

Understanding climate adaptation policy dynamics: an overview of effectiveness of Dutch policy design regarding water robustness

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Abstract

This paper reviews the contextualisation of the Dutch national goal to become water robust in 2050. It aims to research the current Dutch water infrastructure policy design and its effectiveness through secondary document analysis and expert interviews with policy staff members of several governmental organisations. Policy design theory presumes policy to be effective when coherence of policy goals occurs, consistency in policy instruments and congruence between goals and instruments on strategic, tactical and operational level. Next to that, the level of integration is assumed to be of influence on effectiveness of policy design. Main results from the expert interviews are that coherency of policy goals occurs in Dutch water infrastructure and climate change policy design. Nevertheless, there is a slight inconsistency in policy instruments and therefore incongruence, due to a current lack of effective and adequate instruments to complement the goals. It can be concluded that there is an intermediate degree of integration in the policy field, as integration mainly occurs on the operational policy level. The intermediate degree of integration, together with a slight inconsistency and incongruence in the policy design affect the effectiveness of Dutch water infrastructure policy negatively. The effectiveness of this policy design could be improved through further research into policy integration on the strategic level, the political debate, and stressing priority of the goal of becoming water robust in 2050.

Key words: water robustness, climate adaptation, policy design, effectiveness, policy integration

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List of abbreviations

FRM: flood risk management

IPCC: Intergovernmental Panel on Climate Change

Ministerie van BZK: ministerie van Binnenlandse Zaken en Koninkrijkrelaties / Ministry of the Interior and Kingdom Relations

Ministry of I&W: Ministry of Infrastructure and Water Management

NH: Noord-Holland

NOS: Nederlandse Omroep Stichting

NOVI: Nationale Omgevingsvisie

Waterschap AGV: Waterschap Amstel, Gooi en Vecht / Regional water authority Amstel, Gooi and Vecht

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1 Introduction

1.1 Introduction to the research

The future perspective of the Dutch National Strategy on Spatial Planning and the Environment (in Dutch: Nationale Omgevingsvisie, or NOVI) (Ministerie van BZK, 2020) for 2050 contains 4 priorities, namely climate adaptation and energy transition; sustainable economic growth; healthy cities and urban regions; and futureproof development of rural areas. The priority of climate adaptation and the energy transition for example states that the Netherlands should be climate-proof and “water robust” in 2050, with a sustainable energy provision. For this research, the objectives set in this priority of the NOVI (Ministerie van BZK, 2020) will be used. More specifically, the research will focus on the objective of becoming “water robust”, what water robustness entails, and how policies are designed to achieve this. The strategy (Ministerie van BZK, 2020) elaborates on the fact that spatial design should be adjusted to rising sea levels and divides the objective into the Dutch coastal zone, the rivers and the sweet water reservoir. However, specific goals or detailed standards that need to be met are missing from the document. On a more tactical level, there are references to the Delta Programme and the “Kennisprogramma Zeespiegelstijging” (Ministerie van BZK, 2020, p. 76), that provide more explicit “water robustness” goals, however still very much open for interpretation.

1.2 Research gap and relevance

Recent changes in the weather conditions and climate in the world and the Netherlands, not just in the past decades, but even more so in the past year, have stressed the need for climate adaptation in all areas (Landholm et al., 2019; NOS, 2022). The challenges connected to increasing drought, heat, floodings and water hindrance are increasing faster than expected, which requires faster and more adaptation than anticipated for decades ago. The issues become bigger, and so should the solutions. There seems to be a lack of priority in meeting these major climate change problems with adaptive solutions, due to multiple reasons (IPC, 2022). As stressed in the IPCC report from April 2022 (IPCC, 2022), an increase in policy measures would be necessary to reach the goal of the Paris climate agreement in limiting the global warming to 1.5 degrees Celsius. This will require change in all national industries, such as the economy, agriculture, infrastructure and energy (IPCC, 2022).

Existing policy documents on the subject in the Netherlands focus mostly on process-related working methods, goals and instruments and less on the execution, implementation and monitoring. This research is relevant as it aims to provide an overview of the current Dutch water infrastructure policy design, elaborates on the goal of becoming water robust in 2050, and explains how effective this policy design currently is. Hereby, integrating climate adaptation in Dutch water infrastructure

policy can be optimized. This will meet the urge to adapt to climate change faster and more efficiently (Landholm et al., 2019).

1.3 Research aim and research questions

The Netherlands has a long history of coping with water-related challenges. More recently, a transition has taken place in Dutch water management style from a more technocratic management to an integrated and participatory style (van der Brugge et al., 2005). The idea is to focus not only on preventing floods and other impacts of climate change, but also mitigating these impacts, based on the probability that they will occur (Ritzema & van Loon-Steensma, 2018). Despite these innovations, research shows that Dutch water institutions are still only partly prepared for the results of climate change (van den Brink et al., 2010), which reinforces the need for institutional improvement on this subject. Therefore, with this research, the aim is to explore the goal of becoming water robust in an attempt to contextualize and clarify the term, by investigating Dutch water infrastructure policy and its effectiveness. As a result, an overview of water robustness in Dutch infrastructure policy design should contribute to producing recommendations on the improvement and optimization of policy design in the future. Hence, the main research question for this research is:

“How is water robustness contextualized in Dutch water infrastructure policy and how effective is this policy design?”

In order to make recommendations on optimizing this policy design and improving its effectiveness, policy design theory needs to be explored on what effective policy design entails and when policy design can be considered effective. In addition, an overview of Dutch policy design in the field of water infrastructure and climate adaptation will set the scene of the current Dutch policy landscape. Therefore, the following sub-questions will be researched and answered in order to provide a conclusion for the main research question:

- What does the current Dutch water infrastructure and climate change policy field look like?
- What conditions result in effective policy design?
- What influences policy design effectiveness?
- How is Dutch climate adaptation policy implemented in practice?

1.4 Research methods

To answer the aforementioned questions, several research methods will be used. Within policy design theory, Kern & Howlett (2009) state that successful policy design consists of coherence of policy goals, consistence in policy instruments and congruence between the goals and instruments. In this research,

this framework will be used to analyse how water robustness is shaped in policy design on different levels and whether there is congruence, coherence and consistency. As stated above, the term “water robustness” can mean different things: it is abstract on the strategic level, with higher specificity on the tactical and operational level. The question therefore is, what exactly is meant with water robustness and is it understood and equally interpreted on different levels of policy design? To answer this question, a great deal of policy documents have been researched that elaborate on the goal of becoming water robust, such as the Dutch National Strategy on Spatial Planning and the Environment (in Dutch: Nationale Omgevingsvisie, NOVI), the Delta Programme, the Delta Plan on Spatial Adaptation, and different policy documents from the Province of Noord-Holland, municipality of Amsterdam and several regional water authorities. Next to literature research, expert interviews with policy staff members of different governmental organisations provide an overview of the implementation of climate adaptation and water infrastructure policy in the Netherlands.

1.5 Reading the thesis

This thesis starts with an introduction to the research in chapter 1, followed by an overview of current Dutch water infrastructure and climate adaptation policy in chapter 2: ‘Setting the scene’. Policy design theory and literature on policy design effectiveness and policy integration are explained in chapter 3. The methodology used to conduct this research is elaborated on in chapter 4. Chapter 5 presents the results and an analysis of the secondary literature study of relevant policy documents, as well as the conducted expert interviews with policy staff members in the Dutch water infrastructure policy field. A finalizing conclusion and discussion to this research is set in chapter 6.

2 Setting the scene

As this research entails an in depth overview of Dutch policy design in the field of water infrastructure and climate adaptation, the policy field itself next to the theory must be understood. Therefore, in this chapter, Dutch water infrastructure and climate change policy will be elaborated on and explained in light of different governmental and geographical layers. This hereby addresses the first research sub-question: “What does the current Dutch water infrastructure and climate change policy field look like?”. With the help of expert interviews, conducted with policy staff members in the field, an answer to this sub-question will be formulated. Below, a brief overview of the Dutch water infrastructure policy field is provided, with an explanation of the different governmental layers involved.

The Dutch national government has several ministries incorporating climate change policy into water infrastructure. A Deltaprogramme (Rijksoverheid, 2021a) has also been created, with the Delta plan Spatial Adaptation combining climate adaptation and spatial planning (Rijksoverheid, 2021b).

The Ministry of Economic Affairs and Climate Policy, the Ministry of Finance, and the Ministry of Infrastructure and Water Management play the most important roles in this subject. The Ministry of Finance provides funding and the Ministry of Economic Affairs and Climate Policy covers national climate policies, such as nitrogen emissions regulations. The Ministry of Infrastructure and Water Management (Ministry of I&W) also covers climate policies, as climate adaptation and sustainable land use are nowadays inevitable when creating infrastructural plans. Next to the plans and programmes from within the Ministry of Infrastructure and Water Management, a separate Deltaprogramme was initiated, that aims to protect the Netherlands from floodings, rising sea levels, and sweet water shortage (Rijksoverheid, 2021a). The programme also elaborates on designing and developing the country in a water robust and climate proof manner. This national Deltaprogramme is run by the Delta commissioner and its staff, together with a team of selected governmental staff members from the State, provinces, municipalities and regional water authorities. The Deltaprogramme consists of three major sub-plans covering water security, sweet water and spatial adaptation (Rijksoverheid, 2021b; 2021c; 2021d). The latter is of most relevance for this research, since it incorporates climate change into spatial planning and design.

On a lower governmental and more decentralised level, policies on water infrastructure and climate change are designed by provinces in provincial strategies on spatial planning and the environment (in Dutch: Provinciale Omgevingsvisie). For example, the province of Noord-Holland in the Netherlands provides its own strategy with spatial environment plans, ranging from real estate plans, plans addressing recreational activities and mobility, all attempting to include and integrate climate change (Provincie Noord-Holland, 2018). On a more regional or even local level, municipalities design policy in

a similar manner as provinces. Municipalities also create strategies on spatial planning, together with execution agendas to specify the required actions. For example, the municipality of Amsterdam has created an execution agenda climate adaptation for the city, stating how to obtain the set climate adaptation goals (Gemeente Amsterdam, 2021).

Other public organisations endorsing climate change are the regional water authorities. The Netherlands has 21 of them, each covering a separate water basin and corresponding surrounding area. Responsibilities include supervising nature and water reservoirs and keeping surface water safe and levelled. In the city of Amsterdam and its surroundings, a collaborative separate organisation has been created between the municipality of Amsterdam and the regional water authority 'Waterschap Amstel, Gooi en Vecht', named Waternet. This organisation carries out the aforementioned responsibilities on behalf of both municipality and regional water authority, to save costs and work more efficiently. Each regional water authority in turn also creates a programme that sets out goals and ambitions. Waternet carries out the goals set in the Water Control Programme from the regional water authority Amstel, Gooi and Vecht (Waterschap AGV, 2022).

This provides a brief overview of the Dutch water infrastructure policy field and the different governmental layers involved in designing and implementing these policies.

3 Theory

3.1 Policy design in theory

In order to understand the process of decision-making for policies and policy design, the theoretical concept of policy design and different layers within this design need to be explained. Also, by exploring the interactions between these layers, the second sub-question of “What conditions result in effective policy design?” can be answered. Policy goals and instruments can be synchronised on a strategic, tactical and operational level. If so, congruence, coherence and consistence will occur, resulting in effective policy design (Kern & Howlett, 2009; Howlett, 2009; Van Geet et al., 2019). This is further explained in chapter 3.2.

Howlett (2009) created a multi-level policy design model, based on earlier research on policy dynamics by Cashore & Howlett (2007) and policy paradigms by Hall (1993). In the process of policy design, decisions on policy goals and instruments to accomplish these goals are made at different levels of abstraction, specifically strategic, tactical and operational (Howlett, 2009). The strategic level of policy goals remains the most abstract and contains the first step of policy goal formulation. On the tactical and operational level, the policy goals are redefined to fit the level of abstraction and area that the policy addresses (Howlett, 2009). A similar division in abstraction levels exists for policy instruments, where general goal implementation preferences are defined on the strategic level, where the tactical level consists of logic, capacity, and technical instrument design. The operational level, as the name suggests, is the least abstract, more dynamic level, as it contains the operationalization of the policy design. The goals and instruments are interdependent, as the nature of a policy goal influences the choice of instrument to achieve this goal. Simultaneously, defining a policy goal can be influenced by which instruments are available and create a feasible process of reaching the goal (Howlett, 2009).

A strategic goal is defined as the basic policy aim, the general expectations of governments in a specific policy area. At a lower level, a tactical goal is defined as the specific meso-level subjects, or operationalizable objectives, that policies address. The operational goal entails specific on-the-ground targets or measures that allow policy objectives to be attained (Howlett, 2009; 2019). In practice, the goal of becoming a prosperous society for example can be defined as a strategic goal. On a tactical level, this goal can be operationalized through better educational opportunities and accessible education to all. To lead these objectives to attainment, specific operational goals could be increasing higher educational attendance (Howlett, 2009). This represents how goals can be reformulated on each level and still contribute to obtaining the main goal.

Next to goals, a successful policy design also includes instruments that match these goals. A strategic instrument can be defined as a certain type of organizational preference that can be used to implement the set goals (Howlett, 2009; 2019). A tactical instrument can be explained as a specific type of instrument (Cashore & Howlett, 2007), or specific policy tools that can be used to reach programme level goals (Howlett, 2009). Instruments on an operational level entail specific ways in which the instruments are used (Cashore & Howlett, 2007) in order to best achieve the policy requirements (Howlett, 2019).

Two types of instruments can be distinguished: substantive and procedural instruments (Howlett, 2000; Van Geet et al., 2021). Where substantive instruments are used to directly affect goal attainment, procedural instruments influence interactions between policy actors to reach governmental goals (Howlett, 2000). In practice, financial resources such as subsidies can be classified as substantive instruments, as are regulations and permits, and knowledge. Examples of procedural instruments are providing information and including or denying policy actors in decision-making, as these actions manipulate actor interactions (Howlett, 2000).

In theory, policy design thus consists of goals on the one hand, and instruments on the other. These goals and instruments can be categorised in three different levels, namely strategic, tactical and operational. On each level, the goals and instruments are reformulated to fit the policy design (Cashore & Howlett, 2007; Kern & Howlett, 2009; Howlett, 2009; Van Geet et al., 2019).

By adjusting the goals and instruments to each other on all strategic, tactical and operational levels, the policy design will be coherent, consistent and congruent, meaning the policy design is effective (Kern & Howlett, 2009; Howlett, 2009; Van Geet et al., 2019). The effectiveness of policy design through coherency, consistency and congruency is elaborated on below in chapter 3.2.

3.2 Effectiveness of policy design

As explained above, a policy design is composed of goals and instruments, formulated on a strategic, tactical and operational level. To answer the second sub-question of “What conditions result in effective policy design?”, the synchronizing criteria coherency, consistency and congruency must be explained.

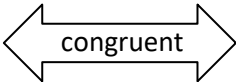
Within the policy design level, Kern & Howlett (2009) state that successful policy design consists of three different aspects, namely coherence of policy goals, consistence in policy instruments and congruence between the goals and instruments (see figure 1). In order for policy to be designed to provide an optimal outcome, it is assumed that these three synchronizing criteria are adhered to (Kern & Howlett, 2009; Howlett, 2009). Policy goals are coherent, if they are in line with the similar

overall objectives, goals and settings (Van Geet et al., 2021) and “can be achieved simultaneously without any significant trade-offs” (Kern & Howlett, 2009; p. 395). Coherency in goals entails the possibility for goals to exist next to each other logically (Howlett, 2019), as it focusses on the process and mechanism of goal formulation (Bahn-Walkowiak & Wilts, 2017).

Consistency in policy instruments exists when they contribute together in achieving the same goal (Van Geet et al., 2019; Kern & Howlett, 2009; Bahn-Walkowiak & Wilts, 2017). The implementation preferences on a strategic level, should be aligned with the policy tools on the tactical level and the tool calibrations on the operational level (Howlett, 2009). Consistency in policy instruments should mean that the instrument preferences, tools, and calibrations reinforce each other, rather than undermine, in helping to achieve goals (Howlett, 2019).

Finally, goals and instruments can be considered congruent if they support each other and provide a basis for successful goal achievement (Van Geet et al., 2021; Kern & Howlett, 2009). Goals and instruments are congruent “if they serve corresponding purposes” (Van Geet et al., 2019, p. 326), rather than having different purposes (Howlett, 2014). Congruent goals and instruments collaboratively work in the same direction to support goal achievement (Howlett, 2019).

It can be assumed that in successful policy design, congruence, consistency and coherence occur within the design, making the design most effective.



	Goals	Instruments
Strategic level	Goals (policy development)	Logic (policy instrument preferences)
Tactical level	Objectives (policy aim)	Tools (choice of instrument)
Operational level	Settings (policy requirements)	Calibrations (application of instrument)

Figure 1. Policy design model based on Howlett (2009) and Kern & Howlett (2009)

The framework in figure 1 provides a basis for further explorative research into the operationalization of the synchronizing variables coherence, consistency and congruence into practice. Theory on policy

design creates a clear, yet very abstract, overview of how policy goals and instruments should be adjusted and interrelated.

3.3 Level of integration

The framework in figure 1 provides a basis for this research and an overview of effective policy design in general. The next question that rises is the third sub-question: “What influences policy design effectiveness?”. For this research, the level of integration is assumed to be of influence on coherency, consistency and congruency and therefore on the effectiveness of policy design (Van Geet et al., 2021). Consequently, the expectation for this research is that the policy design fit in combination with policy integration, will lead to policy design effectiveness. This expectation forms the basis for this qualitative research. With the data collected through expert interviews, a conclusion is drawn as to whether this expectation was correct.

In order to test the expectation of policy integration being of influence on policy design effectiveness, a framework to assess integration in policy design is used.

Candel & Biesbroek (2016) argue that policy integration is an ongoing, dynamic process that occurs to a certain degree. Policy integration can be used as a strategy to tackle fragmented and sectoral public organization and by doing so solving problems that exceed the boundaries of the sectors (Cejudo & Michel, 2017; Van Geet et al., 2021). Cumiskey et al. (2019) elaborate on integration as “jointly working toward common goals, ..., as a means to support society as a whole” (Cumiskey et al., 2019, p. 3). The article is focussed on integration in flood risk management (FRM) and proposes a framework to assess the level of integration in FRM policy design. As stated, the framework can also be used for integration challenges other than FRM, when appropriately adjusted (Cumiskey et al., 2019). Therefore, it will be used for this research to assess the level of policy integration in Dutch water infrastructure and climate change policy.

The integration assessment framework can be divided into the governance capacity for integration and the realisation of integration, both further divided in multiple indicators. As this research aims to explore the degree of policy integration and its effect on policy design effectiveness, only the indicators for governance capacity of integration are used. Cumiskey et al. (2019) state, based on Candel & Biesbroek (2016), that the capacity of integration is influenced by the number of actors involved. Next to that, the perception of these actors on the strength of their relationship is also of influence on the governance capacity of integration (Cumiskey et al., 2019; Candel & Biesbroek, 2016; Gilissen et al., 2015).

Other influencing mechanisms that influence the degree of policy integration are actor-based, rule-based, and resource-based mechanisms. These mechanisms can influence the strength of the actor relationships and therefore the governance capacity of policy integration (Gilissen et al., 2015; Cumiskey et al., 2019). Actor-based mechanisms can be described as mechanisms that contribute to actors' interactions and exchange of knowledge, such as working groups, multistakeholder partnerships and collaborative working arrangements (Cumiskey et al., 2019). Rule-based mechanisms are mechanisms that steer the actions of actors, such as duties to cooperate (Gilissen et al., 2015), regulations and permitting (Candel & Biesbroek, 2016), and cooperation agreements (Cumiskey et al., 2019). Resource-based mechanisms are defined as the "funding arrangements that help actors to implement joint actions in the form of operational activities, projects, or programs of work" (Cumiskey et al., 2019, p. 6), for example funding programs, financial incentives (Candel & Biesbroek, 2016), and joint funding arrangements (Cumiskey et al., 2019).

Figure 2 shows and summarises the indicators that are of influence on the degree of policy integration. By assessing the presence of these indicators and to what extent, a degree of integration can be labelled to the policy design. By testing these indicators in Dutch infrastructure water policy, the level of policy integration can be defined and subsequently concluded to what extent policy integration influences policy design effectiveness.

Actor relationships	Number of actors Perception of strength of relationship
Influencing mechanisms: actor-based mechanisms	Working groups Multistakeholder partnerships Collaborative working arrangements
Influencing mechanisms: rule-based mechanisms	Duties to cooperate Regulations and permitting Cooperation agreements
Influencing mechanisms: resource-based mechanisms	Funding programs Financial incentives Joint funding arrangements

Figure 2. Indicators of governance capacity for integration based on Cumiskey et al. (2019)

4 Methodology

This research is conducted through a qualitative research method (Clifford et al., 2016). The second and third research question, “What conditions result in effective policy design?” and “What influences policy design effectiveness?” are researched and answered through secondary document research. Document research has been conducted to provide a clear overview of Dutch policy design on climate adaptation and more specifically, the concept of water robustness. All documents were coded with the search word ‘water robust’ and ‘robust’ in combination with ‘water(system)’, which provided an overview of water related goals and instruments. Focus was needed on a specific area, as covering all or even several provinces and municipalities would go beyond the scope of this research. Therefore, the choice was made to focus on the province of Noord-Holland, the several regional water authorities involved and the municipality of Amsterdam, as this is a large municipality, with an extra collaborative organization (Waternet) that is involved. The documents analysed are:

- National Strategy on Spatial Planning (Nationale Omgevingsvisie, NOVI)
- Execution agenda of the National Strategy on Spatial Planning (Uitvoeringsagenda NOVI)
- Delta programme (Deltaprogramma)
- Deltaplan Spatial Adaptation (Deltaplan Ruimtelijke Adaptatie)
- Provincial Strategy on Spatial Planning Noord-Holland 2050 (Provinciale Omgevingsvisie NH 2050)
- Execution Agenda Climate Adaptation Amsterdam (Uitvoeringsagenda Klimaatadaptatie Amsterdam)
- Water Control Programme Amstel, Gooi and Vecht 2022-2027 (Waterbeheerprogramma Amstel, Gooi en Vecht 2022-2027)

The contextualization of water robustness in Dutch water infrastructure policy design is an abstract and ill-defined concept and the analysis of the above-mentioned documents raised a lot of questions. Therefore, expert interviews were conducted to provide a supplementary overview on this subject and to gain more specific insights in answering the first and fourth sub-question: “What does the current Dutch water infrastructure and climate change policy field look like?” and “How is Dutch climate adaptation policy implemented in practice?”. These interviews were conducted with experts in the field, working for different organizations that created these policy documents on climate adaptation. As this is a slightly political subject, not all organizations were willing to participate in this research and speak openly about it. For instance, despite multiple attempts from various contacts, the province of Noord-Holland has not reacted to the request. The practical insight from that governmental layer is therefore missing in this research. However, most organizations did react and were willing to elaborate on the relating policy documents, which created interesting conversations and new insights in how

goals are interpreted and formulated. The interviews were conducted online via video, as all interviewees preferred this type of appointment, due to covid reasons and practical reasons in their schedules. All interviews were conducted in Dutch, as this was the native language of all interviewees and they were therefore most capable in expressing themselves in Dutch. A semi-structured interview guide (see Appendix A) was used with open questions. Depending on the said organisation, some questions were asked with a focus on the perspective of the organisation. For example, the interview guide (see Appendix A) shows the question “Are climate adaptation goals adjusted and synchronised on each policy layer? (Is er afstemming tussen de klimaatadaptatie doelen (waterrobuust doel) op verschillende beleidsniveaus?)”. This question resulted in each interviewee explaining how the specific organisation they work for adjusts and synchronises policy goals to higher and lower policy layers. A similar question was asked regarding instruments on different policy layers (“Are policy instruments for implementing climate adaptation adjusted and synchronised on each policy level? / Is er afstemming tussen de instrumenten op verschillende beleidsniveaus?”). This question also resulted in interviewees answering from a certain perspective. Nevertheless, this does not undermine the validity of this research. By combining all answers to this question, all perspectives together provide a complete overview of adjustment of goals and instruments on different policy layers.

Ethical considerations were taken into account during the data collection for this research. All interviews were conducted anonymously, to ensure reliability, trustworthiness and validity of the data collected. The following interviews have taken place:

- Member of staff of the Delta commissioner / Deltaprogramme
- 2nd member of staff of the Delta commissioner / Deltaprogramme
- Member of staff of the Delta plan Spatial Adaptation
- 2nd member of staff of the Delta plan Spatial Adaptation
- 3rd member of staff of the Delta plan Spatial Adaptation
- Member of staff of Waternet / the municipality of Amsterdam
- Member of staff of Waternet / regional water authority (waterschap) Amstel, Gooi and Vecht
- Member of staff of regional water authority (hoogheemraadschap) Hollands Noorderkwartier
- Member of staff of regional water authority (hoogheemraadschap) Rijnland

The latter two members of regional water authorities Hollands Noorderkwartier and Rijnland were included in the research, to gain sufficient understanding of policymaking on a more regional, even local, and operational level. Despite the fact that the main focus was on the municipality of Amsterdam, including more regional water authorities has proven useful, as the municipality of Amsterdam has its own separate organisation, Waternet, that takes on policymaking and

implementation. Using multiple sources for the same level of policymaking also increased the validity of the data collected.

For the analysis of the collected data, an inductive method was used. While transcribing, the analysis started with descriptive coding, highlighting major subjects and other interesting or unexpected quotes during the interviews. Furthermore, deeper values and meanings were found in the transcribed interviews and similar findings were highlighted to create a represented overview of the outcome of the expert interviews. The information and data collected from the interviews was then analysed through a framework to assess policy integration (Cumiskey et al., 2019).

5 Results and analysis

5.1 Dutch water infrastructure and climate change policy through documents

The policy design framework (figure 1) can be filled in with practical examples of policy design on the strategic, tactical and operational level. This information can help in answering the first research sub-question of “What does the current Dutch water infrastructure and climate change policy field look like?”. On the strategic level, water robustness goals are formulated in the Dutch National Strategy on Spatial Planning and the Environment (NOVI), such as building infrastructure that is water resistant and creating enough green areas. The main message is that the Netherlands should be water robust in a sense that it can handle both sea level rise and subsidence in and after 2050 (Ministerie van BZK, 2020). The NOVI (Ministerie van BZK, 2020) explains that how this should be accomplished is agreed on in different plans and programmes, such as the Delta programme (Rijksoverheid, 2021a). On the tactical level, the Delta programme (Rijksoverheid, 2021a) aims for water robustness in three different Delta plans, focusing respectively on water safety, sweet waters, and spatial adaptation. These plans contain goals that need to be achieved to become more water robust, such as strengthening dikes and increasing the number of water barrages (Rijksoverheid, 2021a; 2021b). Next to that, the Delta plan on spatial adaptation (Rijksoverheid, 2021b) contains process related instruments, such as the Watertoets and stress tests, to accomplish these goals. The operational level can be filled with specific projects within the aforementioned plans and programmes that strive for certain goals. Each province in the Netherlands creates its own Strategy on Spatial Planning (in Dutch: Omgevingsvisie) with goals for spatial design within the province. On an even more operational level, with the goals set in these provincial Strategies on Spatial Planning, municipalities and regional water authorities create their own plans. For example, the Province of Noord-Holland aims to follow plans set in the Strategy on Spatial Planning Noord-Holland 2050, which states ambitions and implementation ideas for spatial planning for the province until 2050, including building a water robust environment (Provincie Noord-Holland, 2018). Zooming in on the Province of Noord-Holland, several organizations work together in creating visions and strategies on a local level in and near the city of Amsterdam. The municipality of Amsterdam itself created an agenda to execute climate adaptation goals in the near future on a very local level, including tackling extreme weather conditions such as heat and drought. Furthermore, the agenda focusses on climate adaptation measures as a reaction to floodings and water hindrance (Uitvoeringsagenda Klimaatadaptatie Amsterdam, 2021). Larger water related tasks in and around the city of Amsterdam are executed by Waternet, which is a collaborating organization of the municipality of Amsterdam and the water authority Amstel, Gooi and Vecht. The water authority Amstel, Gooi and Vecht itself creates a water control program in which goals and regulations are stated to ensure water safety (Waterschap Amstel, Gooi en Vecht, 2022).

	<i>Goals</i>	<i>Instruments</i>
<i>Strategic</i>	Dutch National Strategy on Spatial Planning and the Environment (NOVI): goal of becoming water robust through water resistant infrastructure and green areas	Execution agenda NOVI: Deltaprogramme
<i>Tactical</i>	Deltaprogramme: three different plans: focus on water safety, sweet waters, and spatial adaptation: goal of strengthening dikes, increasing water barrages	Delta plan Spatial Adaptation: process related instrument, e.g. Watertoets and stress tests
<i>Operational</i>	Provincial Strategy on Spatial Planning NH2050: goal of new developments being water robust by increasing the sponge capacity of cities and adjusting in all industries	Execution agenda climate adaptation municipality of Amsterdam: goal of tackling heat, drought and extreme weather conditions through local measures and adjustments. Water control program regional water authority Amstel, Gooi and Vecht: ensure water safety

Figure 3. Policy design model with practical examples.

Based on several criteria, all these aforementioned policy documents can in some way fit in the policy design figure based on Howlett (2009; figure 1; figure 3). The level of abstraction of the climate adaptation goals in the National Strategy on Spatial Planning is high, which is why these goals can be labelled as 'strategic' (Howlett, 2009). The level of abstraction becomes less in the Deltaprogramme, as it provides technical instruments and more specific requirements and objectives for becoming water robust in the future. This fits the description of tactical goal formulation by Cashore & Howlett (2007) and therefore, the Deltaprogramme fits the figure on a tactical level. The provincial strategy of Noord-Holland contains local, on-the-ground, targets and measures, which fits the operational level of policy design (Howlett, 2009). Agendas of executions and water controlling programmes reformulate these targets and can also be defined as instruments, that contribute in reaching the targets (Cashore & Howlett, 2007; Howlett, 2019).

Next to the level of abstraction, these policy documents can also be divided similarly when focusing on the targeted area in the policy document or by analysing the time frame. On the strategic level, goals are formulated on a national level, targeting the entire country. On the tactical level, focus areas are formulated, and on the operational level, strategies focus on a province, or even a certain water basin or municipality. When analysing the time frame in which the goals are formulated, the national Strategy on Spatial Planning focusses mainly on 2050 (Ministerie van BZK, 2020). The provincial Strategy on Spatial Planning and the water control programme of water authority Amstel, Gooi and Vecht are not only focussed on 2050, but also more short-term focussed (Provincie Noord-Holland, 2018; Waterschap AGV, 2022).

Figure 3 provides an overview of the current Dutch water infrastructure and climate adaptation policy field on paper. Data collected from expert interviews complements this overview with a more practical perspective.

5.2 Dutch climate adaptation policy implemented in practice

As the overview of climate adaptation goals in Dutch water infrastructure policy is clear, the next step is to further explore this policy design and implementation in practice, which will contribute to answering the last sub-question “How is Dutch climate adaptation policy implemented in practice?”. With the outcome of the interview data, a conclusion can be drawn as to if there is any coherency in goals formulation, consistency in instruments and congruence in goals and instruments (Howlett, 2009) and whether or not there is a certain level of integration of climate adaptation policy (Cumiskey et al., 2019; Van Geet et al., 2021). This is determined through an analytical framework to assess integration in policy design (Cumiskey et al., 2019). First, an overview of the interview results is discussed and analysed.

Contextualising water robustness

An overall first impression of the definition or interpretation of the concept of water robustness was asked for in the interviews. Several answers included being resilient to climate change and more extreme weather conditions, with limited damage or harm done, especially nothing permanent. The idea is to reach a state where floodings to a certain extent are acceptable, as the long-term consequences stay limited. Another interpretation of water robust is the idea that all activities in a certain area take water in the broadest sense into account. Staff members of regional water authorities mostly explained a water robust region as a region that ensures “water and ground as drivers” in all activities. The priority lays with ensuring enough space for water, as well as protecting vital infrastructure from damage. The interviewed staff member of the municipality of Amsterdam does not

label water robust as an abstract concept, rather as a “deliberate choice that needs to be made by the government and private organisations in the spatial environment” (Interviewee 5). Most interviewees stressed the fact that it is hard to define the concept of water robustness, as everyone has their own personal explanation for it, and that it can be interpreted in many different ways. One interviewee of a regional water authority added that it is not just about becoming water robust, but that this problem is about the whole future of the Netherlands.

Some interviewees agreed with the fact that the definition and contextualisation of water robustness can be context- of region-dependent. As an example for this, the floodings in the province of Limburg in 2021 were mentioned multiple times during the interviews. Heavy rain will produce a different outcome in about every province, which makes it hard to formulate a more precise definition for water robustness on a national level. To the contrary, it was also stressed that there is need for a clearer definition from the national government, which makes it easier for lower governmental organisations to follow up on. Next to that, an interviewee from a regional water authority added that defining this on a national level can also help in providing a financial basis for the execution on the national level.

Goal formulation

To get an understanding of Dutch climate adaptation policy in practice, a question was asked about how goals are formulated within the organisation the interviewee works for. By combining these answers, a more clear view on the level of coherency between goals on strategic, tactical and operational level can be formulated (Kern & Howlett, 2009; Howlett, 2019; Van Geet et al., 2019; Bahn-Walkowiak & Wilts, 2017). Several answers included the challenge of the never ending process of goal reformulation, as the context and circumstances keep changing as well. The realisation that climate change is speeding and coming ahead of us had risen over the past decade, meaning that the plans created over a decade ago are based on outdated calculations and need to be revised. One interviewee states that it is therefore easier to keep the goals abstract, even on a regional water authority level, to prevent having to revise them in the future. Others state it is inevitable to not revise them, and name it part of the process to keep evaluating past and future goal formulations.

An interviewee on the tactical level, working for the Deltaprogramme and the Delta commissioner, was slightly sceptical to if coherency of goals is taken into account when goal reformulation takes place on each level. The staff member mentioned that it is a challenge to keep up to date with every municipality and what they are doing for climate adaptation. There are certain manuals available from the Deltaprogramme to help municipalities in reformulating the goals and implementing the plans, however there is no strict regulation that obliges these lower governmental organisations in doing this. Another staff member working for a tactical organisation also mentions

this as a challenge. Here it is actually considered an advantage to formulate goals abstractly on the strategic level. Consequently, through a basic set of rules and criteria, the responsibility then lies at a decentralised level with a governmental organisation.

A staff member of a regional water authority however states that coherency does occur in how they reformulate goals from a higher governmental layer and while reformulating, make them more precise. Other interviewees from the operational level provided similar answers. For example, the state and the province provide a certain standard for rain capacity that needs to be met and handled. The regional water authority then elaborates on this goal by expressing the capacity of a polder, the amount of housing under risk and on a very local level what needs to be changed to meet the policy target (Howlett, 2019).

By analysing these answers from the expert interviews, it can be concluded that the goals are formulated mostly coherently. Remarkable for the answers to the question about the formulation of goals on each level, was that the perception to the level of coherency was different between the levels. As mentioned above, interviewees from the operational level agree that there is coherency in goal formulation and how these organisations on an operational level use and reformulate the goals, in order to reach the main policy aim (Howlett, 2009). However, the perception of the level of coherency on the strategic and tactical level was different. Most staff members working for a strategic or tactical governmental organisation questioned to what extent lower governmental organisations take into account the main policy aim while formulating on-the-ground measures, a criteria for coherency in goals (Kern & Howlett, 2009; Van Geet et al., 2019). Overall, the goals formulated on all levels take into account the same strategic policy goal and can be implemented without any significant trade-offs (Kern & Howlett, 2009; Van Geet et al., 2019). Therefore, it can be concluded that there is goal coherency in Dutch water infrastructure and climate change policy design.

Choice of instruments

Subsequently to the goal formulation, questions were asked about the instruments available in Dutch water infrastructure policy to reach goals. The answers provided can help in understanding to what extent consistency occurs between instruments on a strategic, tactical and operational level (Bahn-Walkowiak & Wilts, 2017; Howlett, 2009; Howlett, 2019). A staff member of a regional water authority mentioned that there is indeed consistency in instruments between for example the province and the municipality and between the province and the regional water authority. However, it was mentioned to be more of a challenge to adjust instruments between municipalities and regional water authorities, as they are more on the same governmental layer and policy level. Others mention that, considering instruments, there is still a lot to be decided on. Since it is a hot topic in political discussions as well,

several interviewees label the choice of instruments and therefore the execution of plans still as vague and insufficient. From a more strategic perspective, interviewees provide among others the Deltaprogramme, several execution agendas and the aforementioned manuals as instrument, on which the tactical and operational level can build. However, in practice this remains, as mentioned, vague and yet to be executed.

A reoccurring topic on the subject of instruments in the interviews is the funding, which is closely related to a priority-discussion. All governmental organisations have broad political agendas, where it becomes a tough discussion to include climate plans that are not completely necessary at the moment or can be integrated with other plans. In several interviews it was also stated however, that by integrating climate adaptation in other industries and plans results in a lack of budget to eventually implement the climate adaptation measures, as it is not the main priority. “Everything that we won’t do now, are postponed costs for the future” – a quote from interviewee 5 about this dilemma. Interviewees from regional water authorities and Waternet, funding plays a separate role in goal attainment, since these organisations collect their own tax. This on the one hand comes in handy as an instrument to attain goals fast and quite easily. It can however increase the difficulty of goal attainment as well, as mentioned in the interviews. Larger plans or programmes that cover more ground than solely the regional water authorities’ responsibility cannot or only partially be funded through these taxes, which results in a need for other financial incentives, such as subsidies.

When analysing the instrument related answers from the interviews, it is difficult to conclude if there is consistency of instruments or a lack thereof. It is hard to say, as multiple interviewees mention the necessity for more decisions on this matter. Also, there are still more plans that need to be implemented and execution agendas to be created. Aside from several funding possibilities, most instruments that are currently available can be classified as procedural instruments, that influence actor relationships rather than directly influence goal attainment (Howlett, 2000). Examples of this are knowledge- and working-groups created by the Ministry of Infrastructure and Water Management and the Deltaprogramme to work collaboratively on the matter. Most already existing instruments are mentioned to be aligned with one another on different levels, which means there is to some extent instrument consistency occurring (Bahn-Walkowiak & Wilts, 2017). Next to that, the existing instruments do not undermine each other, rather even support each other in pursuing policy goal attainment, which is another element of instrument consistency (Howlett, 2019). There is however a need for more instruments than there currently are, which implies an inconsistency in policy instruments.

Goal and instrument congruence

Next to coherency in policy goals and consistency in policy instruments, a policy design is considered to be effective if congruence occurs (Kern & Howlett, 2009; Howlett, 2009). Congruence entails a mutual support between goals and instruments on all policy levels (Van Geet et al., 2021; Kern & Howlett, 2009), which is in practice resembled as for example the Deltaprogramme providing a separate Deltafund as financial incentive. Another example of an instrument complementing a goal, are the nationally developed manuals, that help municipalities in executing stress tests to clarify the immediate climate risks per region. The stress tests themselves also serve a corresponding purpose (Van Geet et al., 2019; Howlett, 2014), namely helping the Netherlands to become water robust in 2050. This indicates that congruence between goals and instruments in Dutch water infrastructure and climate change policy does occur, however only to the extent that there are enough instruments available to support the corresponding goals.

Policy integration

Another policy related subject that was questioned in the interviews was to what extent policy integration occurs. A member of staff of the Delta commissioner explains that it is the general idea to integrate and implement climate adaptation into the plans of each ministry. This is also one of the reasons the National Climate Adaptation Strategy (in Dutch: nationale klimaatadaptatie strategie) was created; to provide a nationally collaborative working group that influences every ministry. As this has happened quite recently, integrated results are still to be waited for. An interviewee from Waternet also mentioned the need for a more integrated approach at the national government between ministries. This partially because monitoring and evaluation of the process is, as far as that even currently already exists for Dutch climate change policy, almost impossible when execution takes place in multiple different sectors. On a more decentralised level, integration of policy becomes easier as said by an interviewee of a regional water authority, as the collaboration with other governmental organisations is stronger. Another interviewee from the Delta plan on Spatial Adaptation agrees and adds that on the regional and local level, integration is even a 'must'. On the national level, it should be a 'must', however subjects as climate change are still treated per sector and ministry. According to interviewee 5 from the municipality of Amsterdam, the challenge currently lays with "how we can change the embedded sectoral focus to more connectivity and integration". The interviewee added that with a lack of integration, there will be goal attainment in each sector, but no integrated goal attainment.

A specific component of policy integration, based on Cumiskey et al. (2019), are the actor relationships and actor-based mechanisms. The interviewees were therefore questioned about the partnership and cooperation with other governmental organisations. Mostly interviewees from regional water authorities mentioned how they are currently attempting to strengthen the collaboration with municipalities even more. Instead of solely advising municipalities on plans, the idea is to create and work on plans together and be more of influence as a regional water authority. A staff member of Waternet, the collaborative organisation between the municipality of Amsterdam and the regional water authority Amstel, Gooi and Vecht, also mentions that working cooperatively becomes easier when the relationship is tighter. Subsequently, this interviewee stresses the need for collaboration to be able to handle integrated topics, which is in line with earlier research (Candel & Biesbroek, 2016; Cumiskey et al., 2019). On the contrary, another interviewee again stresses the need for integration, but also acknowledges the many different existing partnerships at the moment. The staff member of the municipality of Amsterdam mentions that there is a great amount of regional collaborative agreements of organisations working together on different topics, which the interviewee labels as “unhandy” (Interviewee municipality of Amsterdam) rather than positive. The proposed solution would then be integration in these collaborative agreements (Cumiskey et al., 2019), which is a major challenge as said by the interviewee.

Another component of policy integration are rule-based mechanisms, such as regulations, permitting and duties to cooperate (Cumiskey et al., 2019; Candel & Biesbroek, 2016; Gilissen et al., 2015). A member of staff from the Delta commissioner explains how it is strongly advised for every municipality to execute stress tests and provide an overview of potential risks per municipality. However, it is not obliged by law, merely included in the Deltaprogramme and Delta plan on Spatial Adaptation (Rijksoverheid, 2021a; 2021b). This questions whether there is really a duty to cooperate (Gilissen et al., 2015), when this duty is based on each municipality’s will and sense of priority. From a more local perspective, interviewees from regional water authorities mention how climate change policy is embedded in every plan created and the priority given to this subject. This then implies that there is indeed a sense of responsibility and duty to cooperate on every level (Gilissen et al., 2015), contributing to policy integration (Cumiskey et al., 2019).

The last component from the policy integration framework utilised for this research are resource-based mechanisms, namely funding and financial incentives (Candel & Biesbroek, 2016; Cumiskey et al., 2019). An interviewee from the Deltaprogramme mentions a lack of budget as one of the main reasons for municipalities to decline giving priority to integrating climate adaptation policy. There are

very little joint funding arrangements available, which increases the difficulty of implementing integrated policy.

With the help of an analytical framework to assess integration based on the framework by Cumiskey et al. (2019), the level of integration of climate adaptation in water infrastructure policy can be measured. As explained before, the elements of the framework used for this research to indicate the level of policy integration are actor relationships, actor-based mechanisms, rule-based mechanisms, and resource-based mechanisms (see figure 2). Based on the actor-relationships, there is a high to intermediate level of integration occurring, as there is a high number of actors involved with a mostly shared mindset that collaboration is necessary for policy effectiveness. This shared perception of the relationship increases the governance capacity for integration (Candel & Biesbroek, 2016; Gilissen et al., 2015).

Taking the influencing mechanisms into account, the actor-based mechanisms are in place, however not all effective, due to the many different existing collaborative agreements. This results in lesser effectiveness of policy design due to intermediate integration (Cumiskey et al., 2019). The rule-based mechanisms are definitely available. The duties to cooperate as mentioned above are mostly clear on all levels (Gilissen et al., 2015), as are cooperation agreements (Cumiskey et al., 2019) and regulations and permitting (Candel & Biesbroek, 2016). The clarity of ruling and the perception of duty to cooperate however differs on each policy level, which indicates a difference in degree of integration on each level. On an operational level, the rule-based mechanisms lead to high integration, whereas on the strategic and tactical level, the rule based mechanisms indicate only intermediate governance capacity for policy integration (Cumiskey et al., 2019). As for the resource-based mechanisms, there are very limited joint funding arrangements available that could contribute to policy integration (Cumiskey et al., 2019). Also, existing financial incentives are sectoral and it is therefore hard to combine these funding sources to help achieving policy goals, which would increase the capacity for policy integration (Candel & Biesbroek, 2016). Based on the resource-based mechanisms, the degree of policy integration therefore is intermediate to low.

Taking all above into account, it can be concluded that policy integration occurs to a certain extent in Dutch water infrastructure and climate change policy design. Only to a certain extent, as it occurs mostly on the operational level, and less on the strategic and tactical level. Actor-based mechanisms exist, however not fully effectively; rule-based mechanisms are widely available, however taken into consideration differently on each level; and resource-based mechanisms are still quite limited and very sectoral on the national level. The governance capacity for integration in Dutch water infrastructure

and climate change policy can therefore be classified as an intermediate degree of integration (Cumiskey et al., 2019).

6 Conclusion and discussion

6.1 Conclusion

Secondary document research of multiple policy documents was conducted, together with expert interviews with policy staff members of corresponding governmental organisations, to research and elaborate on the contextualisation of water robustness in Dutch water infrastructure policy. Subsequently, the effectiveness of this policy design was investigated, through an analysis of policy coherence, consistency and congruence occurring, together with policy integration.

This paper has elaborated on the policy field of water infrastructure and climate change in the Netherlands, to answer the first sub-question: “What does the current Dutch water infrastructure and climate change policy field look like?”. The Dutch national government has several ministries implementing climate change policy, of which the Ministry of Infrastructure and Water Management executes water-related policies. Among others, it aims for the goal to become water robust in 2050. Several governmental organisations work on reaching this goal, namely the Deltaprogramme, the Delta plan on Spatial Adaptation, provinces, municipalities and regional water authorities. Goals and instruments are dictated and reformulated on each policy level.

The second sub-question entailed an explanation of policy design theory to understand: “What conditions result in effective policy design?”. Policy design is said to be effective, when there is goal coherency, instrument consistency and congruence occurring between goals and instruments on all policy levels, namely strategic, tactical and operational (Kern & Howlett, 2009; Howlett, 2009; Van Geet et al., 2019). Policy goals are coherent, if they aim for corresponding objectives, goals and settings (Van Geet et al., 2021) and can be reached complementary to each other (Kern & Howlett, 2009; Howlett, 2019). Consistency in policy instruments occurs when all available instruments contribute together in achieving the same policy goal (Van Geet et al., 2019; Kern & Howlett, 2009; Bahn-Walkowiak & Wilts, 2017). Goals and instruments are congruent, if they provide a basis for successful goal achievement and all serve corresponding purposes (Howlett, 2014; Van Geet et al., 2021; Kern & Howlett, 2009).

The level of integration was assumed to be of influence for policy design effectiveness, contributing to the third sub-question: “What influences policy design effectiveness?”. To test the level of integration, a framework to assess the governance capacity of integration was used, adopted from Cumiskey et al. (2019). Several elements of policy design were used as indicators for policy integration and therefore

of influence on policy design effectiveness, namely actor relationships; actor-based mechanisms; rule-based mechanisms; and resource-based mechanisms.

The last sub-question was “How is Dutch climate adaptation policy implemented in practice?”. Climate adaptation policy, together with water infrastructure policy, is implemented through goals and instruments set in the National Strategy on Spatial Planning and the Environment (NOVI), the Deltaprogramme, the Delta Plan on Spatial Adaptation, provincial and municipal execution agendas, and through water control programmes of regional water authorities. All these governmental organisations formulate goals and instruments on different policy levels, in order to reach policy effectiveness. To summarize, there is goal coherency occurring in Dutch water infrastructure and climate change policy design, as all policy goals, objectives, and settings pursue the same outcome (Howlett, 2014; Kern & Howlett, 2009; Van Geet et al., 2019). In terms of instrument consistency, there is a slight inconsistency occurring, as it is still an early stage of creating and defining the right instruments that correspond to each other and to the set goals. Most existing instruments do however align with one another on all different levels, which contributes to goal attainment and therefore to effective policy design (Bahn-Walkowiak & Wilts, 2017; Howlett, 2014). This also indicates that, only to a certain extent, there is congruence between goals and instruments in Dutch water infrastructure and climate change policy. When the right instruments are available, they serve a corresponding purpose as the goals (Van Geet et al., 2021), resulting in effective policy design (Kern & Howlett, 2009; Howlett, 2014).

It can also be concluded that there is an intermediate degree of integration in Dutch water infrastructure and climate adaptation policy in practice (Cumiskey et al., 2019). The integration occurs to a certain extent, as it occurs mostly and mainly on the operational policy level and less on the strategic and tactical level. There is a great amount of existing and contributing actors and actor-based mechanisms such as partnerships, however not all fully effective. Subsequently, the funding remains sectoral on the national level, due to a lack of priority, a lack of joint funding arrangements (Candel & Biesbroek, 2016) and the highly political debate.

To answer the main research question “How is water robustness contextualized in Dutch water infrastructure policy and how effective is this policy design?”, the conclusions of the analysis and sub-questions must be combined. Water robustness can be defined as a dynamic state of, in this case, the Netherlands, in which the country is resilient to a certain extent to changing weather conditions and other causes for water hindrance as a result of climate change. To exactly what extent is open for interpretation and differs as to how much hindrance is temporarily accepted.

The expectation for this research was that the policy design fit in combination with policy integration, will lead to policy design effectiveness. This expectation was proven to be mostly substantiated. Coherency of policy design occurs in Dutch water infrastructure and climate change policy design, whereas there is a slight inconsistency in instruments and therefore incongruence due to a lack of substantial and effective instruments that complement the goals. Next to this, there is an intermediate degree of integration in the policy field. As it is still a somewhat early stage of this climate change policy design in the Netherlands, it cannot be fully predicted if this policy design will be effective. However, to answer the main research question to the current state of the policy design, it can be concluded that the slight inconsistency and limited degree of integration affect the effectiveness of the policy design negatively. This does not imply that the current policy design is ineffective, however it is recommended to increase the degree of integration on all policy levels, especially strategic. Subsequently, stressing the priority of climate adaptation may increase the awareness and contribute to accelerating the political debate.

6.2 Discussion

This research developed an overview of water robustness in Dutch infrastructure water policy design and the effectiveness of this design in current practice. It can be concluded that there are several barriers to the current water infrastructure policy design that influence its effectiveness and can be subject to future research. The interviews showed that incorporating climate change in Dutch water infrastructure policy is a highly political topic, resulting in policymakers handling the matter differently. Also, as frequently mentioned in the interviews, the goals to become water robust in 2050 are widely discussed and reformulated. However, the execution and implementation of these plans are still vague and subject for discussion. Among other things, there is a great amount of time pressure involved, which should lead to more concrete implementation structures in the near future to succeed in attaining the set goals.

Currently, integration of climate change policy mostly occurs on decentralised levels of government. The degree of integration increases when going from a strategic to operational policy level. This was stressed by some interviewees as they mentioned the need for more integration and collaboration between ministries on the national and strategic level. More research into policy integration on a strategic and national level is necessary to provide insights in effectiveness of policy design.

Lastly, this research showed the lack of priority still occurring in including climate change in Dutch infrastructure water policy design. Even though it is a highly discussed topic, also due to the political debate on this subject, there still seems to be a lack of instruments and a missing sense of urgency to execute plans to become climate proof and water robust by 2050 in the Netherlands. The

reasons to why this priority is still lacking and how the urgency can be stressed could be investigated in future research.

6.3 Reflection

Several challenges were faced while conducting this research. The theoretical basis was found quite easily, however understanding it thoroughly took some time, as political and policy sciences needed to be studied. As mentioned briefly in the methodology, not all written parties agreed to join the research by conducting interviews with the organisations. For almost all interviewees, it took multiple attempts through various contacts to eventually agree on an appointment. Unfortunately, the province of Noord-Holland has not responded to an request and is therefore excluded from the interviews. This might have affected the validity of this research, since it does not provide a complete overview of all governmental layers involved in the policy process. There were however sufficient interviews conducted with other governmental staff members from a similar policy design level, to obtain enough information for a decent analysis. The communication thus was quite a challenge, however in the end it can be concluded that sufficient interviews have taken place and provided with sufficient information and data to answer the research questions and provide a conclusion to the research.

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Appendix A – interview guide

Interview questions (in Dutch)

- Wat verstaat u onder waterrobuust?
 - o Is er nog een verschil in de betekenis van waterrobuust in context? Regio?
 - o Waterrobuuste inrichting, robuust watersysteem, waterrobuuste infrastructuur; blijft de betekenis / het doel hetzelfde?
 - o Waterrobuuste inrichting; gaat dat om waar bebouwen of hoe bebouwen?

- Hoe is de samenwerking met andere overheidslagen?

- Hoe bepaal je dat een doel is bereikt?
 - o Wanneer is iets waterrobuust? / Wanneer zie je dat iets waterrobuust is?

- Is er afstemming tussen de klimaatadaptatie doelen (waterrobuust doel) op verschillende beleidsniveaus?
- Wat is van invloed op de beslissing voor bepaalde doelen?
- Wie maakt de keuze voor bepaalde doelen?
- Hoe wordt invulling gegeven aan deze doelen?
 - o Wie is verantwoordelijk voor de uitvoering?

- Is er afstemming tussen de instrumenten op verschillende beleidsniveaus?
- Wat is van invloed op de beslissing voor bepaalde instrumenten?
- Wie maakt de keuze voor bepaalde instrumenten?
 - o Wie is verantwoordelijk voor de uitvoering?

- Is er afstemming tussen klimaatadaptatie doelen en instrumenten die ingezet worden om deze doelen te bereiken? Waar blijkt die afstemming uit (of juist niet)?

- Is er een vorm van controle (of evaluatie) in het beleidsproces, wat afstemming tussen doelen en instrumenten kan bevorderen?

- Hoe zit het met de integratie van klimaatadaptatie in andere sectoren / onderwerpen?
 - o Denkt u dat er een verschil in mate van integratie is op verschillende overheidslagen?