to gain more insight into the mechanisms behind the changes. These documents included evaluation reports on flooding policies and flood risk management after the 2021 flooding, official parliamentary documents, party manifestos, and the coalition agreement. All the documents used are listed in Appendix B, with their accompanying code name. Each document is given a code name (D1 – D24) to link the results back to the specific document used.

3.5 Validity and Reliability of the Research

Validity and reliability are both important aspects to ensure the quality of research. Validity refers to the appropriateness of the measures used (measurement validity), the accuracy of the analysis of the results (internal validity), and the generalisability of the findings (external

validity) (Saunders et al., 2019). On the other hand, reliability refers to the replication and consistency of the research (Saunders et al., 2019).

There are several ways to overcome and increase the validity and reliability of one's research. These include triangulation and participant validation. Triangulation involves using more than one source of data and method of collection to confirm the validity of research data, analysis, and interpretation. Participant validation involves taking or sending research data back to participants to allow them to confirm its accuracy by permitting them to comment on and correct it to validate (Saunders et al., 2019). Both triangulation and participation validation will be used to ensure the validity of this research. Multiple qualitative methods will be used to ensure triangulation, and the transcriptions of the interviews will be sent to the participants for them to check and confirm their words.

4.0 Results

PART I: CHANGES IN DUTCH FLOOD RISK MANAGEMENT AFTER THE 2021 FLOOD

4.1 Agenda-setting

Directly after the flooding event, the Ministry of Infrastructure and Water Management introduced the *Beleidstafel Wateroverlast en Hoogwater*. The goal of the initiative was to learn from the flooding event in Limburg and gain better insight into how the Netherlands could better prepare for periods of extreme rainfall in the future. In 2022, they published two interim advisory reports: one in spring and one in autumn 2022. In December of 2022, they published their final report: *'Voorkomen kan niet, voorbereiden wel - Allemaal aan de slag'* (D1). In September 2023 (D2) and August 2024 (D3), progress reports were published regarding the advice of the *Beleidstafel.*

Within the *Beleidstafel*, the MLS was the leading thread in its advice. It formed the central starting point from which the new policy suggestions were formulated around the MLS concept. The advice formulated in the *Beleidstafel* pointed to two major points of recommendation related to MLS itself. The first was expanding the existing three layers to five layers by adding awareness at the base, before the existing layers of prevention, reduction of consequences, and crisis management. Also, recovery was added as the fourth layer, in which the aim was to focus especially on climate-robust recovery. Second, during the flooding of 2021, it was mainly the regional water systems that posed a threat due to the extreme rainfall. Thus, the MLS should not only be applied within the borders of the main water systems, as has always been done, but also within the regional water systems (D1). Below the advice of the *Beleidstafel,* placed in seven categories, and its progress will be shown:

4.1.1 Everyone is water aware and self-reliant

The goal is to make everyone (citizens, businesses, governments) aware of the consequences of extreme rainfall through education and, additionally, make people aware of what they can do by themselves to reduce the risks.

In 2023, they were working on a wide strategy to enhance water awareness and gain insight into water awareness levels (D2). In 2024, the results of the insight into water awareness in Limburg became available, indicating low water awareness, insufficient preparedness, and low information and communication. To tackle these issues, Limburg created an awareness campaign and brochures to enhance awareness, also enhancing self-reliance in case of flooding and risk communication (D3). The province of Limburg has indicated that, from *Waterveiligheid en Ruimte Limburg* (WRL), where Limburg municipalities, Waterboards Limburg, Limburg province, and the government collaborate to better prepare and protect Limburg against flooding, water awareness will be given serious attention (I5).

…You can ensure you adapt your home, that when you develop new things, you don't install expensive utilities in a basement if you know it can flood. Well, those kinds of awareness campaigns are very important in our program, because that's precisely how we will prevent a lot of damage and inconvenience in the future' (I4, personal communication, June 11th 2025).

The municipality of Meerssen has, for example, created scripts for its inhabitants regarding precautionary measures they can take in case of flooding (I3). The creation of water awareness is planned to expand on a national scale by gaining insight into water awareness for specific regions and audiences to create an approach for water awareness that fits each specific context (D3).

Lastly, research was being conducted on existing experiences with water labels (D2). Free housing scans became available to receive expert advice on how to make one's housing waterproof (D3). This was also a desire from Limburg residents, so the WRL has conducted over 500 free housing scans where advisors visit homes to identify weak points in and around one's home and how to strengthen these, which received a positive response from citizens (I9). Also, research on the use of water labels is in continuation, such as in the municipality of Land van Cuijk, through a climate label tool to gain insight into how much it will cost to achieve a certain label for specific climate themes like flooding and heat (I12).

4.1.2 Steering of the entire catchment area

The entire catchment area plays a role in the reduction of the consequences of extreme rainfall. Thus, increasing the sponge mechanisms of the landscape through spatial adaptation measures is essential. Additionally, the standardization of flooding should be expanded towards a more risk-based approach in which all three layers of multilayer safety are equal and in balance. Furthermore, it is also important to give room beside the big waters, like rivers, for smaller waters such as streams. Lastly, it is advised to improve the execution of river widening and dike strengthening, as well as to prioritize which projects.

Practical cases have been conducted to gain more experience in the field of a more risk-based approach for the standardization of flooding (D2). This has been picked up through pilots for integral risk analyses that have been completed, with continued work on the elaboration of the approach and methodology. This has, for example, been done by the Ministry of Infrastructure and Water Management:

'They (Ministry of Infrastructure and Water Management) are now considering how to apply the old 2003 standards to the regional water system, and to make the regional system more risk-oriented, thus adapting it more to the risks that may arise' (I1, personal communication, May 8th 2025).

Furthermore, research has been done regarding the sponge retention of landscapes, which proved to be effective as 30% of the rainfall was buffered in the earth. However, a realistic picture of the then-current effectiveness and eventual measures to optimize the sponge retention through both nature-based solutions, hybrid, and traditional grey measures on a national level was lacking. Thus, Deltares conducted research to decide which measures are most effective to limit flooding and water nuisance in specific locations.

Steps have been made to improve highwater expectations of the Meuse, international exchange of data and information in light of the highwater prediction has been improved, and measures have been taken in Limburg to prevent unwanted and irreversible spatial developments (D2), with the latter already being implemented by the municipality of Meerssen, which decided to limit development in floodplains (I3). Also, research will be conducted in certain hotspots where the drainage from regional watersystems to the main watersystem poses as bottlenecks (D3).

4.1.3 Additional approach for protection against extreme water nuisance

The *Beleidstafel* advises additional measures aimed at reducing the consequences of extreme rainfall. According to them, this did not receive the needed attention in previous years. But to gain insight into the potential consequences, additional research and testing are needed in the form of supra-regional stress tests, besides the local and regional stress tests, to gain better insight into the bottlenecks and vulnerabilities on a national level. These stress tests are aimed at evaluating the vulnerability of an area to the consequences of climate change, such as extreme rainfall, droughts, heat, and flooding. Furthermore, they wish to develop standardization for the reduction of the consequences.

In 2023, research was conducted to gain insight into the standardization of consequence limitation against vital and vulnerable functions and infrastructure. As of 2024, the supra-regional stress tests were performed; however, the deadline to finish these had been postponed for 6 months (D3). Some municipalities even do additional tests, like the municipality of Land van Cuijk, which has started additional stress tests for all the villages that border the Meuse (I12). Furthermore, to make crucial infrastructure and functions more vital, research has been conducted, and mandatory measures have been legally anchored by the European Commission. Lastly, research was conducted on the resources necessary for vital providers to execute their

resilience analyses (D3). The Safety Regions (*Veiligheidsregios),* in collaboration with the Limburg waterboard and *Rijkswaterstaat*, have established an impact analysis team who are responsible for creating an improved situational overview by combining their knowledge (I8).

The WRL started making Limburg more resistant to extreme weather conditions by applying new ideas and concepts. First, in collaboration with waterboards from Limburg, Belgium, and Noordrijn-Westfalen, mobile emergency barriers are purchased in case of threatening floods. Also, a pilot *'Risicogestuurde normering'* for an exploration around Valkenburg has been finished. The results will be published to be incorporated into the national policies of 2027 (D2). In 2024, no new progress had been reported (D3).

4.1.4 Prepare for a crisis

Extreme rainfall and the regional water system should be included in crisis management. This can, for example, be done through the inclusion of data and information on rainfall, water levels, and water level expectations (D1).

Rijkswaterstaat and the waterboard of Limburg have mapped several improvements to the real-time monitoring, and extra measures have been taken to gain better insight into rainfall and flooding predictions (D2). Furthermore, the province of Limburg, through the WRL program, has established and started an approach for the Early Warning System (D3), and a coordinated approach for regional crisis plans in case of flooding has been established (D2). Lastly, to better include actors in optimal crisis preparedness, a program was created involving the Safety Regions and other relevant actors (D3). The Safety Regions have also expanded their high-water plan for the Meuse to include the regional water system as well. Also, they have started developing an evacuation strategy by allowing municipalities to communicate their evacuation strategy to the Safety Regions (I8). A Limburg disaster response plan has been created in collaboration with *Rijkswaterstaat*, the Limburg waterboard, and municipalities (I8). Furthermore, citizen groups such as Waterstop.nu are trying to enhance water awareness and especially self-reliance through online communications to warn people when a flood is approaching or to help those in need, action plans, and waterproof meter box maps to be prepared during a flood situation (I7).

4.1.5 Climate-robust recovery of damage

It is advised to conduct the recovery phase in a climate-robust manner, taking into account climate change and the demands this makes on existing infrastructure.

In 2023, an interdepartmental exploration was started on the insurability of climate risks in collaboration with the *'Verbond van Verzekeraars'(Dutch association of damage and life insurers)*, as well as what can be insured, and creating risk awareness among citizens. A further exploration was how climate-robust recovery can become a standard practice in the future (D2). In 2024, the approach for climate-robust recovery within insurance conditions for flooding had been established. Furthermore, several ministries had conducted research on the possibilities

for insurance for climate-related damage, with a focus on flood risk from primary flood defenses (D3).

4.1.6 Cross-border collaboration on all cross-border waters

The *Beleidstafel* wishes to intensify collaboration with Germany and Belgium regarding the regional water systems. To do so, they suggested performing cross-border stress tests and sharing acquired knowledge, which creates a point of departure for future collaboration (D1). Cross-border collaboration has been up-scaled between the Ministry of Infrastructure and Water Management and certain waterboards and provinces, part of regional cross-border watersystems (D2). This upscaling is also mentioned within *Rijkswaterstaat*:

'... collaboration has actually only intensified. Just looking at the Maas water district, the department I'm in, several colleagues have periodic consultations with Belgium, Germany, and even French Belgium, where they make agreements…. (I8, personal communication, June 23rd 2025).

Additionally, an international scientific collaboration program on flooding and drought in regional waters has been established to improve the knowledge base of regional authorities. This theme also addresses some barriers in the form of differences in governance, administrative pressure, lack of capacity, resources, and priority within regional collaboration partners across the border (D2). In 2024, further progress had been made on the methodology for transnational stress tests, and the exchange of information has been upscaled even further (D3).

4.1.7 Implementing smart and integrated work together and building knowledge

Besides recovery, the entire spatial design of the Netherlands should be made to be climate-robust. To reach this goal, the *Beleidstafel* suggested strengthening the approach of climate adaptation by improving the organization and steering, the formulation of concrete goals, possibilities for financing, and the shaping of monitoring (D1).

In 2023, there was work on the monitoring of the progress of climate adaptation on a regional and national level (D2). And in 2024, a progress letter had been sent regarding the national approach *'Gebouwde omgeving'* where attention will be paid towards *'Landelijke maatlat voor een groene, klimaatadaptieve gebouwde omgeving'* that presents an approach towards an climateadaptive built environment (D3).

PART II: THE EMERGENCE OF THE MULTI-LAYER SAFETY EXPANSION AND NEW FLOOD POLICIES

This section explores how the flooding of 2021 helped push the changes suggested by the *Beleidstafel Wateroverlast en Hoogwater* onto the political agenda, answering the second research question: *'How did this evolution in the form of policy stability or change of flood risk management occur after the 2021 flood event?'* This question is answered with help from the MSF. According to the MSF, changes within policies can occur when three independent streams (problem, policy, politics) converge, which can open a 'policy window' for reform, with, in some cases, the help of policy entrepreneurs. This section will examine how such a convergence may have occurred after the 2021 floods.

4.2 Problem stream

4.2.1 Focusing event

While the Netherlands is aware of its history of flooding, the event of 2021 led to many shifts in the perception of flooding. It was emphasized how the flooding event created a shift in the source of flooding. A staff member of the Deltacommisioner (I1) mentioned how *'the water does not come through the rivers, but it comes as a threat from the sky, and that is new'* (Personal communication, May 8th). Also, many respondents described the event as a sudden and unexpected event (I1, I2, I3, I6, I9, I11), even with predictive models in place*: 'this was a rainfall that was not foreseen, it was beyond all the models'* (Interviewee 1, personal communication, May 8th 2025). Additionally, the event also heightened the realization that flooding cannot be entirely eliminated. In the Netherlands, flood risk awareness is rather low, as many feel protected by the dikes in place. But the flooding event made many realize that floods will always be present. Interviewee 1, for example, noted how: *'100% prevention is not possible, that is the case for a flood from the main river system, but also for the regional river system through rainfall'* (Personal communication, May 8th 2025). It is nowadays rather not 'if' a flood will happen, but rather 'when'.

The government formally declared the flooding event a disaster shortly after the floods started, in the month of July (NOS, July 16th 2021). News outlets in the Netherlands, such as the NOS, were also constantly following the progression and status of the floods, giving multiple updates a day. Also, the prime minister of that time, Mark Rutte, visited the scene in the same month, describing the situation as 'horrifying, intense, and poignant', while simultaneously linking the flood event to the intensifying changing climate (NOS, July 16th 2021). But even up until this day, the topic of flooding receives heightened attention:

'There is still a lot of attention for the theme of flooding. There is still so much attention for it, which is wonderful'(I8, Personal communication, June 23rd 2025).

This framing of flood events in relation to climate change was often mentioned in interviews with news outlets, experts, or politicians. The prime minister, Rutte himself, mentioned during his visit how he thinks that there undoubtedly is a connection between the flooding event and climate change. This connection is also expressed by the neighboring affected countries through

the Federal Chancellor Merkel of Germany, the Belgian Prime Minister De Croo, and the chairman of the European Commission, Ursula von der Leyen, who all expressed their concerns regarding climate change and the flooding event (NOS, July 16th 2021).

4.2.2 Indicators

Certain indicators are set in place to gain insight into flood risk. These indicators are often developed by research institutes such as Koninklijke Nederlands Meteorologisch Instituut (KNMI) and Deltares. Since 2006, KNMI has published three climate scenarios. These climate scenarios, based on worldwide climate projections from the IPCC, portray scenarios of how the Netherlands will be climate-wise. These scenarios form the basis of the Deltascenarios, which present possible future scenarios for climate and socio-economic developments in the domain of water. These scenarios guide policymakers in the development of flood risk management.

In 2014, the KNMI expected an increase in rainfall for the future, especially in the summers (D4). They predicted that daily precipitation in the summer months would, in the worst-case scenario, increase from 44 mm up to 48,4 mm as an average change in climate around 2030. However, during the flooding event in Limburg, 150mm to 200mm of rain fell within 48 hours, thus exceeding the predicted models (D4).

The unexpected high water levels also led to problems within the water level indicators themselves, as they damaged the measuring stations meant to measure the water levels: *'There was also a technical issue. Several measuring stations weren't designed for those extreme water levels, so they couldn't transmit measurements. So I think there was also a lack of adequate, up-to-date data'* (I4, personal communication, June 11th 2025). The exact reason for the failure of the measuring stations was specified as *'they also failed due to the high water in 2021 because the electrical cabinets were positioned too low, causing them to fill with water'* (Paul S, personal communication, July 28th 2025). Also, other problems with indicators were described: *'The first thing I think of is that the forecasts left a lot to be desired. It wasn't really clear in advance that the water would reach very high levels'* (I5, personal communication, June 11th 2025). This was due to several factors. The discharge measurements were sometimes inaccurate because the measuring stations were experiencing problems, particularly due to the high water. It was also due to the procedures, which meant that those forecasts weren't being accurately received where they should have been (I5).

Despite indicators in place during the 2021 flooding being unreliable or having technical problems, the issues were experienced differently per municipality. The municipality of Land van Cuijk indicated that it was well prepared for the expected high water through flooding maps and elevation maps indicating potential impact and bottlenecks (I12). Furthermore, due to the location of Boxmeer being located in the province neighboring Limburg (Zuid-Brabant), it had the advantage of having more time to prepare for the high water levels: *'We simply know a huge wave is coming to South Limburg, and a day and a half later, that wave will be, say, right next to our municipality. So we always have a day in between to sort of prepare for that high-water wave'* (I12, personal communication, August 1st 2025).

4.2.3 Feedback

After the flooding event, many evaluations assessed Dutch flood risk management, including evaluations on the flood impacts and learning evaluations. Many evaluation reports discuss improvement points within crisis management and recovery.

The Instituut voor Veiligheids- en Crisismanagement (COT) published two learning evaluations (D5, D7). To improve crisis management, they suggest that the Limburg waterboard create additional disaster plans for the regional water systems and include the Regions, create scenario maps visualizing impact determination, and update scenarios with real-time data. Also, they suggest strengthening the crisis process management and coordination, maintaining crisis awareness, improving crisis management activities schedules to ensure continuity, and decreasing fragmentation through partner collaboration. It also highlights the need for aftercare of those impacted, to expand crisis plans to other areas, as there was only one in place for the Meuse (D5, D7). Furthermore, they emphasize better communication, practice, education, and training for crisis situations. In addition, they also advised incorporating indicators specific to extreme weather and creating special crisis teams (D7).

The Nederlands Instituut Publieke Veiligheid (NIPV) suggested internal improvements towards crisis management, such as practice, educate, and train crisis management situations, collaborate with partners, specify the roles and responsibilities of each organization, and ensure clarity of information during a flooding situation (D6).

Deltares provided various recommendations for the future to reduce flood risk in two evaluations (D8, D9). First, they recommended using damage hazard maps to analyze locations that are safe or dangerous for both new construction and existing construction. Second, they advise improving crisis management by increasing awareness among citizens and improving communication and evacuation during crisis situations through water depth maps or other informative maps. Lastly, Deltares suggests methodological improvements related to prevention and recovery, such as expanding and making flood and flood risk indicators more accurate, basing them on flooding models, and also collecting more data, such as detailed data about damage compensation, flow rate, source, duration, depths, etc. of floods (D8). They provide suggestions to improve flood protection already in place, but they also suggest new measures that include different flood risk management strategies. These measures are mainly aimed at flood prevention and mitigation through spatial adaptation, flood preparedness in the form of crisis management and water or risk awareness, and recovery. They suggest building restrictions in high-risk flood areas, customized building in places where risk is lower but still present, increasing risk awareness among citizens, investing in adequate prediction systems and timely warning of citizens, including perspectives for action, and evacuation planning and crisis management that takes into consideration dangerous areas. They also suggest increasing retention areas by bringing back grasslands to hold water (D9).

Also, a report from Andersson ElffersFelix reflects on the recovery phase in the form of financial compensation that was introduced after the government declared the event a disaster (D10). This compensation was called the *'Wet tegenmoetkoming schade bij rampen'* (Wts). This meant that the government would compensate the personal financial damages that occurred

after the event. However, the evaluation of Andersson ElffersFelix pointed to a mismatch between the expectations of citizens making claims on the Wts and the boundaries of the Wts. The Wts is only received for damages that cannot be insured. Damages that could have been insured by the citizens themselves, but weren't, could not receive Wts. However, many were not aware of this and were afterwards disappointed when no compensation could be received (D10).

4.2.4 Load: Saturated agenda

The Netherlands had its general elections in March 2021. This resulted in the new government cabinet Rutte IV. On December 15th of that same year, the new government cabinet published their coalition agreement: 2021-2025, which presented the future plans and issues they would like to address in the coming years (D11). The coalition agreement emphasized plans to approach the nitrogen crisis; the housing crisis; improvement of healthcare; investing in safety and combating undermining; improving of equality of opportunities and combating discrimination; improving livelihood security by tackling imbalances in the labour market and combating poverty and debt, targeted reduction of taxes and investing in our future prosperity through education and innovation and a good business climate for entrepreneurs and companies. However, the coalition at the time also aimed to combat climate change, in which the approach was centered around climate mitigation through CO2 reductions and the transition to green energy, both receiving €35 billion for funding for the upcoming 10 years from the climate and transition fund (D11).

The Netherlands, like many other countries at the time, was still in the midst of the COVID-19 pandemic, and it had to deal with the benefits affair (*toeslagenaffaire)* and earthquake damages in the province of Groningen. Thus, the flood event was not the only issue on the political agenda that required attention. However, in the policymaking process, other political matters did not hinder attention towards flood safety, especially the COVID-19 pandemic. Many respondents mentioned that while COVID-19 restrictions made performing tasks more difficult, they did not overshadow the flooding event. To the contrary, some respondents reported that the pandemic faded into the background while the flooding event became prioritized. As mentioned by I3: *'I think COVID was kind of forgotten during the floods, so all the attention naturally went to other things'* (personal communication, June 11th 2025). This was also stated by I8: *'We were still dealing with COVID. There was definitely attention, but given the threatening situation and everything that happened to us, COVID faded into the background for a while. But it felt like that wasn't an issue anymore, even though it was still there'* (personal communication, June 23rd 2025). And I11 as well: *'At some point you enter that crisis. Yes, and then, in my opinion, COVID faded into the background, and the water crisis emerged as the biggest issue. And that's where you saw everyone putting in maximum effort to combat the floods'* (personal communication, June 28th 2025).

On the contrary, while COVID-19 did not seem to compete for attention with the flooding event, other agenda points, such as the housing and nitrogen crisis, slightly did (I2, I3, I4, I5, I6, I7, I9). However, these are points that could potentially pose an issue during the

implementation phase of suggestions made by the *Beleidstafel,* as mentioned by I4: *'It's clear, of course, that nitrogen, for example, is a very practical problem you'll encounter during implementation. Therefore, our plans must always provide insight into the nitrogen impact of our implementation. Much of this implementation only has a temporary nitrogen impact, requiring the implementation of a measure. So it's not a permanent nitrogen issue. But the whole of the Netherlands is struggling with that effect, so we'll face it too. So the idea is that we can manage that, so we won't encounter that problem so much'* (Personal communication, June 11th 2025).

Rather than seeing other pressing political agenda points, such as the housing and nitrogen crisis, besides the problem of flooding, as competition, it should rather be weighted alongside each other in the spatial planning process at the administrative table: *'However, for us, it's not a matter of competing with it. It's simply crucial to ensure coordination with these issues during implementation….. So it's not that the interests are being given less weight, but they will simply be weighed alongside each other in the spatial planning process at the administrative table'* (Interviewee 4, personal communication, June 11th 2025).

4.3 Policy stream

4.3.1 Value acceptability

The introduction of the MLS approach, and specifically the expansion of layers and the balanced use of all layers rather than the traditional flood protection approach, is not something that all residents of Limburg experience as positive. The reason for this is that many citizens already feel safe with the dikes in place as part of the first layer of flood protection and thus see other measures not as necessary (I1, I4):

'Citizens, especially those affected, do not immediately experience the concept as a good concept because they are raised in the narrative that the Netherlands is capable of controlling water, and with civil technical solutions, we can shape the world to our liking. So we must not allow this inconvenience to continue to befall us. So they really expect the technical solutions, while the approach of the program (WRL) is the multi-layer safety' (I4, personal communication, June 11th 2025).

The introduction of water awareness might likely be less accepted, as this means self-responsibility rather than the responsibility of the state (I5). But also, flood protection is less accepted in Limburg compared to the rest of the Netherlands. It became clear that resistance occurs regarding flood protection, as in certain regions of Limburg, before the flooding event, the norm for flood protection was increased, meaning that the dikes were to be heightened. However, some citizens did not support this decision, resulting, for example, in the delay of dike strengthening and heightening projects:

'What was interesting about Limburg, as we also noticed in those interviews, was that the first layer was actually quite controversial compared to many other areas, that layer of flood prevention and dike reinforcement. It took them quite a while, well, to actually get their hands

dirty in Limburg, and they're still working on actually strengthening those barriers' (I2, personal communication, May 27th 2025).

After the flooding event, support for this measure was in some cases low, especially noticeable among citizens who have lived in flood-prone areas for a long time compared to newer residents. Those who are long-standing residents have accepted the risk of flooding, while newer residents have not and thus prefer a stricter approach to reduce the risks (I4). Also, older residents are less likely to accept the MLS approach as they view that only flood protection through dikes is sufficient to combat flooding (I1, I4). Furthermore, some view dikes as obstructing their view and thus limiting aesthetics, meaning they want to lower the norms for the heights of dikes (I1).

However, not all elements of the prevention and water awareness layer were deemed negative. The strengthening of the sponge effect of the landscape was seen as a positive suggestion:

'That was also an observation, in the retention of water, actually also in higher parts of the country, within the province. The term "sponge effect" also came up quite a bit…. And you saw quite a bit of positive support for that in Limburg' (I2, personal communication, May 27th 2025).

As well as the introduction of water labels, which were introduced by WRL in Limburg, was seen as a positive aspect:

'While there's general advice on how to better protect your home, residents indicated they were also looking for individualized advice. But what can I actually do in my situation?... We conducted over 500 of these home scans, and a pilot to also determine whether this method works. And we achieved some pretty positive results' (I9, personal communication, June 26th 2025).

Also, the new layer of recovery seemed to garner more support from citizens (I2, I3) as this phase experienced many difficulties after the flooding event:

'What I'm getting at here is that the people who are still experiencing problems, let's say, with the hassle of the Wts…. What I can say is that with the compensation for damages, it was quite a hassle to even get it right, and I haven't used it myself, but it was a real hassle just applying for it. And the problem for people who are already experiencing a lot of inconvenience is that it's a real hassle to apply for it, so they really want help with that' (I3, personal communication, June 11th 2025)

The process of damage recovery was often long and unclear in the eyes of citizens. It was especially unclear when someone would receive compensation from the Wts (I2, I3, I5).

4.3.2 Technical feasibility

In October 2022, Berenschot gathered input from 11 municipalities, 6 provinces, and 16 waterboards on the feasibility of the suggestions made by the *Beleidstafel* (D12). Commissioned by the umbrella organizations Interprovinciaal Overleg (IPO), the Vereniging van Nederlandse Gemeenten (VNG), and the Unie van Waterschappen (UvW), the assessment

investigated the clarity of the scope, the consequences, required tasks, feasibility of deadlines, preconditions for proper implementation, and risks associated with the recommendations.

In total, the feasibility of 16 out of the 21 suggestions was questioned, where feasibility could not be determined yet, or were deemed feasible under certain conditions (See Table 4). These latter suggestions will be discussed below in detail to provide insight into what is needed from municipalities, provinces, and waterboards to make these recommendations feasible in the near future (D12).

Provinces

Provinces highlighted that recommendations 11, 12, 17, and 20 were not yet feasible. They mentioned a lack of knowledge, capacity, and clarity regarding methods to perform supra-regional stress tests. Recommendations 12, 17, and 20 will only be feasible if enough funding and capacity become available to perform the tasks. These limitations would then hinder the feasibility of the set deadline. To increase the feasibility of recommendations 12 and 17, the provinces suggested merging consultation structures (Deltaprogramma Ruimtelijke Adaptatie (DPRA), Nationale Klimaatadaptatiestrategie (NAS), and Directie Bestuurlijke en Politieke Zaken (BPZ)) to streamline involved tasks and acquire additional capacity. Additionally, the provinces requested the inclusion of international partners in the performance of cross-border (supra-regional) stress tests (D12).

Municipalities

For the municipalities, the first recommendation was missing a clear description of the goal and how the recommendation relates to existing communication lines for climate adaptation. They furthermore find that increasing water awareness should be a long-standing process rather than a one-time impulse. Lastly, they require a national communication message and a translation of the toolbox to local customisation. Regarding recommendation 11, they want the opportunity to participate in the development of the guidelines and assessment framework on a voluntary basis, and ask if the platform can be integrated with *'Kennisportaal Klimaat Adaptatie'* a knowledge platform regarding climate adaptation. Lastly, the deadlines for recommendations 11 and 12 are deemed unfeasible due to new tasks. Therefore, the municipalities suggest aligning the cycles for preparing DPRA and supra-regional stress tests with the deadline for the next round being 2026 (D12).

Waterboards

For the waterboards, recommendations 5 and 12 have unfeasible deadlines. They suggest separating the implementation into imaging assessment, including research, and judgment assessment, including the dialogues about the results. For recommendation 17, the waterboards require joint management, clearer monitoring expectations, adaptation, and would like to join the Spatial Planning branch of municipalities to strengthen governance for climate. Lastly, for recommendation 18, the definition and the impact on the implementation organization are unclear, and they experience an insufficient sense of ownership (D12).

Table 4: Feasibility of the recommendations made by the Beleidstafel Wateroverlast en Hoogwater experienced by municipalities, provinces, and waterboards (Berenschot, 2022)

Themes	Recommendations	Municipalities	Provinces	Waterboards
Layer 0: Water awareness, self-reliance and acting climate adaptive	1) Develop a national toolbox to inform local and regional communication through the channels and constituencies of '*Ons Water, Samen Klimaatbestendig en Climate Adaptation Services (CAS)'*	Feasible under conditions	/	Feasibility unclear
	2) Launch a pilot program with industry organizations, including entrepreneurs who are industry leaders.	Feasibility unclear	/	/
	3) Conduct a study on the introduction of a Climate Label and/or Water Paragraph. This will raise awareness and provide actionable perspectives regarding climate extremes in the purchase and sale of homes.	Feasible	/	/
	4) Prioritise water awareness in both formal and informal education.	/	/	Feasible
	5) Intensify communication and education for	Feasibility unclear	/	Feasible under conditions

	users of areas outside the dike.			
Layer 1: Prevention – Limiting the risk of flooding	6) Strengthen the sponge effect of the landscape	Feasibility unclear	Feasibility unclear	Feasibility unclear
	7) Broaden the approach to flood risk management to a more risk-based approach	Feasibility unclear	Feasible under conditions	Feasible
	8) Take advantage of opportunities for an integrated approach to river widening and dike reinforcement	/	/	Feasibility unclear
	9) Research into improvement options for HWBP prioritization	/	/	Feasible
	10) Updating water safety instruments with associated models and statistics	/	/	Feasibility unclear
Layer 2: Consequence limitation – vulnerabilities supra-regional visualized	11) Start supra-regional stress tests and share acquired knowledge on the platform *'Wateroverlast Nederland in Kaart'*	Feasible under conditions	Feasible under conditions	Feasibility unclear
	12) Execution and role fulfilment supra-regional stress tests	Feasible under conditions	Feasible under conditions	Feasible under conditions
Governance: Climate robust Netherlands, acceleration and steering	17) Strengthen governance climate adaptation	Feasibility unclear	Feasible/feasible under conditions	Feasible under conditions
	18) Define vital and vulnerable infrastructure	Feasible/feasible under conditions	Feasibility unclear	Feasible under conditions
International: looking beyond the border	20) Perform cross-border (supra-regional) stress tests together with border regions	/	Feasible/feasible under conditions	Feasible

	21) Expand the shared knowledge base at the administrative and official levels	/	Feasibility unclear	Feasibility unclear

4.3.3 Resource adequacy

After the flooding event, the national government provided extra funding through the Deltafunds. In 2021, Rutte IV pledged €250 million extra annually for the maintenance and management of water protection infrastructure (D11). €200 million was made available within the Deltafunds to give an impulse for climate adaptation, which municipalities, provinces, and waterboards could claim until 2023 after performing a local stress test (D13). For Limburg, Rutte IV made €300 million available for measures in the Meuse's tributary valley's supplemented by the Limburg region, resulting in €600 million of funding (D13).

Despite these increases in funding, respondents indicated that the extra funding was still insufficient for research and future policy executions suggested by the *Beleidstafel,* and it is difficult to acquire the needed funds for applying new water safety measures (I1, I2, I3, I8, I11). The Deltaprogramme has also stated that they are short of €3,4 billion until 2050 (Rijksoverheid, n.d.), while €200 million for climate adaptation has already been fully allocated (I1). The *Beleidstafel* itself also foresees that in the future, more funding will be needed to prepare the Netherlands for flooding:

'In addition to capacity, financing is a key prerequisite for the implementation of the possible measures….. We must invest upfront to limit damage in the future. This investment challenge must be sharpened in the potential years, including through supra-regional stress tests' (Beleidstafel Hoogwater en Wateroverlast, 2022).

Besides financial resources, operational capacity emerged as the most pressing limitation (I1, I3, I4, I5, I6, I9): *'Parties also require the capacity to be available, and that is often limitedly available' (*I6, June 16th 2025).

According to the Deltaprogramme, this operational capacity was and is threatened by the rapidly rising prices and the decline in the supply security of basic materials, which have been affecting construction and hydraulic engineering since the outbreak of the COVID pandemic and the war in Ukraine. Also, issues arose regarding dike improvements as this requires clay material, which was hard to obtain, meaning dike improvements would fall behind in time (D14).

The municipality of Meerssen views budget and capacity as currently pressing issues to perform research tasks. The WRL also struggles with capacity issues (I4, I5, I9). There are not enough people available to perform the extra tasks that came after the flood event; therefore, these extra tasks need to be performed by the existing staff, causing extra workload. Also, the Limburg waterboard struggled with budget and capacity after the flooding event, even with the extra

budget made available by the national government and the region. Besides budget and capacity, they also experience issues with expertise and the availability of space to apply measures, resulting in too much workload:

'There was a lack of budget. There was a lack of manpower. A lack of expertise and a lack of space. Yes, we ran into bottlenecks, and that was certainly the case in the first year, so we were all quite overloaded' (I11, personal communication, July 28th 2025).

This capacity issue within the research phase will also be present in the executional phase:

'You have to search for additional capacity, and that is for sure not directly available…. However, we must make realistic plans and therefore also take these kinds of secondary circumstances into account' (I4, personal communication, June 11th 2025).

4.4 Politics stream

4.4.1 National mood

Following the July 2021 floods in the Netherlands, particularly in the Limburg region, there was an immediate surge of public empathy and solidarity (I2, I11):

'What I appreciated is what you always get in a crisis, when the whole of the Netherlands, in particular, is a team…. We've received a lot of help from all over the Netherlands, from all corners'(I11, personal communication, July 28th 2025).

In the media, the event was followed closely by constant updates on the severity of the situation and the impact on local communities. In the municipality of Land van Cuijk, a liveblog was created to give updates about the situation and to inform its residents regarding safe locations if needed (I12). After the floods, the Nationale Rampenfonds (NRF) a private foundation that takes action in case of disasters, opened up Giro 777 for donations (D15). The initiative received a total of €11.8 million, showing huge solidarity from donating citizens and businesses (D15). Also, emergency services were mobilized to help during the flood event. The Dutch army was deployed to assist in cleanup operations and repair damages (Algemene Rekenkamer, 2025).

The flooding event had a huge emotional impact to this day for those who experienced the floods. This major impact means that in the region of Limburg itself, the flooding event led to demand for better flood protection:

'The disaster was in 2021, but for some people, it's still happening today, because they still haven't fully restored their homes. Or because there are people with trauma who close their curtains when it rains extremely heavily because they don't want to see or hear it. So the impact is truly enormous. That also makes the group calling for action, for changes, for concrete improvement measures in the landscape, that's simply enormous' (I9, personal communication, June 26th 2025).

Some citizens found that the protection norms were too low. Those citizens who had objections also saw urgency in the government making changes. This led to the establishment of several action groups or citizen initiatives that strived towards changes in how flood risk management was organized. In 2021, directly after the flooding, residents of Vlodrop established the *Hoogwaterwacht Roerdalen* in collaboration with neighboring towns to better protect themselves against flooding. The organization consists of volunteers who are being trained by the waterboard to take adequate action if flooding is on the horizon (Wachtnietopwater, n.d.). Another example of an interest group is the Water-stop.NU, a group of 200 neighbors who aspire for higher protection levels (Waterstop.nu, 2025).

However, on a national level, there seemed to be less pressure for change. The Sociaal en Cultureel Planbureau (SCP), an institute that performs social-scientific policy-relevant research and reports this to the government and parliament. In the fall of 2021, they published research on the perspectives of citizens on challenges during that time (D16). The report showed that in October, citizens were mainly worried about politics in general (16%), COVID-19 (15%), income issues such as income differences and increasing costs (12%), immigration (10%), the way of living together (11%), and the housing shortage (11%). Only 8% perceived the topic of environment and climate as the biggest concern, which had only increased by two percent compared to the results presented in June of 2021 (D17). In the year afterward, in 2022, the attention to the environment and climate even declined further to 5% (D18).

4.4.2 Administrative turnover

In 2021, several administrative or legislative turnovers occurred that are worth noting. In January 2021, the Dutch cabinet Rutte III resigned over the *toeslagenaffaire*, leading to a demissionary government until the installation of a new cabinet (NOS, January 15 2021). In December 2021, the new cabinet, Rutte IV, published its coalition agreement, which contained its plans for the upcoming term of office (D11). It was also during its formation period that the floods in Limburg took place.

The new cabinet, Rutte IV, included two main shifts in ministerial posts related to climate and water policy. First, Rob Jetten from D66 was appointed as the first Minister of Climate and Energy Policy. He was responsible for climate, Dutch Emission authority, Energy policy, Climate- and Transitionfund, and Centraal Orgaan Voorraadvorming Aardolieproduction (COVA). Second, the Minister of Infrastructure and Water, part of cabinet Rutte III, Barbara Visser from VVD, was now replaced by Mark Harbers from VVD (Rijksoverheid, 2021). In 2022, Mark Harbers introduced the *Water en Bodem sturend* concept and suggested making it a leading principle in regards to the spatial planning of the Netherlands.

'What you saw nationally in government was Mark Harbers… Minister of Infrastructure and Water Management, and he had already embraced Water en Bodem sturend, so to speak, as a credo' (I2, personal communication, May 27th 2025).

The *Water en Bodem sturend* concept entails that when making changes to the Dutch spatial landscape, it is suggested to adapt the Dutch landscape to the limits of water and soil, rather

than adapting water and soil to the wishes of the Netherlands. This also touched topics such as freshwater, droughts, and heatwaves, besides flooding prevention (Rijksoverheid, 2022).

Shortly after the new minister of Infrastructure and Water Management suggested *Water en Bodem sturend* as a leading principle for the spatial planning of the Netherlands, the concept was embraced by cabinet Rutte IV in November 2022. In regard to limiting the effects of potential flooding, this meant that the goal of Rutte IV was to move towards less soil coverage to improve water drainage and take into consideration flood risk when planning for new building locations (Rijksoverheid, 2022).

4.4.3 Political ideology

Flood protection, especially in the form of primary flood defences, has always been supported by the government. This insight into the importance of flood protection has led to stability and continuity of policies directed at flood protection in the form of primary flood defences (I1, I2, I3, I4, I5, I9, I12):

'Water and water protection have never been a political issue. Everyone understands the Room for the River, dikes, and coastal protection…. Until now, all the members of the government have unanimously agreed that flood protection is an important issue for a Delta such as the Netherlands' (I1, personal communication, May 8th 2025).

During the 2021 elections, some parties dedicated attention to water safety in their manifestos, with an emphasis on droughts. However, some parties, while not as much as droughts, gave attention to flood safety (D19, D20, D21, D22). Both VVD and D66 emphasized the need for the inclusion of climate adaptation within flood risk management through spatial adaptation and the use of nature-based solutions for water mitigation (D19, D20). ChristenUnie gave the most attention to water safety, suggesting multi-functional spaces through, for example, water retention, to increase space for both flood safety and for nature and biodiversity. Investing in the Deltaprogramme, climate-resistant infrastructure, and buildings to ensure water robustness, and research towards natural climate buffers for water drainage (D21). CDA, on the other hand, did not include flood safety, especially the threat of rainfall (D22). Rather, they view the Netherlands as already flood safe and want to expand the Dutch expertise in this field to other climate issues:

'Our country became big in the joint battle against water. With windmills and polder pumping stations, we have drained the polders. The flood defences protect our country against the ocean. This combination of militancy, resourcefulness, and collaboration we require again to provide a solid contribution to the approach of climate change and the realisation of the Climate agreement of Paris' (CDA, 2021).

Thus, most political parties at that time deemed flood safety to be addressed amongst the other pressing issues. The 2021 flooding in Limburg gave heightened attention to this matter in the coalition agreement published in the winter of 2021. To work towards better water and flood safety, Rutte IV aimed at investing extra funds in the Deltafunds, continuing to invest in their

primary flood defenses, making resources available to protect the stream valleys of Limburg, speeding up the Delta decisions for a water-safe country with plentiful fresh water and a future-proof spatial planning, and emphasizing a shift from climate mitigation towards adaptation (D11):

'We do see that climate adaptation is, I'll just say it in parentheses, more popular than climate mitigation, which is more quickly dismissed, well, as it's not necessary right now. But climate adaptation is also being invested in by, well, parties who don't believe in it that much. So that's an advantage for us' (I9, personal communication, June 26th 2025).

In 2024, with the new Cabinet Schoof I, differences in framing towards flood risk management occurred. The attention towards flood risk management seemed toned down compared to the previous cabinet. This was noticeable through the difference in tone and accent as Cabinet Rutte IV was strongly advocating for the principle of '*Water en Bodem sturend',* while Cabinet Schoof I nuanced that and referred to it as taking '*Water en Bodem'* into consideration (I2, I5) in favor of a different pressing political issue on the agenda. For example, it was agreed upon that building new constructions would not be allowed in floodplains. But this advice was in some places revised in favor of the housing crisis (I2, I11):

'The policy has chosen to formulate policy in a way that takes into account the pressure of the housing construction challenge…. For example, a recent advisory report, the tourism committee, once again recommended building in the floodplains as deregulation, while we had actually ruled that out in Watermolen's administrative policy' (I2, personal communication, May 27th 2025)

However, this difference in framing between the two cabinets did not affect regional or local policy-making. It did not result in less interest towards flood risk management; rather, it meant that all agenda points would need to become more integrated and work side by side (I5).

4.4.4 Balance of interests

Flooding policy formulation has mainly been a collaborative effort. Many governments and municipalities work closely together to shape these policies. The WRL, for example, is a collaborative effort between the state, province, waterboard, and municipalities of Limburg in which they work together towards decision-making. This collaborative construct was deemed as new (I5):

'Now you have a collaborative programming phase, and that is quite unique. We don't do that often, but for this task, the WRL task, this has been embraced… You need all the abilities and resources bundled to get the desired result' (I5, personal communication, June 11th 2025).

Because flooding involves many stakeholders, the Ministry of Infrastructure and Water Management requested an evaluation to gain insight into the opinions of relevant stakeholders on potential policy directions. In this light, the Overlegorgaan Fysieke Leefomgeving (OFL) organized two gatherings, on January 13th and September 23rd, 2022, to gain insights into stakeholder opinions on the suggestions made by the first and second versions of the

Beleidstafel. The stakeholders included Casade, municipality Land van Cuijk, Hiswa Recron, KNMI, Koninklijke Binnenvaart Nederland (KBN), Vereniging voor Energie en Water, and Wereld Natuur Fonds (WWF) (D23, D24).

While all had different opinions, the participating stakeholders agreed that changes are necessary to prevent such a flooding event from occurring in the future and provided many inputs to reach this goal:

'That was actually the general call throughout every meeting we had. It is absolutely necessary that sense of urgency was very high among the stakeholders, and the call was: do something!' (I10, personal communication, July 17th, 2025).

This unified statement between the stakeholders made that the collaboration efforts went smoothly:

'So there was absolutely no resistance. I didn't encounter any resistance. They were very happy to have their say' (I10, personal communication, July 17th 2025).

The inclusion of citizen participation within the process of flooding policy formulation has also been enhanced, partially due to the *Omgevingswet (Dutch law regarding the development and management of the living environment)* requirement for broader involvement (I4). Citizens are given the opportunity to share their opinions and ideas regarding flood risk management in conversations with, for example, municipalities and WRL (I1, I3, I4, I5). These collaborative efforts after the flooding event between citizens have been evaluated as positive by both sides (I3, I4, I5). The municipality of Meerssen created scripts regarding precautionary measures with input from its citizens (I3). The Province of Limburg gained input from its citizens through working sessions where citizens could give suggestions for possible policy solutions, and they held polls to gain insight into what citizens find important. Furthermore, they include citizens in all the phases of policy formulation (I4). WRL organized online polls with statements regarding possible policy solutions to reach a wider audience, especially the younger generation that is underrepresented in participation meetings (I9), and it includes citizens in thinktanks throughout the whole process regarding projects. In several municipalities in the Geul area, WRL organized participation meetings for citizens to give their input on the possibilities for flood risk management:

'So no one knows the area as well as the people who live there. Some have lived there for decades, so they know exactly how high the water can rise, what damage it will cause, where the bottlenecks are, and what solutions are available' (I9, personal communication, June 26th 2025).

Despite collaborative efforts between stakeholders and citizens, some mismatches are present between various stakeholders. Within the Limburg waterboard, there is an overrepresentation of the political party CDA, who favor the interests of the farmers and project developers (I7). These farmers have other priorities which can contrast with certain water safety measures, making collaboration in some cases difficult (I9). The interests of the farmers have resulted in the prevention of certain measures:

'So, in Central and North Limburg, there were people who didn't want the dike raised…. So, because interest groups there, and especially farmers, approached and influenced the CDA, Limburg lowered the standard to one to 25' (I7, personal communication, June 18th 2025).

4.5 Policy entrepreneurs

Various PEs seemed to be present in trying to push for changes within flooding policies and flood risk management strategies. These PEs seemed to express themselves in collective ways rather than individually. Thus, the PEs mentioned were not individual beings but rather groups. These PEs were mainly present on a regional and local scale, operating in the province of Limburg, which was affected by the flooding. On a more national level, the presence of PEs who tried to influence the agenda on the topic of flooding and flood risk management seemed absent. Furthermore, the policy entrepreneurial groups in Limburg were often initiated by citizens themselves. Very shortly after the flooding event, several citizen initiative groups were started: Waterstop. nu and Samen tegen Water. These citizen initiatives aimed for better protection and faster implementation of these measures (I3, I4, I5).

One prominent policy entrepreneurial group is Waterstop.nu. It is officially a foundation established right after the flooding event by those affected. Their goal is to prevent such a flooding event from happening again in the future by improving the organizations involved in flood risk management (I11). To reach this goal, they strive for a central supervisor responsible for the direction of water management, which has not been established yet:

'There's no oversight like you do in other industries, like a supervisory body or a department that inspects. That's completely absent in water management. Everyone inspects themselves and thinks they are doing well. And if you take safety as a starting point, you see that these organizations don't actually make any progress because they're constantly focused on their budgets, their own objectives, or their own interests. And we actually believe that the safety of citizens should come first' (I7, June 18th 2025).

One of their strategies to make a change within flood risk management includes lobbying and being present in thinktanks of WRL (I9), in the waterboard, and *Rijkswaterstaat* (I7):

'We're present at everyone's table. You simply have to constantly work at that, because otherwise, agencies tend to talk about citizen participation... But in reality, you're making things difficult for them, because they can't just do whatever they wish. So, by being constantly present, you have to make it clear that there are indeed different opinions from the ones they all believe in' (I7, personal communication, June 18th 2025).

Waterstop. nu receives donations and has several sponsors to finance its foundation. In 2024, they had one major sponsor from Rabobank, which gave them the possibility to make use of an engineering agency (I7). They also invest a lot of their free time and knowledge into their founding group, and have better connections to gain influence or spread their opinions (I9). However, despite their resources and strategies, they do not see many of their efforts to change being implemented:

'It's June now, so in three weeks it will have been four years. And supposedly very little has happened' (I7, personal communication, June 18th 2025).

According to the Province of Limburg, PEs managed to successfully influence policy-making. Through their persistence in making their point and by visiting regional and local politicians or policymakers to present their ideas (I3, I4). The persistence of these groups has, in some cases, led to these groups being given a voice by being included in discussions or thinking groups with policymakers to introduce their ideas and opinions (I4, I5). Policymakers have tried to partially accommodate the wishes of these groups that were realistically feasible with the available resources, through discussions and conversations:

'We've consulted and coordinated with them extensively over the past period. But those three factions (Waterstop.NU, Platform Geul, Samen tegen Wateroverlast) also get a place in a consultative group of residents across the entire river basin. So in that way, we try to give those roles a position in the decision-making process. They're not the ones making the decisions, of course, but they do have influence to contribute their thoughts and ideas' (I4, personal communication, June 11th 2025).

Besides, citizen groups, a lobby was started from a cultural-historical perspective. Their goal was to better protect cultural-historical objects and monuments by advocating for standardized protection norms for such objects and monuments. Often, these are located in areas prone to flooding and thus are not well protected against flooding (I5). The Limburg Waterboard experienced lobbying from nature groups, where nature organizations strongly lobby for concepts such as building with nature and try to influence policy by being present at thinktanks by voicing their interests (I11).

However, the wishes of these various entrepreneurial groups could not always be entirely accommodated due to certain obstacles. The goal of the cultural-historical lobby to have protection norms for cultural-historical objects and monuments was not entirely possible, as this would be too difficult to implement in practice (I5). But the policymakers have really tried to accommodate their ideas, which have been taken into consideration in the new '*Omgevingsvisie*' *(Integrated vision with strategic main choices of policy for the living environment for the long-term)* and will further try to map how their wishes can be accommodated further (I5). Also, the interests of nature groups clash with the protection of citizens against the consequences of flooding, making it unfeasible:

'You also see them trying to lobby very powerfully in politics to support their policy of, "Yes, we have to build with nature, that's very important." Yes, I think that's important too. But what do you do then? What's the right decision? Are you going to fill the entire gully valley with trees? Yes, because that slows down the water, they say. Yes, I understand, that's true, I'm not against it. But when high water comes, a lot of trees will fall' (I11, personal communication, July 28th 2025).

4.6 Policy window

The flooding event can be viewed by some as a push for several changes in flooding policy and flood risk management strategies (I1, I2, I4, I8). It is mentioned how often a crisis is needed as a catalyst for change:

'It often happens that something has to happen first, and a disaster has to happen before action is taken. The major rivers are better protected with the "Room for the River" program, which isn't quite finished yet, but is very advanced. But the fact that "Room for the River" was actually needed, even for the regional water system, was something no one had really considered… So, in that sense, the 2021 floods, aside from the extensive damage, have also ensured that we're working tirelessly to prevent this from happening again as much as possible' (I8, personal communication, June 23rd 2025).

The flooding event accelerated the urgency towards specific flooding measures, for example, climate adaptation and nature-based solutions (I1, I2). It also brought about the involvement and support of other sectors, such as the financial sector, which is willing to explore the possibility of insurance systems for flooding and play a role in creating water awareness among Dutch citizens (I1, I2):

'Well, I think it's really made a difference in terms of the Delta Program and its connection to the financial sector, and I definitely see that as lasting. So, the fact that an NL Triple A movement has emerged in the financial sector, I strongly relate that to this event' (I2, personal communication, May 27th 2025).

However, not all see the flooding event as a catalyst for change within flooding policies, rather it brought a change in the perception of flood risk: *'I think it wasn't so much due to the flooding in Limburg, but rather the realization that things can go wrong, and that you can't always fix everything, and even beyond the models, a situation can arise.'* (I1, personal communication, May 27th 2025). Furthermore, some view that the flooding event did not specifically lead to the changes in MLS. It might have accelerated it and given it more urgency, but it has not led to the expansion: *'Yes, that already existed somewhat, the multi-layered safety policy, so it did gain momentum. But, it wasn't really new. It had already been around for a year, or maybe even 10 years or so?'* (I5, personal communication, June 11th 2025).

5.0 Discussion

This chapter will specifically discuss the points that stood out in the results chapter and how these relate to existing literature. In total, three notable points will be discussed, including whether the flooding event can be seen as a shock event, whether the changes made after the flooding event can be described as critical junctures, and the role of actors within these changes.

5.1 Is it a shock event?

Shock events exhibit three characteristics as discussed in the literature review. An event can be seen as a shock event when (1) the event is unanticipated or unexpected by the actors involved, (2) the event results in dramatic and major disruption to current conditions, and (3) the event occurs suddenly and thus is different from evolving or slow-moving processes of change (Gordell & Volgy, 2022). When looking at these characteristics of a shock event, it seems that the 2021 flooding meets all three requirements. In the interviews, it was mentioned by almost all participants that the flooding was not something that was foreseen. This was due to the fact that this event was not predicted by models such as those from KNMI, thus indicating a mismatch between the models and reality. Furthermore, the flooding event was very sudden due to the heavy rainfall that occurred very abruptly. Thus, it was not an evolving or slow-moving process but an abrupt one in the form of heavy precipitation. Lastly, the flooding event caused many financial and physical damages in the Limburg region. Also, it caused much mental distress in those affected by the flooding, with some still affected by the event to this day. The flooding event caused the government to declare it a crisis, which is very uncommon. These points indicate that the 2021 flooding event led to major disruptions to the conditions of that time. The presence of all the characteristics of a shock event within the 2021 flooding event can thus indicate that it can be seen as a shock event.

5.2 Is it a critical juncture?

As discussed in the literature review, a shock event can, in some cases, act as a trigger for critical junctures, acting as opportunities for change within policies, including flood risk management strategies, as these shock events can heighten attention towards a policy problem when presenting inadequacies of existing policies. The previous discussion on whether the 2021 flooding event can be categorized as a shock event showed that the flooding event exhibited all three characteristics to be deemed a shock event. Thus, it will be discussed whether, as the literature indicates, a shock event can lead to a critical juncture within policies.

The introduction of the *Beleidstafel Wateroverlast en Hoogwater* directly after the 2021 flooding in Limburg demonstrates how this event has acted as a focusing event and catalyst for policy change suggestions in the field of flood risk management in the Netherlands. The addition of the water awareness and recovery layer is especially noteworthy, as this makes the Dutch MLS model align more with the international version. Internationally, the MLS model often includes water awareness and recovery, which, before the flood, was not explicitly part of the Dutch MLS model. The Dutch model consisted of protection, limitation of consequences, and crisis management. Despite the three layers that previously encompassed the MLS model of the Netherlands, the first layer of protection has always been more dominant than the other layers. This indirectly also became noticeable through the interviews and the evaluation reports that were published after the flooding event. For example, it was only after the flooding event that it was decided to develop an Early Warning System as part of crisis management. Also, many evaluation reports pointed to improvement points within the crisis management layer.

Furthermore, it was indicated that climate adaptation was given a bigger role, for example, the *Water en Bodem sturend* initiative was implemented after the flooding event. Thus, the flooding event, besides the expansion of the layers, also led to a more balanced existence of the existing layers.

These changes within the Dutch MLS model seem to point towards a critical juncture within flood risk management practices, set in motion by the flooding event. As discussed in the literature review, critical junctures can be referred to as abrupt changes in which institutions decide to follow a new path that is significantly different from what has always been done in the past. While the progress reports of the *Beleidstafel* show that the implementation in practice is not instant, due to the need for research beforehand, the suggested ideas themselves show major changes within Dutch flood risk management. As mentioned earlier, the expansion of the Dutch MLS concept demonstrates a deviation from what has been the mainstream path of the Netherlands since its introduction in 2009. Furthermore, moving away from the protection layer as the dominant approach, and giving more space for the limitation of consequences and crisis management, can also be regarded as a major deviation from the organization of Dutch flood risk management.

5.3 The role of actors

Critical junctures also have a role for agency by various actors to push policy in a direction that favors a specific actor. The results expressed the role of PEs in policy change within Dutch flood risk management. The flooding event itself gave rise to certain PEs who wished for certain changes in flood risk management. These PEs are organized more in a collective manner rather than at the individual level. These groups, such as Waterstop.NU was additionally more active on the local level of Limburg, rather than on the national level. The PEs used various strategies in line with the strategies identified by Meijerink and Huiema (2010). The development of new ideas and recognizing, exploiting, creating, and/or manipulating multiple venues seemed to be the strategies that were used by Waterstop.NU, Samen tegen Water or other PEs. For example, Waterstop.NU wished to change flood risk management in Limburg by presenting new ideas in the form of a central supervisor responsible for the direction of water management. Furthermore, they were present in lobbying activities and various thinktanks of, for example, the Province of Limburg and various municipalities to voice their opinions. Both strategies point towards specifically venue shopping and manipulating existing venues as they try to choose certain venues and send a representative to participate in thinktanks to try to change the policy direction.

Besides the role of PEs, other actors have also been shown to play a role in the policy direction of flood risk management. These include the residents of Limburg and the political field itself. It became clear that residents had certain visions of certain flood risk management strategies. Some had, for example, opposition towards dike heightening, or others did not immediately embrace the concept of MLS. But if their opinions on flood risk management strategies affected policies, it did not become clear. However, various interviews indicated that residents were given a bigger role in the policy process formation through think groups or surveys. But, the wishes of residents cannot always be fulfilled as these cannot always be realistically performed

by policymakers in practice due to, for example, budget constraints or lack of personnel. Likewise, the political sphere seems to play a major role in steering the direction of Dutch flood risk management. Although the Dutch national government has always supported flood protection, it became clear that the change from cabinet, from Rutte IV to Schoof I, meant that the principles of the *Water en Bodem sturend* concept became more nuanced due to competing political agenda points, such as the housing crisis.

1.0 Conclusion

6.1 Research questions

In the final chapter, the research questions will be answered, the limitations of this research will be discussed, and possible suggestions for future research will be described. In the introduction, two main research questions were presented: (1) How has flood risk management evolved after the 2021 flooding event in the Netherlands? And (2) How did the evolution in the form of policy stability and change of flood risk management emerge after the 2021 flood event? The second research question also consists of sub-questions that will be answered separately.

6.1.1 How has flood risk management evolved after the 2021 flooding event in the Netherlands?

Following the flooding event, the *Beleidstafel Wateroverlast en Hoogwater* was initiated by the Ministry of Infrastructure and Water Management, which made various suggestions to improve Dutch flood risk management. Two suggestions stood out and seemed transformative. These suggestions included the expansion of the MLS concept from the existing three layers to five layers, through the addition of a water awareness and recovery layer. Furthermore, the flooding event demonstrated how flooding can also occur in the secondary water systems; therefore, it was recommended that Dutch flood risk management practices should be applied to the secondary water system as well, besides the main water system. For each suggestion made, differences in progress could be detected, as each suggestion has a different timeline for completion. Progress on all the suggestions also seemed to be initiated quite quickly after the final suggestions were published. However, many of the progress points more towards being in a research or development phase rather than already being implemented. Some points have already been partially implemented. Thus, some suggestions have made great progress, while others need more time to be completed.

6.1.2 How did the evolution in the form of policy stability or change of flood risk management emerge after the 2021 flood event?

Subquestion 1: How was the flooding event and Dutch flood risk management framed?

The flooding was a sudden and unexpected event. This unexpectedness can be linked to the fact that the source of the flooding, the extreme rainfall, was a new phenomenon and not predicted by the models in place. The KNMI, for example, did not predict such rainfall in its climate scenarios published in 2014. Another factor that contributed to the unexpectedness is the failure of measuring stations caused by the heightened water levels, making it difficult to receive accurate water level measurements. Thus, the fact that flooding can happen so unexpectedly through rainfall and will likely occur more frequently in the future, created the realization that in the future, the Netherlands will need to learn to live with water, rather than trying to prevent it.
Despite the unexpectedness, the event received heightened attention, despite other competing political agenda points. At the time, COVID-19 was still ongoing, but this matter was pushed to the background to make space for the flooding event. Additionally, several evaluation reports were published after the flooding event to help improve future flood risk management, especially within crisis management and the recovery phase.

Subquestion 2: How viable are the policy suggestions made within Dutch flood risk management after the flood event?

After the flooding event, localized pressure seemed to rise for change within flood risk management in the form of action groups or citizen initiatives. Citizens are also given a bigger role in the process of policy formation, and relevant stakeholders have indicated a sense of urgency to do something regarding flood risk management practices. Despite the severity of the flooding event, opposition towards certain flood risk management strategies, such as dikes, could be detected among citizens with a clear distinction between, for example, long-standing residents and newer residents. But other strategies seemed more accepted among the public and policymakers, such as the concept of sponge retention, the introduction of water labels, and the addition of the recovery layer as part of the MLS.

Furthermore, a report from Berenschot showed how municipalities, provinces, and waterboards had different views on the feasibility of suggestions made by the *Beleidstafel.* 7 out of the 21 suggestions were not entirely feasible yet in the eyes of the municipalities, provinces, or waterboards. To possibly make these suggestions feasible, the municipalities, provinces, and waterboards made suggestions in order for the suggestions to be performed by them. Also, difficulties were mentioned regarding having enough resources to perform all the needed measures in the form of budget, personnel, and expertise. Despite extra budget being made available by the national government through the Deltafunds, it became clear that the budget could become an issue. Also, extra personnel and expertise would be needed to perform all the measures, which could also become a barrier in the future.

Subquestion 3: What was the public and political opinion on the flood and Dutch flood risk management?

The national government maintained great support for flood risk management, especially flood protection. Initially strengthened by the new coalition, Rutte IV, established fairly soon after the flooding event occurred, with the promise to give more attention to flood safety in its coalition agreement, and the *Water en Bodem sturend* principle. Many political parties in Rutte IV also paid separate attention to improving flood safety in their party manifestos. However, a shift in political priorities occurred after the establishment of Schoof I. *Water en Bodem sturend* became more nuanced compared to the previous coalition in favor of other political agenda points, such as the housing crisis.

Subquestion 4: What was the role of policy entrepreneurs in shaping Dutch flood risk management after the flood event?

PEs were present on the collective level through action groups operating on the local scale of the affected Limburg. One prominent group is Waterstop.NU, which strives for a central supervisor responsible for the direction of water management. To reach their goal, they use various strategies and resources. They receive donations, for example, from the Rabobank. They used strategies such as venue shopping and manipulating these existing venues by being present at sessions from WRL or other organizations and lobbying. Also, lobbies were initiated from a cultural-historical perspective, which wished for better protection of cultural-historical objects and monuments, and nature organizations, which opposed certain measures in favor of nature protection. Despite the efforts of the various groups, their success seemed limited in impacting the direction of policy in their favor.

Subquestion 5: How did the streams, with the help of potential policy entrepreneurs, facilitate or hinder changes within Dutch flood risk management?

The flooding event led to a window of opportunity by highlighting shortcomings within flood risk management, gaining widespread attention, receiving political support and pressure from citizens and stakeholders, prompting major suggestions for change within the MLS concept. While some solutions were new introductions, others were already on the agenda before the flooding occurred, but led to an acceleration of these initiatives. However, while in reality, not all suggestions have been implemented yet, as this takes time, some obstacles can be mentioned that can hinder the implementation process. These obstacles include adequate resources in the form of budget, personnel, and expertise to execute the suggested policies; as well as opposition towards certain measures from citizens themselves or certain action groups. But the heightened inclusion of citizens in the formulation process of the policies might reduce this opportunity.

6.2 Limitations

In the following section, various limitations that arose during the research process will be discussed. First, the initial idea was to conduct research in a comparative setting, including Germany, which was more strongly affected by the flooding than the Netherlands. However,

due to time limitations, difficulty gaining access to the right data, and difficulty finding respondents from Germany, it was decided to focus on the Netherlands only. In the Netherlands, governmental documents are widely publicly accessible online. However, only focusing on one country creates a methodological limitation, as comparing policy change among multiple countries could have given an additional insight into how countries respond to flood events. This limits the generalizability of results to other governance systems, such as Germany or Belgium, both of which were affected by the same flood.

A second methodological limitation arises when looking at the interview process. Insights are based on a limited number of interviews, as in total, 12 interviews were conducted due to a low response rate, while the minimum goal was to conduct 14 interviews. Furthermore, most respondents held governmental positions. This limits the views of other positions that might have been of value, and thus may not fully capture the diversity of perspectives. For example, only one policy entrepreneur was interviewed, while there are more who could have given their perspectives. Also, the view of residents themselves could have been included, as they could have given valuable insight into the 'national mood'.

Third, the temporal scope of the research also poses a limitation. While several years have passed since the flooding event that occurred in 2021, it can still be seen as a relatively fairly event. This means that only changes in the short term could be observed, while long-term changes in Dutch flood risk management cannot be observed yet. As policies are often not implemented immediately, but require time for their development, policy change in terms of actual implementation might not be or limitedly observed in the short-term, but may be seen when taking a long-term perspective.

Lastly, this research has been conducted using the MSF. This framework proved to be useful in examining agenda-setting in the form of policy stability and change within Dutch flood risk management, and the various dimensions that played a role in forming the agenda-setting. However, the MSF does not capture structural institutional factors such as rules, path dependency, and power dynamics, like other frameworks do. Therefore, in the future, it would be more suited to combine the framework with others that do capture these factors, such as the Politicized Institutional Analysis and Development Framework, the Punctuated Equilibrium Theory, and the Advocacy Coalition Framework.

6.3 Recommendations for Future Research

6.3.1 Research recommendations

The results and limitations presented earlier provide several directions for future research that will be introduced below. First, the focus on only one country affected by the 2021 flooding can be expanded to also look at the institutional responses of Germany and Belgium. Scholars can look into whether and how these countries have adapted policies to reduce future flood risk. Also, researching how these policy changes reached the political agenda can provide valuable insight into the facilitators, but also the barriers towards certain policy suggestions. This insight

can potentially help governments to overcome these barriers and improve flood risk management.

Second, scholars can enhance perspectives on Dutch flood risk management after the flooding event by solely focusing on the specific role of PEs or by further including the vision of residents and additional stakeholders linked to flood risk management. Other PEs that have been mentioned by interviewees but have not been interviewed, such as Samen tegen wateroverlast, the cultural-historical lobby, and the nature groups. Also, stakeholders that were approached by OFL to provide insight into their opinions regarding the suggestions made by the *Beleidstafel Wateroverlast en Hoogwater* can give a more diverse perspective on how stakeholders of Dutch flood risk management view potential policy change.

Lastly, future research can be done by entailing a more long-term setting by conducting research in a later phase, when all suggestions made by the *Beleidstafel Wateroverlast en Hoogwater* are implemented. This can really indicate policy stability and change more clearly, as it can demonstrate which suggestions have actually been implemented and which have not. Also, if in the case that some policies have not been adopted, the reasoning behind this decision can be researched. This can help gain insight into potential barriers to implementing certain measures and how these can be overcome.

6.3.2 Policy recommendations

This research suggests policy recommendations to lower barriers towards flood risk management changes to improve future flood resilience further. First, investing in sufficient resources in the form of funding and personnel is essential for the execution of the *Beleidstafel* recommendations. Thus, research is needed to look into creative ways to acquire the needed additional funds, which can also be applied to personnel. This is, for example, already initiated by the Deltaprogramme of 2024, which suggested an exploration of how to gain structural funding for climate adaptation. Second, citizen opposition towards certain flood risk management measures can be addressed by gaining insight into opinions through surveys or polls and incorporating the benefits of measures within water awareness campaigns to heighten transparent knowledge on flood risk management. Furthermore, while the Dutch political sphere has always dedicated support towards water safety and flood protection in general, differences could be detected within coalitions. To ensure that attention towards water safety is never diminished, the *Water en Bodem sturend* concept should remain embedded by, for example, institutionalizing it into legal instruments.

7.0 Sources

Albright, E. A. (2011). Policy change and learning in response to extreme flood events in Hungary: An advocacy coalition approach. *Policy studies journal*, *39*(3), 485-511.

Algemene Rekenkamer. (2025). *Factsheets Wateroverlast Limburg* [PDF]. Retrieved from AR+Factsheets+Wateroverlast+Limburg (1).pdf

Allaire, M. (2018). Socio-economic impacts of flooding: A review of the empirical literature. *Water Security*, *3*, 18-26.

Amenta, E., & Ramsey, K. M. (2010). Institutional theory. *Handbook of politics: State and society in global perspective*, 15-39.

Arts, B., Leroy, P., & Van Tatenhove, J. (2006). Political modernisation and policy arrangements: a framework for understanding environmental policy change. *Public organization review*, *6*, 93-106.

Bardach, E. (2006). Policy dynamics. *The Oxford handbook of public policy*, 336-366.

Baumgartner, F. R., & Jones, B. D. (2002). *Policy dynamics*. University of Chicago Press.

Baumgartner, F. R., Jones, B. D., & Mortensen, P. B. (2018). Punctuated equilibrium theory: Explaining stability and change in public policymaking. *Theories of the policy process*, 55-101.

Béland, D. (2009). Ideas, institutions, and policy change. *Journal of European public policy*, *16*(5), 701-718.

Béland, D., & Howlett, M. (2016). The role and impact of the multiple-streams approach in comparative policy analysis. *Journal of comparative policy analysis: research and practice*, *18*(3), 221-227.

Bell, S. (2002). *Institutionalism: Old and New.* University of Queensland.

Birkland, T. A. (1997). *After disaster: Agenda setting, public policy, and focusing events*. Georgetown University Press.

Bosoni, M., Tempels, B., & Hartmann, T. (2023). Understanding integration within the Dutch multi-layer safety approach to flood risk management. *International Journal of River Basin Management*, *21*(1), 81-87.

Brouwer, S., & Huitema, D. (2018). Policy entrepreneurs and strategies for change. *Regional Environmental Change*, *18*, 1259-1272.

Capoccia, G. (2015). Critical junctures and institutional change. *Advances in comparative-historical analysis*, *147*, 147-179.

Capoccia, G. (2016). Critical junctures. *The Oxford handbook of historical institutionalism*, 89-106.

Capoccia, G., & Kelemen, R. D. (2007). The study of critical junctures: Theory, narrative, and counterfactuals in historical institutionalism. *World politics*, *59*(3), 341-369.

Cardoso, P. G., Raffaelli, D., Lillebø, A. I., Verdelhos, T., & Pardal, M. A. (2008). The impact of extreme flooding events and anthropogenic stressors on the macrobenthic communities' dynamics. *Estuarine, Coastal and Shelf Science*, *76*(3), 553-565.

Chan, J. K. H., & Liao, K. H. (2022). The normative dimensions of flood risk management: Two types of flood harm. *Journal of Flood Risk Management*, *15*(2), e12798.

Collier, R. B., & Collier, D. (1991). Critical junctures and historical legacies.

Dacin, M., Goodstein, J., & Scott, W. (2002). Institutional theory and institutional change: Introduction to the special research forum. *Academy of management journal*, *45*(1), 45-56.

De Bruijn, K. M., Jafino, B. A., Merz, B., Doorn, N., Priest, S. J., Dahm, R. J., ... & Comes, T. (2022). Flood risk management through a resilience lens. *Communications Earth & Environment*, *3*(1), 285.

Deltares. (2023). *Gevolgen overstromingen Limburg: Inventarisatie en duiding*. Retrieved from https://publications.deltares.nl/11207700_007_0011.pdf

De Waal, R. (2021). *Sky image of Limburg flooding* [online photo]. Metro Nieuws. Retrieved from https://www.metronieuws.nl/in-het-nieuws/binnenland/2021/07/10-miljoen-euro-overstromingen-limburg/

Dieperink, C., Hegger, D. L., Bakker, M. H. N., Kundzewicz, Z. W., Green, C., & Driessen, P. P. J. (2016). Recurrent governance challenges in the implementation and alignment of flood risk management strategies: a review. *Water Resources Management*, *30*, 4467-4481.

Dovers, S. R., & Hezri, A. A. (2010). Institutions and policy processes: the means to the ends of adaptation. *Wiley interdisciplinary reviews: climate change*, *1*(2), 212-231.

Driessen, P. P., Hegger, D. L., Kundzewicz, Z. W., Van Rijswick, H. F., Crabbé, A., Larrue, C., ... & Wiering, M. (2018). Governance strategies for improving flood resilience in the face of climate change. *Water*, *10*(11), 1595.

EM-DAT & UCLouvain. (2024). Global reported natural disasters by type: 1900-2024 [graph]. Ourworldindata. Retrieved from https://ourworldindata.org/grapher/natural-disasters-by-type

Expertisenetwerk Waterveiligheid [ENW]. (2021). *Hoogwater 2021: Feiten en Duiding.* Retrieved from file:///C:/Users/amkel/Downloads/211102_enw_hoogwater_2021-dv-def%20(1).pdf

Endendijk, T., Botzen, W. W., De Moel, H., Aerts, J. C., Duijndam, S. J., Slager, K., ... & Kok, M. (2023). Experience from the 2021 floods in the Netherlands: household survey results on impacts and responses. *Authorea Preprints*.

European Commission. (n.d.). *Climate change, river flooding and adaptation.* Joint research centre EU. Retrieved from https://joint-research-centre.ec.europa.eu/system/files/2020-09/05_pesetaiv_river_floods_sc_august2020_en.pdf

Fekete, A., & Sandholz, S. (2021). Here comes the flood, but not failure? Lessons to learn after the heavy rain and pluvial floods in Germany 2021. *Water*, *13*(21), 3016.

Fife, S. T., & Gossner, J. D. (2024). Deductive qualitative analysis: Evaluating, expanding, and refining theory. *International Journal of Qualitative Methods*, *23*, 16094069241244856.

Florensa, M. C. (2004). Institutional stability and change: A logic sequence for studying institutional dynamics. In *The Tenth Biennial Conference of the International Association for the Study of Common Property (IASCP), Oaxaca, Mexico* (pp. 9-13).

Garrelts, H., & Lange, H. (2011). Path dependencies and path change in complex fields of action: climate adaptation policies in Germany in the realm of flood risk management. *Ambio*, *40*, 200-209.

Gordell, K. M., & Volgy, T. J. (2022). Political shocks in foreign policy and international politics: An alternative approach. *Canadian Foreign Policy Journal*, *28*(2), 109-126.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research*, *2*(163-194), 105.

Güneralp, B., Güneralp, İ., & Liu, Y. (2015). Changing global patterns of urban exposure to flood and drought hazards. *Global environmental change*, *31*, 217-225.

Gunn, A. (2017). Policy entrepreneurs and policy formulation. In *Handbook of policy formulation* (pp. 265-282). Edward Elgar Publishing.

Hall, P. A., & Soskice, D. (2001). An introduction to varieties of capitalism. *Debating varieties of capitalism: A reader*, 21-74.

Hegger, D. L. T., Driessen, P. P. J., Wiering, M., Van Rijswick, H. F. M. W., Kundzewicz, Z. W., Matczak, P., ... & Ek, K. (2016). Toward more flood resilience: Is a diversification of flood risk management strategies the way forward? *Ecology and Society*, 21(4).

Herweg, N., & Zahariadis, N. (2018). The multiple streams approach. *The Routledge handbook of European public policy*, *1*, 32-41.

Hirabayashi, Y., Mahendran, R., Koirala, S., Konoshima, L., Yamazaki, D., Watanabe, S., ... & Kanae, S. (2013). Global flood risk under climate change. *Nature climate change*, *3*(9), 816-821.

Hitz, S., & Smith, J. (2004). Estimating global impacts from climate change. *Global Environmental Change*, *14*(3), 201-218.

Hodgson, G. M. (2006). What are institutions?. *Journal of economic issues*, *40*(1), 1-25.

Huitema, D., & Meijerink, S. (2010). Policy entrepreneurs and change strategies: Lessons from sixteen case studies of water transitions around the globe. *Ecology and Society*, 14(2).

Intergovernmental Panel on Climate Change [IPCC]. (2023). *Climate change 2023 Synthesis Report: Summary for Policymakers.* IPCC. Retrieved from https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

Johnson, C. L., Tunstall, S. M., & Penning-Rowsell, E. C. (2013). Floods as catalysts for policy change: historical lessons from England and Wales. In *Water and Disasters* (pp. 21-35). Routledge.

Johnstone, P., & Schot, J. (2023). Shocks, institutional change, and sustainability transitions. *Proceedings of the National Academy of Sciences*, *120*(47), e2206226120.

Jones, M. D., Peterson, H. L., Pierce, J. J., Herweg, N., Bernal, A., Lamberta Raney, H., & Zahariadis, N. (2016). A river runs through it: A multiple streams meta-review. *Policy studies journal*, *44*(1), 13-36

Jongman, B., Ward, P. J., & Aerts, J. C. J. H. (2012). Global exposure to river and coastal flooding: Long term trends and changes. *Global Environmental Change*, 22(4), 823–835.

Jonkman, S. B., de Moel, H., Moll, R., & Slager, K. (2023). Editorial for the Special issue on "2021 Summer Floods in Europe". *Journal of Coastal and Riverine Flood Risk*, *2*.

Jonkman, S. N., Curran, A., & Bouwer, L. M. (2024). Floods have become less deadly: an analysis of global flood fatalities 1975–2022. *Natural Hazards*, 1-16.

Kaufmann, M., Doorn-Hoekveld, W. V., Gilissen, H. K., & Van Rijswick, H. M. W. (2016). *Analysing and evaluating flood risk governance in the Netherlands: drowning in safety*. Utrecht: STARFLOOD Consortium.

Kaufmann, M., Lewandowski, J., Choryński, A., & Wiering, M. (2016). Shock events and flood risk management: a media analysis of the institutional long-term effects of flood events in the Netherlands and Poland. *Ecology and society*, *21*(4).

Kaufmann, M., Mees, H., Liefferink, D., & Crabbé, A. (2016). A game of give and take: The introduction of multi-layer (water) safety in the Netherlands and Flanders. *Land Use Policy*, *57*, 277-286.

Kennisdomein. (2022). *Dijken in Nederland*. Retrieved from https://www.kennisdomein.nl/wereld/dijken-in-nederland/

Kingdon, J. W. (1984). Agendas, alternatives and public policies. Boston: Little Brown.

Kingdon, J. W. (1995). *Agendas, Alternatives, and Public Policies*.

Klijn, F., Kreibich, H., De Moel, H., & Penning-Rowsell, E. (2015). Adaptive flood risk management planning based on a comprehensive flood risk conceptualisation. *Mitigation and adaptation strategies for global change*, *20*, 845-864.

Knill, C., & Tosun, J. (2012). Governance institutions and policy implementation in the European Union. *Constructing a policy-making state*, 309-333.

Koebele, E. A. (2021). When multiple streams make a river: analyzing collaborative policymaking institutions using the multiple streams framework. *Policy Sciences*, *54*(3), 609-628.

Koelewijn, A., Pol, J., & van Schaijk, M. (2023). Performance of flood defences in the Netherlands during the 2021 Summer floods. *Journal of Coastal and Riverine Flood Risk*, *2*, 7.

Kolen, B., Maaskant, B., & Hoss, F. (2010). Meerlaagsveiligheid: Zonder normen geen kans. *Ruimtelijke veiligheid en risicobeleid*, *2*, 18-25.

Koning, E. A. (2016). The three institutionalisms and institutional dynamics: Understanding endogenous and exogenous change. *Journal of Public Policy*, *36*(4), 639-664.

Kreibich, H., Van Loon, A. F., Schröter, K., Ward, P. J., Mazzoleni, M., Sairam, N., ... & Di Baldassarre, G. (2022). The challenge of unprecedented floods and droughts in risk management. *Nature*, *608*(7921), 80-86.

Kron, W. (2005). Flood risk= hazard• values• vulnerability. *Water international*, *30*(1), 58-68.

Kryžanowski, A., Brilly, M., Rusjan, S., & Schnabl, S. (2014). Structural flood-protection measures referring to several European case studies. *Natural hazards and earth system sciences*, *14*(1), 135-142.

Kundzewicz, Z. W., Hegger, D. L. T., Matczak, P., & Driessen, P. P. J. (2018). Flood-risk reduction: Structural measures and diverse strategies. *Proceedings of the National Academy of Sciences*, *115*(49), 12321-12325.

Leroy, P., & Van Tatenhove, J. (2000). Political modernization theory and environmental politics. In *Environment and global modernity* (pp. 187-208). SAGE Publications Ltd.

Liefferink, D. (2006). The dynamics of policy arrangements: turning round the tetrahedron. In *Institutional dynamics in environmental governance* (pp. 45-68). Dordrecht: Springer Netherlands.

Lowndes, V. (2010). The institutional approach. *Theory and methods in political science*, *3*, 60-79.

Mahoney, J., & Thelen, K. (2010). A theory of gradual institutional change. *Explaining institutional change: Ambiguity, agency, and power*, *1*(1).

McBean, G., & Rodgers, C. (2010). Climate hazards and disasters: the need for capacity building. *Wiley Interdisciplinary Reviews: Climate Change*, *1*(6), 871-884.

Mees, H., Crabbé, A., & Suykens, C. (2018). Belgian flood risk governance: Explaining the dynamics within a fragmented governance arrangement. *Journal of Flood Risk Management*, *11*(3), 271-280.

Meijerink, S. (2005). Understanding policy stability and change. The interplay of advocacy coalitions and epistemic communities, windows of opportunity, and Dutch coastal flooding policy 1945–2003. *Journal of European public policy*, *12*(6), 1060-1077.

Meijerink, S., & Huitema, D. (2010). Policy entrepreneurs and change strategies: lessons from sixteen case studies of water transitions around the globe. *Ecology and society*, *15*(2).

Merz, B., Blöschl, G., Vorogushyn, S., Dottori, F., Aerts, J. C., Bates, P., ... & Macdonald, E. (2021). Causes, impacts and patterns of disastrous river floods. *Nature Reviews Earth & Environment*, *2*(9), 592-609.

Merz, B., Hall, J., Disse, M., & Schumann, A. (2010). Fluvial flood risk management in a changing world. *Natural Hazards and Earth System Sciences*, *10*(3), 509-527.

Merz, B., Kreibich, H., Schwarze, R., & Thieken, A. (2010). Review article: Assessment of economic flood damage. *Natural Hazards and Earth System Sciences*, 10(8), 1697–1724.

Merz, B., Thieken, A. H., & Gocht, M. (2007). Flood risk mapping at the local scale: Concepts and challenges. *International Journal of Risk Assessment and Management*, 7(2), 230–244.

Meseguer, C. (2005). Policy learning, policy diffusion, and the making of a new order. *The Annals of the American Academy of Political and Social Science*, *598*(1), 67-82.

Mintrom, M. (2019). *Policy entrepreneurs and dynamic change*. Cambridge University Press.

Mintrom, M., & Norman, P. (2009). Policy entrepreneurship and policy change. *Policy studies journal*, *37*(4), 649-667.

Moon, K., & Blackman, D. (2014). A guide to understanding social science research for natural scientists. *Conservation biology*, *28*(5), 1167-1177.

Mutlu, A., Roy, D., & Filatova, T. (2023). Capitalized value of evolving flood risks discount and nature-based solution premiums on property prices. *Ecological Economics*, *205*, 107682.

NOS. (2021, January 15). *Hoe het derde kabinet-Rutte steeds meer verstrikt raakte in de toeslagenaffaire.* Retrieved from https://nos.nl/collectie/13855/artikel/2364574-hoe-het-derde-kabinet-rutte-steeds-meer-verstrikt-raakte-in-de-toeslagenaffaire

NOS. (2021, July 15). *Kabinet noemt overstromingen Zuid-Limburg formeel een ramp, overheid betaalt deel schade.* Retrieved from https://nos.nl/collectie/13869/artikel/2389502-kabinet-noemt-overstromingen-zuid-limburg-formeel-een-ramp-overheid-betaalt-deel-schade

NOS. (2021, July 16). *Rutte bezoekt watersnoodgebied, ziet link met klimaatverandering.* Retrieved from https://nos.nl/artikel/2389641-rutte-bezoekt-watersnoodgebied-ziet-link-met-klimaatverandering

Oosterberg, W., Van Drimmelen, C., & Van der Vlist, M. (2005). Strategies to harmonize urbanization and flood risk management in deltas.

Penning-Rowsell, E. C., Johnson, C., & Tunstall, S. (2017). Understanding policy change in flood risk management. *Water Security*, *2*, 11-18.

Penning-Rowsell, E., Johnson, C., & Tunstall, S. (2006). 'Signals' from pre-crisis discourse: lessons from UK flooding for global environmental policy change?. *Global Environmental Change*, *16*(4), 323-339.

Peters, B. G. (2016). Institutionalism and public policy. In *Contemporary approaches to public policy: Theories, controversies and perspectives* (pp. 57-72). London: Palgrave Macmillan UK.

Petridou, E., & Mintrom, M. (2021). A research agenda for the study of policy entrepreneurs. *Policy studies journal*, *49*(4), 943-967.

Planbureau voor de Leefomgeving [PBL]. (2018). *Kleine kansen, grote gevolgen.* Themasites.pbl. retrieved from https://themasites.pbl.nl/o/risico-overstromingen/#:~:text=Ongeveer%2059%25%20van%20het%20Nederlandse,rampen%20die%20Nederland%20kunnen%20treffen.

Polski, M. M., & Ostrom, E. (1999). An institutional framework for policy analysis and design. *1999*.

Pot, W., de Ridder, Y., & Dewulf, A. (2024). Avoiding future surprises after acute shocks: long-term flood risk lessons catalysed by the 2021 summer flood in the Netherlands. *Environmental Sciences Europe*, *36*(1), 138.

Pralle, S. B. (2009). Agenda-setting and climate change. *Environmental Politics*, 18(5), 781–799.

Prognos. (2022). *Schäden der Sturzfluten und Überschwemmungen im Juli 2021 in Deutschland: Eine ex-post-Analyse.* Retrieved from https://www.prognos.com/sites/default/files/2022-07/Prognos_KlimawandelfolgenDeutschland_Detailuntersuchung%20Flut_AP2_3b_.pdf

Radaelli, C. M., Dente, B., & Dossi, S. (2012). Recasting institutionalism: Institutional analysis and public policy. *European Political Science*, *11*, 537-550.

Rentschler, J., Salhab, M., & Jafino, B. A. (2022). Flood exposure and poverty in 188 countries. *Nature communications*, *13*(1), 3527.

Rijksoverheid. (2021). *Kabinet-Rutte IV (2022-2024).* Retrieved from https://www.rijksoverheid.nl/regering/over-de-regering/kabinetten-sinds-1945/kabinet-rutte-iv

Rijksoverheid. (2022, November 25). *Kabinet maakt water en bodem sturend bij ruimtelijke keuzes.* Retrieved from https://www.rijksoverheid.nl/actueel/nieuws/2022/11/25/kabinet-maakt-water-en-bodem-sturend-bij-ruimtelijke-keuzes

Rijksoverheid. (2025). *Wat is het nationale Deltaprogramma?*. Deltaprogramma. Retrieved from https://www.deltaprogramma.nl/deltaprogramma

Rijksoverheid. (n.d.). *Delta Fund.* Deltaprgramma. Retrieved from https://english.deltaprogramma.nl/delta-programme/delta-fund

Sabatier, P. A., & Weible, C. M. (2019). The advocacy coalition framework: Innovations and clarifications. In *Theories of the policy process, second edition* (pp. 189-220). Routledge.

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Pearson education.

Sayers, P., Yuanyuan, L., Galloway, G., Penning-Rowsell, E., Fuxin, S., Kang, W., ... & Le Quesne, T. (2013). Flood risk management: A strategic approach.

Schanze, J. (2006). Flood risk management–a basic framework. In *Flood risk management: Hazards, vulnerability and mitigation measures* (pp. 1-20). Springer Netherlands.

Schlager, E. (2019). A comparison of frameworks, theories, and models of policy processes. In *Theories of the Policy Process, Second Edition* (pp. 293-319). Routledge.

Schmidt, V. A. (2010). Taking ideas and discourse seriously: explaining change through discursive institutionalism as the fourth 'new institutionalism'. *European political science review*, *2*(1), 1-25.

Schulte, P. A., Bhattacharya, A., Butler, C. R., Chun, H. K., Jacklitsch, B., Jacobs, T., ... & Wagner, G. R. (2016). Advancing the framework for considering the effects of climate change on worker safety and health. *Journal of occupational and environmental hygiene*, *13*(11), 847-865.

Shastry, V., Reeves, D. C., Willems, N., & Rai, V. (2022). Policy and behavioral response to shock events: An agent-based model of the effectiveness and equity of policy design features. *Plos one*, *17*(1), e0262172.

Sjöstedt, M. (2015). Resilience revisited: taking institutional theory seriously. *Ecology and Society*, *20*(4).

Slomp, R. M., de Waal, J. P., Ruijgh, E. F. W., Kroon, T., & van Alphen, J. S. L. J. (2014). The Dutch Delta Model for policy analysis on flood risk management in The Netherlands. In *6th International Conference on Flood Management (ICFM6)*.

Sorensen, A. (2024). Taking critical junctures seriously: theory and method for causal analysis of rapid institutional change. *Planning Perspectives*, *38*(5), 929-947.

STOWA. (n.d.). *Meerlaagsveiligheid in de praktijk.* Retrieved from https://www.stowa.nl/deltafacts/waterveiligheid/innovatieve-dijkconcepten/meerlaagsveiligheid-de-praktijk

Strijker, B., Asselman, N., de Jong, J., & Barneveld, H. (2023). The 2021 floods in the Netherlands from a river engineering perspective. *Journal of Coastal and Riverine Flood Risk*, *2*.

Tariq, M. A. U. R., Farooq, R., & Van de Giesen, N. (2020). A critical review of flood risk management and the selection of suitable measures. *Applied Sciences*, *10*(23), 8752.

Thieken, A. H., Bubeck, P., Heidenreich, A., Von Keyserlingk, J., Dillenardt, L., & Otto, A. (2023). Performance of the flood warning system in Germany in July 2021–insights from affected residents. *Natural hazards and earth system sciences*, *23*(2), 973-990.

Tol, R. S. (2018). The economic impacts of climate change. *Review of environmental economics and policy*.

True, J. L., Jones, B. D., & Baumgartner, F. R. (2019). Punctuated-equilibrium theory: explaining stability and change in public policymaking. In *Theories of the Policy Process, Second Edition* (pp. 155-187). Routledge.

United Nations Office for Disaster Risk Reduction (UNDRR). (2017). *The Sendai Framework Terminology on Disaster Risk Reduction*. Retrieved from https://www.undrr.org/terminology/disaster.

Van Alphen, J. (2016). The Delta Programme and updated flood risk management policies in the Netherlands. *Journal of Flood Risk Management*, *9*(4), 310-319.

Van Buuren, A. (2019). The dutch delta approach. *Great policy successes*, 201-217.

Van Dijk, A.I.J.M., H.E. Beck, E. Boergens, R.A.M. de Jeu, W.A. Dorigo, C. Edirisinghe, E. Forootan, E. Guo, A. Güntner, J. Hou, N. Mehrnegar, S. Mo, W. Preimesberger, J. Rahman, P. Rozas Larraondo. (2025). *Global Water Monitor 2024: Summary Report.* Global Water Monitor Consortium. Retrieved from www.globalwater.online

Van Thiel, S. (2014). *Research methods in public administration and public management: An introduction*. Routledge.

Wachtnietopwater. (n.d.). *'Gebruik de lokale deskundigheid'.* Retrieved from https://wachtnietopwater.nl/verhalen/wim-bas-hoogwaterwacht/#:~:text=Hoogwaterwacht%20Roerdalen,roepen%20als%20het%20nodig%20is.

Wallemacq, P., Guha-Sapir, D., & McClean, D. (2015). *The Human Cost of Natural Disasters: A Global Perspective.* Centre for Research on the Epidemiology of Disasters. Retrieved from https://www.preventionweb.net/files/42895_cerdthehumancostofdisastersglobalpe.pdf

Ward, P. J., Couasnon, A., Eilander, D., Haigh, I. D., Hendry, A., Muis, S., Veldkamp, T. I. E., Winsemius, H. C., & Wahl, T. (2020). Dependence between high sea-level and high river discharge increases flood hazard in global deltas and estuaries. *Environmental Research Letters*, 15(10), 104008.

Water-stop.NU. (2025). *Missie en Visie.* Retrieved from https://water-stop.nu/doelstelling

Wiering, M., Liefferink, D., & Crabbé, A. (2018). Stability and change in flood risk governance: on path dependencies and change agents. *Journal of Flood Risk Management*, *11*(3), 230-238.

Zahariadis, N. (2016). Delphic oracles: Ambiguity, institutions, and multiple streams. *Policy Sciences*, *49*, 3-12.

8.0 Appendix

Appendix A: Interview Guide

Probleem indicatie en aandacht

1. Wat was in jouw/jullie ogen ten tijde van de overstromingen mis met Flood Risk Management (FRM)? Waarom?

2. Belemmerde andere politieke kwesties van die tijd, zoals COVID-19, huizencrisis, stikstofcrisis, beleidsverandering of uitvoering binnen overstromingsbeleid en FRM?

Beleidsoplossingen

Nederland is altijd heel erg gericht geweest op de 3 lagen van het meerlaagswaterveiligheid model (preventie, gevolgenbeperking, crisismanagement). Naar aanleiding van de overstromingen werd er bijvoorbeeld door de Beleidstafel Wateroverlast en Hoogwater geadviseerd om dit uit te breiden naar 5 lagen (bewustwording en herstel). Daarnaast werd ook aangeraden onder andere door de Beleidstafel, maar ook door andere evaluaties (bv. Deltares) om laag 2 en 3 te verbeteren.

3. Hoe werd er tegen deze suggesties aangekeken? Was er wel of geen draagvlak voor? Waarom wel/niet?

4. Vormden middelen zoals budget, operationele capaciteit, expertise etc. een hindernis in het realistisch uitvoeren van de suggesties van de Beleidstafel? Waarom wel/niet?

Politieke en maatschappelijke situatie

In 2021 vonden er verkiezingen plaats voor kabinet Rutte 4. Dit kabinet bestond uit dezelfde partijen als Rutte 3, en relevante ministeries zoals het IeW werd nog steeds vertegenwoordigt door VVD. Ook werd Jette van D66 aangewezen als de eerste Minister van Klimaat en Energiebeleid.

5. Hebben deze veranderingen in en binnen het kabinet of de coalitie van Rutte 4, invloed gehad op beleidsvorming omtrent overstromingsbeleid of FRM? Zo ja, op welke wijze?

6. Hebben er nog andere administratieve veranderingen plaatsgevonden die van invloed zijn geweest op FRM beleidsvorming?

7. Is er druk geweest vanuit de maatschappij, bv. in de vorm van petities, protesten of actiegroepen die van invloed zijn geweest in het vormgeven van overstromingsbeleid of FRM beleid ?

8. Welke groepen waren er betrokken, of betrokken jullie bij FRM beleidsvorming ?

9. Hoe verliep de samenwerking tussen betrokken partijen bij FRM beleidsvorming? Waren er bv. onenigheden? Zo ja, waarom?

Policy entrepreneurs

10. Zijn er specifieke individuen geweest buiten of binnen jullie organisatie die invloed probeerden uit te oefenen op overstromingsbeleid en FRM?

11. Zo ja, welke middelen of methodes gebruikten zij om dit te doen?

Beleidsverandering

12. Welke factoren hebben bijgedragen tot deze veranderingen? (bv. druk vanuit de maatschappij, belanghebbenden of individuen, politieke steun, evaluaties, de uitvoerbaarheid etc.)

13. Welke factoren vormden een struikelblok voor verandering? (bv. financiële/operationele middelen, politieke en maatschappelijk draagvlak, onenigheden, etc.)

Appendix B: List of Policy Documents

D1: Ministry of Infrastructure and Water Management. (December 2022). *Eindadvies Beleidstafel wateroverlast en hoogwater: Voorkomen kan niet, voorbereiden wel*. Retrieved from https://open.overheid.nl/documenten/ronl-63ef3f6ee7ec67053759c6901eefa10240dcf004/pdf

D2: Ministry of Infrastructure and Water Management. (2023). *Beleidstafel wateroverlast en hoogwater: Overzicht en aanbelevelingen – voortgang.* Retrieved from https://open.overheid.nl/documenten/dpc-327e4ad8c480deec85c2c5b625fa723b8554d0e5/pdf

D3: Ministry of Infrastructure and Water Management. (2024). *Voortgangsrapportage Beleidstafel wateroverlast en hoogwater.* Retrieved from https://www.eerstekamer.nl/overig/20241112/voortgangsrapportage_beleidstafel/document

D4: Koninklijke Nederlands Meteorologisch Instituut [KNMI]. (2014). *KNMI' 14: Klimaatscenario's voor Nederland.* Ministry of Infrastructure and Water Management. Retrieved from Brochure_KNMI14_NL.pdf

D5: Waterschap Limburg & Instituut voor Veiligheids- en Crisismanagement [COT]. (2022). *Een crisis van ongekende omvang: Leerevaluatie watercrisis juli 2021*. COT. Retrieved from waterschap_limburg_-_leerevaluatie_watercrisis_juli_2021_1.pdf

D6: Bakker, M., Berger, E., van Duin, M., Broeder, S., & Karacan, O. (2022). *Hoogwater in Limburg: de aanpak van Rijkswaterstaat - een evaluatie om als crisisorganisatie te leren van de inzet*. Nederland Instituut Publieke Veiligheid [NIPV]. Retrieved from 20220420-NIPV-Hoogwater-in-Limburg-de-aanpak-van-Rijkswaterstaat.pdf

D7: Ministery of Infrastructure and Water Management & Instituut voor Veiligheids- en Crisismanagement [COT]. (2022) *Leerevaluatie – Departementale Crisisbeheersing Hoogwater en Wateroverlast juni 2021*. Retrieved from bijlage-2-cot-dcc-ienw-reflectie-departementale-crisisbeheersing-hoogwater-en-wateroverlast.pdf

D8: Slager, K. (2023). *Gevolgen overstromingen Limburg: Inventarisatie en duiding.* Deltares. Retrieved from 11207700_007_0011.pdf

D9: Asselman, N., & van Heeringen, K. (2023). *Deltares een watersysteemanalyse – wat leren we van het hoogwater van juli 2021?*. Deltares. Retrieved from een_watersysteemanalyse_wat_leren_we_van_het_hoogwater_van_juli_2021-1-_(3).pdf

D10: Van Helmond, C., Schelfhout, D., & Folmer, T. (2023). *Procesevaluatie afhandeling waterschade Zuid-Nederland: Eindrapportage.* Andersson Elffers Felix. Retrieved from 3346-procesevaluatie-afhandeling-waterschade-volledige-tekst.pdf

D11: Dutch cabinet.(December 2021). *Coalitieakoord 2021-2025: Omzien naar elkaar, vooruitkijken naar de toekomst.* Retrieved from coalitieakkoord-2021-2025.pdf

D12: Overgaauw, N., & van Gilse, J. (October 2022). *Eindrapport: Uitvoeringsscan eindadvies Beleidstafel Wateroverlast en Hoogwater.*Berenschot. Retrieved from uitvoeringsscan-koepels-op-70-procent-versie.pdf

D13: Rijksoverheid.(2023). *Nationaal Deltaprogramma 2024: Nu voor later.* Ministry of Infrastructure and Water Management. Retrieved from deltaprogramma-2024.pdf

D14: Rijksoverheid. (2022). *Nationaal Deltaprogramma 2023: Versnellen, verbinden, verbouwen*. Ministry of Infrastructure and Water Management. Retrieved from https://open.overheid.nl/documenten/ronl-a954a5faa91b731686234ace619df41e62bb0410/pdf

D15: Nationaal rampenfonds GIRO. (2023). *Eindrapportage: Overstromingen in Limburg 2021*. Retrieved from 392-giro777-eindrapportage-overstromingen-in-limburg-2021.pdf

D16: Miltenburg, E., de Ridder, J., Wagemans, F., & Schaper, J. (2021). *Burgerperspectieven 2021|2* (Nr. 1). Sociaal en Cultureel Planbureau [SCP]. Retrieved from Burgerperspectieven+2021_02_WEB (1).pdf

D17: Den Ridder, J., Vermeij, L., Maslowski, R., & van't Hul, L. (2021). *Burgerperspectieven 2021|4* (Nr. 2). Sociaal en Cultureel Planbureau [SCP]. Retrieved from SCP_Burgerperspectieven_2021_4 (3).pdf

D18: Den Ridder, J., Miltenburg, E., Kunst, S., 'T Hul, L., & van den Broek, A. (2022) *Burgerperspectieven 2022* (Nr. 1). Sociaal en Cultureel Planbureau [SCP]. Retrieved from SCP-Burgerperspectieven_2022_bericht_1 (1).pdf

D19: VVD. (2020). *Verkiezingsprogramma 2021-2025: samen aan de slag - nieuwe keuzes voor een nieuwe tijd.* Retrieved from VP VVD 2021-2025-3feb.indd

D20: D66. (2020). *Verkiezingsprogramma 2021-2025: een nieuw begin - laat iedereen vrij, maar niemand vallen.* Retrieved from d66_verkiezingsprogramma_een_nieuw_begin_2021_2025.pdf

D21: Christenunie. (2020). *Verkiezingsprogramma 2021-2025: kiezen voor wat echt telt.* Retrieved from ChristenUnie Verkiezingsprogramma 2021-2025 (3).pdf

D22: CDA. (2020). *Verkiezingsprogramma 2021-2025: Nu doorpakken.* Retrieved from CDA verkiezingsprogramma TK 2021-2025.pdf

D23: Overlegorgaan Fysieke Leefomgeving [OFL]. (Januari 2022). *Rapport Wateroverlast en Hoogwater: Rapport over de consultatie voor de beleidstafel* (Nr. 1). Retrieved from https://www.overlegorgaanfysiekeleefomgeving.nl/actuele+projecten/afgeronde+projecten+overzicht/beleidstafel+wateroverlast+en+hoogwater/documenten+beleidstafel+hoogwater+en+wateroverlast/handlerdownloadfiles.ashx?idnv=2230564

D24: Overlegorgaan Fysieke Leefomgeving [OFL]. (November 2022). *Rapport Wateroverlast en Hoogwater: Tweede rapportage voor de beleidstafel Wateroverlast en Hoogwater* (Nr. 2). Retrieved from https://overlegorgaanfysiekeleefomgeving.nl/actuele+projecten/afgeronde+projecten+overzicht/beleidstafel+wateroverlast+en+hoogwater/documenten+beleidstafel+hoogwater+en+wateroverlast/handlerdownloadfiles.ashx?idnv=2377703