Adaptation Governance in Smaller Municipalities

Analysing the adaptation governance arrangement in eight Dutch municipalities

T.A.M. van Sittert

SPATIAL PLANNING PROGRAMME | CITIES, WATER & CLIMATE CHANGE
NIJMEGEN SCHOOL OF MANAGEMENT | RADBOUD UNIVERSITY
FEBRUARY 2020 | MASTER THESIS | FINAL VERSION

Adaptation Governance in Smaller Municipalities

Analysing the adaptation governance arrangement in smaller municipalities

Author	Tom van Sittert
	S4444620
Master thesis	Final version
1st corrector & Supervisor	Prof. Dr. P.M. Ache
2nd corrector	Dr. L.J. Carton
Internship placement	Waterschap Rivierenland
Internship supervisor	M. Grobben, MSc
Version	Final Version
Date	21 February 2020
Word count[1]	38.347

[2]

Radboud Universiteit Nijmegen

Waterschap Rivierenland

---

[1] Including tables, headers and in-text references

[2] http://www.jhsg.nl/katholieke-universiteit-nijmegen-naar-radboud-university-argumentenspoor/radboud-universiteit-nijmegen-logo-2/, https://www.078.nu/nieuws/nieuwe-directeur-en-dijkgraaf-voor-waterschap-rivierenland/

PREFACE

In front of you lies my thesis on climate adaptation governance in smaller municipalities. This thesis is not only the product of my master Cities, Water and Climate Change, nor just the result of my current internship; it is the product of many different aspects that have developed themselves over the past couple of years. The focus on smaller municipalities was triggered by the differences I noticed between my two hometowns: Nijmegen and Steenbergen. The first is the city in which I have been studying and living for five and a half years now. The second is the city I grew up in, a small city in a rural municipality similar to the cases I have studied. My interest in the changing climate has developed during the bachelor-program of Geography, Spatial Planning and Environmental Policies in combination with a side-job for a sustainable energy platform. This interest has grown during the Cities, Water and Climate Change-master and especially during my internship at Waterschap Rivierenland.

This thesis shows the analysis and results of my research on climate adaptation in smaller municipalities. I have done this research with great pleasure which can for a large part be attributed to my internship. They have supported me throughout the thesis as well as with logistic aspects such as travelling to all the different respondents. I also had the opportunity to participate in the regional adaptation process in the 'Rijk van Maas en Waal', which offered me many new insights in climate adaptation and regional processes. I would like to thank Mireille Grobben, Marjolein Reijnierse and Marije Rothuizen in particular. I would also like to thank my thesis-supervisor Peter Ache for his comments and suggestions on my research. His feedback was efficient and useful and developed this research to what it is now.

Additionally, I would like to thank Marijn Gerts for the necessary distractions with our daily games of table football and Luuk Doornink for his taxi service when the trains did not function.

The end of my thesis also indicates the end of my life as a student. It is not clear what the future will bring, but I am sure that I have developed to be robust and flexible and that I am able to adapt to changing circumstances!

I wish you all a pleasant read.

Tom van Sittert

Tiel, February 2020

SUMMARY

Climate adaptation receives growing attention from the scientific and policy world. That might not be very surprisingly as studies show that climate change already affects our lives (IPCC, 2014). However, adaptation strategies and actions have not been implemented very often yet. This is predominantly due to restricting barriers and insufficient adaptation governance to overcome those. The adaptation governance arrangement provides a framework for proper adaptation governance and helps to overcome these barriers (Termeer et al., 2017). This arrangement consists out of seven elements: framing, the timing of policies, the level at which to act, alignment across sectors, the science-policy interface, leadership and the selection of policy-instruments.

The current literature first of all lacks insight in the way in which this arrangement is actually designed in practice (Den Exter et al., 2015). Additionally, the literature predominantly focusses on large scales and lacks attention for (smaller) municipalities (e.g. Den Exter et al., 2015; Verlaan, 2018). This is problematic because it is argued that municipalities are the level with the highest responsibility for adaptation governance (e.g. Uitenbroek et al., 2013). Additionally, it can be argued that the suggested approaches are not necessarily applicable or useable for smaller municipalities because of their limited capacity (Verlaan, 2018).

This research therefore compared the adaptation governance arrangement of smaller municipalities to the suggested arrangement derived from the literature. The adaptation governance arrangement is analysed for eight smaller municipalities that are engaged in the regional process of '*Klimaat Actief Rivierenland'.* They are all in the same phase of the adaptation governance process and have quite comparable sizes. Eventually, their arrangement was compared with the suggested design of the arrangement based on the literature and compared with the arrangement of a large case. The research was executed to present a first systematic overview of adaptation governance at the level of smaller municipalities. It was additionally executed to test the applicability of the adaptation governance arrangement and subsequently offer recommendations to the policy and scientific domain.

The research showed interesting differences between the suggested design of the elements and the observed design of them in the smaller cases. Those differences can predominantly be attributed to three general aspects: the short-term focus of smaller municipalities, an unprepared municipal organisation, and a lack of awareness and momentum.

Some of these differences need to be tackled by the smaller municipalities. They are challenged to pay more attention to the long-term perspective, develop their organisation, and create more awareness and momentum. It is recommended to pay attention to the elements of *leadership* and *framing*, and to *develop the organisation* before they proceed with the further steps of the adaptation process. Other differences need to be tackled within the region, such as the science-policy interface and the development of a shared strategy. The regional actors within KAR specifically have to think about their role in terms of knowledge-development, a heat-plan, their role as a regional leader and their ability to approach large regional actors. Other differences need more attention from the scientific perspective. For example the negative consequences and necessity of synchronisation, which is suggested for the element of the levels at which to act.

CONTENT

GLOSSARY

Term	Definition
Adaptation	*"Coping strategies and actions to avoid, recover from, or benefit from climate impacts"* (Termeer et al., 2017, p. 2)
Governance	The ways in which governing is carried out, without making assumptions to which institutions or agents are constructively engaged to carry out a public purpose
Adaptation Governance	A way of governing in which institutions and agents are constructively engaged to decide on and carry out climate adaptation.
Governance arrangements	*"The ensemble of rules, processes, and instruments that structure the interactions between public and/or private entities to realise collective goals for a specific domain or issue"* (Termeer et al., 2011, p. 161)
Adaptation governance arrangement	A governance arrangement developed for adaptation governance
Three phases of planning	The three phases of planning that are distinguished by Moser & Ekstrom (2010): understanding, planning and managing.
Barriers	Obstacles that can be overcome. Barriers can be present in each phase of planning and can be technological, financial, informational/cognitive, social/cultural and organisational/institutional (Adger, 2007; Moser and Ekstrom, 2010)
(Design) elements of adaptation governance arrangements	The seven elements set out by Termeer et al. (2017) crucial for adaptation governance arrangements. These are the framing of the problem, the levels at which to act, the timing of the policies, the alignment across sectoral boundaries, the selection of policy instruments, the organisation of the science-policy interface and the forms of leadership.
Framing of the problem	*"The process by which issues, decisions, or events acquire different meanings from different perspectives"* (Dewulf, 2013, p. 322) The construction of the meaning of climate adaptation.
Frame	*"particular way of constructing the meaning of something"* (Dewulf, 2013, p. 322)
Level at which to act	The challenging process to find the right balance between the scale of issues and interventions, and the scale at which it is governed.
Synchronisation	The process in which actors provide meaning to their actions in a larger context of governance levels, scale and time, and other actors' actions, and align their actions with them
Timing of policies Robust	Bringing long-term consequences into short-term actions. Measures/policies which remain functional within the range of possible and plausible scenarios

Term	Definition
Flexible	Measures/policies able to adapt to changing circumstances if needed, when needed
Windows of opportunity	External occasion which offer opportunities to mention and/or act on climate adaptation such as floods, drought and heat waves
Momentum	Social or political pressure, questions or demands which offer opportunities to mention and/or act on climate adaptation
Alignment across sectoral boundaries	Integration of adaptation within the organisation, policy and practical implementation.
Dedicated approach	Adaptation governance through a new, separate policy domain with their own resources, objectives and distribution of responsibilities.
Mainstreaming	Adaptation governance is integrated in all different sectors of an organisation. It is claimed that mainstreaming would be a more appropriate way of anchoring.
Organisation of the science-policy interface	Proper cooperation between policymakers and scientists
Science domain	Everyone working for/related to a scientific institution (e.g. scientists, students or consultants)
Scientific institutions	Institutions in which research is done (e.g. universities, research institutes or consultancy firms)
Boundary organisation	Intermediate organisation between different worlds (science and policy making) in which joint fact-finding can be done
Leadership	Different forms of leadership which need to be present to steer a process without formal control
Selection of policy-instruments	The process in which municipalities choose certain instruments to achieve adaptation action
Policy instrument	*"A deliberate structured effort by governors to solve a policy problem by modifying actions of the governed"* (Burkas & Sallnäs, 2012, p. 605).

ABBREVIATIONS

Abbreviation	Full *Translation*
WKPA	Wallaart and Kusse Public Affairs
IPCC	International Panel on Climate Change
LOP	Landschapsontwikkelingsplan *Landscape Development-Plan*
GRP	Gemeentelijke Rioleringsplan *Municipal Sewage-Plan*
KAR	Klimaat Actief Rivierenland *Climate Active Rivierenland*
DPRA	Deltaplan Ruimtelijke Adaptatie *Deltaprogram Spatial Adaptation*
RAS	Regionale Adaptatiestrategie *Regional Strategy on Adaptation*
LAS	Lokale Adaptatiestrategie *Local Strategy on Adaptation*
RUP	Regionaal Uitvoeringsprogramma *Regional Implementation-program*
LUP	Lokaal Uitvoeringsprogamma *Local Implementation-program*
NKWK	Nationaal Kennisplatform Water en Klimaat *National Platform for Knowledge on Water and Climate*
KNMI	Koninklijk Nederlands Meteorologisch Instituut *Royal Dutch Institute for Climatology*
WUR	Wageningen University and Research
GGD	Gemeentelijke Gezondheidsdienst *Municipal institute for health*
WRP	Water- en Rioleringsplan *Water and Sewage-plan*
HAS	Hogere Agrarische School *University of applied agricultural sciences*
RES	Regionale Energiestrategie *Regional Strategy on Sustainable Energy*

1. INTRODUCTION

Climate change is a hot topic and it is only getting hotter. The debate on this topic predominantly focused on the impact of humans on the climate and climate change. Nowadays, the debate is getting broader and focuses on the impact of climate change on humans. This trend is a result of recent studies showing that climate change already affects our lives (IPCC, 2014). The temperature is rising, drought occurs more often and there are more occasions of extreme weather events (Termeer et al., 2017). Academics and policy-makers therefore show a growing interest in climate adaptation[3] (Dewulf, 2013): *"the coping strategies to avoid, recover from, or benefit from climate impacts"* (Termeer et al., 2017, p.2).

Climate adaptation has not been implemented very often (yet), despite the growing (academic) attention to the topic. This is sometimes caused by a lack of proper knowledge considering the necessary measures. More often, it is a consequence of the difficulties related to the governance of it (Uitenbroek, Janssen-Jansen & Runhaar, 2013) - the adaptation governance (Termeer et al., 2017)[4]. These difficulties are caused by different barriers present during the understanding, planning and managing of climate adaptation. The barriers range from organisational and institutional barriers to cultural and informational barriers (Moser & Ekstrom, 2010). Proper governance is necessary to overcome these barriers. It is therefore crucial that the framework for adaptation governance - the adaptation governance arrangement (Termeer et al., 2011) - is well designed to overcome these barriers.

Many academics claim that municipalities are the most appropriate and therefore responsible authority to focus on adaptation governance. This level shows a strong presence of synergies between climate policy and sustainable development (Uitenbroek et al., 2013). It is the governmental body closest to the people and therefore in the right position to develop adaptation policies and measures that directly influence their cities and citizens (Den Exter et al., 2015). Additionally, adaptation solutions often require changes in the physical environment, which is the task of local authorities usually (Mees, Driessen, Runhaar & Stamatelos, 2013).

There is a general assumption that municipalities are performing well, but this could not be academically supported, because of a lack of systematic overviews of adaptation governance at that level (Den Exter et al., 2015). Additionally, the systematic overviews that are available, only focus on the scale of large cities or municipalities (e.g. Den Exter et al., 2015; Verlaan, 2018)

---

[3] Predominantly referred to as 'adaptation'

[4] Adaptation governance: the way of governing in which institutions and agents are constructively engaged to decide on and carry out climate adaptation policy and measures (see 2.1.3 Adaptation Governance).

1.1 Research problem

Many academics thus argue that municipalities have an important role in adaptation governance (e.g. Uitenbroek et al., 2013; Mees et al., 2013). Paradoxically, most of the current literature on adaptation governance does not focus on the scale of the municipality. The ones that do have that focus, only focus on large municipalities. However, the topics that are covered (could) have different implications and executions for large(r) and small(er) municipalities. An example of this is the way climate adaptation should be integrated within organisations, policies and implementation, which is seen as one of the crucial elements of adaptation governance (Termeer et al., 2017). Rovers, Bosch and Albers (2014) suggest a combination of a dedicated approach - explicit attention - and mainstreaming - integral implementation of climate policy throughout each policy domain. This is not always possible for small municipalities, which have fewer resources (e.g. (Verlaan, 2018). Proper anchoring of climate-policy within the organisation is harder and perhaps even unmanageable in such cases.

It is problematic that the current literature lacks insight in adaptation governance in smaller municipalities. They are the level with a high responsibility for adaptation governance, but little is known about their functioning regarding that topic. Additionally, the previous example gives reasons to believe that the suggested approaches for adaptation governance are not directly generalisable for smaller scale organisations. This therefore requires further analysis.

1.2 Research aim

The primary aim of this research is to gain insight in the adaptation governance in smaller municipalities and supply a systematic overview. This overview fills the current academic void about adaptation governance in smaller municipalities and makes it better understandable.

This research also aims to offer recommendations for the policy- and the scientific world. The literature offers suggestions for municipalities on how to arrange adaptation governance. These suggestions could be used as recommendations for the smaller municipalities. If they for example find it troubling to choose their policy-instruments, the literature could provide recommendations on how to select them. These recommendations could also be directed at regional organisations (like the Waterboard) to inform them about their possible role and actions they need to or could take to support the municipalities.

The systematic overview is also used to value the current large-scale driven literature and its applicability. Literature-based suggestions might not be applicable to smaller municipalities. The smaller municipalities might not be capable to approach certain elements of adaptation governance in the suggested way, or the suggestions might not work for smaller municipalities. If that were the case, recommendations would be made for further research on the design elements for smaller municipalities.

Barriers for adaptation governance can –hopefully- be overcome with the new recommendations. The indirect -and rather ambitious- aim of this research is therefore to smoothen and structure the climate adaptation process leading to a climate-adaptive society.

1.3 Research questions

The main aim of this research is hence to provide a systematic overview of adaptation governance at the level of smaller municipalities. The following research-question will be used to get that systematic overview:

How do smaller municipalities arrange climate adaptation governance compared to the literature on the design of this arrangement?

There are different aspects of adaptation governance that are relevant to answer this question. Additionally, there are aspects that are relevant to provide recommendations for scientist and policymakers. All of these aspects will be analysed in separate sub-questions:

1. What is the suggested approach to the seven elements of the adaptation governance arrangement, based on the literature?
2. How are the seven adaptation governance elements designed in smaller municipalities?
3. Why are they designed like that?
4. Does it correspond with the suggested approaches from the literature?
5. How is adaptation governance designed in smaller municipalities compared to a larger one?
6. Why does the approach of the smaller municipalities differ from the suggested approach?
7. Are the suggested approaches applicable for smaller municipalities?
8. How could a regional actor like the Waterboard support the municipalities in the process?
9. What elements should be further analysed on the level of smaller municipalities?

The main question can be answered through these sub-questions. They are furthermore useful to find recommendations for the municipalities, regional actors and the scientific domain.

1.4 Scientific relevance

There is a large base of scientific literature that describes how adaptation governance should be designed. However, there is little literature that provides a systematic overview of the way this is actually done in practice and how municipalities perform based on the literature (Den Exter et al., 2015). Moreover, the literature that does provide such a systematic overview is based on larger municipalities. Examples of this are Den Exter et al., (2015), Verlaan (2018) and WKPA (2018). They respectively focus on the 25 biggest cities, the 32 highest populated municipalities and 100 highest populated municipalities of the Netherlands.

This research fills the academic void of overviews of the performance of smaller municipalities. It also tests the current literature on adaptation governance and its applicability for smaller municipalities. It is relevant because it provides a first overview of adaptation governance in smaller municipalities. Additionally, the research provides well-founded recommendations for further research for adaptation governance on the scale of (smaller) municipalities.

1.5 Social relevance

There are visible consequences of climate change that affect our society already (e.g. IPCC, 2014). Adaptation measures are necessary to deal with these consequences so that we become climate adaptive (e.g. Termeer et al., 2017). Additionally, the Dutch *Deltaplan Ruimtelijke Adaptatie* (DPRA) was presented in 2018 which stimulates local and regional authorities to work on climate adaptation (Ministerie van I&W, 2018). However, there are many barriers related to adaptation governance that need to be overcome to achieve that (Moser and Ekstrom, 2010; Uitenbroek et al., 2013). These barriers can be overcome through proper adaptation governance and thus a proper adaptation governance arrangement (Uitenbroek et al., 2013; Termeer et al, 2017).

This research offers recommendations for the adaptation governance in smaller municipalities. These recommendations are directed at smaller municipalities or regional organisations. They would be beneficial for their adaptation governance arrangement and thus to overcome the barriers related to climate adaptation. There could also be indirect benefits through recommendations for further research and the newly produced recommendations derived from that. The research is therefore beneficial to overcome the barriers and become (more) climate-adaptive.

1.6 Reading guide

This thesis consists out of nine chapters. The first chapter introduced the topic, aims and questions of this research. The second chapter provides the theoretical framework, followed by a chapter elaborating on the chosen methods (chapter 3) and a more concise description of the data-collection and analysis (chapter 4). The empirical part starts with a description of the current situation in chapter 5. Chapter 6 provides the analysis of the different cases, which provide the answers to the sub-questions in chapter 7. Chapter 8 will answer and discuss the main-question and provide further recommendations. The thesis ends with a reflection on the used literature, methods and the working process in chapter 9 and a conclusion in chapter 10.

2. THEORETICAL FRAMEWORK

This chapter provides the theoretical framework of this thesis. The framework first describes adaptation governance (2.1) and the barriers for climate adaptation (2.2). It will then elaborate on the seven elements of adaptation governance arrangements and how they should be designed (2.3). The framework will be summarised in a conceptual model and the operationalisation (2.4 and 2.5).

2.1 Adaptation Governance
Adaptation governance is the main topic of this thesis. This concept consists out of two parts: *adaptation* and *governance.*

2.1.1 Adaptation
It is necessary to get a clear understanding of climate adaptation, before one could start analysing the adaptation governance on the municipal level. There are different ways of describing adaptation. One of the most used descriptions is provided by the International Panel on Climate Change (IPCC). They describe it as *"the adjustment to actual or expected climatic stimuli and its effects (...) to moderate or avoid harm or exploit beneficial opportunities"* (IPCC, 2014, p.5). For this thesis, I elaborate on the definition of adaptation provided by Termeer et al. (2017) whom describe adaptation as *"coping strategies"* and actions "*to avoid, recover from, or benefit from climate impacts"* (p. 2)*.*

2.1.2 Governance
Adaptation is an important matter of governance (Termeer et al., 2017). Academics argue that some adaptation measures will result from actions taken by private actors and are a result from autonomous or spontaneous forms of self-governing (Termeer et al., 2017). However, adaptation still requires collective action. Moreover, the difficulties related to governance are the main reason why adaptive measures have not been implemented that much (Uitenbroek et al., 2013).

Steurer (2013) defines governance by using the definition provided by Gamble (2000), who describes it as *"the ways in which governing is carried out, without making assumptions as to which institutions or agents do the steering"* (Steurer, 2013, p. 388). Emerson, Nabatchi and Balogh (2012) use a more elaborate definition. They define governance as "*the processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished"* (p.2). Combined, these meanings would result in a definition of governance as '*the ways in which governing is carried out, without making assumptions to which institutions or agents are constructively engaged to carry out a public purpose'.*

2.1.3 Adaptation Governance

Adaptation governance or the governance of adaptation would be a merger between the two concepts. Adaptation governance could then be described as follows: '*the ways in which governing is carried out, without making assumptions to which institutions or agents are constructively engaged to carry out coping strategies and actions to avoid, recover from, or benefit from climate impacts'* (Steurer, 2013; Emerson et al., 2012; Termeer et al., 2017). Dupuis and Biesbroek (2013) describe adaptation governance as "*the process leading to the production of outputs in forms of activities and decisions taken by purposeful public and private actors at different administrative levels and in different sectors, which deals intentionally with climate change impacts, and whose outcomes attempt to substantially impact actor-groups, sectors, or geographical areas that are vulnerable to climate change"* (p. 1480). Based on the previous, the description of adaptation governance would be '*a way of governing in which institutions and agents are constructively engaged to decide on and carry out climate adaptation'.*

The process of adaptation governance consists out of three phases: understanding the problem (1), the planning of adaptation actions (2) and managing the selected options (3) (Moser & Ekstrom, 2010; Uitenbroek et al., 2013). These phases can be further divided into sub processes. Figure 1 shows this division.
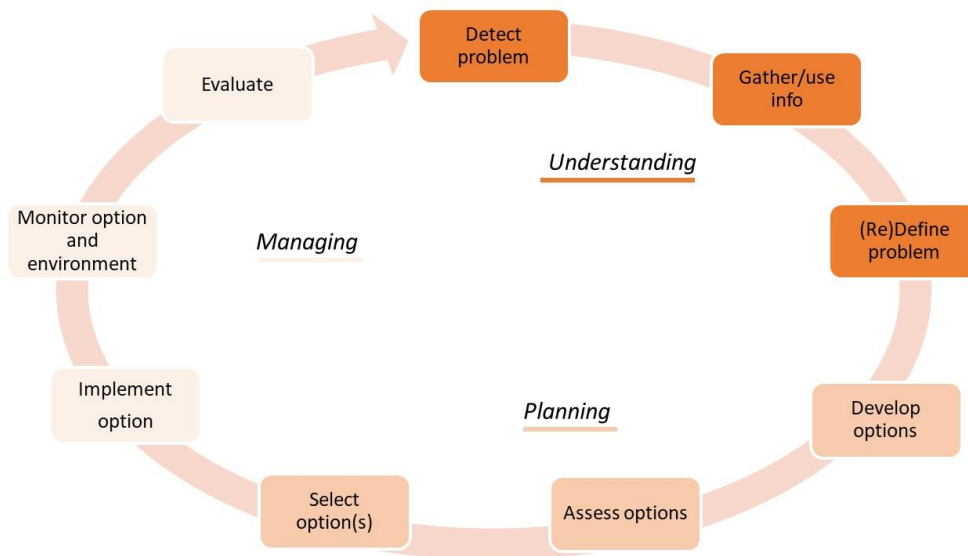
Figure 1: The phases and sub-processes of adaptation governance (Moser & Ekstrom, 2010, p. 22027)

2.1.4 Specific characteristics of adaptation governance

Adaptation governance is a wicked problem par excellence and the governance of it is challenging (Termeer et al., 2017). Climate adaptation for example has no stopping rule meaning that one cannot become a hundred percent climate adaptive and that it is difficult to assess how much adaptation is good enough. Additionally, adaptation is considered as a symptom of another problem - climate change - and is prone to controversies resulting in power plays (Rittel & Webber, 1973; Termeer et al., 2017). Moreover, there are five characteristics that are typical for adaptation and adaptation governance (Termeer et al., 2017; Mees, van Soest, Driessen, van Rijswick & Runhaar, 2014).

Adaptation governance is an emerging policy field with a lot of *controversy* (1). It relates to a lot of different sectors, actors and institutional levels resulting in *social complexity* (2). The long-term horizon of climate change causes it furthermore to be an *uncertain* (3) field in which it is hard to *bring long-term challenges into short-term actions* (4). At last, there is a high *spatial diversity* (5), leading to regional and socioeconomic inequality (Termeer et al., 2017; Mees et al, 2014).

2.1.5 Design principles for adaptation governance arrangements

Uitenbroek et al. (2013) state that insufficient governance is the reason for the lack of adaptation policies and measures. In that line of thought, proper adaptation governance would be crucial to become more climate adaptive. However, this is challenging because of the aforementioned characteristics of adaptation governance and the barriers during the process (see 2.2). It is therefore important that there is a proper governance arrangement (Termeer et al., 2017). This can be described as "*the ensemble of rules, processes, and instruments that structure the interactions between public and/or private entities to realise collective goals for a specific domain or issue*" (Termeer et al., 2011, p. 161). It thus serves as the framework to guide proper adaptation governance.

Termeer et al. (2017) distinguish seven elements that are crucial for designing an adaptation governance arrangement based on the characteristics of wicked problems and adaptation governance specifically. These elements are the framing of the problem, the level at which to act, the timing of the policies, the alignment across sectoral boundaries, the organisation of the science-policy interface, the forms of leadership and the selection of policy instruments. A proper inclusion of these elements would smoothen adaptation governance and help overcome the barriers related to climate adaptation. Section 2.2 describes these barriers, followed by a further elaboration on the elements in section 2.3.

2.2 Barriers for adaptation governance

There are still many barriers perceived by policymakers, even though the number of municipalities that are developing and implementing adaptation policies is increasing (Uitenbroek et al., 2014). These barriers are present in the three phases of policymaking that are part of adaptation governance: understanding the problem, planning the necessary measures (policymaking) and managing the implementation (Uitenbroek et al., 2013).

Moser and Ekstrom (2010) developed a framework of barriers, based on the framework of Adger et al. (2007). They distinguished five different barriers and linked them to different phases of adaptation governance (Uitenbroek et al., 2013). The barriers and phases are shown in table 1. Organisational/institutional barriers are present in all stages. Proper adaptation governance is important to overcome the organisational and institutional barriers. It is hence relevant during each phase of planning.

Type of barrier	Description	Present in phase
Technological	The (lack of) technologies that are necessary to deal with the consequences of climate change (Uitenbroek et al., 2013).	Planning
Financial	The (lack of) resources that are necessary for addressing adaptation and implementing measures. Both in terms of money and work force (Uitenbroek et al., 2013).	Planning, Managing

Type of barrier	Description	Present in phase
Informational/ cognitive	The lack of knowledge and understanding of climate change, influenced by the uncertainty and complexity of it (Uitenbroek et al., 2013).	Understanding
Social/cultural	Barriers related to differences in worldviews, values and beliefs of individuals or groups (Uitenbroek et al., 2013)	Understanding
Organisational/ institutional	Barriers related to insufficient governance, such as incompetent leadership, lack of political support, no public pressure, other objectives, fragmentation, lack of coordination and insufficient organisational cultures (Uitenbroek et al., 2013). Also related to an undefined role for local authorities and a lack of political commitment (Uitenbroek et al., 2014).	Understanding, Planning, Managing

Table 1: Different barriers at different phases of adaptation (Moser and Ekstrom, 2010; Uitenbroek et al., 2013)

2.3 Adaptation governance for smaller municipalities

A structured design of an adaptation governance arrangement helps to overcome the barriers related to adaptation governance (Termeer et al., 2017). This section elaborates on the seven elements of adaptation governance arrangements that are crucial for the governance design. It describes the challenges and principles and elaborates on what suggestions can be derived from the large scale-focused literature.

2.3.1 Framing of the problem

Adaptation governance is characterised by Termeer et al. (2017) as a relatively young policy domain with a variety of interrelated actors, sectors and systems. This causes a lot of different perceptions of climate change, its urgency, the risks and impacts, and the burdens and benefits of it. Actors use these differences to highlight certain aspects at the expense of others, use different scales and limits of the issue, or promote certain elements that suit their own interest as the core of the problem (Dewulf, 2013). This leads to different frames - a *"particular way of constructing the meaning of something"* (Dewulf, 2013, p. 322) - varying between actors. Frames are developed through framing: *"the process by which issues, decisions, or events acquire different meanings from different perspectives"* (Dewulf, 2013, p. 322). This involves two challenging aspects: puzzling and powering. The first refers to the development of a plausible storyline and solution, the latter to the decision on which frames are more relevant (Termeer, Dewulf, Karlsson-Vinkhuyzen, Vink & van Vliet, 2016).

Framing is seen as (one of) the most challenging aspect(s) of adaptation governance (The Royal Commission on Environmental Pollution, 2010). It has a major influence in the process of adaptation governance as it can affect the processing of information and steer policy debates and decision-making processes. It is therefore relevant in all three phases of planning (Dewulf, 2013). An appropriate frame helps to focus the process, activates and includes the right actors and prevents controversies (Termeer et al., 2017). Framing is relevant for the decision on the level(s) at which to act, which in turn has a far-reaching influence on the involved actors and their responsibilities. This decision is thus crucial for the power positions in adaptation governance (Van Lieshout, Dewulf, Aarts & Termeer, 2017). Framing could additionally be helpful to involve actors (Van Lamoen & Meijerink, 2014, p. 12).

What is suggested?
Municipalities are challenged to deal with a large variety of different and perhaps conflicting frames, and to avoid controversies between those frames. They need to prevent bystander-effects and be aware of the puzzling and powering during framing. It is suggested that municipalities should leave room for reflexivity and should be aware of and accept ambiguity. Frames that are (too) overwhelming, abstract, one-dimensional or depoliticized are seen as unsuitable and should be avoided (Termeer et al., 2017).

2.3.2 Levels at which to act

One of the characteristics of (adaptation) governance is that it goes beyond the "*boundaries of public agencies, levels of government, and/or the public, private and civic spheres*" (Emerson et al., 2012, p.2). Adaptation governance is thus a multilevel challenge in which a variety of governmental levels, institutions and organisations are involved. They have to cooperate to build a strategy of collaborative actions that result in climate adaptation (Verkerk, Teisman & Van Buuren, 2015). The traditional way of government is unfit to coordinate such a complex governance system. Multilevel governance systems are better capable as they have strong self-organising qualities and do not have a clear hierarchy (Verkerk et al., 2015).

The challenge of multilevel governance systems is to find the right balance between the scale of the issue and interventions, and the scale at which it is governed (Termeer et al., 2017). The municipalities are seen as the scale of the issue and interventions (e.g. Den Exter et al., 2015; Mees et al., 2013). However, it can be argued that adaptation governance is governed at the regional scale because of the regional approach in the DPRA (Ministerie van I&W, 2018). Moreover, the DPRA is a national policy, thus it can be argued that it is governed on the national scale as well. Multiple academics argue that the traditional approaches - seeking an optimal level at which to act, top-down governing, bottom-up approaches and collaborative processes - are not capable to deal with such a complex challenge (e.g. Termeer et al., 2017; Verkerk et al., 2015). A new approach is required in which different actions by different governance levels become interconnected: synchronisation (Verkerk et al., 2015).

Synchronisation
Synchronisation is the process in which actors provide meaning to their actions in a larger context of governance levels, scale and time, and other actors' actions, and align their actions with them (Verkerk et al., 2015). Actors should value their actions in relation to the whole context of adaptation governance on different levels and their actions should be in line with and strengthen other actors and actions (Termeer et al., 2017). Synchronisation can be stimulated by interactions and exchange to increase mutual understanding, shared goals, awareness and knowledge. Another aspect is that actors should act to stimulate others (Verkerk et al., 2015).

What is suggested?
This design element implies that there should be synchronisation between the municipalities – the scale of the issues and interventions- and the regional and national level –the scale at which adaptation is governed. The actions of the municipality should therefore first of all be aligned with and valued in regard to a broader process of (adaptation) governance on multiple institutional and organisational levels, and time-scales (Termeer et al., 2017). Secondly, the different levels should interact and exchange knowledge, ambitions and insights with other actors and should act in a stimulating way for them (Verkerk et al., 2015).

2.3.3 The timing of the policies

The long-term horizon of adaptation governance challenges municipalities to bring long-term consequences into short-term strategies and actions (Termeer et al., 2017). The timing of the policies is therefore an important but challenging element. Municipalities face the dilemma to act in a precautionary manner, or wait for trustworthy data on climate change and the impacts of it. While the first prevents us from acting too late, too early (and perhaps unnecessary) responses can cause lock-ins or regrets (Dewulf & Termeer, 2015).

Many academics suggest robustness and flexibility to deal with this challenge (e.g. Termeer et al., 2017; Haasnoot, Kwakkel, Walker & Ter Maat, 2013). Robustness consists of strategies and actions that remain functional within the range of possible and plausible scenarios. Flexible strategies on the other hand, are able to adapt to changing circumstances if needed, when needed (Haasnoot et al., 2013; Dewulf & Termeer, 2015). A robust and flexible system can prevent the risk of lock-ins or regrets. If these risks are prevented, it becomes easier to bring the long-term perspective into short-term decision-making (Dewulf & Termeer, 2015).

Momentum is another important aspect for the timing. There are windows of opportunity in which actors are more likely to act, which open when crises occur with higher (media) attention and political pressure. Municipalities should be aware of these windows and use the related momentum to take decisions or actions (Termeer et al., 2017)[5].

What is suggested?

Municipalities should create strategic adaptation visions committed to short-term actions and a framework to guide future actions (Haasnoot et al., 2013). These visions should be both robust and flexible to prevent lock-ins and regrets (Dewulf & Termeer, 2015). Furthermore, they should be aware of windows of opportunity and use the momentum for their benefit (Termeer et al., 2017).

2.3.4 Alignment across sectoral boundaries

Adaptation governance is a highly fragmented policy field and is related to various policy sectors (Termeer et al., 2017; Mees et al., 2014). It is therefore not only important to have alignment across different levels (2.3.2.) and time-scales (2.3.3.), but across sectoral boundaries within organisations as well (Termeer et al., 2017). This alignment across sectoral boundaries can be described as the way in which adaptation is anchored, which is in turn referred to as the placement of adaptation governance within the organisation, policy and practical implementation (den Exter et al., 2015). The alignment can also be described as policy integration, a term used by Candel and Biesbroek (2016) to refer to the process of aligning a cross-sectoral problem in a more or less holistic manner.

---

[5] Window of opportunity: External occasion which offer opportunities to mention and/or act on climate adaptation such as floods, drought and heat waves.
Momentum: Social or political pressure, questions or demands which offer opportunities to mention and/or act on climate adaptation

The dedicated approach and mainstreaming

There is an ongoing debate between two different ways of anchoring: a *dedicated approach* and *mainstreaming* (Rovers, Bosch and Albers, 2014; Uitenbroek et al., 2013; Uitenbroek et al., 2014). In a dedicated approach, climate adaptation is seen as a new and separate policy domain (Uitenbroek et al., 2014). The main objective of such a domain is to address the effects of climate change with the ultimate goal to become climate proof, while having own resources, objectives and responsibilities. This creates a strong awareness and feeling of urgency. (Rovers et al., 2014). Mainstreaming is the opposite of a dedicated approach. This approach integrates adaptation within different sectors of an organisation (Uitenbroek et al., 2013). This is similar to what Candel and Biesbroek (2016) describe as policy integration. Mainstreaming could increase the effectiveness and efficiency of policy-making. The focus is more on the long-term and it could result in a structural change of an organisation. However, it could also be possible that adaptation and the other domains cannot be linked. In that case, the mainstreaming approach will fail (Rovers et al., 2014).

Empirical studies have shown that it would be better not to focus on adaptation only, but to invest in more comprehensive solutions (Uitenbroek et al., 2013). The focus should thus be on mainstreaming over a dedicated approach. Rovers et al. (2014) are less repulsive towards a dedicated approach and suggest a combination of the two approaches in which a dedicated approach is used to achieve mainstreaming.

What is suggested?

Municipalities should pay attention to the alignment of climate adaptation across their different sectors (Termeer et al., 2017). There are different indicators to assess the alignment of climate adaptation within the organisation, policies and the implementation, which should be present (see table 2) (Den Exter et al., 2015). However, the alignment should not be a desired outcome in itself, but should be seen as a mean to become climate adaptive. Municipalities should be aware that it is a dynamic, non-linear process in which disintegration could occur (Candel & Biesbroek, 2016). Moreover, municipalities should be aware that mainstreaming does not only involves boundary crossing. It also incorporates the clear formulation and possible restructuring of sectoral boundaries to clarify the responsibilities and accountabilities of different sectors (Van Broekhoven, Boons, van Buuren & Teisman, 2014). Municipalities could use a dedicated approach to achieve proper alignment across sectoral boundaries (Rovers et al., 2014).

Type of alignment	What is suggested
Organisation	1. A flat network structure in which actors openly cooperate 2. A climate coordinator/manager on a higher level 3. Internal steering committee at management level 4. Clear division of responsibilities across sectors 5. Integration across sectors to increase co-benefits and cost-effectiveness 6. Involvement of private-sector, NGOs, community organisations, corporations
Policy	1. Overarching climate vision in which mitigation and adaptation is addressed 2. Integration of climate strategies on the strategic levels: e.g. long-term visions 3. Integrated at the operational level and short-term activities 4. Climate strategies should be integrated in all relevant sectors' policies

Type of alignment	What is suggested
Practical implementation	1. Internal support from employees 2. Political support 3. External cooperation with stakeholders (universities, NGOs, etc.) 4. Societal support 5. Capacity and resources 6. Monitoring of implementation

Table 2: indicators for alignment (based on Den Exter et al., 2015)

2.3.5 Organisation of the science-policy interface

Adaptation governance is a knowledge intensive policy domain. There needs to be an interface that deals with this intensity in which governmental institutions (policy domain) and scientific institutions are collaborating (Termeer et al., 2017)[6]. However, the relation between science and policy is a complex one and our understanding of this process is limited (Boezeman, Vink & Leroy, 2013). Scientific advice is expected to be credible, salient and legitimate, should be robust to testing and scrutinising, and to the progressions of knowledge and views across different sectors and sub-systems (Boezeman et al., 2013). A proper interface is needed to achieve this.

The literature points out three notions of an appropriate interface: boundary organisations, joint fact-finding and co-production (Termeer et al., 2017). Boundary organisations are intermediates between different domains and are accountable to these worlds. They provide opportunities to create a joint product based on knowledge (Boezeman et al., 2013). Joint fact-finding is used to handle complex scientific and technical questions such as climate adaptation. It can produce creative and durable strategies for adaptation and the governance of it (Karl, Susskind & Wallace, 2007). Joint fact-finding should occur as a collaboration between the worlds of scientists, policymakers, technicians and stakeholders and could thus occur in boundary organisations.

Scientific analyses should be based on the demands of other involved domains. However, this could lead the politicisation of science and less legitimacy to uninvolved actors. It should thus be done carefully. Furthermore, uncertainty should be acknowledged and the generated data should be transparent and accessible (Karl et al., 2007). Co-production refers to the collaboration of different actors across sectors without having a boundary organisation (Termeer et al., 2017).

What is suggested?
A proper science-policy interface is an interface in which co-production leads to adaptive strategies and actions. It is important to develop scientific knowledge through joint fact-finding based on mutually shared goals and demands. This could happen in boundary organisations, which are intermediators between domains to whom they are accountable to. These processes need to be transparent, participative and democratic (Boezeman et al., 2013). Municipalities should be involved in such processes and make clear what kind of knowledge they desire. However, they should also be critical to the knowledge they receive and clarify their

---

[6] Scientific institutions: institutions in which research is done (e.g. universities, research institutes or consultancy firms)

expectations and demands to such organisations (Termeer et al., 2017). The science-policy interface furthermore should prevent the politicisation of science and the scientification of politics. The suggested interfaces do not slide down these slippery slopes as they are in the middle of the mutual interests of both sides (Guston, 2001)[7].

2.3.6 Leadership

The sixth element set out by Termeer et al. (2017) are the different forms of leadership. There always is a *"substantial need for leadership to devise and implement adaptation policies"* (Meijerink and Stiller, 2013, p. 241). Additionally, proper leadership is necessary to overcome the organisational/institutional barriers in the phases of policy-making (Uitenbroek et al., 2013). However, there is no actor with formal control over a process so fragmented as adaptation governance (Termeer et al., 2017).

Adaptation governance therefore requires a new approach beyond the traditional and hierarchic perceptions of leadership. One should aim to accommodate different frames and to connect different actors and levels, time scales and sectors (Termeer et al., 2017). Meijerink and Stiller (2013) listed five functions of leadership that should be present within this new approach (Meijerink et al., 2015). Table 3 shows an overview of these functions, the type of leader and the associated tasks.

Function	Type of leader	Tasks
Political-administrative	Positional leaders; politicians and/or public managers	decide on, communicate, and monitor the realization of a shared vision on climate adaptation; generate and allocate necessary resources for climate adaptation
Adaptive	complex adaptive system (CAS)	nonapplicable (adaptive function is emergent property of the CAS)
Enabling	positional leaders; key individuals (sponsors, boundary spanners, policy entrepreneurs, champions)	allow for and stimulate a variety of adaptation strategies and options; create a sense of urgency, e.g., by setting deadlines; insert adaptive tension; foster interaction
Dissemination	positional leaders; key individuals (boundary spanners, policy entrepreneurs, champions)	insert newly developed ideas (within the CAS) into the network of positional leaders; get accepted newly developed ideas
Connective	positional leaders; key individuals (sponsors, boundary spanners, policy entrepreneurs, champions)	promote problems and mobilise actors to search for solutions; bring people together/agree on a collaborative strategy; stimulate multiple action options/ working together/building trust and legitimacy; forge agreement/move to action/ implement strategies

Table 3: the different functions of leadership (Meijerink & Stiller, 2013)

---

[7] These suggestions are formulated towards the policy domain, because the focus is on the perspective of the municipalities. The researcher is aware that the suggestions would be different for the science domain (e.g. see: Sluijs, Est & Riphagen, 2010; Hulme, 2009)

What is suggested?

Actors need to ensure that all functions are executed throughout the process. They can be executed by positional leaders or policy-makers (thus within municipalities), but can also be executed by non-governmental actors. Municipalities are required to stimulate actors to execute certain roles or need to carry out these roles themselves (Termeer et al., 2017).

2.3.7 Selection of policy instruments

Termeer et al. (2017) see the selection of policy instruments as a crucial element to influence the behaviour of the actors. A policy instrument is *"a deliberate and structured effort by governors to solve a policy problem by modifying actions of the governed"* (Burkas & Sallnäs, 2012, p. 605). Policy instruments can thus be seen as the measures municipalities take to put their adaptation plans into actions (Mees et al., 2014). The instruments can be divided into three groups: legal, economic and communicative (Mees et al., 2013). While some authors suggest the use of certain policy instruments (e.g. Van der Heijden, 2014), there is consensus that there is no one-size-fits-all approach (Termeer et al., 2017). A *"tailor-made mix of policy instruments, attuned to the specific context of a particular climate adaptation issue"* is regarded more appropriate (Termeer et al., 2017, p. 13).

Mees et al. (2014) present a framework that can be used to develop a "*tailor-made mix of policy instruments*". They formulated steps to choose policy instruments, based on the characteristics of adaptation governance and the criteria to deal with the challenges these cause. The criteria are based on economic, legal and political perspectives (Mees et al., 2014). Table 4 provides an overview of the features of adaptation governance and the relevant criteria.

The first step of the framework is to generally asses the policy instruments on the performance criteria. Some instruments are for example better equipped to stimulate effectiveness (e.g. technical requirements), while others stimulate input legitimacy (e.g. information campaigns) (Mees et al., 2014). Step two assesses the instruments specifically for the possible measures. This step may show that certain instruments are not suitable for certain desired actions. Taxes are for example effective to discourage harmful behaviour, but are not suitable to stimulate new measures. In that case, taxes should not be assessed as a possible instrument anymore (Mees et al., 2014). The third step assesses the extent to which a characteristic is involved in certain measures. If the social complexity is a challenging characteristic of a certain measure, policymakers should choose instruments that score high on *input legitimacy* and *accountability* (assessed in step one).

Feature	Criteria	What is the aim?	What question(s) should one ask?
Uncertainty	Effectiveness	Securing adaptation goals	1. Does the instrument steer toward adaptation measures?
Uncertainty	Legal certainty	Ability of the law to regulate those subject to it/the ability of the subjects to regulate themselves based on the law	2. Are there understandable and stable rules to which people can conform?
Uncertainty	Efficiency	Adaptation actions at the lowest costs	3. Are the instruments flexible or adjustable to minimise costs?

Feature	Criteria	What is the aim?	What question(s) should one ask?	
Uncertainty	Fairness	Reasonable distribution of burdens/costs/benefits across time-scales	4.	Does the instrument steer toward sufficient levels of adaptation for everyone now and in the future?
Spatial diversity	Efficiency	Adaptation actions at the lowest costs	5.	Are the instruments tailored to specific spatial challenges to minimise costs?
Spatial diversity	Fairness	Reasonable distribution of burdens/costs/benefits across geographical and social scales	6. 7.	Are actions distributed to those who need it the most? Are the costs of those actions derived from those who benefit?
Controversy	Output legitimacy	Support of all stakeholders for the goals, solutions/actions and decision process	8.	Do policy instruments stimulate acceptance of its effects on all stakeholders?
Social complexity	Input legitimacy	Inclusion of all different interest	9.	Do policy instruments serve all relevant interests without excluding actors that have something at stake?
Social complexity	Accountability	Reciprocal clarity and transparency about the roles and responsibilities of different actors	10.	Is there a transparent and clear allocation of responsibilities for different stakeholders?

Table 4: The framework for policy-instruments (Mees et al., 2014)

What is suggested?

Summarised, municipalities should use a mix of policy-instruments attuned to their own situation. They should not adapt certain instruments because it worked in other cases. Additionally, the instruments should be chosen based on their ability to deal with a challenging characteristic of adaptation governance, assessed on the performance criteria and their ability to attribute to a certain desired outcome.

2.4 Conceptual model

The conceptual model is shown in figure 2. The model is build up with a climate adaptive municipality as the end-goal. To get there, the barriers need to be overcome which require proper adaptation governance. The adaptation governance is structured by the seven elements of the adaptation governance arrangement.
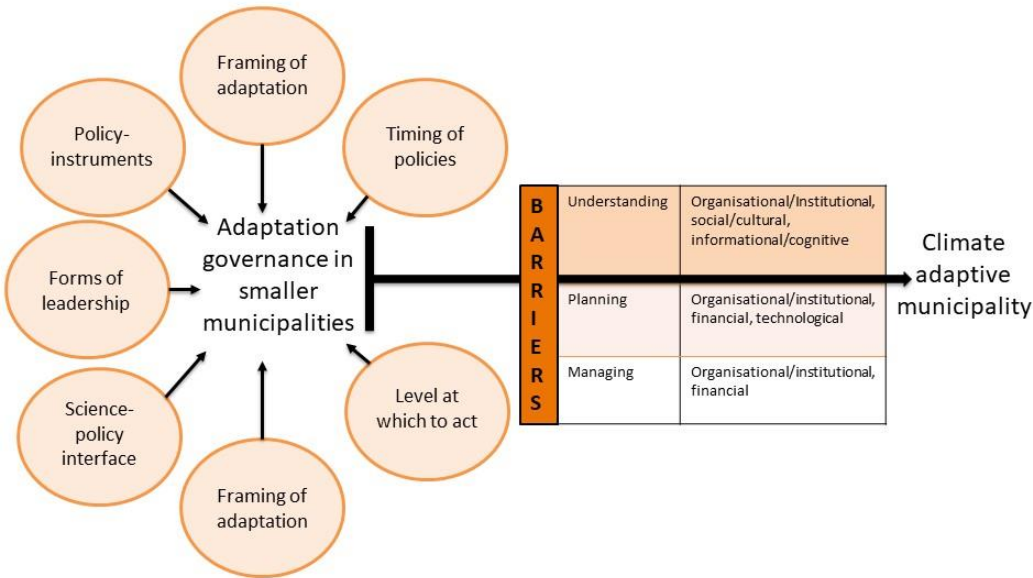
Figure 2: The conceptual model

2.5 Operationalisation

Table 5 provides the operationalisation of the seven design-elements of the adaptation governance arrangement. It answers the first sub-question: *what is the suggested approach of the seven elements of the adaptation governance arrangement, based on the literature?* The table offers an overview of the translation of the used concepts into tangible items that can be used for the data-collection. The focus is on the meaning of each element, how it should be designed based on the literature and how it will be analysed.

A glossary of all the used terms and concepts can be found on page VI

Element	Meaning	Suggested approach	Questions
Framing	The construction of the meaning of climate adaptation.	• Prevent bystander-effects • Inclusive framing • Accept ambiguity and leave room for reflexivity • Frames should not be (too) overwhelming, abstract, one-dimensional or depoliticized	1. How do municipalities frame adaptation? 2. Is this inclusive? 3. How did the framing go? 4. Did they deliberately let out or include certain aspects of it?
Level at which to act	The challenging process to find the right balance between the scale of issues and interventions, and the scale at which it is governed.	• Synchronisation • Alignment and valuing of own actions with other actors' actions over scale and time • Interaction/exchange of knowledge, ambitions and insights with other actors • Action should be taken which can stimulate other actors	5. Is the municipality seen as the right level? 6. Do municipalities see their actions as part of a bigger picture? 7. Do they align and value their actions with this bigger picture? 8. Are/is there interactions/exchange with other actors? 9. Do they act to stimulate others?
Timing of policies	Bringing long-term consequences into short-term actions.	• Have a strategic vision encompassing short-term action and long-term strategies • Prevent lock-ins and regrets through robust or flexible visions/measures • Make use of the momentum/windows of opportunity in possible times of crises	10. How do municipalities deal with this challenge? 11. Is there a strategic vision? 12. Do they recognise the importance of robustness and flexibility? 13. Do they take robust or flexible measures? 14. Are/is there windows of opportunities/momentum that they can use? 15. Do they use this?
Alignment across sectoral boundaries	Integration of adaptation within the organisation, policy and practical implementation.	• Mainstreaming of adaptation throughout the organisation, policies and implementation • A dedicated approach could be used to achieve mainstreaming • Integration as a dynamic process to achieve adaptation • Clear formulation of boundaries, responsibilities and accountability	16. How is adaptation governance anchored within the organisation? 17. How is adaptation integrated in (sectoral) policies? 18. How is adaptation anchored within the practical implementation? 19. Do they use mainstreaming or a dedicated approach? 20. Is integration seen as a mean or as an end? 21. Are boundaries, responsibilities and accountability clearly formulated?
Organisation of the science-policy interface	Proper cooperation between policymakers and scientists	• Co-producing scientific knowledge through joint fact-finding, perhaps in boundary organisations • Knowledge based on mutually shared goals and demands • Transparent, participative and democratic processes • Serving both scientific and political interest	22. Do municipalities collaborate with the science world? 23. Do they clarify what knowledge they need? 24. Are they capable of collaborating with the science world? 25. Are there boundary organisations?

Element	Meaning	Suggested approach	Questions
Leadership	Different forms of leadership which need to be present to steer a process without formal control	• 5 different forms of leadership: political-administrative, adaptive, enabling, connective and dissemination with different tasks • Municipalities should carry out these roles or stimulate others to carry out these roles	26. What task(s) does the municipality fulfil? 27. What function(s) does the municipality fulfil? 28. Does this differ on different scales? 29. Are all functions present in the adaptation governance arrangement? 30. Do other actors fulfil (a) different function(s)?
Selection of policy-instruments	The process in which municipalities choose certain instruments to achieve adaptation action	• There should be a tailor-made mix of instruments for a specific context of a specific adaptation issue/measure. • Municipalities should pay attention to: • The value certain instruments have for the ten criteria • The value certain instruments can have for certain actions • The characteristic challenges of adaptation governance in certain actions	31. Is there a mix of instruments? 32. Are these tailor-made? 33. Why do they choose certain instruments? 34. Do they pay attention to the performance criteria? 35. Do they choose certain instruments related to certain characteristics?

Table 5: Operationalisation of the seven elements

3. METHODOLOGICAL FRAMEWORK

This chapter provides insight in the methodological rationales for this research. It follows the structure of the 'research-onion' (Saunders, Lewis and Thornhill. 2019), shown in figure 3. Each layer can be used to depict the choices underlying the way of data-collection- and analysis, starting with the research philosophy and working towards the research-strategy and time horizon. The data-collection and data-analysis have a separate chapter; chapter 4.
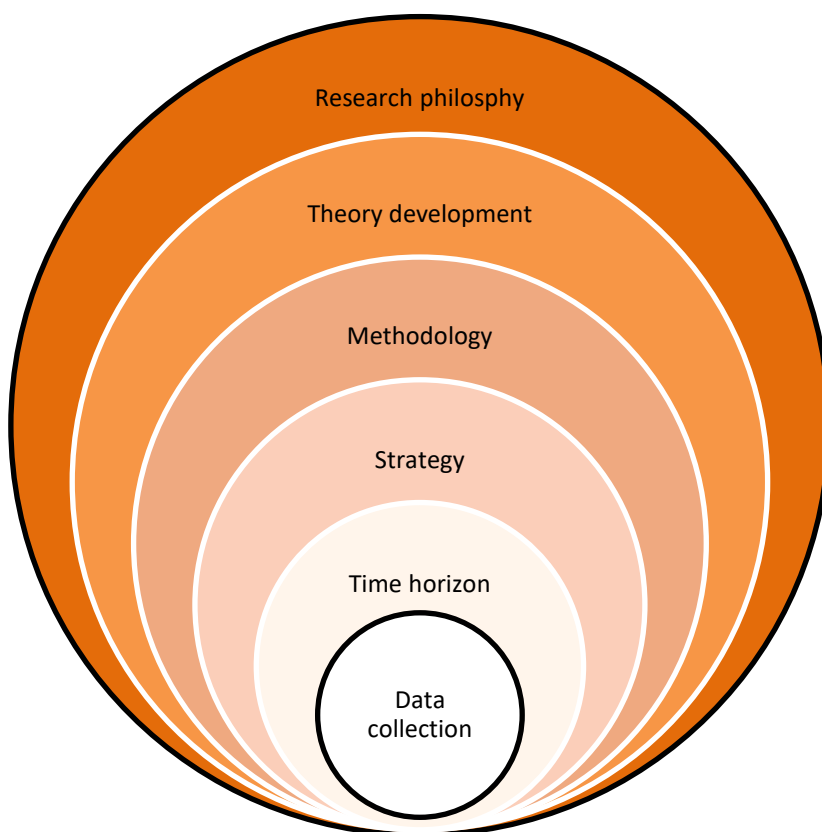
Figure 3: The research onion (Saunders et al., 2019)

3.1 Philosophy

The main goal of this thesis is to develop knowledge and it is therefore important to be aware of one's research philosophy. There are two essential parts of the research philosophy: *ontology* and *epistemology*. Ontology refers to the assumptions that we have about reality. It shapes the way in which the researcher sees the nature of reality and the research objects. Epistemology refers to the assumptions that we have about knowledge. It refers to the beliefs of a researcher on how to develop knowledge and communicate it (Saunders et al., 2019; Guba & Lincoln, 2006). Researchers can have a rather objectivistic or a rather subjectivist view on the ontology and epistemology. Objectivists believe that reality is external and cannot be altered by social actors. Subjectivist on the other hand belief that reality is constructed through the perceptions and actions of social actors. In their view, knowledge is created as a result of a combination of different beliefs and views and are specific for each analysed situation (Saunders et al., 2019).

It is believed that adaptation governance is a local matter and is therefore locally constructed through the perceptions of social actors. Knowledge is developed as a result of the views and beliefs of local authorities, perhaps in combination with other actors. The aim of the research is to provide an overview of the locally developed construction of adaptation governance that is compared to the suggested literature. It is not assumed that this literature is necessarily applicable on the scale of smaller municipalities, because it is believed that the literature lacks the perception of smaller municipalities. This research thus challenges the dominant ways of thinking and does not necessarily assume that these dominant theories (based on larger municipalities) are appropriate and applicable for everyone (smaller municipalities). Additionally, the focus is on processes related to governance instead of government. It can therefore be said that this research takes a subjectivist, postmodernist stance (Saunders et al., 2019).

3.2 Theory development

Academics make a distinction between deduction, induction and abduction (Saunders et al., 2019; Vennix, 2012). The approach to theory development helps to take better decisions about the research design. A better research design is beneficial for the gathering and analysis of the data. Secondly, it stimulates a researcher to think about the appropriateness of different research strategies and methodologies that would be helpful or not. At last, choosing a theory development approach helps to adapt to constraints such as limited access to data or lack of prior knowledge (Easterby-Smith, Thorpe & Jackson, 2012).

The topic of this research is adaptation governance in smaller municipalities. There is a lot of information about that topic in the context of large municipalities. However, less is known about the context of the smaller municipalities. The emphasis is to analyse the current literature of the context of the large municipalities within the context of the smaller municipalities. Such a scenario lends itself to an abductive approach. Additionally, an abductive approach is often present in researches with a postmodernistic approach. Abduction implies that the research moves back and forth from the theories based on the context of large municipalities, to the observed data in the context of smaller municipalities (deduction) and from that data back to theory (induction) (Suddaby, 2006).

An abductive approach results in a research in which the common theories about adaptation governance are applied to the context of smaller municipalities, to be able to make statements about the theories from the perspective of the smaller municipalities.

3.3 Methodological choice

This research intends to answer *how* adaptation governance is designed in the smaller municipalities. It focused on in-depth data collection on a smaller scale and in a relatively small group of respondents. Additionally, the research was holistic and the municipalities were observed in their natural setting with an involved researcher (Williams, 2007). It can therefore be said that it had a qualitative approach. Such an approach is used to gain more specific information about the respondents. However, this information will be harder to generalise, because the group of respondents is smaller (Verschuren & Doorewaard, 2015).

The data is collected through triangulation - the use of different ways of data gathering (Verschuren & Doorewaard, 2015). This is beneficial to the research' validity as it reduces the influence of the observer bias and improves the understanding of the context of the studied phenomena (Vennix, 2012). Data is collected through interviews, observations and the analysis of literature and policy documents.

Hence, the methodological choice for this research was a multi-method qualitative approach.

3.4 Strategies and time horizon

Adaptation governance is, among other things, characterised by its long-term horizon (Dewulf & Termeer, 2015). However, that long-term horizon needs to be translated into short-term actions and strategies (Termeer et al., 2017). It would have therefore been interesting to a do a longitudinal research in which multiple moments of data gathering take place over a long-term horizon (Vennix, 2011). However, this was not possible due to the time frame of this research. The research therefore has a cross-sectional approach in which the data is gathered and analysed at one moment in time (Vennix, 2011).

The aim of this research is to provide an elaborate overview of adaptation governance in smaller municipalities. Cases studies are the most appropriate strategy to generate such an overview. This strategy implies a focus on a relatively small amount of studied objects, but examines their situation comprehensively and it is appropriate in cases in which it is hard to make a distinction between the case and the context (Gerring, 2006). The case studies were an in-depth exploration of adaptation governance within smaller municipalities and resulted in patterns that were compared to the literature (Williams, 2007).

4. CASES, DATA AND CREDIBILITY

This chapter elaborates on the collection and analysis of the data. It first further provides and overview of the cases and the selection of them. Additionally, it covers the data-collection and analysis of this research. This is followed by a description of the interpretation of the results and a discussion on the credibility of this research.

4.1 Cases

Initially, nine municipalities were selected in which the adaptation governance would be analysed. They were selected because they are collaboratively working in *Klimaat Actief Rivierenland'* (KAR) and are therefore at the same phase of the adaptation process. This is beneficial for the generalisability of the results. Additionally, they have quite comparable sizes roughly between 25.000 and 50.000 inhabitants. There is no large municipality that could have influenced the process. Most of the municipalities are quite rural with a low population density, except for Tiel and Culemborg, which are relatively urban.

Unfortunately, it was not possible to arrange an interview with an official from Maasdriel[8]. This case was therefore not analysed. Table 6 shows an overview of the other eight cases that are analysed and their statistics.

Municipality	Size(land)(km²)	Population	Population density (inh./km²)
Buren	133,89	26.568	198
Culemborg	29,29	28.555	975
Lingewaard	62	46.475	750
Nederbetuwe	59,98	24.034	401
Overbetuwe	109,19	47.543	435
Tiel	32,88	41.978	1277
West-Betuwe	216,12	50.697	235
Zaltbommel	79,38	28.451	358

Table 6: Statistics per municipality, source: CBS Statline, Wikipedia

The collected data retrieved from the analysis of the smaller municipalities is compared to data from a large municipality as well. Nijmegen is chosen as the reference case; their characteristics are shown in table 7. Nijmegen is participating in another region: the 'Rijk van Maas en Waal'. This region is a step ahead of KAR and have already developed a regional adaptation-strategy (RAS) collectively. They are now focusing on the implementation-program, which will have a regional and local version, respectively the *regionaal uitvoeringsprogramma* (RUP) and *lokaal uitvoeringsprogramma* (LUP).

Municipality	Size(land)(km²)	Population	Population density (inh./km²)
Nijmegen	53,09	176.731	3329

Table 7: Statistics for Nijmegen, source: CBS Statline, Wikipedia

---

[8] Maasdriel only had one official working on climate adaptation. This official had been on a leave due to personal circumstances and did not have time for an interview. It was therefore decided to drop this case.

4.2 Data-collection

The data is collected through triangulation (Vershuren & Doorewaard, 2015) which is beneficial for the credibility of this qualitative research (Vennix, 2012)
It is collected in four different ways: a literature-study, a policy-study, semi-structured interviews and observations.

4.2.1 Literature-study

The first data was collected during the development of the proposal and the development of the theoretical framework through a literature study. This is used as the foundation on which the further data collection (interviews, observations and policy-study) is based. It is additionally used to provide an overview of the suggested approach to adaptation governance to which the cases are compared.

4.2.2 Policy-study

A policy-study is executed to get a first impression of the adaptation governance arrangement in smaller municipalities. It analysed the seven elements and how they are designed. The climate adaptation policies (if already available) or sustainability policies (if climate adaptation policies are unavailable), and the current coalition-agreement (*coalitieakkoord*) are analysed. Additionally, there is a broad range of other policy-sectors in which adaptation could be integrated because of the fragmented character of adaptation governance (Termeer et al., 2017). The analysis therefore also focussed on the *structuurvisie* or *omgevingsvisie,* the *landschapsontwikkelingsplan* (LOP), the *Gemeentelijk Rioleringsplan* (GRP) and the *gezondheidsnota/gezondheidsagenda* or the policy of the social domain.

The results from the policy study could only be interpreted when they are actually observable (Vennix, 2012). A policy-document was therefore only analysed if climate adaptation is included within that policy. Inclusion is based on the definition of Mickwitz et al. (2009). They make a distinction between policies which have "*positive unintended side-effects*" (p. 22) and policies with actual policy integration. Inclusion -according to them- would therefore only be present when a strategy actually considers adaptation to climate change and not just indicates measures to deal with a certain issue that might be a consequence of climate change without referring to it. For example, the GRP of Buren (2015) does not refer to climate change or the impacts of it. However, the policy lists measures that could be beneficial to deal with the expected impacts of climate change. Nonetheless, it cannot be said that climate adaptation is included because there is no link to climate change. On the other hand, the *Watertakenplan* of Culemborg (RoyalHaskoning DHV, 2019) does refer to climate change, adaptation and climate proofing their system, and is thus analysed.

The policy-analysis provided insight in all seven elements, but gave an indication of the integration across sectors as well. This integration is in turn an indicator of the alignment within the organisation and policy, and -to some extent- in the implementation (Den Exter et al., 2016; see Table 2), and is thus relevant for the alignment across boundaries. It has to be noted however, that the policies often date from earlier years when adaptation was not a big deal yet. Therefore, it might be the case that adaptation is integrated within a sector nowadays, but was not integrated during the development of the policy. The policy-analysis therefore provided insight in the sectoral integration, although it is limited. It additionally only focused on how the elements are designed and not on why they are designed like that. It is additionally used as background-knowledge for the interviews.

4.2.3 Interviews

The responsible official for each municipality was interviewed as a third way of data-collection. The aim of these interviews was to get more insight in the governance arrangement itself and the reasons why municipalities have designed it like that. Additionally, an interview was held with the responsible official from the Waterboard. This interview served to get an impression from the regional perspective.

The interviews were semi-structured, based on interview guides. Different topics and questions were formulated beforehand, but there was no strict order and formulation of questions. Attention was paid to multiple elements that improved the validity of the interviews (Vennix, 2012); the researcher was aware that the communication process is influenced by understanding and interpretation and that misunderstanding and misinterpretation could occur. Reflexive listening and summaries were used to tackle this problem. Another point of attention was the attitude of the interviewer in both verbal and nonverbal communication. The respondents were informed that the aim of the interviews and entire research was not to value their actions in terms of right or wrong, nor good or bad. Rather, it was intended to generate knowledge and to give an overview of their approaches. This was beneficial for the data-collection as the interviewees were more comfortable and shared plenty of information.

4.2.4 Observations

Observations are an important research-strategy in qualitative research (Vennix, 2012). Two observations were done throughout the research to analyse adaptation governance in the most natural setting as possible. The first was done during a meeting with project-group of KAR. The second was done during a board-group meeting of KAR. The observations were done before the interviews to prevent myself from already having developed an idea of certain municipalities. Another approach was to be non-participating and only focussing on the research-objects.

The observations were beneficial to understand the adaptation governance arrangement from the regional perspective. This regional arrangement influences the way in which it is designed at the municipal level. However, it also provided insight in how certain elements are designed in municipalities as well. The observations furthermore made it possible to compare the reported behaviour derived from the interviews with the more natural data from the observations. In that way, it could be distinguished whether the data from the interviews is concise or that it is influenced by how the municipalities want to arrange adaptation governance.

4.3 Data-Analysis

The collected data consists out of an overview of the suggested approaches based on the literature, policy-documents, interviews, and observations. The way in which the policy-documents were analysed is based on the literature and already explained in section 4.1. The framework for this analysis can be found in Appendix A. This section only further elaborates on the way in which the interviews and the observations were analysed.

4.3.1 Analysis of interviews

The interviews first needed to be prepared for the analysis. They were recorded, and these recordings were used to transcribe them. However, the transcripts were not merely a data set of only the relevant information (Vennix, 2012), but are a full registration of everything that was said. The transcripts were further prepared for the analysis through coding. Coding can be seen as the first interpretation of the interviews with the aim to find patterns in the data. For this research, this implies that the transcripts were analysed to see what is said about the seven elements (themes) through listed, descriptive coding, formulating descriptions of certain passages of the transcripts (Vennix, 2012).

A codebook was developed to structure the coding-process and to improve the internal validity of this research (see 4.4). This codebook can be found in Appendix F. Each element had certain codes, which were based on the operationalisation. These codes were assembled in code-groups if they covered a similar aspect of the adaptation governance arrangement. For example, the different tasks of leadership all had a different code, but were assembled in a code-group that resembled the leadership function.

4.3.2 Analysis of observations

The data during the observations was collected by taking notes to keep track of everything that was said during the meetings. Additionally, the framework in Appendix B was used to guide the observations and stimulate objectivity. It was intended to write down notes per municipality in a display similar to the one in table 8 (also see Appendix B). However, it turned out that it was easier to take notes of everything that was being said first. These notes were used to develop a comprehensive summary of the meetings in which the discussed topics were elaborated. Each summary was member checked by someone who was present during the meeting. Afterwards, that checked summary was coded by using similar codes as for the interviews.

It has to be noted that it was not intended to make claims based on the presence of certain codes in the interviews nor the observations. Rather, it served to develop a more systematic data set of the interviews and to make it easier to look into certain elements or aspects of it.

4.3.3 Formulating results

The data-analysis resulted in an overview of the policy-analysis, a coded data set for the interviews and a coded data set of the observations for each case. Each way of data collection was used to answer the questions of the operationalisation for each municipality separately. Eventually, these three separate overviews were used to provide a general answer for each question per municipality. The results were summarised in a table, also referred to as *'display'* (Miles & Huberman, in: Vennix, 2012). The used display can be seen in table 6. These displays were used as an instrument to ease the further elaboration of the results per case, which is presented in chapter 6.

[Insert municipality]	Policy-study	Observation	Interview	Summarised
Framing				
Levels at which to act				
Timing of policies				
Alignment across boundaries				
Science-policy interface				
Forms of leadership				
Selection of policy-instruments				
Other				

Table 8: Display per municipality, (Miles & Huberman, 1994, in; Vennix, 2012)

The results of the smaller cases were compared with each other, supported by the findings from the regional perspective (Waterboard, observations), to be able to make general claims about each element from the perspective of the smaller municipalities (see section 7.1). These were then compared with the suggestions in the literature and with the observed design in the reference case (respectively section 7.2 and 7.3). Eventually, those comparisons resulted in the findings for adaptation governance in smaller municipalities, which are presented and discussed in chapter 8.

4.4 Credibility

There are multiple strategies to increase certain aspects of the credibility of a research (Creswell & Miller, 2000). This section first elaborates on the different aspects of credibility, followed by an elaboration on the credibility of this research.

4.4.1 Aspects of credibility

There are four interconnected aspects of credibility: internal validity, external validity, dependability and objectivity (Creswell & Poth, 2017). First of all, the internal validity refers to the consistency of the research and the extent to which conclusions can be made (Vennix, 2012). This can be achieved through consistent data-collection through triangulation. Triangulation increases the internal validity and thus the credibility because the researcher relies on various forms of data instead of just a single source (Creswell & Miller, 2000).

The external validity (or generalisability or transferability) refers to the applicability of the results to other settings (Creswell & Poth, 2017). For this research, it refers to the extent to which the results of the studied municipalities can be generalised for other municipalities as well. Additionally, the research is expected to be dependable and objective (Creswell & Poth, 2017). The research hence needs to be consistent and repeatable for other cases. The researcher additionally should reduce its bias and provide a traceable line of data-collection, analysis and interpretation (Johnson, 1997).

4.4.2 Credibility of this research

This research uses multiple strategies that improve its credibility. The internal validity is improved through triangulation. It is important to deal with the challenges of each form of data-collection mentioned in 4.2 and the suggested approaches for them are applied. The policy-study therefore only focused on that what was truly observable, the interviews are performed with a right attitude and caution for misunderstanding and misinterpretation, and the data-collection was as objective as possible at all times (Vennix, 2012). Member checking is also used to deal with the challenges. This strategy takes data and interpretations back to the interviewees for confirmation (Creswell & Miller, 2000). It is done through reflexive listening and summaries during the interviews. Additionally, the reports of the observations were checked by someone who was present and the analysis of each municipality is checked by the involved respondent.

Qualitative research has a lower external validity than quantitative research in general (Verschuren & Doorewaard, 2015; Vennix, 2012). The external validity of this research is thus limited and the results are therefore not directly applicable to other situations. The aim of this research however, is to provide an overview of the adaptation governance arrangement in the studied municipalities. The cases are illustrative for adaptation governance in smaller municipalities rather than representative. It is not the intention to formulate theories nor to generalise the findings for all smaller municipalities. The research rather aims to provide the overview and to serve as a foundation for further research on adaptation governance in smaller municipalities. A relatively low external validity is therefore not seen as problematic.

Section 4.1 and 4.2 show that the data was collected, analysed and interpreted in a consistent way. It provided a transparent documentation of the rationales behind this research strategy. This consistency and transparency improved the dependability and repeatability of the research (Creswell & Miller, 2000; Johnson, 1997). In addition, the research is reflexive and open about the assumptions, beliefs and biases existing during the research and prevents these as much as possible and strived for objectivity as much as possible (Creswell & Miller, 2000; Vennix, 2012). The objectivity is strengthened by triangulation and member checking. The postmodernist approach is beneficial for the objectivity as well because it is believed that the current assumptions about adaptation governance are not necessarily applicable in smaller municipalities. There were thus no pre-existing assumptions that could have influenced the objectivity. Additionally, a thorough, thick and rich description of the cases is provided to improve the credibility (Creswell & Miller, 2000). First through an introduction to regional and national processes in chapter 5, followed by an elaboration on the local processes per case in chapter 6.

Table 9 summarises the strategies that increase this research' credibility.

Strategy	Beneficial for
Triangulation	Internal validity, objectivity
Member checking	Internal validity, objectivity
Thick and rich description of each case	External validity
Consistency	Dependability
Transparency	Dependability, Objectivity
Reflexivity	Objectivity

Table 9: Strategies to increase the credibility (based on Creswell & Williams, 2000)

It might be argued that it is not credible to compare the selected cases to Nijmegen, because Nijmegen is ahead of them in the process. The observed differences would then be attributed to the fact that they are further ahead in the process instead of the difference in size. However, it is not clear if the elements are designed differently because Nijmegen is further ahead in the process, or if Nijmegen is ahead in the process, because the elements are designed or developed differently. I believe that the last option is just as likely as the first and that the comparison is not problematic. Additionally, the aim of the comparison is not to make a credible statement on the differences between smaller municipalities and a large one. Rather, the aim is to provide an overview of adaptation governance in smaller municipalities, which could be supported by differences with the reference case.

5. ADAPTATION GOVERNANCE IN THE NETHERLANDS

This chapter provides an impression of adaptation governance in the Netherlands and provides the regional setting in which the cases are participating. It is beneficial for the understanding of the natural setting in which the research is done and thus increases the credibility of this research (Creswell & Miller, 2000). Additionally, this chapter describes the policies and processes on the larger scales to which municipalities should align and value their own policies and actions (Termeer et al., 2017).

5.1 Deltaplan Ruimtelijke Adaptatie (DPRA)

The Dutch have been working on climate adaptation for a longer time, but the urgency has increased because of the already noticeable effects of climate change. It is expected that there will be an increase of heath, drought, floods and water disturbance, which harms the economy, health and safety of the Netherlands. Current approaches to climate adaptation turned out to be non-committal and insufficient to realise the integration of climate adaptation in policy and implementation. A new approach was required, which would be more specified, concrete and activating. Dutch municipalities, waterboards, provinces and the national government have therefore developed the *Deltaplan Ruimtelijke Adaptatie* (DPRA) (Ministerie van I&W, 2018).

The aim of the DPRA is to *"speed up the process of climate adaptation and create obligation, based on agreement on the goals, approaches and monitoring of the implementation"* (Ministerie van I&W, 2018). There is a three-step approach to realise a comprehensive local plan, following the steps of *weten, willen* and *werken* (knowing, desiring and working). The first step is to analyse the vulnerabilities of the area. The second step is to decide on the strategies and actions in terms of accepting, preventing or dealing with certain vulnerabilities. The last step is the actual implementation and monitoring of these actions (Ministerie van I&W, 2018). These steps show a strong resemblance with the aforementioned phases of planning: understanding, planning and managing (Moser & Ekstrom, 2010; Uittenbroek et al., 2013).

Figure 4: The seven ambitions of the DPRA, source: Ministerie van I&W (2018)

The three phases are further specified into seven ambitions, of which three of them can actually be seen as steps to take. The first 'ambition' is to highlight the risks in an area through a *stresstest*. This will be followed by a risk-dialogue, which is used to spread awareness and develop a strategy. An implementation-program should be made based on this strategy as a third step. (Ministerie van I&W, 2018). The implementation will be done on a local scale with participation of non-governmental actors such as civilians and societal organisations. The first steps however must be taken on the regional level and could be taken on the local level as well. It is therefore necessary that municipalities work together in regional processes (Minsterie van I&W, 2018). The other four ambitions of the DPRA are the use of coupling-opportunities, stimulating and facilitating other parties, regulating and anchoring adaptation and taking care of emergency protocols (Ministerie van I&W, 2018).

5.2 Klimaat Actief Rivierenland (KAR)

'Klimaat Actief Rivierenland' (KAR) is one of the regions that has been working on climate adaptation because of the DPRA. It is a combination of *Waterschap Rivierenland* (Waterboard), the province of Gelderland, a regional coordinator and the nine municipalities[9]. They have officially started working on adaptation in January 2018. However, a similar regional collaboration on the topics of the so-called *water-chain* and *water system* has been present since 2013 (Waterboard, interview, a). Lingewaard and Overbetuwe were no part of the adaptation-network initially, but were already participating in the water-related networks. Those municipalities joined KAR eventually due to geographical barriers within their assigned region (Lingewaard, interview, aa).

It took a little bit of time for the region to get the ball rolling. The initial phases mostly concerned a lot of talking and it took almost a year to develop a proper proposal. At the end of 2018, the actors decided that they wanted to follow the steps of the DPRA collectively (Waterboard, interview, b). The first step of the DPRA (the *stresstest*) was already executed at the time of the data-collection. The risk-dialogues, the development of a RAS and the development of the RUP still needed to be executed. The actual strategy for these steps was discussed during the meetings of the network-group and project-group (resp. Observation 1; Observation 2)[10].

The studied cases thus have an impression of the expected consequences and impacts of climate change for their municipality, based on the regional *stresstest*. However, there have not been any risk-dialogues during the time of the research, nor was there a RAS or a RUP, let alone a LUP. For comparison, the region in which Nijmegen is engaged –Rijk van Maas en Waal- is one-step further. That region has developed a RAS and is now focussing on their RUP and LUP's.

---

[9] Of which eight of them are analysed; Maasdriel is part of KAR, but not analysed
[10] These steps still needed to be taken at the time of the data-collection. It is not certain whether have been taken at the time of the completion of this thesis.

6. RESULTS PER CASE

This chapter presents the results per case and the reference case. Each section first describes the case and the current situation, followed by a description of the design of each element based on the questions of the operationalisation. Section 7.1 summarises these results and makes general statements about the design of the elements in the smaller municipalities.

6.1 Buren

The municipality of Buren consists of 26.568 inhabitants spread across 133,89 km² and has a relatively low population density of 198 inhabitants per km². Buren exists out of 16 small villages of which Maurik is the largest with 4.363 inhabitants. It can be seen as a rural municipality with a lot of agricultural land (Buren, interview, a). There have been some political changes, which resulted in the resignation of two deputies. One of them was responsible for climate adaptation, among other things. The municipality of Buren was thus not represented during the board-group meeting. The municipal organisation roughly consists out of 160 employees. One of those employees is working on the strategic task of sustainability and the climate, including climate adaptation. The interview is done with this official and he was present during the project-group meeting. The *Startnotitie Klimaatvisie Gemeente Buren* (Gemeente Buren, 2018), their coalition-program (Gemeentebelangen Buren, VVD & PvdA, 2018) and LOP (Gemeente Buren, 2012) are analysed during the policy analysis. Adaptation was not included in their GRP (De Haan, 2015), *structuurvisie* (SAB, 2009) and their health-policy (Gemeente Buren, 2017).
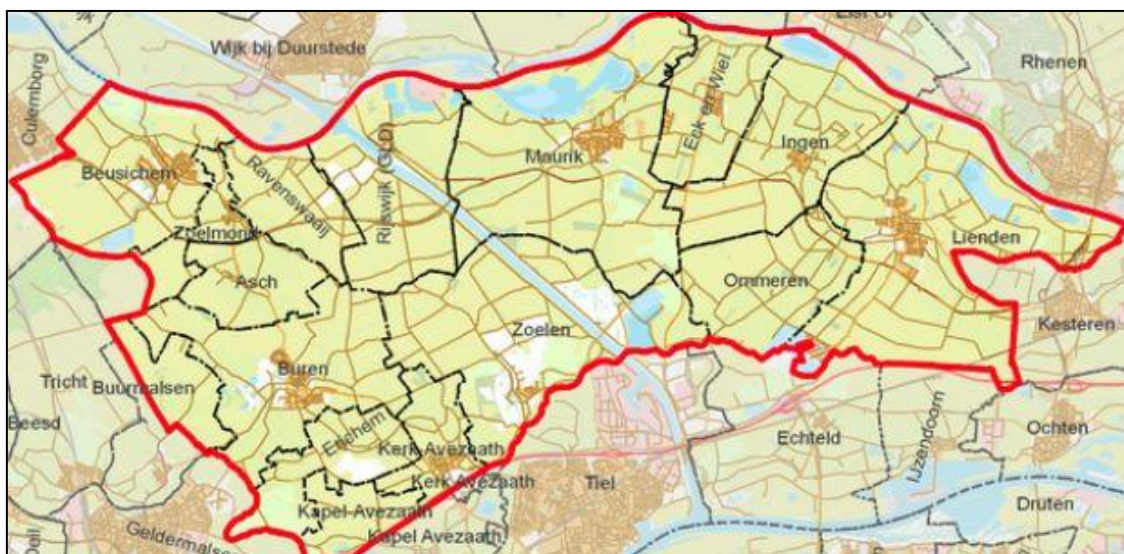
Figure 5: The municipality of Buren, source: https://www.buren.vvd.nl/nieuws/36449/moeilijke-keuzes

6.1.1 Framing

Buren frames adaptation as the adjustments of their living environment to the impacts of a changing climate for humans and flora and fauna (Gemeente Buren, 2018; Buren, interview, b). Their focus is on physical aspects as well as social aspects and it can thus be seen as an inclusive frame. The frame is not definite yet and additional framing will be done with deputies in combination with the already existing definition in the Startnotitie (Buren, interview, c). Other actors or definitions were not mentioned. Framing is used to actively engage certain actors by focussing on economic opportunities (Buren, interview, d).

6.1.2 Level at which to act

The municipality is seen as the responsible level to act on climate adaptation because it takes place on their ground with their citizens (Buren, interview, e). It has to be noted however, that some tasks could be executed better regionally. For example, the development of a strategy. Synchronisation is present in Buren; they see their actions as part of a bigger picture and align and value them with regional and national processes and policies. They for example mention nationwide policies such as the DPRA in their *startnotitie* (Gemeente Buren, 2018). There are interactions with other parties, for example in the regional network in which they can share knowledge and learn from others. Setting the right example is one of the pillars in the *startnotitie* (Gemeente Buren, 2018) and the respondent mentioned that they want to increase this role (Buren, interview, f). They thus act to stimulate other parties in their municipality. However, they have a following attitude in KAR and thus do not stimulate other municipalities. It could also be said that they align and value their actions too much with the regional process and do not take initiative themselves.

6.1.3 Timing of policies

Buren does not have a strategic vision encompassing short-term and long-term ambitions. They initiated a vision with their *startnotitie* (Gemeente Buren, 2018), but are focused on the short term. Quick measures are valued over strategic visions and the respondent mentioned that this is common in their kind of rural municipalities (Buren, interview, a). They thus aim to translate this challenge into short-term actions, with less regard to long-term strategies. Flexibility is seen as important to adjust actions to spatial preferences and characteristics (Buren, interview, g) and they mention that their approach is an *"ongoing and flexible process"* (Gemeente Buren, 2018, p. 12).

Buren clearly lacks momentum. There are minor windows of opportunity in the agricultural sector but major incidents have not occurred. The former deputy did not believe these minor incidents were urgent and there was therefore no political support or urgency (Buren, interview, h). Citizens of Buren generally have a liberalistic and conservative orientation. They are not (very) committed to the climate and do not expect the municipality to take an active role on this matter (Buren, interview, i). The respondent furthermore argued that it would be easier if there would be more incidents (Buren, interview, j). He also mentioned that he lacks external pressure and obligation and feels that the whole process is too non-committal (Buren, interview, k).

6.1.4 Alignment across sectors

Buren intends to achieve many of the indicators of proper anchoring (table 2), but this is not actualised yet in general. There is no proper integration within the organisation. The climate coordinator/manager is the only indicator that is already present. However, Buren intends to achieve integration across sectors and involvement of different stakeholders. There is more integration on the policy level, although it is just in the initial phase and many of the indicators are still only intended. Adaptation and mitigation is combined in the *startnotitie* (Gemeente Buren, 2018), although it is not sure if this really leads to a vision because of the aim on short-term implementation-programs. Climate adaptation is slightly integrated in the LOP and indirectly mentioned in the coalition-program, but is for example not integrated in the GRP.

Buren aims for short-term integration in policies and the operational level, which is already going on. It is expected that adaptation will be integrated in strategic visions as the *Omgevingswet.* There are little indicators of anchoring in the implementation. They aim for internal and external support and collaboration, and have some resources and capacity.

They currently have a dedicated approach in which climate adaptation has to be "*explicitly mentioned*" (Buren, interview, l) and is executed by a 'team' consisting of one official. Adaptation in the end needs to be integrated within the whole organisation so that it becomes a "*natural structure*" (Buren, interview, l). This shift to mainstreaming is currently seen as a goal, but is intended to make sure that things can be executed (Buren, interview, m).

6.1.5 Science-policy interface
There is no collaboration with universities, knowledge institutes, researchers or anything similar. They do see the added value of this collaboration with the science world in terms of knowledge creation and sharing. However, they do not have the capacity to collaborate with those organisations (Buren, interview, r). It could therefore be done better on the regional scale together with multiple municipalities, thus through joint-fact-finding (Buren, interview, n). There are no boundary organisations in which they were engaged.

6.1.6 Leadership
The municipality executes tasks of the political-administrative function. They decide on the actions in the form of an implementation-program in which they will allocate resources (Gemeente Buren, 2018). The development of a strategy is expected from the region. Buren also executes tasks of the enabling function. They foster interaction for example through soundboard-groups (Gemeente Buren, 2018) and they mention themselves as a "*regisseur*" (Buren, interview, o). The municipality aims for social support and to get their ideas accepted (Gemeente Buren, 2018). This is a sign of the dissemination function. The respondent sees it as his job to *"build on organisation which is prepared for"* climate adaptation (Buren, interview, p) and make sure that action is taken by others as well. He thus focuses on mobilising actors, bringing people together and build a collaborative strategy, which are signs of the connective function. The municipality executes the adaptive function of the network because they aim for customisable and flexible instruments that can be altered to spatial characteristics (Gemeente Buren, 2018).

All leadership functions are present in Buren, although not all related tasks are executed. The respondent mostly executes the connective function, while the municipality itself focuses on the political-administrative function as well. Some tasks, such as the development of a vision, are expected from other actors, in this case the region.

6.1.7 Selection of policy instruments
There is no indication of the policy instruments. It can therefore not be said if it is a tailor-made instrument mix. They have mentioned collaborations and communication as a possibility. There is no direct link between instruments and characteristics nor between instruments and criteria. However, there are signs that they value legal certainty and want to *"clarify the legal framework for the future"* (Buren, interview, q). Fairness, effectivity, efficiency, input and output legitimacy and accountability are observed in the policies as well. There is also an indication that they see the long-term vs. short-term challenge, the social complexity, uncertainty and spatial diversity as important characteristics.

6.2 Culemborg

The municipality of Culemborg mainly covers the urban area of the city of Culemborg. It covers an area of 29,29 km² and is therefore the smallest case in terms of surface. However, the population density is one of the highest with 28.555 people living there (pop. density of 975 inh./km²). It is therefore a relatively urban area. There are roughly 150 people working for the municipality, not including the transcending employees working on financial and facility services for Culemborg, Tiel and West Betuwe (Culemborg, interview, a). Climate adaptation is attributed to the policy advisor responsible for water. The interview was done with that official whom was present during the project-group meeting as well. Culemborg has a deputy that is working on energy, climate and water. This is - among other things - combined with their green-maintenance and public space. The deputy was present during the board meeting. Their adaptation policy is set in a presentation (Gemeente Culemborg, n.d.) and adaptation is included in the *Watertakenplan* (RoyalHaskoning DHV, 2019). Adaptation is not included in the coalition-program (Gemeente Culemborg, 2018), the current *structuurvisie* (Gemeente Culemborg, 2011) and their social policy (Gemeente Culemborg, 2013). There was no LOP. The presentation and the *Watertakenplan* are therefore used for the policy analysis.
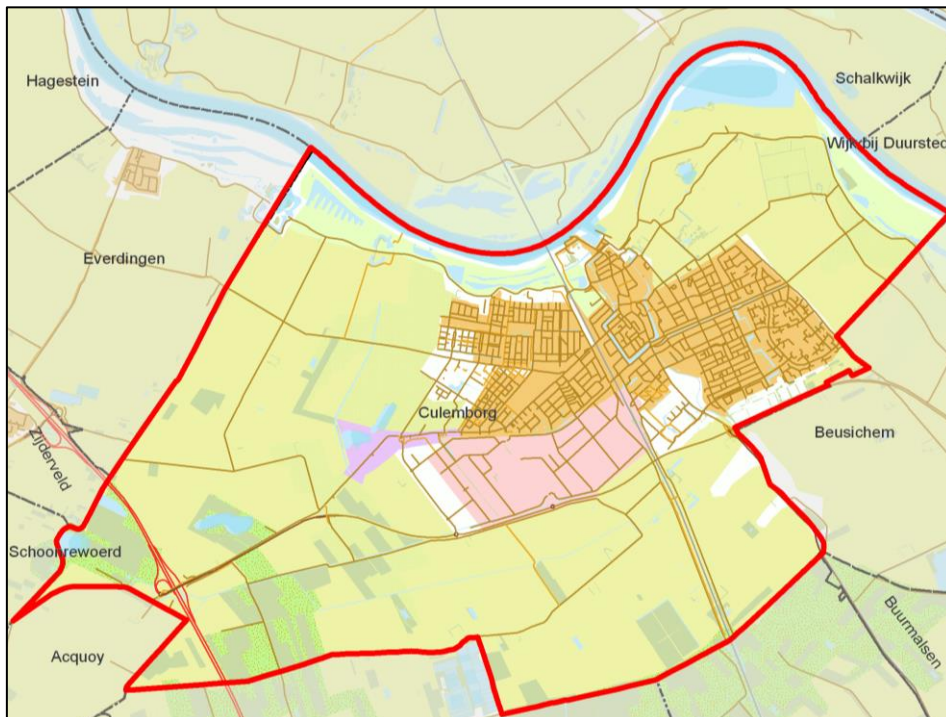
Figure 6: Municipality of Culemborg, source: Wikipedia

6.2.1 Framing

Climate adaptation is framed as "*the reduction of the vulnerability now, to reduce damage, divestments and victims in the future and the utilization of the opportunities resulting from a changing climate*" (Gemeente Culemborg, n.d., p. 15). The respondent framed it a bit more practical and less inclusive and referred to it as the spatial adjustments to deal with the consequences of climate change (Culemborg, interview, b). The general frame mentions actions now to benefit from them in the future and possibilities, and is therefore very inclusive. However, the respondents frame is focused on the spatial domain and the policy-frame does not specify that other domains are included either. It therefore cannot be said that it is entirely inclusive.

The respondent mentioned that the frame is based on definitions from other levels, such as the province of Gelderland (Culemborg, interview, b). It is therefore not developed through framing. However, the respondent did mention the importance of framing. He explained that the term 'climate adaptation' is too broad and vague, and needs to be explained logically on the implementation level to make it better understandable and useable (Culemborg, interview, c). Their frame is thus not developed through framing. However, they use framing to explain climate adaptation to their citizens.

6.2.2 Level at which to act

There is no indication whether the municipality and the respondent see the level of the municipality as the right level at which to act. Synchronisation is present in the municipality. Their actions are first of all aligned and valued with policies on a larger scale, because the DPRA is mentioned in the presentation, the *Watertakenplan* and the interview (Gemeente Culemborg, n.d.; RoyalHaskoning DHV, 2019; Culemborg, interview, d). The respondent additionally aligns and values their actions with activities in other municipalities such as Lingewaard and Overbetuwe (Culemborg, interview, e), and with activities in KAR (Culemborg, interview, f).

Interaction and exchange is mentioned in the presentation (Gemeente Culemborg, n.d.) and the interview (e.g. Culemborg, interview, f). The respondent sees the exchange of knowledge as an attribute of the regional process (Culemborg, interview, g). He furthermore exchanges his knowledge on a larger scale (Culemborg, interview, h). The policies do not really mention stimulating other parties. However, the respondent mentioned that they are a *voorloper* for some aspects and he is aware that the *voorlopers* can stimulate the *achterblijvers* within KAR (Culemborg, interview, f).

6.2.3 Timing of policies

The municipality of Culemborg does not have an elaborate strategic vision. The respondent focuses on short to medium term to make *"korte slagen"* (Culemborg, interview, i), even though a local strategy is intended in the presentation (Gemeente Culemborg, n.d.). The respondent additionally does not expect that they will develop elaborate policy texts but use their time to implement adaptation on the operational level on a short notice (Culemborg, interview, j). They will develop a local plan, which is demanded by the council (Culemborg, interview, k). The latter can be seen as a sign of momentum.

Timing of the policies is included within the frame of the presentation. It is mentioned that actions need to be taken now, to benefit and reduce divestments in the future (Gemeente Culemborg, n.d.). The prevention of divestments are an indicator of robustness and no-regret measures. Culemborg experienced multiple floods in 1995, 2006, 2007 and 2009. These windows of opportunity made it easier to introduce climate adaptation, especially to their citizens (Culemborg, interview, l).

6.2.4 Alignment across sectors
The data shows multiple indicators of integration within the organisation. There is a flat network structure with short connections (Culemborg, interview, m) and the respondent is the coordinator for adaptation. Adaptation is integrated within the activities of some sectors already (Culemborg, interview, n). However, it could be better, especially for the social domain (Culemborg, interview, o). Collaboration with other stakeholders is furthermore seen as important (Observation 1). The division of boundaries, responsibilities and accountability is still not entirely clear for some domains (Culemborg, interview o; Observation 2).

Alignment within policies could be better. There is no overarching vision and the policy-analysis showed that adaptation is only included in the *Watertakenplan*. However, the respondent aims for sectoral integration on a strategic policy level (Culemborg, interview, p). The focus is on integration on the operational level, which is already achieved in some occasions (Culemborg, interview, q). Adaptation is quite integrated within the implementation. There is collaboration with external stakeholders, such as RoyalHaskoning DHV, even though there are stakeholders who still need to be involved, such as the *Veiligheidsregio* (Observation 1). The interview showed that there is political support (Culemborg, interview, k) and internal support from colleagues (Culemborg, interview, q). There are some resources from the funding for the *Watertakenplan* (RoyalHaskoning DHV 2019).

Culemborg focuses on mainstreaming adaptation. The respondent sees it as his task to spread adaptation across the municipality and make his colleagues aware of the topic (Culemborg interview, r). This is necessary to make sure that adaptation is manageable (Culemborg, interview, s). There are some results of this already (Culemborg, interview, q). Mainstreaming is thus seen as a mean to manage climate adaptation. It could be said that this happens through a dedicated approach in which the respondent is dedicated to mainstream climate adaptation.

Boundaries, responsibilities and accountability are clear to some extent. There is still some work to do to involve the social domain (Culemborg, interview, o) and the deputy wishes for a better distinction between these aspects between the local and regional scales (Observation 2).

6.2.5 Science-policy interface
The respondent has been actively engaged in a boundary organisation called the '*National Kennisplatform Water en Klimaat'* (NKWK) for almost two years. He gathered information and shared the knowledge and examples of Culemborg in the network in which the Dutch meteorological institute (KNMI) was involved for example (Culemborg, interview, t). They have also collaborated with the University of Wageningen (WUR) for their *stresstest* and with organisations as RoyalHaskoning and RioNed (Culemborg, interview, u).

6.2.6 Leadership

Political-administrative tasks are executed by the respondent through the arrangement of resources, the development of a local strategy (Culemborg, interview, v) and his role in terms of communication (Culemborg, interview, w). It is expected that the municipality will develop a local plan and that the region will develop a vision (Gemeente Culemborg, n.d.). Enabling tasks are executed by the municipality by fostering interaction through the risk-dialogues (Gemeente Culemborg, n.d.), and by the respondent by creating urgency through communication (Culemborg, interview, v). The respondent has the task to spread his ideas to positional leaders and get them accepted by his colleagues (Culemborg, interview, w) and thus executes the dissemination function. Connective tasks are executed by the respondent by promoting the problems with his colleagues (Culemborg, interview, w) and to bring people together and mobilise actors (Culemborg, interview, v). The municipality additionally is connective in the risk-dialogues in which actors are brought together (Culemborg, interview, x). At last, the respondent mentions that KAR has the task to take care of the collaboration with regional actors such as the *Veiligheidsregio* and the GGD[11](Culemborg, interview, y).

Tasks of four of the five functions of leadership are thus executed within the municipality or KAR. There only is no sign of the adaptive function of the network.

6.2.7 Selection of policy instruments

There is a mix of communicative and economic instruments, for example the risk-dialogues and subsidies. It is not indicated that these instruments are based on specific characteristics. However, communication itself will be attuned to the situation (Culemborg, interview, c). The data does not offer a direct link between the instruments and the criteria or characteristics. Although, it has to be noted that communication is used to stimulate the clarity of climate adaptation (Culemborg, interview, z) and therefore could enhance the output legitimacy. They also implement risk-dialogues, which could be used to stimulate the input legitimacy.

---

[11] GGD: Geestelijke Gezondheidsdienst (Municipal institute for health). An overarching organisation focussed on health.

6.3 Lingewaard

Lingewaard is one of the bigger cases in terms of population with a total of 46,475 inhabitants. They are spread out over a surface of 62 km² and the population density is therefore relatively high (750 inh./km²). Bemmel and Huissen are relatively large cities within the municipality with respectively 12.228 and 19.290 inhabitants. The municipality employs roughly 300 employees. One of those employees is working on the sewage, water and climate adaptation. The interview was done with that official and he was present during the project-group meeting. They have a supportive deputy who is responsible for physical aspects such as spatial planning and the public space. This deputy was not present during the board meeting. Climate adaptation was included within the coalition-program (VVD, LBL, CDA & Lingewaard.NU, 2018), the *structuurvisie* (Gemeente Lingewaard, 2012) and the GRP (Antea Group, 2016). It was not integrated in their sustainability policy (Hage, 2015) and their policy for the social domain (Gemeente Lingewaard, 2016). The LOP dates from 2005 and is therefore outdated and not analysed.
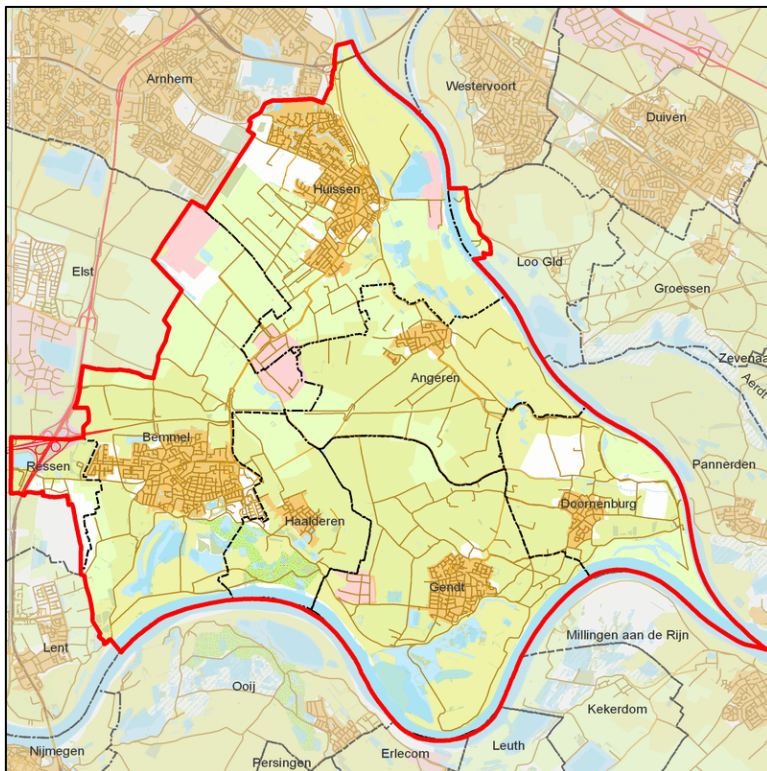
Figure 7: Municipality of Lingewaard, source: https://heijmanswoningontruiming.nl/lingewaard/

6.3.1 Framing

The frame for adaptation is derived from the policies and the interview. Adaptation is seen as the strategy and actions to respond to climate change and reduce the municipality's vulnerability (Lingewaard, interview, a). The respondent uses simple measures to explain climate adaptation (Lingewaard, interview, b). Adaptation is seen as spatial adaptation and the respondent therefore argues that the social domain and buildings are no part of it, formally speaking. However, climate adaptation in the broadest sense would include those aspects and Lingewaard does integrate those aspects practically (Lingewaard, interview, b). The respondent tries to spread his definition across the municipality, but is aware that people can have different frames and accepts that (Lingewaard, interview, a).

There is no indication of how the frames of the respondent and the policies are developed. It could thus be argued whether framing took place or not, or if they just accept a variety of frames.

6.3.2 Level at which to act
There is no indication whether the respondent sees the municipality as the right level to act or not, although there is a lot happening on the local scale. The respondent does suggest that aspects like a heat-plan could better be executed on a regional scale (Lingewaard, interview, c). Synchronisation came forward in the policies, the interview and during the observation. The policies are linked with policies and actions on a larger scale (e.g. the DPRA in: VVD, LBL, CDA & Lingewaard.NU, 2018) and the respondent aligns and values their actions with the national processes and policies (Lingewaard, interview, d; Lingewaard, interview, e). Lingewaard therefore sees their actions as part of a bigger picture. The respondent regards the regional process as a crucial added value. Lingewaard aligns their actions to the KAR-process and he believes that the interactions keep the municipalities on their toes (Lingewaard, interview, f). The project-group showed that the respondent is aware that they are further ahead of others and that they can stimulate other municipalities and share their knowledge with them (Observation 1).

6.3.3 Timing of policies
Lingewaard does not have a strategic vision on climate adaptation. They intend to integrate adaptation in sectoral policies on the short-term to prepare themselves on the long-term (Lingewaard, interview, g). It is expected that they will develop a vision, although it is unclear if this will be a separate document. The vision could be integrated in the *Omgevingsvisie* and the implementation could be integrated in sectoral policies, but it could also be the case that it will become a separate policy (Lingewaard, interview, h)[12]. Robustness is present in the sense that they want to integrate adaptation into measures now so that they will not have to wait another 20 years (Lingewaard, interview, i) and it is desired for their water system (Antea Group, 2016). The coalition-program is seen as a flexible vision (VVD, LBL, CDA, Lingewaard.NU, 2018).

There are windows of opportunity caused by the *scheurvorming* because of drought. This caused a lot of societal pressure on the municipality. It could therefore be argued that it was beneficial for the process, although it might not have felt that way in the beginning. This incident will additionally be used in the risk-dialogues (Lingewaard, interview, j). The respondent mentions that there is political support and societal pressure for adaptation and actions. Momentum is thus present (Lingewaard, interview, k).

6.3.4 Alignment across sectors
There is a climate manager (the respondent) who is supported by a *kerngroep* of three people and a larger *projectgroep* in which officials from different domains are integrated (Lingewaard, interview, l). There is thus an internal committee, although it can be questioned to what extent they are steering. The respondent mentioned that the integration across sectors went surprisingly smooth (Lingewaard, interview, l). Some responsibilities are quite well divided, although it needs understanding of the legal framework (Lingewaard, interview, m). It is expected that it will be further clarified after the risk-dialogues (Lingewaard, interview, n).

---

[12] A check-up with the respondent indicated that they are developing a separate local strategy currently. This has not been indicated at the time of the data-collection and analysis however.

They aim to involve many other stakeholders, for example through citizen-participation (Antea Group, 2016), and other government institutions (VVD, LBL, CDA, Lingewaard.NU, 2018). Adaptation is thus quite aligned within the organisation.

There already is quite some integration in sectoral policies such as the GRP (Antea Group, 2016) and *structuurvisie* (Gemeente Lingewaard, 2012). The respondent aims to further integrate adaptation on the operational and strategic level by integrating it in sectoral policies, visions and developments (Lingewaard, interview, o; Lingewaard, interview, p). There is no overarching vision yet, but the respondent expects that there will be one in the future. It is not clear whether this will be a separate document, or if it will be immediately integrated in a strategic vision as the *Omgevingsvisie* (Lingewaard, interview, h).

Lingewaard has a deputy who is supportive for climate adaptation (Lingewaard, interview, q). There furthermore is no societal resistance (Lingewaard, interview, o) and the topic is supported in the organisation (Lingewaard, interview, r). They also have capacity and resources in terms of employees, money and time (Lingewaard, interview, l; Lingewaard, interview, s). Those resources are for example attributed in the GRP (Antea Group, 2016). Monitoring is not mentioned in the policies and during the interview.

The project-group and core-group are a sign of a dedicated approach in which people are specifically working on climate adaptation. It is indicated that this approach was very beneficial for the integration of adaptation across the organisation (Lingewaard, interview, l). Dedication is therefore seen as a mean to achieve mainstreaming. The respondent mentions that they already take adaptation measures into account in new developments, thus it is already mainstreamed quite well (Lingewaard, interview, t). There is some division of responsibilities through legal frameworks. It will be further clarified in a later stage, based on the risk-dialogues (Lingewaard, interview, m; Lingewaard, interview, n).

6.3.5 Science-policy interface
The interview showed that there was some collaboration with researchers from Wareco (Lingewaard, interview, u). Further investigations are done by the municipality or taken care of on the regional scale. The municipality already has a notable amount of knowledge on climate adaptation and does not have the need to do further research. There are therefore no further collaborations with the science world and no boundary organisations (Lingewaard, interview, v).

6.3.6 Leadership
The political-administrative function is executed by the respondent. He generated resources (Lingewaard, interview, l; Lingewaard, interview, s) and is willing to monitor certain aspects (Lingewaard, interview, w). The municipality decides on and develops a vision (Lingewaard, interview, h) and is aware that they need to take action if necessary (VVD, LBL, CDA, Lingewaard.NU, 2018). The region is expected to develop a vision on heat (*hitteplan*) (Lingewaard, interview, c). Enabling tasks are executed by the respondent and the municipality. The municipality fosters interaction in sessions, and allows for and stimulates initiatives (VVD, LBL, CDA, Lingewaard.NU, 2018; Lingewaard, interview, x). The respondent fosters interaction in the project- and core-group (Lingewaard, interview, s).

Dissemination is done by the respondent towards co-workers (Lingewaard, interview, s) and the deputy (Lingewaard, interview, k). Connective tasks are done by the municipality and the respondent. The municipality brings people together in sessions (Lingewaard, interview, x) and the risk-dialogues (Lingewaard, interviews, j), and motivates and mobilises others (Lingewaard, interview, r). The respondent brings people together in their project- and core-group (Lingewaard, interview, s) and aims for a collaborative strategy (Lingewaard, interview, y).

Four functions are thus executed. There is no sign of the adaptive function. The four functions are executed by different actors across different scales. Additionally, the respondent mentioned the importance of proper leadership (Lingewaard, interview, q; Lingewaard, interview, r) for the process in Lingewaard.

6.3.7 Selection of policy instruments

The GRP mentions communication as an instrument to create awareness and social support (Antea Group, 2016). The respondent focused on the wish for legal-instruments and that they will develop these themselves (Lingewaard, interview, z). There is thus a mix of instruments. Communication is based on its added value for social support and awareness, which stimulates legitimacy (Antea Group, 2016). Legal instruments are valued because of their additional value for legal certainty, which the respondent sometimes misses (Lingewaard, interview, z). The short-term and long-term challenge is seen as an important characteristic (Lingewaard, interview, g). However, there is no direct link with the instruments. Lingewaard thus intends to use a mix of policy-instruments of which at least one will be tailor-made. The instruments can be linked to some criteria, but show no connection to the characteristics.

6.4 Neder-Betuwe

Neder-Betuwe is one of the smaller municipalities within KAR in terms of population. They have 24.034 inhabitants which are spread across 59,98 km². Their population density therefore is 401 inh./km². Neder-Betuwe is a combination of six villages with roughly 6.000 inhabitants or less. Opheusden is the biggest village with 6.290 inhabitants. The municipal organisation roughly exists out of 180 employees (Neder-Betuwe, interview, a). Three employees are working on climate adaptation. One of those was present during the project-group meeting; the other two were respondents during the interview. There is a deputy with a combined task for the environment, sustainability and climate. This is, among other things, combined with the maintenance of public space. This deputy was present during the board-group meeting. Climate adaptation is included in the municipality's *Klimaatnota* 2018 – 2023 (Gemeente Neder-Betuwe, 2018, a) and their GRP (Gemeente Neder-Betuwe, 2018, b). It was not included within their coalition-program (SGP, CDA & VVD, 2018), LOP (Brons + Partners & SAB, 2009) and their *structuurvisie* (Buro SRO, 2018). There was no policy for the social domain. Neder-Betuwe also made a *Duurzaamheidsvisie* in 2016. Some parts of this vision –including adaptation- required further elaboration, which resulted in the *Klimaatnota*. This nota is analysed, because it is more up-to-date than the vision.
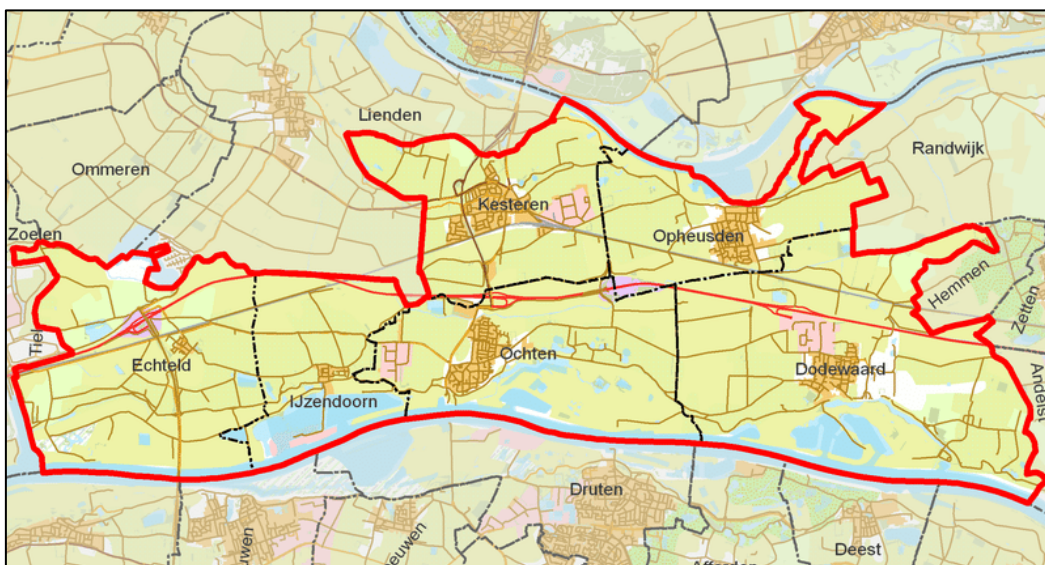
Figure 8: Municipality of Neder-Betuwe, source: https://heijmanswoningontruiming.nl/neder-betuwe/

6.4.1 Framing

Climate adaptation is seen as the process to make the living environment future proof by anticipating the negative consequences of climate change (Gemeente Neder-Betuwe, 2018, a; Neder-Betuwe, interview, b). The *Klimaatnota* (Gemeente Neder-Betuwe, 2018) provides a list of negative consequences as a result of heath, water-disturbance, drought, floods and soil-subsidence. It is interesting to see that they list social and economic damage and mobility-issues before they mention actual health and safety-issues. The latter can be explained because health and safety are the responsibility of the GGD and *Veiligheidsregio* and therefore no direct task for the municipality. The policy-frame focuses on social and economic issues and is thus quite inclusive.

The respondents however, frame adaptation less inclusive and for example mentioned that they only focus on water-related issues. Heath and drought are not very present, although this will be included in the future (Neder-Betuwe, interview, c; Neder-Betuwe, interview, d). One of the respondents mentioned that he met with different policy-domains to discuss adaptation, which is a sign of (relatively) inclusive framing (Neder-Betuwe, interview, d).

6.4.2 Level at which to act

The level of the municipality is seen as the proper level to act. Actions have to be taken locally (Observation 2) and adaptation depends on the people working on it locally. However, strategies can be developed regionally (Neder-Betuwe, interview, e). Neder-Betuwe has an interesting case of synchronisation. The policies are aligned with policies on larger scales (Gemeente Neder-Betuwe, 2018, a) and the respondents value their situation with other municipalities (Neder-Betuwe, interview, f) and other transitions (Neder-Betuwe, interview g). The respondents also mention that the regional interaction could stimulate municipalities who are running behind. However, they see themselves as a forerunner and therefore believe that they are slowed down by the regional process (Neder-Betuwe, interview, h). It is mentioned that their actions can stimulate others, but they do not want to put too much effort into it because of their limited capacity (Neder-Betuwe, interview, i). The interview also shows that they see themselves as quite autonomous (Neder-Betuwe, interview, j) and that they feel less connected to the region (Neder-Betuwe, interview, k) which was observed during the project-group meeting as well (Observation 1).

The municipality of Neder-Betuwe thus sees their actions as part of a bigger picture of policies and actions on other scales or by other actors. The municipality values their actions in line with that bigger picture and the respondents indicated that it could be possible that they align their actions with it. Additionally, they are willing to interact and exchange with others and stimulate them. However, they do not feel this urge because of their local, autonomous perspective and a lack of time. It can therefore be said that synchronisation is present in terms of larger scale policies, but not in terms of interaction, exchange and acts.

6.4.3 Timing of policies

Neder-Betuwe developed the *Klimaatnota* - and *Duurzaamheidsvisie*, which is a strategic vision. It is focussed on the short-term – up to 2020 – but has a long-term perspective as well (Gemeente Neder-Betuwe, 2018, a). However, the respondents mentioned that their focus is on a short-term practical integration and less on visions and strategies (Neder-Betuwe, interview, k). The municipality recognises the importance of flexibility and robustness. It is for example mentioned that the *Klimaatnota* is a flexible policy (Neder-Betuwe, interview, l) and their water system needs to become robust (Gemeente Neder-Betuwe, 2018, b).

There has been some disturbance caused by intense precipitation. This window of opportunity is used by the respondents and had a positive effect on the process of adaptation in Neder-Betuwe (Neder-Betuwe, interview, f). Climate adaptation gets a lot of attention currently. The respondents mention that it is therefore necessary to act now and use the opportunities that result from this momentum (Neder-Betuwe, interview, m). Additionally, the Klimaatnota stresses the possible impacts in terms of social and economic damage, and safety-concerns. This is a way to create urgency (Gemeente Neder-Betuwe, 2018, a).

Neder-Betuwe thus deals with this challenge through a strategic vision, has a focus on the short-term, is aware of windows of opportunities and momentum and uses it, and creates a sense of urgency.

6.4.4 Alignment across sectors

Integration within the organisation is one of the aims in the *Klimaatnota* (Gemeente Neder-Betuwe, 2018, b). This already has some result, because some indicators are already present. There is a climate coordinator (Neder-Betuwe, interview, n) and a flat network structure. The latter is seen as a positive aspect of smaller municipalities (Neder-Betuwe, interview, o). They involve different stakeholders from other domains or institutions (Neder-Betuwe, interview, p) which is also intended in the *Klimaatnota* (Gemeente Neder-Betuwe, 2018, a). Integration across sectors is intended. However, it is not achieved entirely, especially not for the social domain (Neder-Betuwe, interview, q). They are still searching for a proper division of responsibilities internally (Neder-Betuwe, interview, r).

Adaptation is combined with mitigation in an overarching vision: the *Klimaatnota* (Gemeente Neder-Betuwe, 2018, a). There is a strong focus on integration at the operational level and a practical approach, both observed during the interview (Neder-Betuwe, interview, h; Neder-Betuwe, interview, r). They also wish to integrate adaptation on a longer-term strategic level, but this is also more focussed on long-term actions and less on strategic policies (Neder-Betuwe, interview, s).

The respondents mentioned that there is internal support from politicians, the deputy and colleagues (Neder-Betuwe, interview, t) which is for example visible in a decent ambition for climate and sustainability (Neder-Betuwe, interview, u). Capacity and resources are reserved in the GRP (Gemeente Neder-Betuwe, 2018, b) and taken care of by one of the respondents (Neder-Betuwe, interview, v). However, their capacity is limited (Neder-Betuwe, interview, j). External support and collaboration is one of the aims of the Klimaatnota (Gemeente Neder-Betuwe, 2018, a). No sign of monitoring.

There is no separate team or employee specifically working on climate adaptation and the respondents did not believe that there should be a responsible person (Neder-Betuwe, interview, w). Neder-Betuwe therefore has a mainstreaming approach. It is expected that they see this as a mean to be better able to deal with adaptation, because the respondents mention that you cannot do everything on your own (Neder-Betuwe, interview, v).

No clear formulation of boundaries, responsibilities and accountabilities yet as they are still searching for it (Neder-Betuwe, interview, r).

6.4.5 Science-policy interface

Neder-Betuwe does not collaborate with institutions from the scientific domain (Neder-Betuwe, interview, x). They mention a collaboration with a consultancy firm, but this is focussed on the development of a tool and not on knowledge (Neder-Betuwe, interview, y).

6.4.6 Leadership

The analysis shows that multiple tasks of multiple functions are executed. The respondents mention that they will monitor (Neder-Betuwe, interview, z). Monitoring and communication is additionally mentioned in the *Klimaatnota* (Gemeente Neder-Betuwe, 2018, a). Enabling tasks are executed by the respondents and by the municipality as well. The respondents foster interaction (Neder-Betuwe, interview, d) and aim to create urgency (Neder-Betuwe, interview, t). This urgency is also created in the *Klimaatnota* (Gemeente Neder-Betuwe, 2018, a).

The respondents furthermore see their dissemination function to spread their ideas internally (Neder-Betuwe, interview, t). This is seen as a task of the deputy as well (Neder-Betuwe, interview, aa). The respondents additionally aim to bring people together and mobilise actors (Neder-Betuwe, interview, z). They have a strong urge to move to action (Neder-Betuwe, interview, bb), aim to promote problems, and create urgency (Neder-Betuwe, interview, t). The municipality additionally aims to bring people together and mobilise actors (Gemeente Neder-Betuwe, 2018, a). Tasks of the connective function are thus executed. There are no signs of the adaptive function

There are different roles and functions for different actors and they have used an external party for connective and dissemination purposes. Additionally, the importance of proper leadership is highlighted by the respondents and it is mentioned that they execute it (Neder-Betuwe, interview, t).

6.4.7 Selection of policy instruments

The interview showed that the respondents are looking for legal instruments (Neder-Betuwe, interview, y) and want to develop a communication strategy (Neder-Betuwe, interview, cc). The Klimaatnota (Gemeente Neder-Betuwe, 2018, a) also mentions economic instruments as the *duurzaamheidslening*. They thus focus on a mix of policy instruments.

There is no direct link between the instruments and criteria and characteristics. However, the GRP mentions the importance of efficiency (Gemeente Neder-Betuwe, 2018, b). The interview additionally indicates the importance of legal certainty (Neder-Betuwe, interview, y) and accountability (Neder-Betuwe, interview, dd). The observation also showed that the spatial diversity is relevant for the deputy (Observation 2). There is thus no indication that this mix of policy instruments will be attuned to the situation.

6.5 Overbetuwe

Overbetuwe is one of the biggest cases both in surface (109,19 km²) and population size (47.543). It has a population density of 435 inh./km². The municipality consists out of one central bigger city combined with several small villages. Elst is the biggest city with 21.914 inhabitants. This is followed by Heteren and Zetten with 5.078 and 4.960 inhabitants respectively. The municipal organisation roughly exists out of 350 employees (Overbetuwe, interview, a). Climate adaptation is attributed to an official who is working on civil-technical issues related to water among other things, but there was no clear reason why that official is responsible (Overbetuwe, interview, b). This official was present during the project-group meeting. Recently, a new deputy has been appointed for sustainability. He was present during the board-group meeting. Climate adaptation is included within the *Omgevingsvisie* (Gemeente Overbetuwe, 2019) and GRP (Sweco, 2017). It is specifically not included within the *Routekaart Duurzaamheid* (RoyalHaskoning DHV, 2016) and it was not included in the coalition-program (CDA, Gemeentebelangen Overbetuwe & VVD, 2018), LOP (Gemeente Overbetuwe, 2010) and their health-note (Gemeente Overbetuwe, 2018).
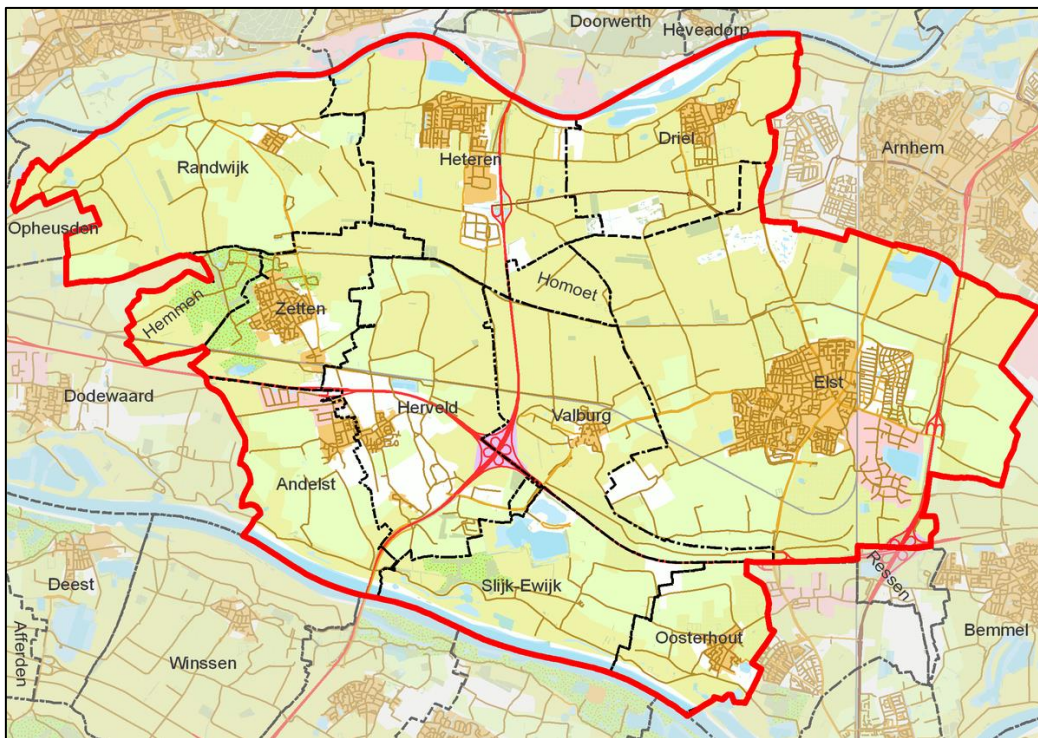
Figure 9: Municipality of Overbetuwe, source: Wikipedia

6.5.1 Framing

Adaptation is framed as the design of the pubic space and water system in such a way that it is future and climate-proof (Overbetuwe, interview, c; Sweco, 2017). This frame only focuses on physical aspects and is therefore not very inclusive. The GRP does mention that some consequences need to be accepted (Sweco, 2017). It is indicated by the respondent that it was difficult to formulate a frame during the interview and it could therefore be suspected that they do not really have a shared frame yet (Overbetuwe, interview, c). The frame of the respondent is based on what they want to and are able to do locally. They specify the frame in case they want to use it for specific measures (Overbetuwe, interview, d). This desire for a specific frame was also noted during the project-group meeting (Observation 1). Framing thus happens. Although it is not indicated how the framing goes exactly.

6.5.2 Level at which to act

The respondent sees the municipality as the responsible level for climate adaptation, because they are the level that is the closest to their people with whom this topic needs to be approached (Overbetuwe, interview, e). The respondent mentioned that he likes to align his actions with the regional process (Overbetuwe, interview, f) and feels urgency because of national policies (Overbetuwe, interview, g), which is a sign of synchronisation. The interview showed that the respondent values the regional interaction because of the knowledge sharing and larger capacity (Overbetuwe, interview, h). He also mentioned that they definitely will not be a forerunner and therefore do not have the ambition to stimulate others (Overbetuwe, interview, f). However, setting an example is listed as an ambition in the *Omgevingsvisie* (Gemeente Overbetuwe, 2019).

Overbetuwe thus aims to act on local level and believe that is the best-suited level. Synchronisation is visible through alignment and valuing of local actions with national policies and regional processes. They see the added value of knowledge sharing through interactions. The respondent does not aim to stimulate others in the region, although this ambition is visible in general policies as the *Omgevingsvisie*.

6.5.3 Timing of policies

Overbetuwe specifically did not include adaptation within their sustainability policy (Royalhaskoning DHV, 2016). There therefore is no strategic vision. However, the respondent states that adaptation will be included in an overarching policy in the future (Overbetuwe, interview, h). This lack of vision made it difficult to act on a short term, because they did not have a clear target (Overbetuwe, interview, h). The *Omgevingsvisie* shows that the municipality aims to combine the short- and long-term which (Gemeente Overbetuwe, 2019) can be applied on a possible new vision.

The interview showed that the respondent wants to take no-regret measures by awaiting the results of the *stresstest,* because he argues that it would not be desirable to act beforehand (Overbetuwe, interview, i). Flexibility and robustness are thus not used for adaption in particular, although flexibility is seen as an important aspect of the *Omgevingsvisie* (Gemeente Overbetuwe, 2019). There have not been any specific impacts of climate change within the municipality (Overbetuwe, interview, j). There is no strong sense of urgency as well, mainly because of the lack of incidents. The respondent argues that this has slowed down their ambitions and that it is a reason why they are not a forerunner (Overbetuwe, interview, k). However, he also states that momentum is growing due to media coverage (Overbetuwe, interview, l) and previous hot summers (Overbetuwe, interview, k).

Adaptation is not very present in Overbetuwe on a short-term notice. This is due to a lack of windows of opportunity and momentum, although the latter is growing. The respondent and responsible official favours no-regret measures and awaits the result of the stresstests before he acts. Flexible or robust measures are not taken. There will be a strategic vision, but it is not clear whether this policy will focus on the short- or long-term or both.

6.5.4 Alignment across sectors

The data shows that some indicators of alignment within the organisation are present. The respondent is the climate coordinator, although he acts alone. He mentioned that they want to involve other stakeholders such as the citizens (Overbetuwe, interview, e), NGO's and corporations (Overbetuwe, interview, m). Overbetuwe aims for sectoral integration (Gemeente Overbetuwe, 2019; Sweco, 2017; Overbetuwe, interview, n) although the respondent mentioned that this needs further improvement for the social domain (Overbetuwe, interview, o). It was also observed during the project-group meeting that it was hard to involve the right people for meetings, which was a sign that it was not very well integrated across sectors yet (Observation 1). The division of responsibilities is still insufficient (Overbetuwe, interview, p) although it is getting clearer on the board-level (Overbetuwe, interview, q) and will be further elaborated in the future in *uitvoeringsprogramma's* (Gemeente Overbetuwe, 2019).

There is no overarching vision combining adaptation and mitigation. It is expected that such a vision will be developed (Overbetuwe, interview, h). The interview shows that the focus is on integration on the operational level and integrate it in new developments (Overbetuwe, interview, n). The *Routekaart Duurzaamheid* mentioned that adaption would be integrated on the operational level in sectoral policies (RoyalHaskoning DHV, 2016). The latter is for example done in the GRP (Sweco, 2017). There is some integration on the strategic level within the *Omgevingsvisie* (Gemeente Overbetuwe, 2019).

The support for adaptation is growing within the municipal organisation, on the political level and within their society (Overbetuwe, interview, j; Overbetuwe, interview, r; Overbetuwe, interview, l). The importance of this support is for example observed during the board meeting in which a *participatieparagraaf* and a *startnotitie* were suggested to stimulate societal and political support (Observation 2). External cooperation is intended by the respondent and mentioned in the policies (e.g. Overbetuwe, interview, e). There already are some examples of cooperation such as the information-session organised with Lingewaard (Overbetuwe, interview, s). However, the respondent notes that cooperation with non-governmental actors is still in a very early phase (Overbetuwe, interview, t). There are some resources reserved in the GRP (Sweco, 2017), but this is not enough to be a forerunner (Overbetuwe, interview, k). There is no indication of monitoring.

It can be stated that Overbetuwe aims for mainstreaming. There is a strong focus on awareness and integration across sectoral activities (Overbetuwe, interview, n). There is no clear formulation of boundaries, responsibilities and accountability yet (Overbetuwe, interview, p), but this is getting clearer (Overbetuwe, interview, q). It is mentioned in the *Omgevingsvisie* that this division will be clarified in the *uitvoeringsprogramma's* (Gemeente Overbetuwe, 2019).

6.5.5 Science-policy interface

There is no science-policy interface yet in the municipality of Overbetuwe. They do not collaborate with scientific institutions, but see the added value of this and are willing to do this in the future (Overbetuwe, interview, u). It is not clear if they would do this with actual scientific institutions or for example with consultancy firms. There is no indication of boundary organisations.

6.5.6 Leadership
Communication is seen as an important task of the political-administrative function of the municipality (Observation 2; Overbetuwe, interview, v). Enabling tasks are executed by the municipality by fostering interaction to create urgency and awareness (Overbetuwe, interview, s). The respondent also sees it as his task to create awareness and urgency (Overbetuwe, interview, w). Additionally, it is mentioned that the municipality intends to have a facilitating function (Gemeente Overbetuwe, 2019). The respondent mentioned that it was important to spread his ideas and have them accepted by other stakeholders (Overbetuwe, interview, s). He therefore executes the dissemination function. At last, connective tasks are done by the municipality and the respondent. The municipality for example connects with other stakeholders (Gemeente Overbetuwe, 2019). The respondent organised a meeting with Lingewaard to bring people together and promote problems (Overbetuwe, interview, s). He also believes that one of his tasks is to bring everyone on the same page, so they can work together (Overbetuwe, interview, w).

Multiple tasks and multiple functions are executed by different actors. The adaptive function is the only function that is not present. The respondent mainly sees his role on the level of the municipality. He expects a stronger directory role from regional actors as the Waterboard (Overbetuwe, interview, x).

6.5.7 Selection of policy instruments
The respondent mentioned that they will use a mix of policy instruments (Overbetuwe, interview y), and for example mentioned a communication-campaign (Overbetuwe, interview, w). The actual instruments will depend on the actual topic and the challenge, and are supposed to be effective and efficient for current and future generations (Gemeente Overbetuwe, 2019). The respondent also mentions that adaptation requires a tailor-made approach (Overbetuwe, interview, y). This thus indicates that they want to use a tailor-made mix of instruments, based on the criteria of effectiveness, spatial and flexible efficiency, and spatial and generational fairness.

6.6 Tiel

Tiel is the case with the highest population density. It only covers an area of 32,88 km² but has a population size of 41.978. It therefore has a density of 1.277 inh./km². The municipality covers the city of Tiel and some of its surroundings and is therefore an urban municipality. Over 200 people are working for the municipality. This does not include those who work for Tiel, Culemborg and West Betuwe in an overarching organisation, or for the maintenance of their public space (Tiel, interview a). There is one official working on sustainability and the energy-transition. She was the respondent for the interview and was present during the project-group meeting. She was also present during the board-group meeting to replace the deputy. Climate adaptation is included within the climate-policy (Gemeente Tiel, 2010), the start-note of their *omgevingsvisie* (Gemeente Tiel, 2019, a) and the draft version of their GRP (Gemeente Tiel, 2019, b). It was not included within their coalition-program (PvdB, VVD & PvdA, 2018) and their health-nota (Gemeente Tiel, 2019, c). There was no LOP.

Figure 10: Gemeente Tiel, source: Wikipedia
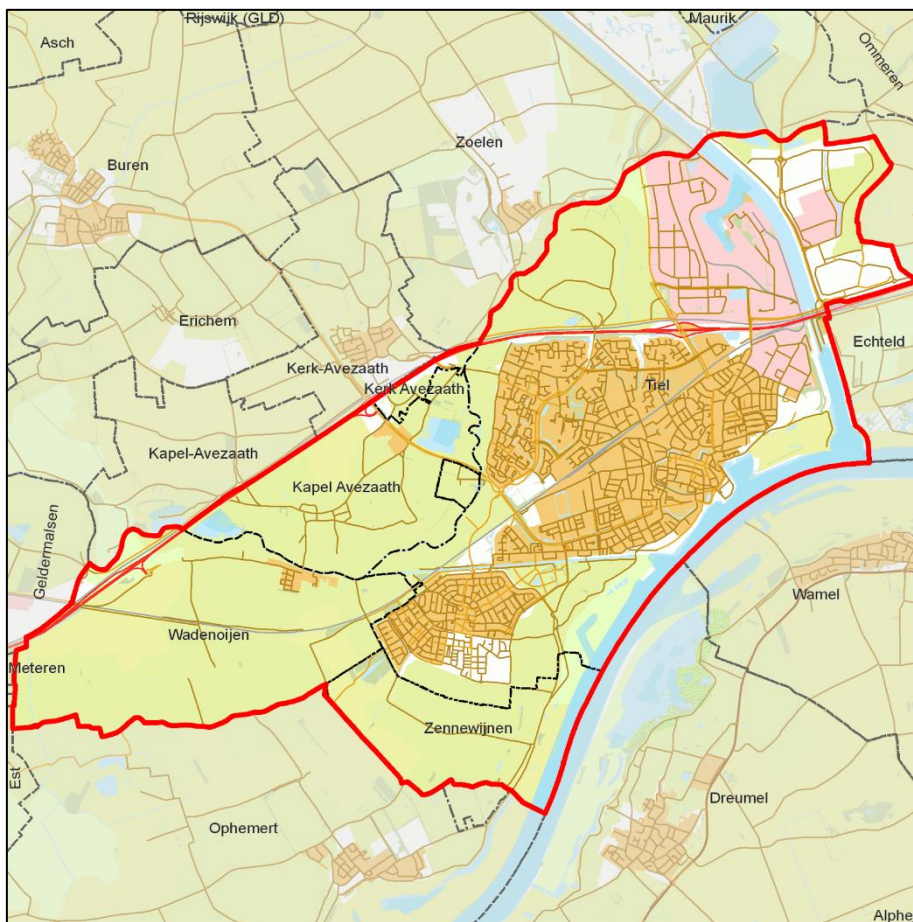
6.6.1 Framing

Adaptation is framed as the adjustments to the impacts of climate change in terms of public space, water-management and health (Tiel, interview, b; Gemeente Tiel, 2010). This frame is very inclusive as it integrates three different aspects, the public space, water-management and the social domain. However, there is no specific focus on the negative consequences.

It is interesting that the respondent mentioned that they do not have a shared frame in their municipality (Tiel, interview, c). However, the policy-analysis of the climate-policy showed that there is (or was) an inclusive frame. Framing thus happened years ago, but the respondent was not present during that time and could not give an impression of it. Additionally, the climate-policy stems from 2010 and is therefore not very up-to-date. The policy and frame thus need revising. It is indicated that the frame could be specified for different moments in the cycle, for example by making it less abstract and more tangible for practical purposes (Tiel, interview, d).

6.6.2 Level at which to act
There is no indication whether the municipality sees themselves as the right level to act or not. They do show indicators of synchronisation. Their policies are first of all aligned with national and provincial policies (Gemeente Tiel, 2010). Their policies also mention the possibilities and added value of interaction and exchange with the Waterboard and within KAR (Gemeente Tiel, 2010; Gemeente Tiel, 2019, b). The respondent has the ambition to align their actions with the regional process within KAR (Tiel, interview, e) and values the knowledge sharing that is happening in that process (Tiel, interview, f). They are aware of their role as an example within their municipality to stimulate others (Gemeente Tiel, 2010). However, they do not have the capacity to stimulate other municipalities within KAR and are just following the regional process, for now (Tiel, interview, g).

The municipality sees their actions as part of a bigger picture and aligns their actions with regional processes and policies on larger scales. They do not have the capacity to play an active role within those processes. They do mention that they can and want to stimulate others within their own municipality.

6.6.3 Timing of policies
Tiel has a strategic sustainability vision in which climate adaptation is included (Gemeente Tiel, 2010). However, this policy is expiring soon. The respondent does not expect that they will develop a new strategic vision. It is expected that they will use the RAS and translate that into local, short-term implementation-programs (Tiel, interview, h). They also stress the importance of short-term actions, which will be beneficial in the future (Gemeente Tiel, 2010). The GRP has a strong focus on the robustness of the water system (Gemeente Tiel, 2019, b). There is no indication of flexibility.

The *klimaatbeleidsplan* aims to create urgency by stressing the vulnerability of Tiel (Gemeente Tiel, 2010). The interview however indicates that there is no real momentum yet. There is awareness of the consequences of climate change in terms of heath and water-disturbance (*kwel*) (Tiel, interview, i). However, they are not capable to use these windows of opportunity due to a lack of human and financial capital (Tiel, interview, i). This lack is caused because of the higher priority of other challenges (Tiel, interview, j).

Tiel focusses on the short-term actions and implementation to benefit from it in the future. They will not develop a long-term strategic vision themselves. It is expected that the latter will be done regionally. The focus is on the robustness of the measures and they do not have the capacity to use the windows of opportunity and momentum.

6.6.4 Alignment across sectors

There is an ambition for alignment within the organisation that is already achieved for some indicators. The respondent is the climate-coordinator and the division of responsibilities, boundaries and accountability is made for the people in the municipality who are working on sustainability (Tiel, interview, k). Integration across sectors is intended in their *klimaatbeleidsplan* (Gemeente Tiel, 2010) and the interview shows that this is already happening for physical aspects (Tiel, interview, l). It is intended to involve other non-governmental stakeholders (Gemeente Tiel, 2010). No indication of an internal steering committee or flat network structure.

There is an overarching vision, although it is expiring soon. It is not expected that there will be a new one. The focus is on integration on the operational level within implementation-programs (Tiel, interview, h). Adaptation is integrated in some sectoral policies, such as the GRP (Gemeente Tiel, 2019, b) and the start-note for the *omgevingsvisie* (Gemeente Tiel, 2019, a).

It is mentioned that adaptation can only be achieved if they work on it collectively and that support of the board and external parties is very important (Gemeente Tiel, 2010). This indicates a focus on internal and external support and cooperation. Additionally, it is mentioned that there is political support, although the time of the deputy is limited (Tiel, interview, m). The municipality lacks capacity and resources, which are thus, not present for adaptation as well (Tiel, interview, n). There is no indication of social support or resistance.

Tiel does not have people who are dedicated to climate adaptation (Tiel, interview, n). It is additionally mentioned by the respondent that climate adaptation is not seen as a separate activity but part of larger improvements of the environment (Tiel, interview, o). The GRP (Gemeente Tiel, 2019, b) also mentions that adaptation needs to become a natural aspect within spatial (re)developments. They therefore have a mainstreaming approach.

The division or responsibilities, boundaries and accountability is clear for the people working on sustainability within the municipal organisation (Tiel, interview, k).

This case thus shows indicators of alignment within the organisation, implementation and to some extent in the policies. The focus is on mitigation and there is a clear division of responsibilities. However, the respondent sees this process of alignment as something that will happen naturally during the implementation of adaptation measures (Tiel, interview, p). Alignment is thus not seen as a precondition to implement adaptation measures.

6.6.5 Science-policy interface

The municipality of Tiel does not collaborate with the scientific domain. The respondent does believe that this could be an additional value within the process, but they do not have the necessary connections. Knowledge is produced by themselves, if this is seen as desirable. It is mentioned that a boundary organisation could be a proper way to collaborate (Tiel, interview, q).

6.6.6 Leadership

Political-administrative tasks are executed by the municipality and the respondent. The municipality stresses the importance of communication and monitoring in their *klimaatbeleidsnota* and GRP (Gemeente Tiel, 2010; Gemeente Tiel, 2019, b). Monitoring is seen as a task of the respondent as well (Tiel, interview, r). Policy-development and generating resources are mentioned by the respondent too (Tiel, interview, s; Tiel, interview, t). The respondent aims to create urgency and sees the municipality as an enabling actor that create urgency (Tiel, interview, u; Tiel, interview, v). Interaction is fostered by the region, which is used to create urgency as well (Tiel, interview, w).

Ideas on climate adaptation are spread by the respondent. She argues that it is important to include the surroundings within the process (Tiel, interview, p) and it is one of her responsibilities to inform the deputy whom is in turn responsible to inform the council (Tiel, interview, x). Connective tasks are executed by the respondent, the municipality and the region. The respondent brings people together in the Tielse Kompas in which they build a collaborative strategy on different topics (Tiel, interview, y). The municipality has a connective approach in which they want to involve many parties (Tiel, interview, v). KAR organises meetings to promote problems and bring people together (Tiel, interview w). This region also appointed a coordinator who is in the right position to connect regional stakeholders (Tiel, interview, z). The GRP additionally stresses the role of the municipality as a connector (Gemeente Tiel, 2019, b). Tiel was expected to have a stronger leading role in the regional process, but did not execute this. (Waterschap, interview, g)

Tasks of each function are or will be executed by the respondent, the municipality, the deputy or KAR. However, there is no indication of the adaptive function. The roles and tasks differ on different scales, for example for the respondent who is observing on the regional scale and more active on the local scale.

6.6.7 Selection of policy instruments

The *klimaatbeleidsplan* and the GRP mention that communicative instruments are important (Gemeente Tiel, 2010; Gemeente Tiel, 2019, b). The respondent also indicates that she wants to use communication as an instruments to stimulate awareness and knowledge (Tiel, interview, u; Tiel, interview, aa). Communication is used to create a shared sense of accountability. There are no further direct links between instruments and criteria. Although it is mentioned that the municipality favours a consistent approach within their instruments (Gemeente Tiel, 2019, b), which could be a sign of legal certainty. Their *klimaatbeleidsplan* is intended to stimulate the efficiency and effectiveness (Gemeente Tiel, 2010). There is no direct link with characteristics.

Tiel focusses on communicative instruments and thus does not have a mix. It is not indicated whether instruments are tailor-made or not, although it can be linked to their preference of accountability and awareness to stimulate to output legitimacy.

6.7 West Betuwe

West Betuwe is the youngest municipality of the cases and only exists since the beginning of 2019. It is a merger between three municipalities: Lingewaal, Geldermalsen and Neerijnen. West Betuwe is the biggest case in terms of surface (216,12 km²) and population (50.697 inhabitants). However, they have a relatively low population density with only 235 inhabitants per square meter. The municipal organisation employs 285 people, not including those working for a transcending organisation. The interview was done with the official for sustainability, environment, climate and waste. This official was also present during the project-group meeting. There is a deputy with the task for climate adaptation, combined with nature and the environment, and sustainability. The board-group meeting was led by him. West Betuwe is thus a very young municipality and does not have many policies yet. They only had a coalition-program (Dorpsbelangen West Betuwe, SGP, ChristenUnie & Leefbaar Lokaal Belang West Betuwe, 2019) and a GRP (Gemeente West Betuwe, 2019). Adaptation is only included in the GRP.
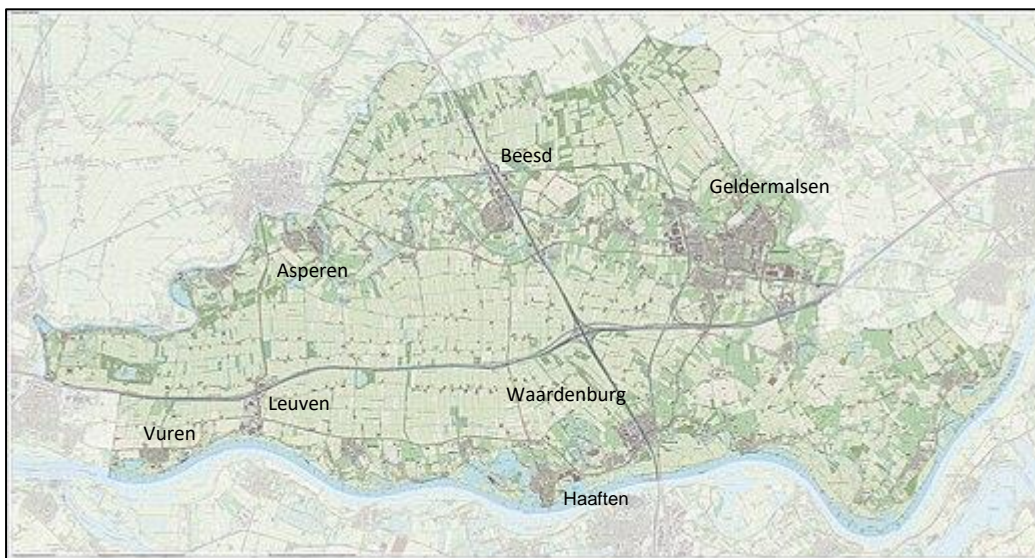
Figure 11: Municipality of West Betuwe, source: Wikipedia

6.7.1 Framing

Adaptation is framed as dealing with and adjusting to changing weather extremes (West Betuwe, interview, a). The frame is getting more inclusive as the focus is expanding from 'only' water-related issues to heat and drought as well (West Betuwe, interview, b). The frame is developed together with multiple officials from different sectors within their municipality and from other governmental levels. It was a deliberate decision to focus on weather-circumstances to make adaption better understandable (West Betuwe, interview, c).

The frame is getting more inclusive. Framing happened in quite an inclusive way already.

6.7.2 Level at which to act

There is no indication whether the municipality is seen as the right level to act or not. West Betuwe does see themselves as part of a bigger picture. They for example mention large-scale policies as the DPRA (Gemeente West Betuwe, 2019) and align and value their actions with other municipalities (Observation 1) and other transitions (West Betuwe, interview, d).

It is interesting that the respondent also mentioned that they value their actions to bigger cities and even large countries. This valuing is discouraging action on their level, because people do not believe that the consequences in bigger cities would apply to them and expect those other countries to act first (West Betuwe, interview, e). They are interacting and exchanging with other municipalities within KAR and value the extra knowledge generated by this collaboration (West Betuwe, interview, f). The respondent mentioned that they are active in the regional process and take more steps than the minimum requirements (West Betuwe, interview, g) and that municipalities can stimulate each other within KAR (West Betuwe, interview, h). West Betuwe expects an active contribution of the market and civil society (Gemeente West Betuwe, 2018). It could therefore be expected that they stimulate them as well.

West Betuwe aligns and values their actions with policies and processes on larger scales and with other actors' actions. They interact with others, exchange knowledge and are aware that they can stimulate others or can be stimulated by others.

6.7.3 Timing of policies

There is no strategic vision for the municipality of West Betuwe yet. The respondent expects that they will develop one. This will be a local version of the RAS in which they combine short-term actions with a long-term perspective (West Betuwe, interview, i). Robustness and flexibility is mentioned. The first is desired within new developments so that those are ready to deal with weather-extremes in the future (West Betuwe, interview, j). Flexibility comes forward in the respondent's wish to constantly analyse the process and learn from it for measures and actions in the future (West Betuwe, interview, k).

The recent merger opened a big window of opportunity for integration of climate adaptation within sectoral policies. It is the wish of the respondent to use this window (West Betuwe, interview, l). He admits however that this will be a difficult task, because people still need to be convinced. The fact that there is little momentum caused by a lack of political (West Betuwe, interview, m) and societal support (West Betuwe, interview, e) makes this extra difficult.

It is intended by the respondent to have a combination of a short-term program with a long-term vision. Current actions need to be robust and the process needs to be flexible to learn from what is happening. There is a window of opportunity to integrate adaptation within (sectoral) policies. It is doubted whether this can be used due to a lack of momentum.

6.7.4 Alignment across sectors

West Betuwe has a team working on sustainability in which adaptation is included. This team exists out of two advisors, a director and a *medewerker.* The respondent is specifically responsible for adaptation (West Betuwe, interview, n). There also is a deputy for adaptation. They thus have a climate coordinator and internal steering. Sectoral integration is desired by the respondent (West Betuwe, interview, o). He sees a change to sectoral integration, but their municipality still has a sectoral approach (West Betuwe, interview, p). They aim for involvement of other stakeholder such as the citizens and market, but this is not achieved yet (West Betuwe, interview, q). There is no clear division of boundaries, responsibilities and accountabilities yet (West Betuwe, r) because of the merger (West Betuwe, interview, s). It is expected that this will be clarified soon, for example in the LAS (West Betuwe, interview, t). The respondent stresses the importance of a shared sense of responsibility and accountability and argues that it would be crucial for the process to succeed (West Betuwe, interview, s).

There is no overarching vision yet, but it will be developed (West Betuwe, interview, i). The respondent focuses on integration on the operational and strategic level; adaptation needs to be integrated within the regular jobs related to maintenance (West Betuwe, interview, u) and it can be integrated within policies as a result of the merger (West Betuwe, interview, l). The latter also provides opportunities for integration in sectoral policies. This is already done in the GRP (Gemeente West Betuwe, 2018).

The municipality is working on awareness (West Betuwe, t). They do not have a lot of political, social and internal support because people or not aware of the consequences for such a rural municipality (West Betuwe, interview, u). The GRP has allocated resources for some measures (Gemeente West Betuwe, 2018). Some people however believe that they do not have enough capacity to integrate adaptation within their work (West Betuwe, interview, v). The respondent mentions that they are monitoring the process to learn from it (West Betuwe, interview, k).

Currently, there is a dedicated team for sustainability and the respondent is dedicated on adaptation (West Betuwe, interview, n). The focus is that much oriented on integration, that it is expected that this dedicated approach is seen as a mean to achieve mainstreaming.

There are not many indicators of alignment across sectors yet within the municipality. A lot of them are intended and are expected to be achieved within short notice. There is no clear formulation of boundaries, responsibilities and accountability yet, but this is once again intended.

6.7.5 Science-policy interface

There is no science-policy interface for the municipality of West Betuwe. They do not collaborate with scientific institutions because they do not see the benefit of investments in it for such a rural municipality as themselves (West Betuwe, interview, w). However, they do collaborate with consultancy firms (West Betuwe, interview, w) and the respondent acknowledges that the scientific domain could be an addition for the adaptation process (West Betuwe, interview, x).

6.7.6 Leadership

Communication is seen as an important task for the municipality (Gemeente West Betuwe, 2018) and for the respondent (West Betuwe, interview, y; West Betuwe, interview, z). The municipality has the task to develop a vision and is monitoring and evaluating the process (West Betuwe, interview, I; West Betuwe, interview, k). They are fostering interaction within the regional process (West Betuwe, interview, aa). The respondent interacts with different domains to spread awareness and create urgency (West Betuwe, interview, z), and he organises an in-company training to create urgency and spread ideas on adaptation (West Betuwe, interview, v). The region is expected to be supportive and are thus expected to be enabling (West Betuwe, interview, bb).

The respondent sees himself as an ambassador for climate adaptation and as a connector between domains (West Betuwe, interview, cc). He also expects that the deputy acts as an ambassador (West Betuwe, interview, dd). The respondent aims to give everyone some responsibility to mobilise them (West Betuwe, interview, q), which is also intended in the GRP (Gemeente West Betuwe, 2018).

Political-administrative and enabling tasks are executed by the respondent and the municipality. The respondent executes connective and disseminative tasks. He expects a more enabling role of the region. The deputy is disseminating as well. Different domains and actors are linked together by the respondent and they are given responsibility to be mobilised. The respondent additionally aims for a flexible process in which they learn from previous actions, which is a sign of an adaptive network.

All functions are present and executed by different actors. There are differences across scales and some actors are expected to have other roles on those different scales. It is mentioned that there are still too few people who actually take responsibility and action on adaptation (West Betuwe, interview, ee) which indicates that there is not enough leadership yet.

6.7.7 Selection of policy instruments

The respondent stresses the urge for legal instruments (West Betuwe, interview, ff). However, the policy and board-group observation also show the intention for communicative instruments (Gemeente West Betuwe, 2018; observation 2). The latter is based on the importance of legal certainty (West Betuwe, interview, ff). Communicative instruments are value because of accountability and input legitimacy (West Betuwe, interview, q; West Betuwe, interview, h). The interview showed that certain actions and instruments are valued because there still is much uncertainty about the topic (e.g. West Betuwe, interview, c).

There is thus an intention for a mix of instruments, based on their local criteria and characteristics.

6.8 Zaltbommel

Zaltbommel is one of the smaller cases and has a rural character. It has 28.451 inhabitants, spread across a land-surface of 79,38 km² and thus has a population density of 358 inh./km². The city of Zaltbommel is the core of the municipality with 12.489 inhabitants. Other villages are a lot smaller with roughly 3.000 inhabitants or less. The municipal organisation employs 170 people and shares 70 employees with the municipality of Maasdriel in a transcending organisation. One of those 170 employees is working on water, nature and landscape and is attributed with climate adaptation. The interview was done with this official. That respondent could not be present during the project-group meeting in which Zaltbommel was thus not represented. Zaltbommel has a deputy with the specific task of spatial adaptation. He was present during the board-group meeting. Adaptation is only included within their *Water- and Rioleringsplan* (WRP) (Zaltbommel, Maasdriel & BOOT, 2017). It was thus not included within their presentation on sustainability (Posthouwer, 2018), coalition-agreement (Gemeente Zaltbommel, 2018), the *Structuurvisie Buitengebied* (BügelHajema, 2012) and their health-nota (Gemeente Zaltbommel 2017). Their LOP dated from 2003 and was therefore outdated (Zaltbommel & Maasdriel, 2003).
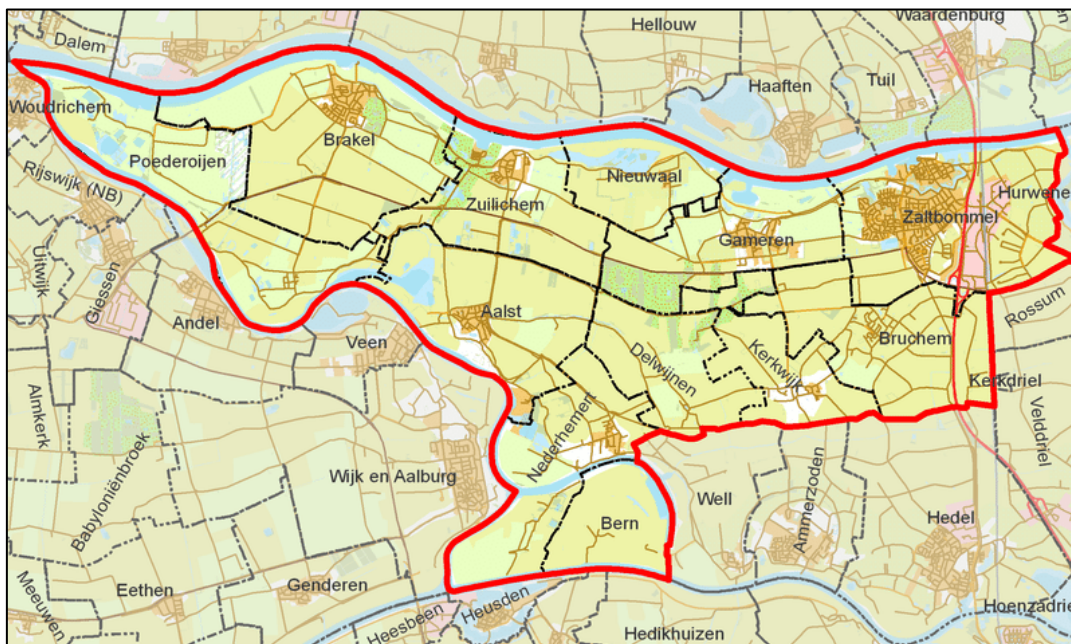
Figure 12: Municipality of Zaltbommel, source: https://heijmanswoningontruiming.nl/zaltbommel/woonplaatsen-gemeente-zaltbommel/

6.8.1 Framing

Adaptation is framed as the adjustments to a changing climate to maintain a liveable environment (Zaltbommel, interview, a). Both in terms of negative impacts and in terms of possible advantages (Zaltbommel, interview, b). It is mentioned that this frame is not shared across the municipality and that different sectors would explain adaptation in a different way. The respondent argues that this is not seen as a problem currently and does not expect that they will develop a specific frame locally. It would be better just to keep it broad and inclusive (Zaltbommel, interview, c). The frame that she uses is linked to the DPRA (Zaltbommel, interview, a).

The interview showed that they are thus aware of the multiple frames and that it is not seen as problematic. It was not expected at the time that framing would be done locally.

6.8.2 Level at which to act

The respondent mentioned that the municipality could be seen as the right level to act, because of their responsibility for the public space and their connection to their citizens. However, it is mentioned that it is sometimes hard to do this with all the different interests (Zaltbommel, interview, d). The approach in Zaltbommel is aligned and valued with national policies (e.g. DPRA; Zaltbommel, Maasdriel & BOOT, 2017), other transitions such as the energy-transition (Observation 2) and with KAR. The respondent mentioned that they are following the regional process to meet the requirements of the DPRA (Zaltbommel, interview, e). It is easier to just be following that process, because they do not have enough capacity and political support to put in some extra effort (Zaltbommel, interview, f).

Interaction and exchange happens between municipalities and within KAR. The respondent values this in terms of knowledge sharing and to receive proper examples (Zaltbommel, interview, e). It is indicated that KAR could have a stimulating effect on municipalities. Zaltbommel does have the ambition to stimulate others within their municipality. They want to spread awareness to their citizens and stimulate them to act (Zaltbommel, Maasdriel & BOOT, 2017). This first requires awareness within their organisation and proper practical examples of adaptation (Zaltbommel, interview, h). However, the respondent does not expect that Zaltbommel will take a leading role within KAR or stimulate other municipalities or parties within that regional process (Zaltbommel, interview, g).

The municipality is thus seen as the right level to act and sees themselves as part of a bigger picture. However, they are only following regional process and national policies, for now. They are aware of the possibilities of regional interactions and exchange, but only benefit from it. Zaltbommel does not stimulate other municipalities or parties within KAR, but aims to do that within their own municipality.

6.8.3 Timing of policies

The municipal organisation focuses more on the short-term than on the long-term. They believe that their system functions properly for now, even though it could be different in five or ten years (Zaltbommel, interview, i). There is no separate strategic vision on climate adaptation within the organisation. It is not expected that Zaltbommel will develop one in the future, because there is no demand for another policy or vision. It is more likely that it will be integrated in other policies, such as the WRP or *Omgevingsvisie* (Zaltbommel, interview, s). It is expected that their focus will be on a local implementation-program derived from the regional strategy (Zaltbommel, interview, j). The WRP mentions that the water system needs to be robust (Zaltbommel, Maasdriel & BOOT, 2017).

Adaptation is seen as something new and forced from above by people in the municipal organisation (Zaltbommel, interview, k). It is believed that it will only cost extra effort, money and time (Zaltbommel, interview, h) or that they are doing it already (Zaltbommel, interview, k). There are no examples of incidents caused by climate change (Zaltbommel, interview, l) and it is mentioned that the incidents probably would not cause much outrage because people do not see the problem (Zaltbommel, interview, m) and are for example quite used to floods (Zaltbommel, interview, l).

There is some momentum because of political and social demand for actions as *Operatie Steenbreek*, but the organisation was not enough prepared yet to act on that (Zaltbommel, interview, n).

Zaltbommel is not really timing their policies. The focus is very much on the short-term and they have not yet experienced serious consequences of climate change.

6.8.4 Alignment across sectors

Zaltbommel has a climate coordinator. The municipality does have the ambition to integrate adaptation across sectors (Zaltbommel, interview, o) and to involve other stakeholders such as their citizens (Zaltbommel, Maasdriel & BOOT, 2017). They aim for a clear division of responsibilities, boundaries and accountability (Zaltbommel, interview, p). However, the interview shows that these intentions are not achieved yet (respectively: Zaltbommel, interview, o; Zaltbommel, interview, q; Zaltbommel, interview, p).

There is no overarching vision and it is not expected that there will be one in the future (Zaltbommel, interview, m). The respondent is aware that adaptation needs to be anchored within their actions and in their policies such as the *Omgevingsvisie* (Zaltbommel, interview, r; Zaltbommel, interview, s). Adaptation is only integrated within their WRP currently (Zaltbommel, Maasdriel & BOOT, 2017), but the ambition is thus to integrate it in other sectors such as spatial planning as well.

There is a lack of political, social and internal support. There is no sense of urgency (Zaltbommel, interview, t), there is no political ambition (Zaltbommel, interview, f) and officials see it as a forced task (Zaltbommel, interview, k). The municipality lacks resources and capacity for adaptation (e.g. Zaltbommel, interview, f; Zaltbommel, interview, n), even though some resources are allocated in the WRP (Zaltbommel, Maasdriel & BOOT, 2017).

The respondent has the ambition to have adaptation integrated within people's daily work and therefore focusses on mainstreaming (Zaltbommel, interview, u). It could be possible that they will develop a team on adaptation first to achieve mainstreaming (Zaltbommel, interview, v). It could thus be said that they have the intention to mainstream adaptation through a dedicated approach.

Adaptation is not well aligned across the different sectors in Zaltbommel based on the above. However, many indicators are intended, thus it could be expected that it will be better aligned in the future. They have the ambition to have a dedicated approach to mainstream adaptation. There is no clear division of boundaries, responsibilities and accountability yet, but this will be done in the implementation-programs (Zaltbommel, interview, p).

6.8.5 Science-policy interface

Zaltbommel offers opportunities for students to do an internship for the municipality or a research in order of the municipality (Zaltbommel, interview, w). This mostly happens with students from the *Hogere Agrarische School* in 's Hertogenbosch, but there is no formal agreement on it. There is no further indication of a science-policy interface nor an indication of boundary organisations.

6.8.6 Leadership
It is the municipality's intention to focus on communication and monitoring (Zaltbommel, Maasdriel & BOOT, 2017). Additionally, the respondent mention that they need to anchor adaptation in their policies and thus need to develop new ones (Zaltbommel, interview, a). The respondent focuses on generating resources (Zaltbommel, interview, y).

The respondent aims to create urgency and awareness to mobilise actors to move to action (Zaltbommel, interview, z). Fostering interaction and bringing people together in dialogues is seen as a task of the municipality. Those dialogues are used to work together and build a collaborative strategy (Zaltbommel, interview, aa). The respondent additionally has the task to spread ideas internally and externally (Zaltbommel, interview, m) and to keep the deputy informed (Zaltbommel, interview, x).

The respondent and the municipality thus execute tasks related to the political-administrative, enabling, dissemination and connective functions of leadership. Additionally, it is mentioned that they do not want to work based on a norm, but to be flexible and collectively choose specific solutions for specific challenges (Zaltbommel, interview, aa). This shows that they want to have an adaptive network. All leadership functions are thus (intended to be) present. There are different roles for the municipality and the respondent, but there are no specific expectations of KAR or regional actors.

It is mentioned that adaptation is not fully embraced yet. The leadership-responsibility is not fully embraced by the respondent because it was not clarified enough and because she lacks time to work on it (Zaltbommel, interview, cc).

6.8.7 Selection of policy instruments
The interview shows that Zaltbommel intends to have a mix of policy-instruments instead of a focus on one specific item (Zaltbommel, interview, dd). The respondent mentions communicative and economic instruments (Zaltbommel, interview, dd), and mentions a desire for legal instruments by her colleagues (Zaltbommel, interview, ee). The latter is caused by a desire for legal certainty, while the communicative and economic instruments are used to spread awareness and accountability (Zaltbommel, interview, dd). There is still a lot of uncertainty about the impact and costs of measures, the approach for a dialogue and about adaptation in general (Zaltbommel, interview, h; Zaltbommel, interview, ff).

Zaltbommel thus aims for a mix of policy instruments of communicative, legal and economic instruments, to provide more legal certainty and accountability. This could be attributed to the importance of uncertainty in the municipality. The mix can thus be seen as tailor-made.

6.9 Regional perspective

Climate adaptation is dealt with in the regional process of KAR. Some data is collected from the regional perspective. This is done through the observations of the meetings of the network-group and the board-group. The reports of this are added in Appendix E. Additionally, an interview was done with the responsible official of the Waterboard who is connected to the regional process. The results of this data will be described in this section for each element separately.

6.9.1 Framing

The respondent of the Waterboard mentioned that she is not convinced that heat and drought are included in the frames of each municipality, although it is mentioned that some include it already (Waterboard, interview, c) and that it is developing over time (Waterboard, interview, d). It is mentioned in the interview that they do aim to have a shared image of the consequences of climate change (Waterboard, interview, d), but this does not necessarily mean that they focus on a shared frame. It was observed that there is a strong desire to frame adaptation in an understandable manner (Observation 2). The network-group preferred framing from a 'we'-perspective to create a sense of unity and that it needs to be framed in a tangible way (Observation 1).

6.9.2 Levels at which to act

It is believed that the local level of the municipalities is the level who is responsible for the actual implementation of and decisions on climate change (Waterboard, interview, e). The respondent however argues that regional collaboration is beneficial to develop possible steps and connect to regional actors (Waterboard, interview, e). Therefore, it is a topic that should be regionally approached, but executed locally.

The regional data shows that there is a general image that the actions in the municipalities are part of a bigger picture. It is observed that the actions are aligned and valued to other transitions (e.g. Observation 1), other regions (Observation 1), and (perhaps too much) with national policies (Observation 1) and other cities (Waterboard, interview, f). Interaction and exchange is happening between the municipalities. Some of the municipalities are ahead of others and are stimulating the laggards in the regional process (Waterboard, interview, g). The respondent also intends that the regional process will stimulate the municipalities (Waterboard, interview, h). Not all municipalities take a stimulating role however and are just awaiting the regional process (Waterboard, interview, h).

It is indicated that synchronisation might not always be a good thing. The network-group stressed that they desired more focus on the local level and less valuing and aligning with national policies (Observation 1). Additionally, the smaller municipalities feel less urgency, because they believe that the consequences will be smaller for them compared (valued) to larger cities and municipalities (Waterboard, interview, f). The respondent also mentioned that some municipalities could get that far behind of others that they could become demotivated and not embrace adaptation (Waterboard, interview, e).

6.9.3 Timing of the policies

The respondent indicated that smaller municipalities generally do not focus on actual policies, but favour actions over documents (Waterboard, interview, i). Smaller municipalities also do not have a strategic and long-term approach (Waterboard, interview, j). They are aware that it is required, but it is mentioned that this will be challenging (Waterboard, interview, i). Most of the municipalities do not take action now, because of a lack of priority, political support (Waterboard, interview, h), or a lack of leadership and capacity (Waterboard, interview, k). They do not take robust or flexible measures currently.

It is mentioned that some municipalities have had incidents and that these windows of opportunity were beneficial (Waterboard, interview, d). The importance of the windows of opportunities is observed during both observations. There is a lack of awareness in general, which results in low urgency and momentum. This could be caused by the fact that the smaller and rural municipalities believe that the consequences of climate change will not affect them as much as bigger cities and that it is therefore not their problem (Waterboard, interview, f).

6.9.4 Alignment across sectors

Both the observations and the interview showed that integration across sectors, involvement of non-governmental stakeholders and a clear demarcation of boundaries, responsibilities and accountability are intended. It is for example mentioned that the social domain needs to be involved (Observation 1) and that they are trying to approach adaptation with a broad scope to include many sectors (Waterboard, interview, l). They are moving into such an integral approach, but it is still difficult to do it and it needs attention (Waterboard, interview, l). A clear demarcation between local and regional responsibilities is desired (Observation 2) and it is intended to further clarify them in the risk-dialogues (Observation 1). KAR lacked a climate coordinator in the beginning, but this task was eventually attributed to the respondent of the Waterboard (Waterboard, interview, b). Some non-governmental parties were approached by the regional coordinator and the municipalities are willing to cooperate with them (Observation 1).

It is already mentioned that the interview showed that the smaller municipalities focus less on policies, but favour actions over documents (Waterboard, interview, i). The focus therefore is on integration on the operational level, and less on the strategic level.

The board-group stressed the importance of social support and support from the council and that they need to be involved in an early stage (Observation 2). This support is also intended by the network-group. They want to achieve it by using a 'we'-perspective and want to stimulate it during the risk-dialogues (Observation 1). The interview showed that political support is crucial for the process in the municipalities (Waterboard, interview, m) and that internal support is necessary (Waterboard, interview, k). Smaller municipalities often lack capacity (time) (Waterboard, interview, k)

It is sensed that the regional focus is on mainstreaming. There is a lot of attention for integration across sectors and internal and external support. It is not indicated whether this will happen through a mainstreaming or dedicated approach. There is a strong desire for a clear demarcation of boundaries, responsibilities and accountability, but this still needs attention.

6.9.5 Science-Policy interface

There is no science-policy interface between the smaller municipalities and scientific institutions. Some are involved in national programs, but that is not necessarily based on climate adaptation. The smaller municipalities do not have the necessary connections, lack capacity to invest in it or are just less interested in such a collaboration (Waterboard, interview, n). It is stressed however, that there is a demand for knowledge (e.g. Observation 1) and the respondent mentioned that they could try to design the interface from a regional perspective (Waterboard, interview, n).

6.9.6 Leadership

Regional tasks and functions of leadership can be derived from this regional perspective. It is first of all indicated that there will be a RAS (Observation 1). The region thus develops a collaborative vision, although it is indicated that decisions need to be made on a local level (Waterboard, interview, e). An important aspect is to keep politicians and other stakeholders involved (Observation 1; Observation 2). Spreading ideas and getting them accepted is therefore seen as a regional task. Additionally, the respondent mentioned that there is a regional task to bring regional stakeholders (GGD, corporations) within the process and mobilise them (Waterboard, interview, o), that it is important to build commitment and legitimacy (Waterboard, interview, e), and to build a collaborative strategy to move to action (Waterboard, interview, p).

It was mentioned during the interview that the region lacked some kind of natural leadership in the initial phase (Waterschap, interview, i). This was expected from Tiel, but they could not manage to execute that role at that time (Waterschap, interview, g). Additionally, the respondent mentioned that the differences between the municipalities are very dependent on the responsible leader per municipality (Waterboard, interview, q).

6.9.7 Selection of policy-instruments

The observations show that there is a strong focus on communicative instruments. A communication-strategy was desired in the board-group (Observation 2). Such a strategy is necessary to deal with the complexity caused by the amount of stakeholders and needs to be flexible and adjustable. It is desired to create more input and output legitimacy, and to stimulate accountability (Observation 2). The network-group actually discussed a new national instrument (subsidies). It was mentioned that the structure for the subsidies was inefficient, lacks attention for spatial differences and would create a lack of input (Observation 1). The interview also indicated that there was a local initiative to develop a legal instrument to create more legal certainty (Waterboard, interview, r).

A mix of instruments is indicated in the observations and the interview. Those instruments are assessed on their performance for a certain criterion (e.g. efficiency) or intended because of their added value to certain criteria (e.g. legal certainty). There is a link with the characteristics of adaptation governance, such as the social complexity and spatial diversity. It is indicated that some municipalities develop instruments locally (the *groennorm*). Other instruments are developed regionally (communication-strategy) and some are selected nationally (subsidies). There is thus a mix, which is assessed based on the criteria and characteristics. However, it cannot be said that the entire mix is attuned to the situation of the municipalities, because they use instruments from other municipalities or because some are 'forced' nationally.

6.10 Nijmegen – Reference Case

Nijmegen is used as a reference case for this research. It is a lot bigger than the other cases in terms of population with 176.731 inhabitants. It covers a relatively small area of 53,09 km² and therefore has a population density of 3329 inh./km². The municipality covers the city of Nijmegen and is therefore an urban municipality. It does not have any agricultural or natural landscapes. Those are all part of their surrounding municipalities (Nijmegen, interview, a). Nijmegen participates in a different region than KAR: the 'Rijk van Maas en Waal'. This region consists out of the Waterboard, the province, the municipality of Nijmegen and the surrounding municipalities. They have already developed a RAS and are now focusing on the translation of this strategy into an implementation-program.

Adaptation is divided across two civil servants and into green and blue aspects. The interview was done with one of those civil servants. They were not present during the observations, because they are no part of KAR. There is a deputy for sustainability that is working on the climate and the energy-transition, among other things. Adaptation is included within their draft sustainability-agenda (Gemeente Nijmegen, 2019), their *structuurvisie* (Gemeente Nijmegen, 2013), GRP (Gemeente Nijmegen, 2016) and health-policy (Gemeente Nijmegen, 2017). It is not directly included within the coalition-program (Groenlinks, D66 & SP, 2018). They do not have a LOP.
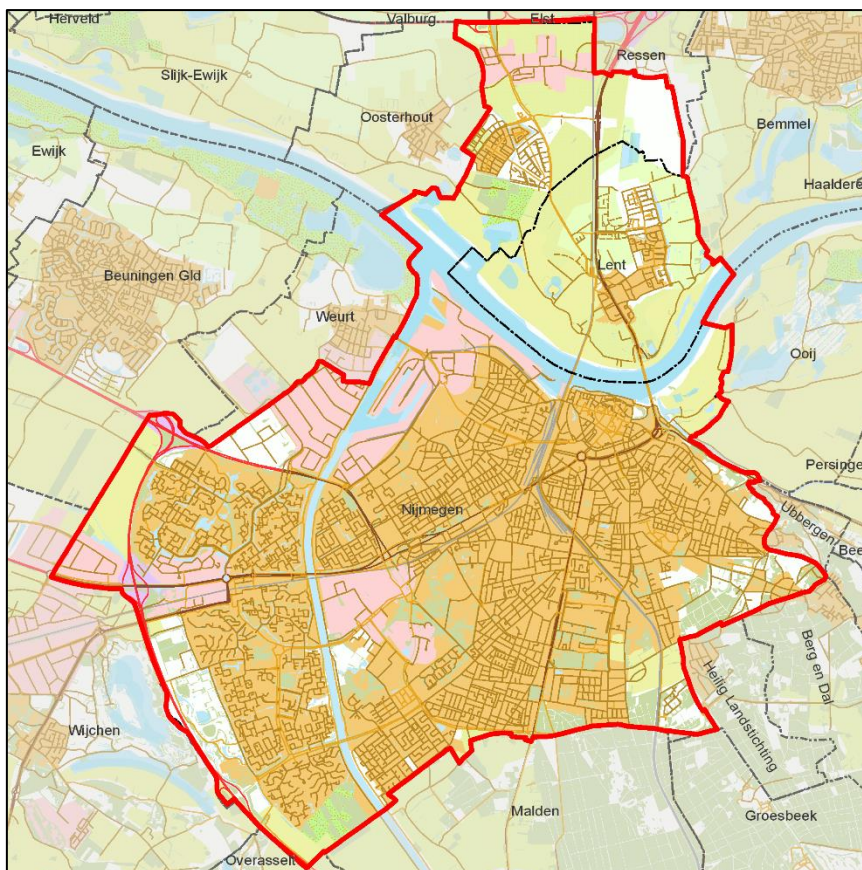

Figure 13: Municipality of Nijmegen, source: WIkipedia

6.10.1 Framing

Adaptation is seen as the spatial adjustments in the city to be able to deal with the negative consequences of climate change (e.g. Nijmegen, interview, b). It initially only focused on water-disturbance, but the frame is more inclusive now as heat- and drought-stress are included as well (Nijmegen, interview, c; Gemeente Nijmegen, 2019). The frame is based on the different definitions that were used at that time and attuned to what the municipality wanted and regarded important (Nijmegen, interview, d). The respondent mentioned that the abstractness of the frame is attuned to different purposes (Nijmegen, interview, e).

The frame is quite inclusive, but does not include the possibilities. It is getting more inclusive. Framing occurs, but it is not indicated whether it is inclusive.

6.10.2 Level at which to act

There is no indication in the policies and the interview that they see the municipality as the right level to act. Additionally, there are some actions of which they would not have been capable to do that on their own (Nijmegen, interview, f). Their actions are seen as part of a bigger picture. The respondent mainly values their actions with actions of other municipalities (e.g. Nijmegen, interview, g). The policies however, also focus on the alignment of adaptation with other transitions (Gemeente Nijmegen, 2017).

Interaction and exchange with other stakeholders is desired on different levels (Gemeente Nijmegen, 2019). The respondent also mentions the added value of this collaboration. He argues that adaptation does not stop at the borders of the municipality and that interaction and exchange is therefore crucial. It helps to stimulate others and to exchange knowledge (Nijmegen, interview, g). Additionally, they aim to stimulate others within their municipality (Gemeente Nijmegen, 2019), within the region (Nijmegen, interview, g) and within other regions (Nijmegen, interview, h).

6.10.3 Timing of policies

There are different approaches considering a long-term and/or a short-term strategy. Nijmegen first of all has recently updated their sustainability-agenda, which can be seen as their local policy (Nijmegen, interview, i). There is a RAS, but it is not expected that they will develop a LAS. Instead, they develop an implementation-program, which will be integrated within the *Omgevingsvisie* (Nijmegen, interview, j). The *structuurvisie* and health-agenda focus on the long-term (Gemeente Nijmegen, 2013; Gemeente Nijmegen, 2017), while the GRP combines the two and offers short-term actions and a long-term vision (Gemeente Nijmegen, 2016).

It is stressed that the water system needs to be robust (Gemeente Nijmegen, 2013). Additionally, they mention the flexibility of their policies (Gemeente Nijmegen, 2013) and resources (Gemeente Nijmegen, 2019). The respondent mentions windows of opportunity and argues that these are crucial for the process (Nijmegen, interview, k). They have used them to stimulate awareness (Nijmegen, interview, k) and it created momentum (Nijmegen, interview, l). However, it is noted that they are restricted by low ambitions caused by limited resources (Nijmegen, interview, m). It is sensed that Nijmegen focuses both on the long- and on the short-term. They stress the importance of robustness and flexibility, and windows of opportunity and momentum are present and used.

6.10.4 Alignment across sectors

The analysed policies focus on integration across sectors and involvement of non-governmental actors. The interview shows that these two aspects are already achieved; actors as the Radboud University (RU) and the GGD are involved (Nijmegen, interview, n) and it is integrated across sectors (Nijmegen, interview, o). Additionally, there is a climate coordinator (the respondent), there is a flat network structure (Nijmegen, interview, p), it is internally steered (Nijmegen, interview, q) and there is a division of responsibilities (Nijmegen, interview, r). However, the respondent mentions that the responsibilities, boundaries and accountabilities are not very clear and that it is impossible to make it entirely clear (Nijmegen, interview, s). They do intend to clarify it better in their implementation-program (Nijmegen, interview, t).

Adaptation is integrated within an overarching vision on sustainability (Gemeente Nijmegen, 2019). The respondent mentions that they focus on integration on the operational level in the implementation-program and *omgevingsplan* (Nijmegen, interview, j) and on the strategic level in the *Omgevingsvisie* (Nijmegen, interview, u). Adaptation is integrated within sectoral policies for water (GRP), spatial planning (*structuurvisie*) and the social domain (*health-agenda*).

There is a lot of collaboration with external parties, which is intended in the sustainability-agenda (Gemeente Nijmegen, 2019). There is political support from the deputy (Nijmegen, interview, v) but the council still lacks knowledge to be supportive (Nijmegen, interview, w). The municipality intends to monitor (Gemeente Nijmegen, 2019) and resources are allocated in the GRP and health-agenda (Gemeente Nijmegen 2016; Gemeente Nijmegen, 2017). Social support is intended (Gemeente Nijmegen, 2019), but it is not clear whether this is achieved.

The indicators show that adaptation is already very much aligned within the municipality. Adaptation is therefore mainstreamed throughout the municipality. It is claimed that it is a task for everyone (Nijmegen, interview, x) and everyone is getting aware of their responsibility for climate adaptation (Nijmegen, interview, y). Additionally, there are people who are working on adaptation, thus it could be said that mainstreaming is achieved through a dedicated approach. It has to be noted that not everyone is aware of his or her responsibility yet even though the boundaries are quite clear (Nijmegen, interview, s). This division of responsibilities and accountability will be further clarified in the implementation-program (Nijmegen, interview, t).

6.10.5 Science-policy interface

Nijmegen collaborates with multiple scientific institutions. There is a centre for sustainability affiliated to the RU, which promotes collaboration between the university and the municipality and align their demands (Nijmegen, interview, z). They also collaborate with other institutions as the HAN, ROC and Tauw. They have a demand for more practical and social knowledge and the respondent intends to clarify this to the boundary organisation (Nijmegen, interview, aa).

6.10.6 Leadership
The respondent indicates that proper communication (Nijmegen, interview, e) and the generation of resources (Nijmegen, interview, k) are his tasks within the municipality. He also decided on a vision regionally (Nijmegen, interview, bb). He additionally mentions that he has an enabling role (Nijmegen, interview, e), fosters interaction and brings people together in meetings (Nijmegen, interview, p) and creates urgency and awareness by promoting the problems (Nijmegen, interview, k). The respondent also mobilises actors (Nijmegen, interview, e).

The municipality sees themselves as a facilitator and connector (Gemeente Nijmegen, 2013). They foster interaction through participation and communication, and will monitor (Gemeente Nijmegen, 2016). They embrace and stimulate initiatives and act as a director to provide guidance (Gemeente Nijmegen, 2017).

Tasks of the leadership functions are thus executed by the municipality and the respondent. The importance of flexibility is mentioned as well (Gemeente Nijmegen, 2013), which indicates that they aim for an adaptive network. Furthermore, a vision will be developed by the region (Nijmegen, interview, bb).

All functions are thus present and executed by different actors. It is interesting that the respondent is a leader within his organisation and the regional process as well.

6.10.7 Selection of policy instruments
The sustainability-agenda indicates that the resources and instruments are not known yet, but that it is intended that they are flexible (Gemeente Nijmegen, 2019). The respondent mentions communication as an important instrument (Nijmegen, interview, cc). Communication is necessary to clarify the accountability (Nijmegen, interview, e). It is additionally mentioned that there is a focus on effectiveness caused by uncertainty and controversy (Nijmegen, interview, dd) and efficiency (Nijmegen, interview, m).

The flexible instruments are required to attribute to flexible efficiency and fairness, and the municipality aims to make their approach tailor-made to deal with spatial diversity (Gemeente Nijmegen 2016). It is furthermore intended to be trustworthy and fair (Gemeente Nijmegen, 2013), which indicates the value of legitimacy and fairness.

It is not indicated if Nijmegen will have a mix of policy instruments. However, it can be said that their instruments will be tailor-made, based on the criteria and characteristics that they believe to be relevant for adaptation governance.

7. ADAPTATION GOVERNANCE IN SMALLER MUNICIPALITIES

This chapter provides the analysis of the results and answers the sub-questions related to the analysis. It first covers the description of the arrangement in smaller municipalities per element (7.1). This is followed by a comparison of the arrangement in smaller municipalities to the suggested design of the arrangement (7.2) and to the arrangement in a larger municipality (7.3). The chapter ends with an overview of the comparisons in table 18.

7.1 Adaptation governance in smaller municipalities

This section provides an answer to the second and third sub-question. It describes *how* the adaptation governance elements are designed in smaller municipalities and *why* they are designed as such. Each element is compared between the municipalities and analysed with the questions from the operationalisation.

7.1.1 Framing

The literature mentioned that there are many different frames, caused by the variety of actors, sectors and systems (Termeer et al., 2017). It might therefore be no surprise that the used frames differ per municipality. However, there are aspects that are observed in general. Adaptation is commonly seen as the adjustments to the impacts of a changing climate. These adjustments are mainly done in the living environment or public space. There are some municipalities who particularly focus on the physical aspects (e.g. Culemborg & Overbetuwe) and there is a general focus on the negative consequences of climate change only, except for Zaltbommel and Culemborg.

Most of the municipalities developed their frames together with politicians (e.g. Buren), other policy-domains (e.g. Neder-Betuwe) or within KAR (e.g. West Betuwe). It is often indicated that 'adaptation' in itself is too vague and that respondents frame it differently to their desire. The official in Buren for example focuses on economic benefits to activate actors. Additionally, the network-group suggested a frame from a 'we'-perspective.

It can be argued that the cases are not very aware of framing. The analysis shows that some cases do not have a definite frame yet (Buren) or that it needs to be revised (Tiel). Some frames are adopted from higher institutional levels or the DPRA (Culemborg) and it is (in)directly indicated by some cases that they do not have a shared frame at all (Lingewaard, Zaltbommel; indirect: Overbetuwe). Lingewaard however, does not think that everyone should have the same frame and accepts the plurality. Additionally, quite some respondents indicated that it was difficult to provide a frame during the interview (e.g. Overbetuwe, interview, c)

7.1.2 Levels at which to act

Half of the municipalities mentioned that the municipality is the level with the highest responsibility for climate adaptation. They have the strongest connection with actors within their borders, such as the citizens (Overbetuwe). It is additionally seen as a matter of public space, which is the responsibility of the municipalities (Buren, Zaltbommel). However, some argue that some matters of governance should be done on the level of KAR, such as the development of a strategy (Buren) or the development of a heat-plan (Lingewaard). It is seen as a topic that requires to be approached regionally and executed locally.

All municipalities see themselves as part of a bigger picture. They value their actions with the regional process in KAR and often with national policies as the DPRA. Their actions are aligned to the regional process by most cases and some cases showed that adaptation is aligned to other transitions (West Betuwe, Neder-Betuwe). The interaction and exchange within KAR is seen as an important added value by most municipalities. It is useful to exchange knowledge and experiences, and the municipalities can align their actions to the regional process. However, most municipalities just use the regional process to align their actions with it and get stimulated by it. They do not aim to stimulate other municipalities within KAR and are mostly just following. Culemborg and Lingewaard are the only two cases that actually stimulate others regionally. West Betuwe tries to do it, but does not do this yet. There is awareness that the municipalities can stimulate other actors within their municipality and they mostly intend to do so.

An exception can be made for Neder-Betuwe, who see themselves as quite autonomous and believe that adaptation is a local matter. They valued their actions compared to the regional process and argue that they are ahead of the region. They do believe that they can stimulate others, but do not have (or make) time to do so, because they believe that adaptation is a local matter and demands their attention locally.

It has to be noted that the rural municipalities sometimes do not believe that they have many impacts from climate change compared (valued) to urban areas. Additionally, aligning to the policies on a national scale was mentioned as an obligatory and extra task and therefore regarded as otiose. Furthermore, too much focus on national policies takes the attention away from what is happening locally. It can therefore be argued that synchronisation is not always beneficial for acts on the level of smaller municipalities.

7.1.3 Timing of the policies

The municipalities are required to bring the long-term consequences of climate change into short-term adaptation strategies and actions. However, only two cases have a strategic vision in which these two terms are combined. One of those visions is expiring soon and it is not expected that they develop a new one. There are three cases who believe that there will be a strategic vision soon, although it is for example not clear if this will be a separate policy or if it will be integrated in the *Omgevingsvisie* (Lingewaard). Most cases however, have a strong focus on the short-term and implementation-programs, and thus do not intend to develop a strategic vision.

Most of the cases mention the importance of a robust water system, but it is not indicated whether robust measures are taken already. Flexibility is also mentioned, in particular for West Betuwe. It is mostly desired in terms of flexible policies that can be altered over time. No-regret measures are therefore desired. Culemborg has also integrated that within their frame with their aim to reduce divestments. Overbetuwe indicated that they have a sit-and-wait-for-the-results-of-the-*stresstest*-approach and thus not focus on robustness or flexibility.

There are differences between the cases in terms of windows of opportunities and momentum. Lingewaard, Culemborg and Neder-Betuwe had clear windows of opportunity because of *scheurvorming* or floods, which were beneficial for the process. These municipalities also have more momentum in terms of political, internal and social support. Other municipalities have less or even no momentum, although it is growing in some cases.

The lack of momentum is mostly due to a lack of awareness. There is no sense of urgency in those cases because there are no incidents (Overbetuwe), because they believe that climate change would not affect their rural municipality (e.g. West Betuwe) or because they are rather used to water-disturbance and floods (Zaltbommel). Additionally, some cases have windows of opportunity, but lacked resources or momentum to use them (Zaltbommel, Tiel, Buren).

7.1.4 Alignment across sectors

All cases at least show the intention to align climate adaptation within their organisation. There is a strong focus on a clear division of responsibilities, integration across sectors and involvement of non-governmental organisations. However, this is only achieved in a few cases yet. They all have a climate coordinator and are internally steered by their deputy, except for Buren, who did not have a deputy at that time. Culemborg and Neder-Betuwe also indicated that they have a flat network structure. The region lacked a climate coordinator in the initial phase, but eventually asked the respondent from the Waterboard in 2018.

Organisation	Present	Intention
A flat network structure in which actors openly cooperate	Culemborg, Neder-Betuwe	
A climate coordinator/manager on a higher level	Buren, Culemborg, Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel	
Internal steering committee at management level	Lingewaard, West Betuwe	
Clear division of responsibilities across sectors	Tiel	Buren, Culemborg, Lingewaard, Neder-Betuwe, Overbetuwe, West Betuwe, Zaltbommel
Integration across sectors to increase co-benefits and cost-effectiveness	Culemborg, Lingewaard, Tiel	Buren, Neder-Betuwe, Overbetuwe, West Betuwe, Zaltbommel
Involvement of private-sector, NGOs, community organisations and	Neder-Betuwe	Buren, Culemborg, Neder-Betuwe, Overbetuwe, Tiel, Zaltbommel

Table 12: Anchoring within the organisation in the cases

The cases show less indicators of alignment within their policies. Only two have an overarching vision addressing adaptation and mitigation, and there are only two who intend to do it. There is less focus on integration on the strategic level. The municipalities that have that focus, integrate(d) it within their *Omgevingsvisie*. The main focus is on integration on the operational and short-term level. Culemborg and Lingewaard already achieved it; the other cases intend to do it. Adaptation is integrated in the GRP's of all cases, except for Buren. It is commonly intended to focus on integration in other, relevant, sector's policies. Lingewaard, Overbetuwe and Tiel are further ahead and already integrated adaptation in their spatial planning policies.

Policies	Present	Intention
Overarching climate vision in which mitigation and adaptation is addressed	Neder-Betuwe, Tiel	Overbetuwe, West Betuwe
Integration of climate strategies on the strategic levels: e.g. long-term visions	Lingewaard, Overbetuwe	Neder-Betuwe, West Betuwe, Zaltbommel
Integrated at the operational level and short-term activities	Culemborg, Lingewaard	Buren, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel
Climate strategies should be integrated in all relevant sectors' policies	Lingewaard, Overbetuwe, Tiel	Buren, Culemborg, West Betuwe, Zaltbommel

Table 13: Anchoring within policies in the cases

The cases aim for anchoring within the implementation and this is achieved for some indicators already. Initial and political support is present or intended in almost every case. External cooperation is present in some cases and intended in others. Only one case has societal support. Other cases intend to achieve it, or mention that it still needs to develop further. Some cases have capacity and resources although it is not enough for some, while others mentioned that they (clearly) lack it. Monitoring is intended by a few cases. It is clearly present in two of them.

Implementation	Present	Intention
Internal support from colleagues	Culemborg, Lingewaard, Neder-Betuwe,	Buren, Overbetuwe, Tiel, West Betuwe
Political support	Culemborg, Lingewaard, Neder-Betuwe, Overbetuwe	Buren, Tiel, West Betuwe
External cooperation with stakeholders (universities, NGOs, etc.)	Culemborg, Overbetuwe, West Betuwe	Lingewaard, Tiel
Societal support	Lingewaard	Buren, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe
Capacity and resources	Buren, Culemborg, Lingewaard, Neder-Betuwe	Overbetuwe, Tiel,
Monitoring of implementation	West Betuwe, Lingewaard	Tiel, Neder-Betuwe, Zaltbommel,

Table 14: Anchoring within the implementation in the cases

It can be said that the cases focus on mainstreaming and that it is mainly seen as a mean to make adaptation easier (e.g. Culemborg, Neder-Betuwe). Lingewaard, West Betuwe and Buren indicate a dedicated approach to achieve mainstreaming. Tiel does not focus on anchoring, but wants to implement adaptation as soon as possible. It was not indicated whether Zaltbommel focusses on dedication or mainstreaming. Most cases do not have a clear formulation of boundaries, responsibilities and accountability yet. It is expected that the implementation-programs and risk-dialogues will clarify this.

7.1.5 Science-policy interface
Culemborg and Zaltbommel have collaborated with scientific institutions and Lingewaard collaborated with a consultancy firm. Culemborg actually had this collaboration within a boundary organisation. Other municipalities do not have this collaboration, because they lack capacity (Buren), do not have the connections (Tiel), have no demand for knowledge (Overbetuwe), or do not believe that it is worth the investment for their rural municipality (West-Betuwe). The analysis indicated that most municipalities do see the added value of a science-policy interface. It is mentioned that this could be done through joint-fact-finding within KAR (Buren) or within a boundary organisation (Tiel).

7.1.6 Leadership
Table 15 provides an overview of the different functions that are executed or intended in each case. It also shows if they are executed/intended by the respondent, the municipality or required from KAR or the deputy. A full overview of the tasks and functions per actor is added in Appendix D. The political-administrative, enabling, dissemination and connective function are present in each case. Buren, West Betuwe and Zaltbommel also indicate that the adaptive function is present in their case.

Function	Respondent	Municipality	Region	Deputy
Political-administrative	Culemborg, Lingewaard, Neder-Betuwe, Tiel, West Betuwe, Zaltbommel	Buren, Culemborg Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel	Buren, Lingewaard, Regional	
Adaptive		Buren, Zaltbommel		
Enabling	Culemborg, Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel	Buren, Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel	Overbetuwe, Tiel, West Betuwe,	
Dissemination	Culemborg, Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel	Buren	Regional	Lingewaard, Neder-Betuwe, Tiel, West Betuwe
Connective	Buren, Culemborg, Lingewaard, Neder-Betuwe, , Tiel, West Betuwe, Zaltbommel	Culemborg, Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, Zaltbommel	Culemborg, Tiel, Regional	

Table 15: Leadership functions and responsible actors

It can be seen that most of the respondents mentioned their dissemination-function, but do not expect this from the municipality. The analysis of Buren did not indicate a lot of tasks and functions for the respondent. Rather, it indicated that some tasks and functions could or should be executed by the municipality or by the region. Other municipalities also expect KAR to be more facilitative, to develop a vision and to connect certain overarching actors.

The regional data that political-administrative, dissemination and connective tasks are executed regionally or intended regionally. It is interesting that the dissemination function was not expected from them by the municipalities. However, the enabling functions is expected, but that one is not indicated during the meetings or the interview. It could be argued though that the meetings themselves were a way of fostering interaction and that the region thus executes enabling tasks.

Leadership is seen as an important aspect of adaptation governance. Some municipalities indicated that they have proper leadership (e.g. Lingewaard, Neder-Betuwe), while others indicated that they miss it locally (Zaltbommel) or regionally (Overbetuwe). It can additionally be said that there was no regional leader in the initial phase, which was problematic for the process at that time.

7.1.7 Selection of policy instruments

Almost every case provided insight in the kind of instruments they want to use, except Buren. Tiel is the only case who does not intend a policy mix. The other cases mostly focus on a combination of communicative and legal instruments. Economic instruments are only indicated by Neder-Betuwe and Lingewaard.

The instruments can be linked to certain criteria and characteristics that are regarded important in the cases. These links are shown in table 16 and table 17. Some criteria and characteristics were observed in the analysis. However, they were not or could not directly be linked to the policy instruments.

Criteria	Linked	Indicated
Effectiveness	Overbetuwe, Regional	Buren, Tiel
Legal certainty	Lingewaard, West Betuwe, Zaltbommel	Buren, Tiel
Flexible efficiency	Regional	Neder-Betuwe, Tiel
Generational fairness	Overbetuwe	
Spatial efficiency	Overbetuwe	Neder-Betuwe, Tiel
Spatial fairness	Overbetuwe	Buren
Output legitimacy	Culemborg, Lingewaard, Tiel, Regional	Buren
Input legitimacy	West Betuwe, Regional	Buren, Culemborg
Accountability	Tiel, West Betuwe, Regional	Buren, Neder-Betuwe

Table 16: Criteria for policy instruments per case

Characteristics	Linked	Indicated
Uncertainty	Culemborg, West Betuwe	Buren
Long-term/short-term		Buren, Lingewaard
Spatial diversity	Regional	Buren, Neder-Betuwe
Controversy		
Social complexity	Regional	Buren

Table 17: Characteristic for policy instruments per case

The link between instruments and criteria and characteristics is stronger in some cases than others. Additionally, some municipalities show that the instruments are locally developed (Lingewaard) or that they will be attuned to local topics and challenges (Overbetuwe). However, it cannot be said that each municipality attunes their instruments to their situation. They use instruments developed in other municipalities or because the instruments are 'forced' nationally. There is thus a mix of instruments, which is assessed on the criteria and characteristics in most cases and regionally. However, it cannot be said that it is tailor-made or not.

7.2 Smaller municipalities compared to the literature

This section compares the suggested design of the elements of the adaptation governance arrangement (section 2.3) with the actual observed design of the elements in the cases. It provides an answer to sub-question four as analyses if the actual observations correspond with the suggested approach. This is done for each element separately. Each section starts with a quick recap of the suggested design. An overview of this can be found in table 18 (page 82).

7.2.1 Framing

Adaptation governance is a relatively young policy domain with a variety of actors, sectors and systems. There therefore are many different perceptions of adaptation. Framing is therefore an important element. It is suggested that the municipalities should prevent bystander-effects, have an inclusive frame and framing, accept ambiguity and leave room for reflexivity, and that frames should not be overwhelming, abstract, one-dimensional or depoliticized (Termeer et al., 2017).

The frame and framing is getting more inclusive, the social domain is less seen as bystanders and framing is therefore getting less one-dimensional. Additionally, there is a regional desire for inclusive framing by using a 'we'-perspective. Most cases are flexible in their frames and attune it to make it less abstract or overwhelming. Quite some cases do not have a shared frame, accept that ambiguity or indicate that their frame needs to be revised or still needs to be collectively decided. It can thus be said that the results for this element resemble the suggested design from the literature. However, it can be argued that the most of the cases are not very aware of the framing process and the importance of this.

7.2.2 Levels at which to act

Municipalities are seen as the level with the most responsibility for climate adaptation (e.g. Mees et al., 2013). However, adaptation governance is so challenging that there needs to be a right balance between the scale of the issue and interventions, and the scale at which it is governed (Termeer et al., 2017). The literature therefore suggest synchronisation. Municipalities should first of all see their actions as part of a bigger picture and align and value their actions with that bigger picture. They should additionally interact and exchange knowledge with other actors and levels, and act to stimulate those (Verkerk et al., 2015).

Four cases indicated that the municipality is the level with the most responsibility, but the region has responsibility too. The cases see themselves as part of bigger picture and they align and value their actions with policies and processes on a larger scale. They also interact and exchange knowledge with other cases, predominantly within KAR. Some cases saw their role to stimulate others in the regional process. However, most cases are just following the regional process and align their actions to what is happening there. They thus do not act to stimulate others. Additionally, Neder-Betuwe believes that they are that much ahead of others and have less intention to stimulate and exchange with other actors.

Synchronisation is present in the cases, although the possibilities and intentions to stimulate others are limited. The municipalities agree they are responsible to execute adaptation measures, but generally require a regional approach for the strategy. The results of this element therefore match the suggested design, although the stimulation of others could be done more in the cases.

It could however be argued that synchronisation is not always beneficial for acts on the level of smaller municipalities, because it could decrease the sense of urgency or momentum. Additionally, one of the precursors in the region shows the least amount of synchronisation. It would therefore not be a necessary approach for a right balance between the scale of the municipalities and larger scales.

7.2.3 Timing of the policies

Municipalities are challenged to bring long-term consequences into short-term strategies and actions. The municipalities should therefore create strategic adaptation visions committed to short-term actions and a framework to guide future actions (Haasnoot et al., 2013). These visions and actions should be both robust and flexible to prevent lock-ins and regrets (Dewulf & Termeer, 2015). Furthermore, they should be aware of windows of opportunity and use this momentum for their benefit (Termeer et al., 2017).

Robustness and flexibility to prevent lock-ins and regrets are noted in the analysis. This is thus similar to the suggestions in the literature. However, not every case has the ambition to develop a strategic vision combining the short- and long-term themselves. This can be explained because they favour short-term actions or are not used to a long-term perspective. Some cases mention that they will use the RAS as their long-term strategy and will only develop a short-term implementation-plan locally.

Additionally, only three cases were able to use windows of opportunities and momentum. Three other cases could not use it due to a lack of resources and/or momentum. It is indicated that the cases still lack a lot of awareness and urgency to use their windows of opportunity or to create momentum.

7.2.4 Alignment across sectors

Attention should be paid to the alignment of climate adaptation across different sectors within the organisation, policies and implementation in the cases (Termeer et al., 2017). This incorporates the clear formulation and possible restructuring of sectoral boundaries to clarify the responsibilities and accountabilities of different sectors (Van Broekhoven et al., 2014). Municipalities could use a dedicated approach or a mainstreaming approach, which should be seen as a mean for proper adaptation governance. Dedication can be used to achieve proper alignment across sectoral boundaries (Rovers et al., 2014).

The cases achieved or at least intend to achieve many of the indicators for anchoring within their organisation and implementation. However, there is less focus on anchoring within policies. They all value integration on the operational level and within sectoral policies, but are less focused on overarching visions and the strategic level. The latter could be attributed to their focus on the short-term. It has to be noted that many of the cases also indicated a lack of resources and capacity and that there was no regional climate coordinator for quite some time.

Mainstreaming is indeed intended and it is often seen as a mean. Some cases use a dedicated approach, but others go directly to mainstreaming, because they do not have the capacity for a dedicated approach. Most cases are still searching in terms of boundaries, responsibilities and

accountability. It is expected that this will be further clarified in the *uitvoeringsprogramma's* and risk-dialogues. The cases thus resemble the suggestions to some extent.

7.2.5 Science-policy interface

A proper science-policy interface is necessary to deal with the knowledge-intensity of adaptation governance. The literature suggests a collaboration between the policy world and scientific institutions to co-produce scientific knowledge (e.g. Termeer et al., 2017). This could be done through joint-fact-finding or in boundary organisations. This knowledge should be based on mutual goals, serving political and scientific interests and the process should be transparent, participative and democratic.

Only three cases actually collaborated with the scientific domain. There is thus less collaboration between the science- and policy-domains than suggested. The cases do see the benefit of such a collaboration, but are not able to collaborate. They lacked capacity or did not have the connections. There is no proper cooperation between the two worlds in general, but this could be achieved in the future within KAR or a boundary organisation.

7.2.6 Leadership

Proper leadership is necessary in the adaptation governance arrangement (e.g. Termeer et al., 2017). Meijerink and Stiller (2013) distinguished five different functions (political-administrative, adaptive, enabling, dissemination and connective) which need to be executed. They have listed different tasks for each function. The functions should be executed by different actors on different scales.

The analysis shows that the political-administrative, enabling, dissemination and connective function are executed or intended in each case. Only two cases indicated that the adaptive function is present. The different functions and correlated tasks are attributed to and intended by different actors, the respondent, the municipal organisation, KAR and the responsible deputy. It can also be said that actions differ across scales. Some respondents for example mentioned that they believe that the region should bring regional actors (GGD, *Veiligheidsregio*) together. It can therefore be said that the cases resemble the suggested approach to leadership, except for the adaptive function, which is only observed in two cases.

7.2.7 Selection of policy instruments

Municipalities should use a mix of policy-instruments to influence the behaviour of actors in the desired direction. These instruments should be attuned to their own situation. They should not adapt certain instruments because it worked in other cases (Termeer et al., 2017). Additionally, the instruments should be chosen based on their ability to deal with a challenging characteristic of adaptation governance, assessed on the performance criteria and their ability to attribute to a certain desired outcome (Mees et al., 2014).

It can be said that the cases focus on a mix of policy instruments, which is in line with the suggested approach. The instruments are assessed on their performance on certain criteria and the extent to which they deal with certain characteristics for most cases and from a regional perspective. However, the data does not offer enough insight to make a valid claim whether these instruments are tailor-made.

7.3 Smaller municipalities compared to a large municipality

The results of the cases are compared to a large municipality (Nijmegen) as well. This provides insight in how the elements are designed in the smaller municipalities compared to a large one. Therefore, it answers the fifth sub-question. It has to be noted that the aim of this comparison is not to make valid statements about the differences between smaller and large municipalities. Rather, it aims to give a first impression of possible differences between smaller and large municipalities in terms of adaptation governance. An overview of the comparison is presented in table 18 (page 82).

7.3.1 Framing

Nijmegen's frame also developed themselves from a water-perspective to a broader perspective and they focus on negative consequences too. Their frame is developed based on multiple definitions and will be attuned to the situation in terms of concreteness. Framing is thus designed similarly in the small cases and the reference case.

7.3.2 Levels at which to act

It was not indicated if Nijmegen believes that they are the right level to act or not. They see their actions as part of a bigger picture and predominantly value their actions with other municipalities or want to align them with other transitions. Interaction and exchange is seen as crucial to share and gain knowledge and to stimulate others. They have a strong focus on that last aspect. It might be said that this element is quite comparable. However, Nijmegen not only has a stronger awareness of their role to stimulate others actors within and outside their region, they also fulfil this role.

7.3.3 Timing of policies

The timing of the policies in Nijmegen shows more similarities with the suggestions derived from the literature. Nijmegen mentions robustness and flexibility, similar as the cases. However, they have a stronger integration of the long- and short-term in their policies, which lacked in quite some of the smaller cases. Additionally, they had windows of opportunity, were better able to use them, and have more momentum.

7.3.4 Alignment across sectors

Adaptation is 'better' aligned across sectors in Nijmegen. Many indicators of alignment within the organisation and implementation are present in Nijmegen, instead of mostly intended as it is in the smaller cases. Nijmegen also aligned it further within their policies, with an overarching vision and integration on the strategic level and across sectors. Nijmegen therefore focus on mainstreaming, which is done through a dedicated approach. It is not clear whether it is seen as a mean or an end. The boundaries in Nijmegen are clear. Responsibilities and accountability will also be further clarified in the implementation-program.

7.3.5 Science-policy interface

There is a boundary organisation in Nijmegen in which collaboration between the university and the municipality of Nijmegen is stimulated and better aligned. Nijmegen has a demand for a specific kind of knowledge and is able to clarify this. The science-policy interface is therefore a lot different in Nijmegen than in the smaller cases and it shows more resemblance with the suggestions in the literature.

7.3.6 Leadership

There is no big difference in terms of leadership functions, except that the adaptive function is indicated in Nijmegen. The functions are thus quite similar between the smaller cases and the reference case. It is interesting that the respondent has a leadership function in the regional process as well. Especially because KAR lacked such regional leadership because it was not or could not be executed by the smaller municipalities.

7.3.7 Selection of policy-instruments

Almost all smaller cases intend to have a mix of policy-instruments, whereas this is not indicated for Nijmegen. However, it is indicated that the instruments for Nijmegen will be flexible and there is a direct link with criteria and characteristics. It can thus be expected that their instruments are further tailor-made than they are in the smaller cases.

The table below provides an overview of the suggested approach derived from the literature, the observed arrangement in the smaller cases, and the arrangement in the reference case.

Element	Suggested approach*	Smaller cases	Reference case
Framing	• Prevent bystander-effects • Inclusive framing • Accept ambiguity and leave room for reflexivity • Frames should not be (too) overwhelming, abstract, one-dimensional or depoliticized	• Less bystanders • Frame and framing is getting more inclusive • Ambiguity is accepted • Frame attuned to the situation to make it more specific • Unawareness on framing	• Less bystanders • Frame and framing is getting more inclusive • Ambiguity is accepted • Frame attuned to the situation to make it more specific
Levels at which to act	• Municipality is the responsible level to act • Alignment and valuing of own actions with other actors' actions over scale and time • Interaction/exchange of knowledge, ambitions and insights with other actors • Action should be taken which can stimulate other actors	• Municipality seen as the responsible level, but responsibility for the region too • Synchronisation is visible, although it can be doubted whether it is beneficial • Less focus on stimulation	• No indication of municipality as the responsible level • Synchronisation, interaction, exchange and stimulation is visible
Timing of the policies	• Have a strategic vision encompassing short-term action and long-term strategies • Prevent lock-ins and regrets through robust or flexible visions/measures • Make use of the momentum/windows of opportunity in possible times of crises	• Focus on short-term implementation and less on long-term strategies • Less windows of opportunity and not everyone can use it • Little momentum	• Combining long- and short-term • Use windows of opportunity and momentum.

Element	Suggested approach*	Smaller cases	Reference case
Alignment across sectors	• Mainstreaming of adaptation throughout the organisation, policies and implementation • A dedicated approach could be used to achieve mainstreaming • Integration as a dynamic process to achieve adaptation • Clear formulation of boundaries, responsibilities and accountability	• Indicators are intended, although less focus on policies • Mainstreaming, sometimes through a dedicated approach • Division needs more attention • No regional coordinator and lack of capacity and resources	• Alignment in all three aspects • Mainstreaming through dedicated approach • Division needs more attention
Science-policy interface	• Co-producing scientific knowledge through joint fact-finding, perhaps in boundary organisations • Knowledge based on mutually shared goals and demands • Transparent, participative and democratic processes • Serving both scientific and political interest	• Only a few cases collaborate with the science domain • Others have no connections, no capacity, currently no demand, or do not want to invest • Seen as an added value though	• Strong collaboration in a boundary organisation • Wishes are clarified
Leadership	• 5 different forms of leadership: political-administrative, adaptive, enabling, connective and dissemination with different tasks • Municipalities should carry out these roles or stimulate others to carry out these roles	• All functions are indicated, adaptive to a lesser extent • Different functions for different actors • Lack of regional leadership in the initial phase	• All functions are indicated • Different functions on different scales • Different functions for different actors • Respondent is a leader within the region too
Selection of policy instruments	• There should be a tailor-made mix of instruments for a specific context of a specific adaptation issue/measure. • The value certain instruments have for the ten criteria • The value certain instruments can have for certain actions • The characteristic challenges of adaptation governance in certain actions	• Mix of instruments • (Possible) Links between instruments and criteria and/or characteristics • Not generally indicated that instruments will be tailor-made	• No indication of a mix • Links between instruments and criteria • Indication that the instruments will be tailor-made.

Table 18: Summary of results

*= as suggested in the literature

8. SUMMARY, DISCUSSION AND RECOMMENDATIONS

This chapter offers a summary of the results of this research to answer the main-question, followed by a discussion of the findings in a broader perspective of the literature and other external factors. The chapter ends with recommendations for the municipalities, regional collaborations and for further research.

8.1 Summary

The aim of this research was to provide an overview of adaptation governance in smaller municipalities. Chapter 6 offers an elaborate overview per case. The generalised overview for the smaller municipalities can be found in section 7.1. This is compared to the literature in section 7.2, and the reference case in 7.3, which is then summarised in table 18. All of this leads to an answer to the main-question: *how do smaller municipalities arrange climate adaptation governance compared to the literature on the design of this arrangement?*

The smaller municipalities design the element of framing in a comparable way to the suggestions in the literature and to the design in the reference case. However, the cases were not very aware of the necessity of framing. Smaller municipalities focus less on stimulation and the analysis indicates that synchronisation might not always be beneficial. The element of the levels at which to act is therefore designed differently. Smaller municipalities designed the timing of the policies differently; they focus more on short-term implementation, do not have windows of opportunity or cannot use those, and there is little momentum. Adaptation is aligned within the organisations and implementation of the smaller municipalities. Although there is a lack of resources and capacity in general. The smaller cases focus less on alignment within their policies however, and the formulation of boundaries, responsibilities and accountability needs more attention. There is a lack of resources and capacity in general and there was no regional climate coordinator for a long time in the initial phase. The smaller cases generally do not collaborate with the scientific domain, but see the possible benefit of this. All leadership functions are present, although the adaptive function to lesser extent. It is indicated that the smaller municipalities could not function as a leader within KAR, whereas the reference case could act as a leader in their region. Most of the smaller cases indicate a mix of policy instruments. The instruments can be linked to the criteria and characteristics in general, but it cannot be stated that all instruments will be tailor-made. Hence, there are some differences between the observed design in the cases and the suggestions derived from the literature. It has to be noted that there were differences between the cases as well.

An overview of the summary is already presented in table 18.

8.2 Discussion

By now, this research has answered the first five sub-questions and provided an answer to the main-question. However, there are still some sub-questions left unanswered. This discussion therefore aims to explain *why* the approach in the smaller municipalities differs from the suggested approach (sub-question 6) and *if* the suggested designs of the elements are applicable in the smaller municipalities (sub-question 7).

The aforementioned differences between the cases and the suggested design can be attributed to three general aspects: the short-term focus of smaller municipalities, an unprepared municipal organisation, and a lack of awareness and momentum.

8.2.1 Short-term focus

Smaller municipalities are first of all oriented on the short-term. There are cases who also focused on the long-term, but the short-term perspective gained more attention. Smaller and particular rural municipalities are not used to strategic thinking (Buren, interview, a), and there was a case whose scope was oriented on the next five to ten years (Zaltbommel, interview, i). Additionally, it is argued that smaller municipalities do not attribute a lot of value to visions and policies, but favour actual actions and implementation on the short-term. They focus less on the strategic level and it would be challenging to change that (Waterboard, interview, i). This short-term approach is not beneficial for the momentum and makes it hard to translate long-term consequences into short-term actions. It therefore explains the difference with the timing of the policies.

It could also be argued that this short-term focus is the cause why the smaller cases do not have a strategic and overarching vision and focus less on alignment within their policies. However, it is more likely that it is due to the DPRA and the *omgevingsvisie.* The DPRA prescribes that the regions should develop a regional strategy (RAS) (Ministerie van I&W, 2018). The *omgevingsvisie* is an encompassing strategy in which multiple aspects, possibly including adaptation, will be strategically integrated (Van Eijk & Swenne, 2019). Some of the cases indicated that they see the development of a strategy as a regional task (Buren, interview, n) or that they will use the RAS as a foundation for their local implementation-program (Tiel, interview, h). Others have indicated that they do not expect that they will develop a new strategy, but that it will be part of the *omgevingsvisie* (Lingewaard, interview, h). It is thus not necessary for the cases to develop a separate strategy themselves, because this will be done regionally and/or a local one can be integrated within the *omgevingsvisie.*

8.2.2 Unprepared organisation

Second, the municipal organisations of the smaller municipalities are not sufficiently prepared to work on adaptation. They show a general lack of capacity and resources, some more than others do. The unpreparedness of the municipal organisations is also indicated by the lack of a clear formulation of boundaries, responsibilities and accountability, which was present in seven out of eight cases.

A lack of resources and capacity explains why the smaller municipalities are not able to stimulate others, hence explains why they design the 'level at which to act' differently (Overbetuwe, interview, k; Zaltbommel; f). It also explains why they give less priority to adaptation governance (Tiel, interview, n) and why they cannot use windows of opportunity (Tiel, interview, i). It thus affects the timing of the policies. Additionally, the smaller cases could not collaborate with the scientific institutions because they lacked capacity, among other things (Waterboard, interview, n; Buren, interview, r) and the lack explains why there was no

regional climate coordinator and a lack of leadership (Waterboard, interview, g; Zaltbommel, interview, cc). At last, the lack of a clear division of boundaries, responsibilities and accountability influenced the embracement of adaptation (Zaltbommel, interview, cc) and might trouble the implementation (Van Broekhoven et al., 2014).

Expectation
Generating resources is one of the tasks of the political-administrative function (Meijerink & Stiller, 2013). This task was executed in Lingewaard, Neder-Betuwe and Culemborg, who have more capacity and resources than the other cases as well. The respondents in Tiel and Zaltbommel mentioned that it is an important task for them in the future. Additionally, a proper division is seen as crucial for the adaptation process (West Betuwe, interview, s). Many municipalities indicate that the boundaries, responsibilities and accountability will be clarified in the risk-dialogues or the implementation-programs. It could thus be expected that the municipal organisations will be better prepared in the near future.

8.2.3 Lack of momentum
The smaller cases are generally less aware of the consequences of climate change for their municipality. Politicians are not aware that climate change is an issue in their municipality (Buren, interview, j), people are not aware that rural municipalities will be affected as well (West Betuwe, interview, u) or do not believe that the consequences are that problematic (Zaltbommel, interview, m), or the municipality lacks incidents (Overbetuwe, interview, k). Some cases did have some incidents but were not able to use those windows of opportunity (e.g. Tiel, Buren). There is thus not enough social, political and internal attention and pressure for adaptation governance in the smaller cases. They therefore lack momentum, which makes it more difficult to time the actions and policies. Additionally, there are not enough windows of opportunity or momentum to create support. This is problematic for the alignment within the organisation as well. The lack of momentum was not or less present in Lingewaard, Neder-Betuwe and Culemborg.

Expectation
Creating urgency, spreading awareness and ideas, mobilising actors and promoting problems are all tasks of different leadership functions. The analysis shows that multiple cases have the intention to execute these tasks. Cases in which momentum is already present, but other cases as Overbetuwe, Tiel and Zaltbommel as well. It is therefore suspected that the lack of momentum will be less in the future.

8.2.4 Interrelations
It can be noted that the aforementioned reasons are interrelated. First of all, adaptation governance only makes sense in regard to the long-term impacts of it (Termeer et al., 2017). However, one would not be aware of those long-term impacts, if the focus would be on the short-term. The lack of awareness and momentum could therefore be a result of the short-term focus. It can also be turned around: there is not enough momentum because of awareness or a lack of windows of opportunity yet. The smaller municipalities are then less aware that they need to start preparing themselves for long-term challenges. Secondly, it is argued that a lack of resources and capacity is related to a lack of priority and momentum (Waterboard, interview, k). The lack of resources and capacity could therefore be a result of a lack of momentum. Although, it could also be the other way around: there is a lack of resources and capacity in general, which forces a municipality to prioritise certain challenges. This happened in Tiel where more urgent and short-term challenges were favoured over adaptation governance (Tiel, interview, j).

8.3 Recommendations

This section provides the recommendations based on the findings. The recommendations for the municipalities are based on the findings in the smaller cases and the studied region and directed at those institutions. They therefore do not necessarily apply to all (smaller) municipalities in the Netherlands. Additionally, there are recommendations towards KAR and the regional actors, and the scientific domain, which respectively answer sub-question eight and nine.

8.3.1 Municipalities

The three aforementioned characteristics of smaller municipalities have a negative influence on some of the elements and hinder the adaptation governance. Smaller municipalities hence face three challenges: they should *pay attention to a long-term perspective* (1), *prepare their organisation* (2), and *create more awareness and momentum* (3). It can be recommended that the smaller municipalities focus on three aspects to deal with these challenges: *leadership* (a), *framing* (b) and *the development of their organisation* (c). These recommendations can be applied to deal with the three challenges in the smaller municipalities, but also deal with the general barriers of adaptation governance (table 19)[13].

Type of barrier	Description	Present in phase
Technological	The (lack of) technologies that are necessary to deal with the consequences of climate change (Uitenbroek et al., 2013).	Planning
Financial	The (lack of) resources that are necessary for addressing adaptation and implementing measures. Both in terms of money and work force (Uitenbroek et al., 2013).	Planning, Managing
Informational/ cognitive	The lack of knowledge and understanding of climate change, influenced by the uncertainty and complexity of it (Uitenbroek et al., 2013).	Understanding
Social/cultural	Barriers related to differences in worldviews, values and beliefs of individuals or groups (Uitenbroek et al., 2013)	Understanding
Organisational/ institutional	Barriers related to insufficient governance, such as incompetent leadership, lack of political support, no public pressure, other objectives, fragmentation, lack of coordination and insufficient organisational cultures (Uitenbroek et al., 2013). Also related to an undefined role for local authorities and a lack of political commitment (Uitenbroek et al., 2014).	Understanding, Planning, Managing

Table 19: Different barriers at different phases of adaptation (Moser and Ekstrom, 2010; Uitenbroek et al., 2013)

Leadership

Proper leadership in general is beneficial to overcome organisational barriers (Uitenbroek et al., 2013). Specific tasks of leadership deal with informational, social and financial barriers. There are specific tasks of leadership that are beneficial for the three challenges. Leadership should be used to create momentum, promote the long-term perspective and further prepare the organisations. It is recommended that the municipalities and respondents focus on generating resources, creating urgency, spreading ideas, promoting problems, mobilising actors and moving to action. These tasks are already executed in some municipalities, intended by others, but not mentioned by all. It is recommended that the smaller municipalities execute them or that they make sure that another actor executes those (Meijerink & Stiller, 2013).

---

[13] The recommendations are not one-to-one applicable on the challanges. E.g.: recommendation 'A' does not only apply on challenge '1', but does deal with all three challenges. The same goes for the other recommendations and challenges.

Framing

It is observed that most of the cases are not very aware of their frame and the framing process (e.g. see 7.1). However, it is argued that framing has a major influence on adaptation governance (Dewulf, 2013), the levels at which to act, the involvement of actors and their responsibilities and accountability (Termeer et al., 2017). Framing could also lead to less different perceptions of the urgency, risks and impacts of climate change (Termeer et al., 2017). Framing is thus beneficial to overcome informational and social/cultural barriers (Uitenbroek et al., 2013) and for the alignment across sectors for the organisation and the implementation (Den Exter et al., 2015). Framing would thus be beneficial of boundaries, hence for the development of the organisation and it stimulates awareness and momentum. Hence, it is recommended that the smaller municipalities focus more on framing, if they are not already doing this.

Develop the organisation

The organisations of smaller municipalities are unprepared for adaptation governance in general (see 8.2). It is therefore recommended that they actively work on the development of their organisation. They need to discuss and formulate boundaries, responsibilities and accountabilities of different sectors and actors, especially within their organisation. Additionally, they need to allocate resources to adaptation governance. It would deal with financial and organisational barriers (Uitenbroek et al., 2013).

Stating the obvious?

Smaller municipalities intend and expect that framing and the development of their organisation takes places during the risk-dialogues and implementation-program (e.g. Lingewaard, interview, n; Zaltbommel, interview, p). It might therefore seem that my recommendations to focus on framing and develop the municipal organisation are obvious statements. However, the risk-dialogues and the implementation-program emerge relatively late in the planning process in terms of the phases distinguished by Moser and Ekstrom (2010) (figure 14).
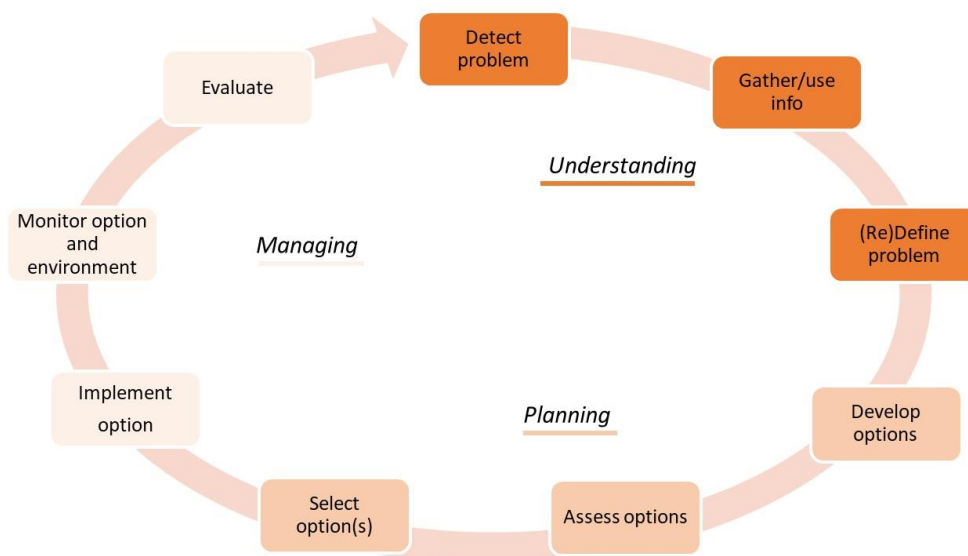

Figure 14: The phases and sub-processes of adaptation governance (Moser & Ekstrom, 2010, p. 22027)

Risk-dialogues focus on awareness, are used to develop and select measures (Ministerie van I&W, 2018) and will be used for framing by (some) municipalities. It takes place in the second phase (planning) whereas the (re)defining - framing – of the problem should be part of the understanding-phase. The implementation-program, resulting from the risk-dialogues, formulates the boundaries, responsibilities and accountabilities and allocates resources. It would deal with organisational and financial barriers. However, this is only done for the actual implementation, thus the managing phase. This causes a lack of a frame during the first phase and a lack of (allocated) resources and the formulation of responsibilities during the first two phases of planning. However, those aspects would be beneficial to overcome barriers during those phases. It can therefore be recommended that the smaller municipalities explicitly focus on these aspects in the early phases of adaptation governance, at least internally, and do not wait for the risk-dialogues and implementation-program. These recommendations are therefore not just obvious statements.

8.3.2 Regions

Some aspects could not be executed by the smaller municipalities themselves and it is not expected that the smaller municipalities will execute those in the future even though it would be beneficial for a proper adaptation governance arrangement. The smaller municipalities for example did not have the connections to develop a science-policy interface. It can therefore be recommended that they look for options to collaborate with the science domain from the regional perspective. This makes it easier for the (smaller) municipalities to collaborate with that domain and it would involve multiple municipalities at once. It is expected that the latter makes the science-policy interface more participative and democratic (Boezeman, et al., 2013). The scientific process could become more politicised as a result. The region should therefore try to stay in the middle of the interests from both sides to prevent the politicisation of science (Guston, 2001). Smaller municipalities additionally pay less attention to policies and vision and do not have the intention to develop a local strategic vision. The region therefore should have a political-administrative function and develop the collaborative strategy.

The regional actors in KAR (e.g. Waterboard, province) are expected to be more supportive in terms of knowledge-development (West Betuwe, interview, aa), could be a bit more directory in the development of a heat-plan (Lingewaard, interview, c), could function more as an overarching and steering leader (Overbetuwe, interview, x) and are required to connect regional players as the GGD and *Veiligheidsregio* (Culemborg, interview, aa).

8.3.3 Science

There are elements that should be further analysed on the level of the smaller municipalities. Synchronisation is suggested to find a better balance between the municipalities and regional and national policies and processes (Termeer et al., 2017; Verkerk et al., 2015). However, the results show that synchronisation is less beneficial to find a balance between the scale of the municipalities and the national and regional scale than suggested. Rural municipalities first of all do not believe that they have many impacts from climate change compared (valued) to urban areas. Additionally, aligning to the policies on a national scale was mentioned as an obligatory and extra task and therefore not embraced within municipal organisations. Too much focus on national policies would furthermore take the attention away from what is happening locally. Moreover, one of the precursors in the region shows the least amount of synchronisation; they mentioned that they are quite autonomous and generally focus on the local scale. Therefore, it can be argued that synchronisation is not always beneficial for adaptation governance on the level of smaller municipalities. It would thus be interesting to analyse the necessity and possible disadvantages of synchronisation.

9. CONCLUDING REMARKS

This research aimed to compare the adaptation governance arrangement in smaller municipalities to the suggested arrangement derived from the literature. It has to be noted that there were differences between the cases. However, enough aspects were similar, which showed interesting differences between the suggested design of the elements and the observed design of them in the smaller cases.

Some of these differences need to be tackled by the smaller municipalities. Those municipalities are challenged to pay more attention to the long-term perspective (1), develop their organisation (2), and create more awareness and momentum (3). It is recommended to pay attention to the elements of leadership and framing, and to develop the organisation before they proceed with the risk-dialogues and the development of implementation-programs.

Some differences need to be tackled within the region, such as the science-policy interface and the development of a shared strategy. The regional actors within KAR specifically have to think about their role in terms of knowledge-development, a heat-plan, their role as a regional leader and their ability to approach large regional actors. Other differences need more attention from the scientific perspective, such as the negative consequences of synchronisation and the necessity of it.

I am aware that this research is not flawless and that the theoretical and methodological decisions have their limitations for the credibility and outcomes of this research. Adaptation governance for example gains that much attention that some of the observations are not representative for the adaptation governance in the smaller municipalities anymore. The flaws and limitations are further discussed in the reflection.

The flaws and limitations of this research offer opportunities for further research. It would be interesting to analyse adaptation governance in a large amount of small municipalities, to develop a broader comparison with large municipalities or to repeat this research in a later phase. It could even be said that the same research could be repeated on a short notice, because of the rapid changing character of adaptation.

The smaller municipalities were still in the early stages of the planning process at the time of the research. They detected the problem and gathered info with the *stresstest* at that time. They are now set to use that info, define their strategy and then further plan and manage the adaptation process. Some of these steps have already been taken currently. I genuinely hope that the results and recommendations of this thesis help them during these further steps and that they are able to develop a climate adaptive municipality.

10. REFLECTION

This chapter provides the reflection of this research. It first of all gives a reflection on the research-aims, the extent to which they are fulfilled and the usability of the research-questions. Additionally, the theoretical and methodological framework are discussed to analyse whether they provided a proper framework for this research and to discuss their limitations. At last, I will reflect on the process of this research.

10.1 Research-questions and –aims

The primary aim of this research was to provide (one of) the first systematic overview(s) of adaptation governance in smaller municipalities to gain insight in that process at that specific level. The research additionally intended to offer recommendations for the policy- and scientific world with the ultimate aim to improve the adaptation governance in the cases and contribute to a climate-adaptive society. Multiple sub-questions and one main research-question have been formulated to structure this research and to achieve the goals. The main research-question was: *how do smaller municipalities arrange climate adaptation governance compared to the literature on the design of this arrangement.*

It can be said that the primary aim of this research is achieved. An overview of adaptation governance is provided for each municipality in chapter 6, followed by a general overview on adaptation governance in the smaller municipalities in chapter 7. Answering the main question lead to the systematic overview. That answer was in turn a result of answers to the first five sub-questions. Other sub-questions were beneficial for the discussion and recommendations. The sub-questions were not only beneficial for the findings in this thesis, but also helped to structure the content of it.

10.2 Theoretical framework

The theoretical framework provided the academic backbone of this thesis. It predominantly exists out of a description of the seven elements of the adaptation governance arrangement (Termeer et al., 2017) and the suggested approach for each element derived from the literature. The framework provided a structured approach to the data collection and the analysis of it. It was clear for each element what it meant, what needed to be analysed and what was suggested based on the literature. However, some aspects could have been better.

I had quite a struggle to decide on which theories to use for the policy-instruments. It could have been narrowed down to specific and suggested instruments (e.g. Van der Heijden, 2014), or could have focussed on the suggestions of Termeer et al. (2014) to have multiple modes of governance, a mix of instrument and to activate citizens. However, I have chosen the approach of Mees et al. (2014) and focused on the rationales behind certain instruments. That theory would provide the most information on *why* the municipalities would choose certain instruments and therefore *why* the element was designed as such. It therefore seemed most appropriate to answer sub-question 3. However, it turned out that the municipalities were not paying a lot of attention to their instruments yet and did not have an understanding about the rationales yet. Mees et al's. approach would therefore be more appropriate in a later phase of the process. The suggestions of Termeer et al. (2017) would have been better suited to analyse that element during the current phase.

The frames of the municipalities are analysed in terms of their inclusiveness, among other things. This is valued in relation to the frame of adaptation of this research. However, the research' frame of adaptation in itself is a result of framing too. In hindsight, it could be said that *puzzling* and *powering* took place; multiple definitions were taken into account, I did not necessarily choose the common used definition and the used definition is a bit altered to my own preferences. However, I was not very aware of this process of framing at that time. It would have been more appropriate if attention were paid to framing during the development of my own frame.

At last, the theoretical framework presented the different phases and barriers of adaptation governance. This initially merely served as a background for adaptation governance. However, chapter 8 showed that these topics were beneficial to offer recommendations towards the municipalities. It would have therefore been interesting to further integrate these topics throughout the research.

10.3 Methods

This research had a qualitative approach in which abduction was used to analyse adaptation governance in the smaller municipalities from a subjectivist, postmodernist perspective. It is a cross-sectional research using case studies. The data is collected through a literature-study, a policy-study, interviews and observations. I believe that this approach was the most appropriate for this research and was beneficial for the research-aims. The postmodernist stance for example made it easier to be neutral and objective during the interviews, and the qualitative case studies were beneficial to gain a first and deep understanding of the smaller municipalities.

The smaller cases were still in the early phases of the planning process. It is expected that multiple elements will develop over time, but these changes cannot be analysed because of the cross-sectional approach. Adaptation is such a hot topic that a lot has changed in the smaller municipalities between the time of the research and the completion of this thesis. A check-up with the respondents showed that adaptation is further aligned within their organisations and that some of the analysed policies are overruled by newer ones. The cross-sectional approach hence caused more restrictions than initially expected. It has to be admitted that a part of the results is not representative for the research-cases anymore and already needs to be updated. A longitudinal research would have been more appropriate –as expected. However, this was not possible due to the time frame of this research and thesis.

It was intended that the policy-analysis provided insight in the integration of adaptation across sectors. However, the policies often dated from earlier years when adaptation was not a big deal yet. It could therefore be the case that adaptation was not included within a sectoral policy, but is integrated within a sector nowadays. Additionally, some of the policies have been overruled by new policies during the finalisation of the thesis. The policy-study therefore offered less insight in the integration across sectors than expected and it focussed on policies that were not prevailing anymore during the finalisation phase of this thesis. This limitation was not expected beforehand. However, I do not believe that there would have been a different approach for the policy-analysis that would have dealt with these issues.

The methodology caused other inevitable – and expected - limitations for this research. It is impossible to make valid claims about adaptation governance for all (smaller) Dutch municipalities, because of the low external validity of qualitative research. The research did provide a first impression of the differences between smaller and larger municipalities. However, the aim of this research was not to highlight these differences and the methodology did not allow for valid claims about the differences. Nevertheless, there are interesting observations that could be the starting point for new research. It was for example mentioned by a smaller municipality that they have less bureaucracy than a large municipality (Neder-Betuwe, interview, ee), whereas the large municipality argued exactly the opposite (Nijmegen, interview, ff).

The limitations of this research provide opportunities for further research. The same research could be done on a short notice because of the rapid changes in adaptation governance now. Further research could focus on a quantitative approach in which a greater amount of cases is analysed, which are even more similar. Additionally, this same research could be done in a later phase of the planning process or a research could explicitly focus on the differences between small and large municipalities.

10.4 Process

The first step of the process was to find a topic that suited my interests, which also suited the interests of my internship. This was easily translated into a proposal that offered relevance for both the scientific and the policy domain. The first phase of the research process then covered the further elaboration of the theoretical framework, methodological approaches and decisions on the collection and analysis of the data. It was decided that the initial selection of 17 cases was excessively broad and that a fair share of these cases were influenced by a large municipality. Nine case were left of which one of them could not be analysed due to external circumstances. The latter might have been prevented if the respondents were contacted earlier. However, I do believe that it still would have been very hard to arrange an interview with that municipality due to the circumstances.

The collection of the data went smoothly, just as the analysis, interpretation and comparison of it. Most of the policies were available online or were sent to me by the municipalities themselves. It was quite easy to arrange the other eight interviews and the two observations. I believe that my internship-placement was very beneficial for the data-collection. The Waterboard already had the necessary contacts with the municipalities. The respondents could therefore be easily approached and the observations during the two meetings were no problem at all. The theoretical and methodological framework provided a structured foundation to collect, analyse and compare the data, which was used to formulate the results. The research-aims and –questions provided the structure for the further discussion on the findings. These findings were also presented and discussed with colleagues from the Waterboard and some respondents during a presentation. This gave me new insights in the results and the interpretation of it.

One of the biggest flaws is that I have not properly explained what would happen with the recordings of the interviews to the respondents. This caused some uncertainty and displeasure once I asked the respondents for their feedback. We decided that the transcripts and passages of it would not become part of this thesis itself and will only be available for the grading of this thesis. I believe that this could have been tackled initially, but that we have found a proper solution eventually.

Adaptation was -and still is- a topic that speaks to me and I am still intrigued by the differences between municipalities. Additionally, it was stressed by multiple colleagues and the respondents that climate-adaptation is a topic that requires a lot of attention and insights. The societal relevance of this thesis was therefore indicated on multiple occasions. This motivated me to work on this research, but I believe that it also made the respondents and my colleagues keen to help me during the process.

The process of this thesis therefore actually went very smooth. This is quite surprisingly if compared to the process of my bachelor-thesis. Motivational issues and a lack of self-discipline were at the order of the day back then and slowed the process down (Van Sittert, 2018). These issues were not at all present during this thesis, luckily. The self-discipline was particularly necessary during this thesis, because the supervision from the university was lacking due to limited time of the assigned professor.

REFERENCES

Adger, W. N., Agrawala, S., Mirza, M. M. Q., Conde, C., o'Brien, K., Pulhin, J., ... & Takahashi, K. (2007). Assessment of adaptation practices, options, constraints and capacity. *Climate change*, *200*.

Antea Group (2016). GRP Lingewaard 2017-2021: Hoofdrapport.

Brons + Partners & SAB Arnhem (2009) Landschapsontwikkelingsplan Neder-Betuwe: Deel 2 - Landschapsontwikkelingsvisie.

BügelHajema (2012). Structuurvisie Buitengebied.

Bulkeley, H. (2013). *Cities and Climate Change*. Oxon/New York: Routledge.

Burkas, V., & Sallnäs, O. (2012). Forest management plan as a policy instrument: carrot, stick or sermon? *Land Use Policy*, *29*(3), 605-613.

Buro SRO Arnhem (2018). Structuurvisie Neder-Betuwe 2018.

CDA, Gemeentebelangen Overbetuwe & VVD (2018). Overbetuwe in bloei: Een dijk van een gemeente.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into practice*, *39*(3), 124-130.

Creswell, J. W., & Poth, C. N. (2017). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

Den Exter, R., Lenhart, J., & Kern, K. (2015). Governing climate change in Dutch cities: anchoring local climate strategies in organisation, policy and practical implementation. *Local Environment*, *20*(9), 1062-1080.

Dewulf, A. (2013). Contrasting frames in policy debates on climate change adaptation. *Wiley Interdisciplinary Reviews: Climate Change*, *4*(4), 321-330.

Dewulf, A., & Termeer, C. (2015). Governing the future? The potential of adaptive delta management to contribute to governance capabilities for dealing with the wicked problem of climate change adaptation. *Journal of Water and Climate Change*, *6*(4), 759-771.

Dorpsbelangen West Betuwe, SGP, Christenunie & Leefbaar Lokaal Belang West Betuwe (2019). Samen Bouwen: Coalitieakkoord 2019-2022.

Dupuis, J., & Biesbroek, R. (2013). Comparing apples and oranges: The dependent variable problem in comparing and evaluating climate change adaptation policies. *Global Environmental Change*, *23*(6), 1476-1487.

Easterby-Smith, M., Thorpe, R., & Jackson, P. R. (2012). *Management research*. Sage.

Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. Journal of public administration research and theory, 22(1), 1-29.

Gemeente Buren (2012). Landschapsontiwkkelinsgplan Buren: Versterk de variatie en verstevig de banden.

Gemeente Buren (2017). Nota gezondheidsbeleid gemeente Buren 2017-2020

Gemeente Buren (2018) (a). Startnotitie Klimaatvisie Gemeente Buren

Gemeentebelangen Buren, VVD & PvdA (2018). Coalitieakkoord 2018-2022: Samen, proactief en kerngericht!

Gemeente Culemborg (n.d.) [powerpoint]. Presentatie aanpak riolering, water en klimaat

Gemeente Culemborg (2010). Structuurvisie Culemborg 2030. Part A, B & C.

Gemeente Culemborg (2013). Contouren voor een sociaal Rivierenland: De Samenredzame samenleving

Gemeente Culemborg (2018). Ruimte voor de stad: raadsprogramma 2018 - 2022.

Gemeente Lingewaard (2012). Structuurvisie: Gemeente Lingewaard 2012 - 2022.

Gemeente Lingewaard (2017). Iedereen doet mee: Beleidsplan Sociaal Domein 2017-2020.

Gemeente Neder-Betuwe (2018) (a). Klimaatnota Neder-Betuwe 2018-2023. Retrieved from: https://decentrale.regelgeving.overheid.nl/cvdr/XHTMLoutput/Actueel/Neder-Betuwe/CVDR611049.html [accessed on multiple dates]

Gemeente Neder-Betuwe (2018) (b). Gemeentelijk Rioleringsplan Neder-Betuwe 2019-2023.

Gemeente Nijmegen (2013). Structuurvisie Nijmegen.

Gemeente Nijmegen (2016). Ontwerp Gemeentelijk Rioleringsplan Nijmegen: 2017 tot en met 2023.

Gemeente Nijmegen (2017). Samen gezond in Nijmegen: gezondheidsagenda 2017-2020.

Gemeente Nijmegen (2019) [concept]. Uitvoeringsagenda Duurzaamheid.

Gemeente Overbetuwe (2010). Landschapsontwikkelingsplan Gemeente Overbetuwe: Samen werken aan het landschap.

Gemeente Overbetuwe (2018). Uitvoeringsnotitie Publieke Gezondheid Volwassenen en Ouderen Overbetuwe 2018.

Gemeente Overbetuwe (2019). Omgevingsvisie Overbetuwe.

Gemeente Tiel (2010). Tiel Klimaatbewust: Klimaatbeleidsplan 2010-2020.

Gemeente Tiel (2019) (a). Typisch Tiel: Startnotitie Omgevingsvisie.

Gemeente Tiel (2019) (b). Gemeentelijk rioleringsplan Tiel 2019-2022: Hoofdlijnenrapport.

Gemeente Tiel (2019) (c). Gezondheidsagenda Tiel 2019-2022.

Gemeente West Betuwe (2019). Water- en Rioleringsplan 2019-2023 gemeente West Betuwe. Retrieved from https://decentrale.regelgeving.overheid.nl/cvdr/xhtmloutput/actueel/West%20Betuwe/CVDR 626709.html

Gemeente Zaltbommel (2017). Zaltbommel Positief Gezond: Beleidsnota gezondheid 2018-2021.

Gemeente Zaltbommel (2018). Bestuursakkoord 2018-2022.

Gerring, J. (2006). *Case study research: Principles and practices*. Cambridge university press.

Groenlinks, D66 & SP (2018). Nijmegen: samen vooruit: duurzaam, sociaal, veerkrachtig, aantrekkelijk.

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

Gupta, J., Termeer, C., Klostermann, J., Meijerink, S., Van Den Brink, M., Jong, P., ... & Bergsma, E. (2010). The adaptive capacity wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environmental Science & Policy*, *13*(6), 459-471.

Guston, D. H. (2001). Boundary organizations in environmental policy and science: an introduction.

Haan, de, A. (2015). Gemeentelijk Rioleringsplan: Beleidskaders

Haasnoot, M., Kwakkel, J. H., Walker, W. E., & ter Maat, J. (2013). Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world. *Global environmental change*, *23*(2), 485-498.

Hage, M. (2015). Beleidsnota Duurzaamheid 2016-2020.

IPCC, (2014). Summary for policymakers. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. … & L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

Johnson, R. B. (1997). Examining the validity structure of qualitative research. *Education*, *118*(2), 282.

Karl, H. A., Susskind, L. E., & Wallace, K. H. (2007). A dialogue, not a diatribe: effective integration of science and policy through joint fact finding. *Environment: Science and Policy for Sustainable Development*, *49*(1), 20-34.

Mann, C. (2018). *The wizard and the prophet.* New York: Picador.

Mees, H. L., Driessen, P. P., Runhaar, H. A., & Stamatelos, J. (2013). Who governs climate adaptation? Getting green roofs for stormwater retention off the ground. *Journal of Environmental Planning and Management*, *56*(6), 802-825.

Mees, H. L., Dijk, J., van Soest, D., Driessen, P. P., van Rijswick, M. H., & Runhaar, H. (2014). A method for the deliberate and deliberative selection of policy instrument mixes for climate change adaptation. *Ecology and Society*, *19*(2).

Mees, H. (2017). Local governments in the driving seat? A comparative analysis of public and private responsibilities for adaptation to climate change in European and North-American cities. *Journal of Environmental Policy & Planning*, *19*(4), 374-390.

Meijerink, S., & Stiller, S. (2013). What kind of leadership do we need for climate adaptation? A framework for analyzing leadership objectives, functions, and tasks in climate change adaptation. *Environment and Planning C: Government and Policy*, *31*(2), 240-256.

Meijerink, S., Stiller, S., Keskitalo, E. C. H., Scholten, P., Smits, R., & van Lamoen, F. (2015). The role of leadership in regional climate change adaptation: a comparison of adaptation practices initiated by governmental and non-governmental actors. *Journal of water and climate change*, *6*(1), 25-37.

Mickwitz, P., Aix, F., Beck, S., Carss, D., Ferrand, N., Görg, C., ... & Máñez, M. (2009). *Climate policy integration, coherence and governance* (No. 2). Peer.

Minsterie van Infrastructuur en Waterstaat (I&W) (2018). Deltaplan Ruimtelijke Adaptatie. *Deltaprogramma 2018.* Available at https://deltaprogramma2018.deltacommissaris.nl/viewer/chapter/1/2-deltaprogramma-/chapter/deltaplan-ruimtelijke-adaptatie.html

Moser, S. C., & Ekstrom, J. A. (2010). A framework to diagnose barriers to climate change adaptation. *Proceedings of the national academy of sciences*, *107*(51), 22026-22031.

Posthouwer, W. (2018) [powerpoint]. We laten de wereld beter achter voor de volgende generatie.

PvdB, VVD & PvdA (2018). Tiel in Balans: coalitieakkoord 2018-2022.

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy sciences*, *4*(2), 155-169.

Rovers, V., Bosch, P. & Albers, R., (2014). Eindrapport Climate Proof Cities 2010-2014. Available at: http://edepot.wur.nl/319234

RoyalHaskoning DHV (2016). Routekaart Duurzaam Overbetuwe: Uitwerking ambities duurzaamheid gemeente Overbetuwe 2017-2020.

RoyalHaskoning DHV (2019). Watertakenplan Culemborg 2019 -2023.
SAB Arnhem (2009). Structuurvisie Buren 2009-2019

Salcedo Rahola, T. B., Van Oppen, P., & Mulder, K. (2009). Heat in the city-an inventory of knowledge and knowledge deficiencies regarding heat stress in Dutch cities and options for its mitigation.

Saunders, M., Lewis, P., & Thornhill, A. (2019). Research methods. *Business Students*. 8th edition.

SGP, CDA & VVD (2018). Samen bouwen aan Ruimte voor de Samenleving: Coalitieprogramma 2018-2022. Neder-Betuwe.

Steurer, R. (2013). Disentangling governance: a synoptic view of regulation by government, business and civil society. *Policy Sciences*, *46*(4), 387-410.

Suddaby, R. (2006). From the editors: What grounded theory is not.

Sweco (2017). Gemeentelijk Rioleringsplan Overbetuwe: Planperiode 2018-2022.

Termeer, C., Dewulf, A., Van Rijswick, H., Van Buuren, A., Huitema, D., Meijerink, S., Rayner, T., & Wiering, M. (2011). The regional governance of climate adaptation: a framework for developing legitimate, effective, and resilient governance arrangements. *Climate law*, *2*(2), 159-179.

Termeer, C., Dewulf, A., Karlsson-Vinkhuyzen, S. I., Vink, M., & Van Vliet, M. (2016). Coping with the wicked problem of climate adaptation across scales: The Five R Governance Capabilities. *Landscape and Urban Planning*, *154*, 11-19.

Termeer, C., Van Buuren, A., Dewulf, A., Huitema, D., Mees, H., Meijerink, S. V., & van Rijswijk, M., (2017). Governance Arrangements for the Adaptation to Climate Change.

The Royal Commission on Environmental Pollution. (2010). Adapting Institutions to Climate Change.

Uittenbroek, C. J., Janssen-Jansen, L. B., & Runhaar, H. A. (2013). Mainstreaming climate adaptation into urban planning: overcoming barriers, seizing opportunities and evaluating the results in two Dutch case studies. *Regional environmental change*, *13*(2), 399-411.

Uittenbroek, C. J., Janssen-Jansen, L. B., Spit, T. J., Salet, W. G., & Runhaar, H. A. (2014). Political commitment in organising municipal responses to climate adaptation: the dedicated approach versus the mainstreaming approach. *Environmental Politics*, *23*(6), 1043-1063

van Broekhoven, S., Boons, F., van Buuren, A., & Teisman, G. (2015). Boundaries in action: a framework to analyse boundary actions in multifunctional land-use developments. *Environment and Planning C: Government and Policy*, *33*(5), 1005-1023.

van Eijk, P. J., & Swenne, A. (2019). De Blauwe Omgevingsvisie 2050: een visiekaart als visitekaartje van waterschappen?. *Landwerk*, *19*(2), 22-25.

Van der Heijden, J. (2014). *Governance for urban sustainability and resilience: Responding to climate change and the relevance of the built environment*. Edward Elgar Publishing.

Van Lamoen, F., & Meijerink, S. V. (2014). Leiderschap door provincies.

Van Sittert, T., (2018). *Conflict in modern day planning.* Available at https://theses.ubn.ru.nl/handle/123456789/7402

Vennix, J., (2012), *Theorie en Praktijk van Empirisch Onderzoek* (5th edition), Harlow: Pearson

Verkerk, J., Teisman, G., & Van Buuren, A. (2015). Synchronising climate adaptation processes in a multilevel governance setting: exploring synchronisation of governance levels in the Dutch Delta. *Policy & politics*, *43*(4), 579-596.

Verlaan, J. (2018) [web-page]. *Klimaatbeleid? In de gemeente loopt het zo'n vaart niet*. Retrieved from: https://www.nrc.nl/nieuws/2018/09/23/klimaatbeleidin-de-gemeente-loopt-het-zon-vaart-niet-a1740869 [accessed on multiple dates]

Verschuren, P., and Doorewaard, H., (2015), *Het ontwerpen van een onderzoek* (5th edition), Amsterdam: Boom Lemma uitgevers

VVD, LBL, CDA & Lingewaard.NU (2018). Samen bouwen aan Lingewaard: coalitieprogramma 2018-2022.

Wallaart and Kusse Public Affairs (WKPA). (2018). Analyse duurzaamheidsambities gemeenten: scan van 100 coalitieakkoorden.

Williams, C. (2007). Research methods. *Journal of Business & Economics Research (JBER)*, *5*(3).

Zaltbommel & Maasdriel (2003). Landschapsplan Bommelerwaard.

Zaltbommel, Maasdriel & Boot (2017). Water- en Rioleringsplan Bommelerwaard 2017-2021.

Appendix A: Framework for policy-study

This framework shows the approach for the policy-analysis. Each question of the observation is translated into a specific action for the analysis. The framework was the same for each municipality.

Element	Questions	Analysis
Framing	1. How do municipalities frame adaptation? 2. Is this inclusive? 3. How did the framing go? 4. Did they deliberately let out certain aspects of it?	1. Look at the definition they provide for adaptation 2. Compare that definition to my own definition 3. Look if there is a sign of the powering and puzzling 4. Analyse if parts are left out and if they mention something about that.
Level at which to act	5. Is the municipality seen as the responsible level to act? 6. Do municipalities see their actions as part of a bigger picture? 7. Do they align and value their actions with this bigger picture? 8. Are/is here interactions/exchange with other actors? 9. Do they act to stimulate others?	5. Analyse if the municipality is mentioned as responsible 6. Analyse if policies and actions from other sectors, stakeholders, governmental levels and organisations are named 7. Analyse if their own actions and policies are attributed/compared/valued/aligned with these other policies and actions 8. See if they mention collaboration with other sectors/actors/stakeholders 9. See if they mention themselves as an example or aim to stimulate others in other ways.
Timing of policies	10. How do municipalities deal with this challenge? 11. Is there a strategic vision? 12. Do they recognise the importance of robustness and flexibility? 13. Do they take robust or flexible measures? 14. Are/isthere windows of opportunities/momentum which they can use? 15. Do they use this?	9. See if they mention long-term and short-term actions. 10. See if there is a strategic vision 11. See if they stress the importance of a flexible policy/attitude and if they stress the importance of robustness. 12. See if they provide any flexible or robust measures. 13. See if they mention events which could increase the window of opportunity/momentum/create urgency. (e.g.: disasters, disturbance, outside pressure) 14. See if they use it to stimulate action.
Alignment across sectoral boundaries	16. How is adaptation governance anchored within the organisation?	16. Is/are there: ● A flat network structure in which actors openly cooperate ● A climate coordinator/manager on a higher level ● Internal steering committee at management level ● Clear division of responsibilities across sectors ● Integration across sectors to increase co-benefits and cost-effectiveness ● Involvement of private-sector, NGOs, community organisations and

	17. How is adaptation integrated in (sectoral) policies?	17. Is/are there: ● Overarching climate vision in which mitigation and adaptation is addressed ● Integration of climate strategies on the strategic levels: e.g. long-term visions ● Integrated at the operational level and short-term activities ● Climate strategies should be integrated in all relevant sectors' policies
	18. How is adaptation anchored within the practical implementation?	18. Is/are there: ● Internal support from employees and appointed officials ● External cooperation with stakeholders (universities, NGOs, etc.) ● Societal support ● Capacity and resources ● Monitoring of implementation
	19. Do they use mainstreaming or a dedicated approach?	19. Analyse whether they aim for a dedicated policy domain or if they aim to mainstream adaptation across the municipality and policies
	20. Is integration seen as a mean or as an end?	20. Analyse why they chose a certain approach
	21. Are boundaries, responsibilities and accountability clearly formulated?	21. See if they do this or aim to do this in the further implementation.
Organisation of the science-policy interface	22. Do municipalities collaborate with the science world? 23. Do they clarify what knowledge they need? 24. Are they capable of collaborating with the science world? 25. Are there boundary organisations?	22. See if science/scientist/research is mentioned 23. See if this research is based on their demands 24. See if they have the necessary connections, capital to collaborate 25. See if there are boundary organisations
Leadership	26. What task(s) does the municipality fulfil? 27. What function(s) does the municipality fulfil? 28. Does this differ on different scales? 29. Are all functions present in the adaptation governance arrangement? 30. Do other actors fulfil (a) different function(s)?	24. See what tasks the policies mention 25. See what tasks relate to which function, and analyse whether certain functions are already mentioned 26. Compare their tasks/functions with the regional process 27. Analyse if they mentioned some functions/tasks which need to be carried out by others 28. See if there are other actors/organisations who carried out other functions.
Selection of policy-instruments	31. Are instruments specified to the context? 32. Why do they choose certain instruments? 33. Do they pay attention to the ten criteria? 34. Do they choose certain instruments related to certain characteristics?	29. See whether instruments are mentioned and if they use the same instruments or state that they use context-specific instruments 30. See if they use certain criteria to base their instruments on. 31. See if they use certain criteria to base their instruments on. 32. See if they mention certain characteristics they want to deal with.

Appendix B: Guide for observations

This is the guide which was used during the observations. The intention was to write down the results in the second display. However, it turned out to be easier to write down notes in my notebook. There where thus only a few observations who were directly written down in the display.

Guide for observations

Element	Questions	Analysis
Framing	1. How do municipalities frame adaptation? 2. Is this inclusive? 3. How did the framing go? 4. Did they deliberately let out certain aspects of it?	1. what is the used definition? 2. Is everything included?
Level at which to act	5. Is the municipality seen as the responsible level to act? 6. Do municipalities see their actions as part of a bigger picture? 7. Do they align and value their actions with this bigger picture? 8. Are/is here interactions/exchange with other actors? 9. Do they act to stimulate others?	3. What is the added value of the collaboration? 4. Do they use each other to exchange/interact? 5. Do they act to stimulate others?
Timing of policies	10. How do municipalities deal with this challenge? 11. Is there a strategic vision? 12. Do they recognise the importance of robustness and flexibility? 13. Do they take robust or flexible measures? 14. Are/isthere windows of opportunities/momentum which they can use? 15. Do they use this?	6. Is robustness or flexibility mentioned? 7. Do they create urgency during the meetings?
Alignment across sectoral boundaries	16. How is adaptation governance anchored within the organisation? 17. How is adaptation integrated in (sectoral) policies? 18. How is adaptation anchored within the practical implementation? 19. Do they use mainstreaming or a dedicated approach? 20. Is integration seen as a mean or as an end? 21. Are boundaries, responsibilities and accountability clearly formulated?	8. Organisation 9. Policies 10. Implementation 11. The importance of integration 12. Are boundaries, responsibilities and accountability clearly formulated?
Organisation of the science-policy interface	22. Do municipalities collaborate with the science world? 23. Do they clarify what knowledge they need? 24. Are they capable of collaborating with the science world? 25. Are there boundary organisations?	13. Do they mention the science-world?
Leadership	26. What task(s) does the municipality fulfil? 27. What function(s) does the municipality fulfil? 28. Does this differ on different scales? 29. Are all functions present in the adaptation	14. What tasks do municipalities have within the region? 15. What functions do they have?

	governance arrangement?	
	30. Do other actors fulfil (a) different function(s)?	
Selection of policy-instruments	31. Are instruments specified to the context? 32. Why do they choose certain instruments? 33. Do they pay attention to the ten criteria? 34. Do they choose certain instruments related to certain characteristics?	16. Do they mention instruments? 17. Which ones? 18. Do they mention certain criteria? 19. Do they mention certain characteristics?

Framework for observations

	Regional	Municipality A	Municipality B	Etc.
Framing				
Levels				
Timing				
Alignment				
Science				
Leadership				
Policy instruments				

Appendix C: Interview-guide

This is the interview-guide for the interview-guide for the interview in Buren. The guides were similar for each municipality. Some aspects were added based on previous findings in the policy-analysis and/or the observations. The added parts are written in italic.

Inleiding
Doel van het interview: inzicht krijgen in de governance in Buren.

Verschillende vragen over verschillende elementen en kijken hoe deze vorm zijn gegeven.

Wellicht vragen naar de bekende weg, maar dat moet nou eenmaal.

eigen functie
1. *Duurzaamheid en klimaat*

2. Wie is er verder nog bij betrokken?
    a. *Wethouder: geen wethouder?*
    b. *Kan er wel verder gegaan worden?*
    c. *Procesmanager en beleidsmedewerker duurzaamheid*
        i. *Is de beleidsmedewerker er al?*

Framing
Laten we beginnen bij het begin, wat is klimaatadaptatie?
1. Hoe zou je adaptatie omschrijven?

2. Hoe wordt adaptatie beschreven binnen je gemeente?
    Strijd tegen de impact van klimaatverandering

3. Waarom gebruiken jullie deze definitie?
    a. Veel gebruikt, best geschikt voor bepaalde doelen?

4. Zijn er aspecten die niet mee worden genomen?
    a. Bewust?

Levels
1. Waarom houden jullie je bezig met adaptatie?
    a. Gestuurd vanuit het DPRA?
    b. Gestuurd door de impact van klimaatverandering?
    c. Uit eigen initiatief/motivatie?
    d. Bestuurlijke druk?

2. Jullie werken met verschillende gemeenten en overheden samen, wat is hiervan de toegevoegde waarde?

3. Werken jullie ook nog samen met andere partijen?
    a. Waarom?
    b. Hoe gaat dat?

4. Er wordt beweerd dat de gemeente het juiste domein is om verantwoordelijk te zijn voor adaptatie. Hoe zie jij dit?

Timing

Adaptatie kenmerkt zich doordat de impact ervan pas op de lange termijn echt zichtbaar wordt, terwijl er nu al actie moet worden ondernomen.

1. Zijn er al merkbare risico's in jullie gemeente?
    a. Is er bewustzijn van deze (mogelijke) risico's

2. Is het al mogelijk om echt actie te ondernemen?
    a. politieke en sociale steun?

3. Wat wordt er gedaan om tot actie over te kunnen gaan?
    a. Gebruik van windows of opportunity, dreigingen

4. Zorgen voor flexibility/robustness?

Alignment

1. Wat is de positie van adaptatie binnen de gemeente?
    a. Wie is er verantwoordelijk etc.
    b. Mainstreaming of dedicated approach?

Uit de beleidsanalyse bleek dat jullie de intentie hebben om een visie op te gaan stellen en ook sturen op beleidsintegratie in andere sectoren.
2. Hoe staat het daarmee?
    Quick win: adaptatie meenemen in nieuw beleid
3. Waar letten jullie op bij de implementatie van beleid?
4. Waar gaan ze op letten?

5. Is het duidelijk wat de taken zijn per sector/actor?
    a. Komt waarschijnlijk in het uitvoeringsprogramma

Science-policy
1. Is er voldoende kennis wat betreft klimaatadaptatie?

2. Werken jullie samen met kennisinstellingen?
    a. Hoe gaat dat?
3. Zouden jullie dat willen?
4. Boundary organisations, demands, capacity

Leadership

Dit deel gaat over de rollen en taken die er zijn voor de gemeente tijdens de verschillende fasen (weten, willen, werken)

1. Welke taken hebben jullie?
    a. In alle beleidsfasen (weten, willen, werken)

2. Welke rollen hebben jullie gemeente?

3. Wat voor rollen/taken zouden jullie uit moeten voeren, maar kunnen/doen jullie niet?

4. Welke taken/rollen hebben jullie op andere schaalniveaus?

5. Welke taken/rollen zijn weggelegd voor andere partijen?

Instruments

1. Welke beleidsinstrumenten gebruiken jullie of gaan jullie gebruiken?

2. Hoe kiezen jullie deze beleidsinstrumenten?
    a. Op basis van wat ze willen bereiken?

3. Zijn er bepaalde resultaten die jullie belangrijk vinden waar de instrumenten aan bij moeten dragen?
    a. *Het coalitieakkoord legt nadruk op kerngericht werken, hoe zit dat bij klimaatadaptatie?*

4. Zijn er belangrijke factoren die hun keuzes beïnvloeden?

Regional process/Waterschap

1. Waar merk je dat jullie extra hulp nodig hebben?

2. Wat kan het Waterschap hierbij doen?

3. Welke van de reeds behandelde elementen is in jouw ogen het belangrijkst?

4. Hoeveel mensen werken er voor de Gemeente?

Appendix D: Observation-reports

Observation 1: Project-group meeting

The first observation was executed on November the seventh, 2019. I was invited to a *werkgroepoverleg:* a meeting with the civil servants who are responsible for climate adaptation per municipality. The aim of the observation was to get an impression of the design elements at the regional level and also see and feel the different roles of the municipalities at the regional scale. This report first gives a short introduction on the meeting to give an impression of the situation and the people that were present. This is followed by a summary of the discussed topics. A description of the seven elements from the regional perspective and per municipality will be derived from this summary. The framework presented in Appendix B is used for this description.

The meeting was held at the office of the Waterboard and led by the regional *trekker* whom is working for the Waterboard. Seven of the municipalities, the province of Gelderland and the Waterboard were represented. The meeting was also attended by an external coordinator. See table 1 for a list of the present organisations. Unfortunately, not all actors were present.

Present	Absent
Organisation	*Organisation*
Overbetuwe	Zaltbommel
Neder-Betuwe	Maasdriel
Buren	
Tiel	
Lingewaard	
West Betuwe	
Culemborg	
Gelderland	
Waterboard Rivierenland	
Radhuis Advies (external coordinator)	

Table 1: Participating organisations in the network-group

Summary

There was an agenda to structure the meeting. The agenda first covered the *'themadocument'* (theme-document), followed by the intended process to come to the RAS. They ended with an elaboration on previous actions and meetings, and the actions and meetings that were still to come.

Themadocument

The theme-document was the result of a first consultation round, executed by the external coordinator. He visited the involved actors and also had meetings with non-governmental parties. The document was a summary of his findings and the draft version of this was discussed during the meeting. It is used to show what is going on already and what they need and want in the future. The document for example showed that there is a general demand for knowledge and willingness to cooperate with non-governmental actors. He used the work of another region ('Rijk van Maas en Waal') as an example for this region.

There was an interesting discussion on the content and the purpose of the document. It was for example mentioned that the document was too general. There was a lot of focus on climate adaptation and the DPRA and it needed more examples on the local level. Such examples would make the document more specific and would make it better understandable and tangible for the directory level. Specific example of measures and approaches can also be used by other municipalities and it shows that some municipalities are further ahead of others.

Another remark was the responsibility of different actors, especially in relation to multi-layered water-safety. There have to be clear boundaries between the local and regional responsibilities and this distinction has to be unambiguous. It was also stated that the document needed to be written from a 'we'-perspective. This would create a better sense of unity and would make it easier to get support from deputy and other stakeholders. The actors agreed that climate adaptation needs to be frame in a very tangible way to reach to directory-level. Those aldermen for example are more familiar with terms as heat-stress and regard adaptation as something new and unknown. Lastly, it was mentioned that the process had to be coupled to the processes in the energy-transition (Regional Energy Strategies (RES)) and to the social domain.

Strategic process

The second topic was the strategic process to develop the RAS. The regional coordinator presented the vision for the process of the risk-dialogues which will be used for the RAS. First, they will meet in two smaller groups to discuss adaptation in urban and rural areas. The idea is that these meetings will be used to exchange and benefit from each other's knowledge and to see who is or should be responsible for different aspects of adaptation (governance). Different civil servants from different sectors will be invited to share their strategic vision, knowledge and experiences. The results of these meetings will then be discussed in broader meetings in which different (non-)governmental stakeholders will be included. These meetings will be used to receive information from different stakeholders and to stimulate urgency and support, both internally and externally.

There were some questions and remarks on this strategy. There first of all was a further elaboration on processes which are going on already. The regional coordinator explained that there was some urgency, but that is dependent on incidents. There are measures, but they are not done in the perspective of climate adaptation. He also mentioned that some non-governmental actors have a stronger sense of urgency already because they already feel the impacts of climate change. It was mentioned that there had to be alignment between the urban and rural processes as well and there was a remark that the rural process could best be

done from the regional perspective. The meetings also had to be kept to a minimum but sufficient amount due to a lack of resources.

Flashback
There were some meetings and actions taken in between the previous *werkgroepoverleg* and the one I observed. There was a knowledge session with the deputy to spread knowledge about the topic, there was a gathering of the DPRA on a national scale, there was a meeting with actors from the RES Rivierenland and there was a knowledge session with civil servants in Lingewaard and Overbetuwe. Each of these topics were discussed.

Knowledge session deputy
The session was organised to spread knowledge across the directory level. Unfortunately, not many people were present at this meeting. However, it was beneficial for the people that were there. It stood out that they did not have much knowledge on adaptation, but this changed over the session. The session showed that many directors do feel the urgency of aspects of adaptation and that they are motivated to work on in once they know what it is about. It was important to use a broad meaning of the topic and to involve the directors during the entire process. This would generate more political support, which is beneficial for the process. The directors also developed a better idea on the possibilities to link the process to the RES and the social domain.

DPRA-gathering
Some people from the workgroup joined the national DPRA-gathering in which the subsidies were discussed. They were a bit sceptical to the approach to these subsidies. There was a lot of bureaucracy which made it inefficient. The municipalities also have to apply for the subsidies in a combined region. This lead to critique because of the spatial differences between and within the regions and it would create a lack of input.

RES-meeting
There was a meeting with responsible actors from the RES-process to see if the processes could be linked. They saw the added value of the linking-opportunities, but were cautious not to make the processes too intertwined. This would create unnecessary confusion about the responsibilities of each process. The idea was that there could become a collective governance approach in the future, once the processes arrived in the implementation phase.

Knowledge session Lingewaard and Overbetuwe
The municipalities of Lingewaard and Overbetuwe organised a knowledge session for their civil servants. This session opted to share knowledge across their organisation and create an integral sense of urgency. Other municipalities also want to organise this session. The session can be seen as collective knowledge-exchange.

Flashforward

The meeting ended with a discussion on the meetings and actions that were still to come. It covered the directory meeting (observation 2), a water chain meeting, the climate-effect atlas, and the local and knowledge tracks.

Directory meeting

The directory meeting was planned a week after the *werkgroepoverleg*. There was some critique on the sectoral approach to the drinking-water facilities which did not include adaptation. This would be further discussed during the directory meeting.

Meeting water chain

The water chain meeting would not specifically cover adaptation related issues.

Climate-effect atlas

The climate-effect atlas was discussed. This atlas can be used as an instrument to spread knowledge across actors. It is necessary to take a look at what they want to achieve with this tool on the short and long term. The people from the workgroup want that the results of the stresstests become publicly available.

Local and knowledge tracks

The municipalities were invited to elaborate on their local actions, observations and ideas. These are covered in the section per municipality as they do not give an impression of the regional perspective.

Observation 2: Board-group meeting

The second observation was executed during a board group-meeting on the 14th of November 2019. It was a board group-meeting for all the regional networks and thus not only for KAR. However, the main part of the meeting concerned KAR and climate adaptation. The meeting was attended by the responsible deputy per municipality, two people of KAR and one regional coordinator. The aim was to get an impressions of the political support for climate adaptation per municipality and to see what political views on climate adaptation per municipality. It also offered insight in the regional process and – off course – into the design elements per municipality. This report consists out of an introduction, an overview of the attendees, a summary of the meeting and an overview of specific aspects per municipality. The observation technique during this meeting was two-sided. I took notes about the topics and different views. I also used the observation framework to write down specific observations about the design elements per municipality.

The meeting was held at the city hall of Maasdriel. It was led by the deputy of West Betuwe. Not every alderman of the selected cases was present. Table 4 provides an overview of the attending organisations.

Present	Absent
Organisation	*Organisation*
West Betuwe (chairman)	Lingewaard
Culemborg	Province of Gelderland
Maasdriel (not a case anymore)	Buren (resigned)
Neder-Betuwe	West Maas en Waal (no part of KAR)
Overbetuwe	Tiel (replaced by official)
Zaltbommel	
Tiel (replacement of deputy by official)	
Waterboard Rivierenland	
Coordinator SNR	
Two regional coordinators	

Table 1: Participating organisations in the board-group meeting

Summary
The meeting was structured with an agenda. It first covered more water-related issues such as drinking-water and a national meeting. This was soon followed by the process of KAR, concerning topics as communication, the proposed steps to take and the workshops about climate adaptation. This summary only covers the parts on climate adaptation and follows the structure of the meeting

Knowledge and inspiration
There was a workshop on climate adaptation to inform different politicians on the necessity and possibilities of climate adaptation. Unfortunately, there were not many people present during this workshop. The people that were present regarded it is a very positive and useful workshop. Many of those who were present were already involved or at least familiar with climate adaptation. It was suggested by Culemborg, West Betuwe and Neder-Betuwe to organise such workshops in the municipalities as well. Another workshop for deputies is scheduled in February which will be more in-depth. This will be clearly communicated to stimulate (new) actors to come to that workshop.

Theme document
The regional coordinator presented the document he made based on his consultation round across different governmental institutions and other stakeholders. The same as he presented at the project-group meeting. It shows the current state of climate adaptation in the region and the desires of the stakeholders. One of the main conclusions of the document concerns the already existing awareness and the lack of a structural approach.

Most of the remarks concerned the process and will be discussed in the next section. There is a general idea that the structural approach is missing because of a lack of incidents. This is especially brought up by Neder-Betuwe. The process of the regional adaptation-strategy (RAS) was compared to the process of the regional energy-strategies (RES). It is also difficult to connect the process of to the regional energy-strategies (RES). There is also a wish for a clear demarcation of regional and local responsibilities and actions, and it is important to keep an eye on regional differences.

Process
The coordinator presented the approach for the process. The idea is to start with two meetings on climate adaptation in rural and urban areas respectively. Smaller groups will look at the problems within those areas. These groups consist of deputy, civil servants and stakeholders whom have added value in terms of strategy or knowledge. These meetings will be followed up through broader meetings in January in which they aim for commitment and support.

There is general consensus that attention needs to be paid to the citizens (Zaltbommel) and the deputies (e.g. West Betuwe, Zaltbommel, Culemborg). These parties need to be involved in an earlier stage through clear communication and information on mutual expectations and actions. A proper communication strategy is therefore necessary. The board group also initiated the idea to develop a *startnotitie* to explain the process of the RAS, the communication strategy and the current actions. This *notitie* will be presented to the council to inform them and stimulate them to be actively involved.

Communication

There was a meeting on the communication-strategy on the civil servants. The conclusion was to formulate an assignment for an external party to develop such a strategy. It was important to formulate this assignment in regard to the large amount of stakeholders to deal with the complexity of it. Another aspect was to explain climate adaptation in an understandable manner. The communication strategy also need to be flexible and adjustable to different stakeholders or situations.

Main remarks

The main remarks in this meeting concerned the early involvement of the councils and citizens. A *startnotitie* and a communication-strategy will be developed to tackle this problem. The communication-strategy will be mainly used to inform and stimulate citizens. The *startnotitie* has the same use, only it is used for the councils.

Appendix E: Codebook

Framing

Topic	Code	Meaning	Key-words
Frame	Frame	The frame of adaptation	
	Inclusive	Sign of aspects which are included	
	Non-inclusive	Aspects which are not included	
	No frame		
Framing	Framing	The framing process	
	Inclusive framing	Everyone is taken into account	
	Non-inclusive framing	Not everyone is taken into account	
	Non-framing	Framing did not happen, they just use a certain frame	
Other			

Levels

Topic	Code	Meaning	Key-words
Municipality-level	Right level	Municipality is seen as the right level to act	
	Other levels	Other levels should be responsible	
Synchronisation	Aligning and valuing	The municipality aligns and values their actions to broader scale processes	
	No aligning and valuing	Do not align themselves with other levels	
	A & V through policies	Aligning and valuing to other policies	DPRA
	A & V through regional process	Aligning and valuing to the regional process	KAR-regio, volgend
	Knowledge sharing	Sharing knowledge as feature of the regional process	
	No knowledge sharing	No knowledge sharing	
	Stimulating others	They act to stimulate others	Voorbeeldfunctie, voorloper
	Not-stimulating others	They do not act to stimulate others	Geen voorloper, volgend zijn
Other			

Timing

Topic	Code	Meaning	Key-words
Strategic vision	Strategic vision	The municipality has a strategic vision combining the short- and long-term	Beleid, Omgevingsvisie, Strategie/Visie
	Short-term	The focus is very short-term	Acties, maatregelen, uitvoering(sprogramma)
	Long-term	The focus is mostly on the long-term	Vooruit kijken, meekoppelen
	No vision	No strategy	
No-regret	Flexible	Municipality aims to be flexible and/or have flexible policies	
	Robust	The municipality aims to be robust and/or have robust policies	
Urgency	Windows of opportunity	Previous impacts of climate change which they could use	Gevolgen van droogte, hitte, wateroverlast
	Momentum	Political and/or social support/pressure which they could use	Vraag vanuit maatschappij, vraag vanuit politiek, bewustzijn
	No windows of opportunity	No/too little previous impacts which can be used	
	No momentum	No/too little political/social support and or pressure	
	Using w.o.o.	Using a crisis for the greater good	
	Using momentum	Using the social/political situation for the greater good	
	Not using w.o.o.	Not using a crisis for the greater good	
	Not using momentum	Not using the social/political situation for the greater good	
Other			

Alignment

Topic	Code	Meaning	Key-words
Organisation	Flat network structure	Horizontal structure in which actors can cooperate	Horizontaal werken
	No flat network structure		
	Climate coordinator/manager	There is somebody who keeps track of everything related to the climate (adaptation)	
	No climate coordinator/manager		
	Internal steering committee management	Managers that steer the people working on adaptation	
	No internal steering committee management		
	Clear division of responsibilities across sectors	Every actor is aware what he or she should do and what others do	
	No clear division of responsibilities across sectors		
	Integration across sectors	Multiple sectors are working on climate adaptation	Meekoppelkansen, integraal, raakvlakken
	No integration across sectors		
	Involvement of other stakeholders	External parties are involved	
	No involvement of other stakeholders		
Policies	Overarching vision	Policy in which adaptation (and) mitigation is addressed.	
	No overarching vision	Speaks for itself	
	Integration on the strategic level. e.g. long term visions	Long term vision in which adaptation is included	Klimaatbeleid, omgevingsvisie, visie, strategie
	No integration on the strategic level	Speaks for itself	
	Integrated at operational level	Short-term actions in which adaptation is included	Laaghangend fruit, uitvoeringsprogramma, korte termijn, praktisch, beleid
	Not integrated at operational level	Speaks for itself	

	Integrated in (all) relevant sector's policies	Integration in sectoral policies	Integratie, integrale aanpak
	Not integrated in (all) relevant sector's policies	Speaks for itself	
Implementation	Political support	Support and understanding from politicians	Politieke steun, bestuurlijke aandacht
	Internal support employees	Support and understanding from colleagues	Interne steun, interne bewustwording
	No political support	Speaks for itself	
	No internal support employees	Speaks for itself	
	External cooperation	Cooperation with other stakeholders and/or institutions	
	No external cooperation	Speaks for itself	
	Societal support	Support and understanding from citizens	Draagvlak, bewustwording
	No societal support	Speaks for itself	Draagvlak, bewustwording
	Capacity and resources	Speaks for itself	
	No capacity and resources	Speaks for itself	
	Monitoring	Speaks for itself	
	No monitoring	Speaks for itself	
Mainstreaming	Mainstreaming	Focussing on integration within sectors	
Dedicated	Dedicated	Having a separate project-team	team
	Mean	Focus on the benefits from integration	
	End	Focus on integration with no mention of its benefits	
Clear boundaries	Clear formulation	It is clear what all parties, actors, and stakeholders should do	
	No clear formulation	It is not clear what all parties, actors and stakeholders should do	

Other			
	No focus on integration etc.		
External pressure	External pressure	Pressure from the region/the state to act	Verplichting, consequenties
	Lack of external pressure	Too little pressure from the region/the state to act	

Science-Policy interface

Topic	Code	Meaning	Key-words
Knowledge	Desire for knowledge	They see that they lack certain kinds of knowledge and want to generate that	
	No desire for knowledge	They do not feel the urgency for new/more knowledge	
Science world	Collaboration with the science world	Collaborations with scientific organisations	Universiteit, Hogeschool, kennisinstituut
	No collaboration with the science world	Speaks for itself	
	Collaboration with researchers	Collaboration with consultancy-agencies	Adviesbureaus
	No collaboration with researchers	Speaks for itself	
	Wish to collaborate	They do not collaborate, but want to	
	No wish to collaborate	They do not collaborate and do not want to	
	Possibility to collaborate	They have the connections, power, resources to do so	
	No possibility to collaborate	They do not have the connections, power, resources to do so	
Demands	Clarification of demands	They know what they desire and clarify it	
	No clarification of demands	Research is not based on the demands of the municipality	
Boundary organisation	Boundary organisation	They mention a boundary organisation in which they have participated	
	No boundary organisation	Speaks for itself	
Other			

Leadership

Topic	Code	Meaning	Key-words
Political Administrative	Political administrative	This function is executed	
	Decide on/develop a vision	This task is executed	Beleid, strategie
	Communication	This task is executed	
	Task: Monitoring	This task is executed	
	Generating resources	This task is executed	
Adaptive	Adaptive	The network is flexible	
Enabling	Enabling	This function is executed	Faciliteren, regisseren, ondersteunen
	Allow and stimulate	This task is executed	
	Create urgency	This task is executed	Bewustwording
	insert adaptive tension	This task is executed	
	Foster interaction	This task is executed	
Dissemination	Dissemination	This function is executed	Ambassadeur, politiek meekrijgen, lobbyen, verspreiden, overtuigen
	Spread ideas to positional leaders	This task is executed	Bewustwording
	Get accepted ideas	This task is executed	Politieke steun, sociale steun
Connective	Connective	This function is executed	Linken, schakel, samenwerken
	Promote problems	This task is executed	bewustwording
	Mobilise actors	This task is executed	motiveren
	Bring people together	This task is executed	
	Collaborative strategy	This task is executed	
	Working together	This task is executed	

	Build trust and legitimacy	This task is executed	
	Forge agreement	This task is executed	
	Move to action	This task is executed	
	Implement strategies	This task is executed	
Actors	Respondent	The task is executed by the respondent	
	Official	The task is executed by the official	
	Municipality	The task is executed by the municipality	
	Region	The task is executed by a regional actor	
	Other	The task is executed by another party.	
Other	Lack of leadership		
	Proper leadership		

Selection of policy instruments

Topic	Code	Meaning	Key-words
Instruments	Tailor made,	Context-specific instruments	Maatwerk
	Legal		
	Economic		
	Communicative		
Criteria	Effectiveness	Effectiveness is important	
	Legal certainty	Legal certainty is important	Kader(stellend)
	Flexible efficiency	Instruments should be flexible and adjustable to minimise costs	

	Generational fairness	a sufficient level of adaptation for everyone now and in the future is important	
	Spatial efficiency	Instruments are tailored to specific spatial challenges to minimise cost	Maatwerk
	Spatial fairness	Actions and costs are distributed to those need it/benefit	Maatwerk
	Output legitimacy	acceptance of its effects on all stakeholders is important	Communicatie, draagvlak, bewustwording
	Input legitimacy	The interests of all stakeholders is important	Draagvlak, dialogen
	Accountability	The allocation of responsibilities needs to be transparent and clear.	Communicatie
Characteristics	Uncertainty	The uncertainty of climate change and adaptation is very important	Onwennigheid, onbekendheid, onduidelijkheid
	Long-term/short-term	The long-term/short-term issue is regarded important	Ver-van-mijn-bed-show
	Spatial diversity	It is important to deal with the spatial differences	Maatwerk, kern/dorp
	Controversy	It is important to deal with the controversy surrounding climate change and adaptation	
	Social complexity	It is important to deal with the multi-dimensional, complex character of climate adaptation.	
Activating other spheres	Activating citizens	Act to stimulate the citizens to move to action	
	Activating civil organisaitons		
	Activating market	Act to stimulate market-parties	
Modes of governance	Multiple modes of governance	Stacking multiple modes of governance to stimulate action	
	Hierarchical governance		

	Interactive governance		
	Market governance		
Other			

Other

Difference between small and large municipalities	Pros for small municipality	Parts of the process that can be better done by smaller municipalities
	Cons for small municipality	Parts of the process which smaller municipalities lack resources/skills/size to do so
Process	Regional process	Explaining what is going on in the regional process
	Local process	Explaining what is going on in the local process

Appendix F: Overview of leadership tasks

Function	Task	Respondent	Municipality	Region	Deputy
Political-administrative	Political-administrative	Culemborg, Lingewaard, Neder-Betuwe, Tiel, West Betuwe, Zaltbommel	Buren, Culemborg Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel	Buren, Lingewaard, Regional	
	Communication	Culemborg, Lingewaard, West Betuwe	Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel		
	Decide/develop vision	Culemborg, Tiel	Buren, Culemborg, Lingewaard, West Betuwe, Zaltbommel, Regional	Buren, Culemborg, Regional	
	Monitoring	Lingewaard, Neder-Betuwe, Tiel	Neder-Betuwe, Tiel, West Betuwe, Zaltbommel		
	Generate resources	Culemborg, Lingewaard, Tiel, Zaltbommel, Neder-Betuwe			
Adaptive	Adaptive		Buren, Zaltbommel		
Enabling	Enabling	Culemborg, Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel	Buren, Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel	Overbetuwe, Tiel, West Betuwe	
	Allow and stimulate		Lingewaard		
	Create urgency	Culemborg, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel	Neder-Betuwe, Overbetuwe, Tiel	Tiel	
	Insert adaptive tension				
	Foster interaction	Lingewaard, Neder-Betuwe, West Betuwe	Buren, Culemborg, Lingewaard, Overbetuwe, West Betuwe, Zaltbommel	Tiel	
Dissemination	Dissemination	Culemborg, Lingewaard, Overbetuwe, Tiel, West Betuwe, Zaltbommel	Buren	Regional	Lingewaard, Neder-Betuwe, Tiel, West Betuwe

Function	Task	Respondent	Municipality	Region	Deputy
	Spread ideas politically	Culemborg, Overbetuwe, Tiel, Zaltbommel		Regional	Tiel
	Spread ideas	Culemborg, Neder-Betuwe, Overbetuwe, Tiel, West Betuwe, Zaltbommel		Regional	
Connective	Connective	Buren, Culemborg, Lingewaard, Neder-Betuwe, Tiel, West Betuwe, Zaltbommel	Culemborg, Lingewaard, Neder-Betuwe, Overbetuwe, Tiel, Zaltbommel	Culemborg, Tiel, Regional	
	Promote problems	Culemborg, Neder-Betuwe, Overbetuwe		Tiel	
	Mobilise actors	Buren, Culemborg, West Betuwe, Zaltbommel	Lingewaard, West Betuwe	Regional	
	Bring people together	Buren, Culemborg, Lingewaard, Neder-Betuwe, Overbetuwe, Tiel	Culemborg, Lingewaard, Neder-Betuwe, Tiel, Zaltbommel	Culemborg, Tiel, Regional	
	Collaborative strategy	Lingewaard, Tiel	Zaltbommel	Regional	
	Working together	Overbetuwe	Zaltbommel		
	Build trust and legitimacy				
	Forge agreement	Overbetuwe			
	Move to action	Neder-Betuwe, Zaltbommel		Regional	
	Implement strategies			Regional	