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Hot Town Summer in the City

Towards an integrated approach

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“Adapt what is useful,

reject what is useless

and add what is specifically

your own”.

- Bruce Lee -

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List of Abbreviations

DPRA: Deltaplan Ruimtelijke Adaptatie (Delta Plan on Spatial Adaptation)

EU: European Union

GGD: Gemeentelijke Gezondheidsdienst (Public health service)

HvA: Hogeschool van Amsterdam (Amsterdam University of Applied Sciences)

IPCC: International Panel on Climate Change

KNMI: Koninklijk Nederlands Meteorologisch Instituut (Royal Netherlands Meteorological Institute)

MRA: Metropoolregio Amsterdam (Amsterdam metropolitan area)

NAS: Nationale Adaptatie Strategie (National Adaptation Strategy)

UHI: Urban Heat Island

VGE: Vereniging voor Gezondheidseconomie (Health Economics Association)

Abstract

It is anticipated that future weather conditions will have a myriad of negative consequences for the current urban environment. Due to urban characteristics, these issues caused by extreme weather will have an amplifying effect. Alterations are therefore required for cities to reduce the impact of future weather events i.e., climate adaptation. Local governments are considered to be the most important initiator for effective climate adaptive planning. Because of the diverse nature and context dependency of the consequences, municipalities therefore aim to integrate climate adaptation in their sectoral policies. This will result in various approaches specifically tailored to the characteristics of each municipality. The goal of this research is to gain insight into the efforts by municipalities setting the agenda on integrated climate adaptation, which should lead to the formation of mainstreaming policies. In this research, specific attention is given to the issue of urban heat, as this issue severely increases the complexity of the issue, since it has both a physical and social component and a myriad of impacts on multiple scales and sectors. Results of this research are that through discourse, the problem of heat is being concretised, by practicing with pilots, possible couplings can be explored, and that political awareness is influenced by experiencing climate adaptation and by forming partnerships with proponents. Key factors in this agenda setting process were the valuation of climate adaptation by politicians, capable concerned promoters in the form of municipal officers, the connection of the issue to the city's DNA and local willingness to increase resilience. Furthermore, despite the fact that all respondents in the research population declare that their municipality pronounced the ambition of increasing their region's climate adaptive capacity, a structural approach to the adverse effects of climate change is still absent. However, with awareness rising both within and outside the public domain in concurrence with local policies getting more and more concrete, a trend towards a structural consideration of climate adaptation is showing and the successful integration of climate adaptation into local policies therefore seems only a matter of time.

Key words: Agenda Setting; Mainstreaming; Heat Stress; Climate Adaptation; Complexity; Urban Policies; Municipalities.

1 Introduction

Resilience could be the next paradigm for planners in the modern age. Where the concept of sustainability aims to preserve a system's original balance, resilience goes further by accepting both balance as imbalance and tries to find ways to manage an unbalanced world (Zolli & Healy, 2012). According to Holling (1973), resilience comprises three main pillars: robustness, adaptability and transformability. A resilient system is thus able to absorb and withstand shocks, to adapt to internal and external changes and to transform into a new system when necessary.

1.1 Problem description

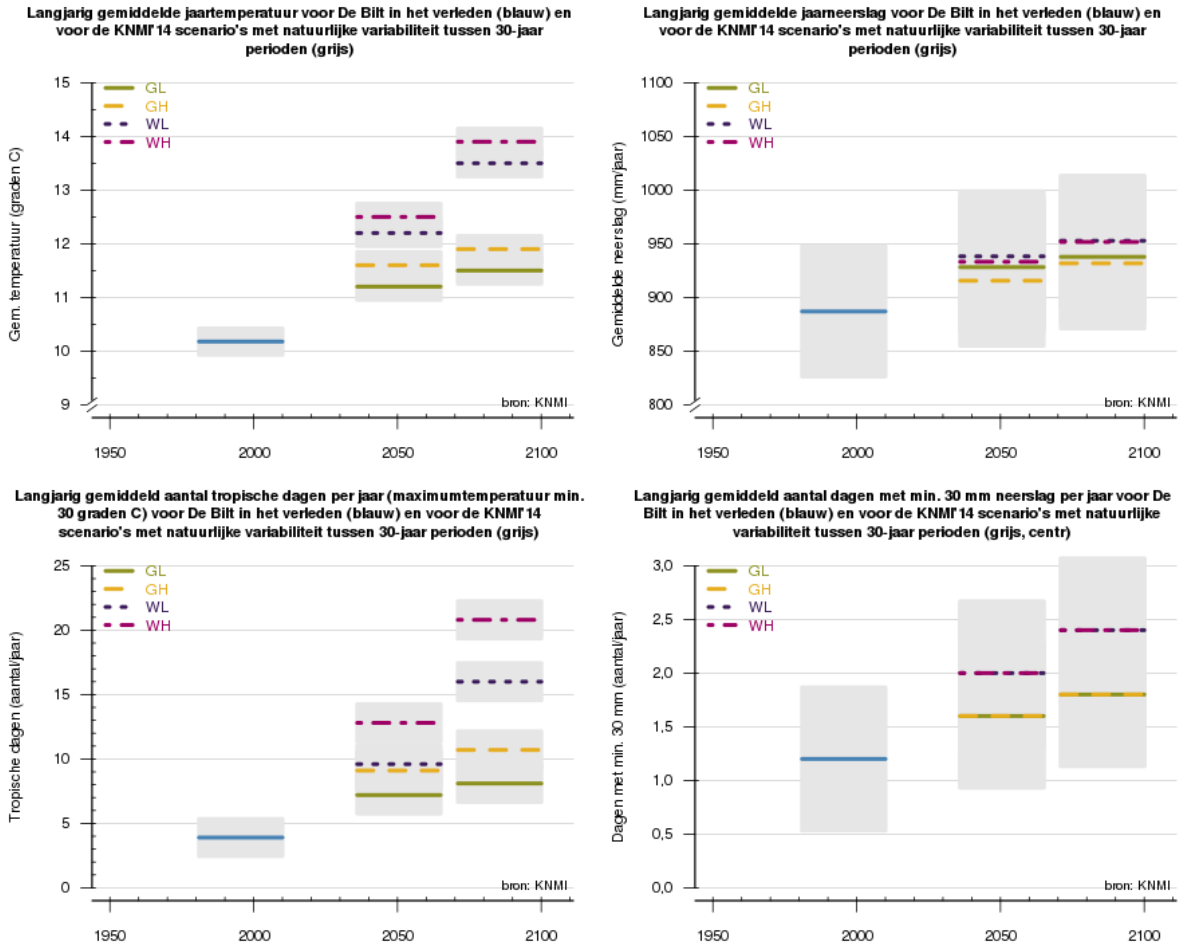
Probably the most challenging expected future change and thereby main disruptor of balance in the world; climate change. The average global temperature rises, and this will have a myriad of negative impacts on our society and environment. In order to reduce these impacts, two measures have often been debated: mitigation and adaptation. Mitigation encompasses human interventions focused on reducing the emission of greenhouse gases. Adaptation measures are adjustments to the system in response to the forecasted weather events of the future (Watson, 2001).

In conjunction with other general trends such as urbanisation, an overall increase in population and the proportional increase of the ageing population, climate change will have some serious implications for cities. Since cities are densely populated, and with the tendency that this will continue to grow, the negative impacts of climate change on cities could become unmanageable (Hughes, 2005). In order to mitigate the consequences of these impacts, cities should be prepared for future scenarios. They should be capable to absorb some of these impacts and to bounce back or transform accordingly. A resilient city will therefore maintain its structures and functions and thereby sustain its socio-ecological status without impairment resulting from the consequences of a hazardous event (Davoudi, 2012).

In order to predict the future climatological changes in the Netherlands, the KNMI (2015) has developed four scenarios to assess within what order of magnitude we can expect climatological transitions in the near future (figure 1.1). These diagrams represent changes in temperature and amount of precipitation for the coming hundred years. The scenarios show that more extreme weather events should be expected. Heavy rainfall, longer periods of drought and higher temperatures will become the new standard. Among the consequences of these changes

are more flood events, subsidence of the groundwater level and more heat-related casualties (KvK, 2018). This means that from a climatological perspective, these changes should be anticipated upon, also in future-oriented planning of the physical environment.

Figure 1.1: Future climate scenarios for the Netherlands



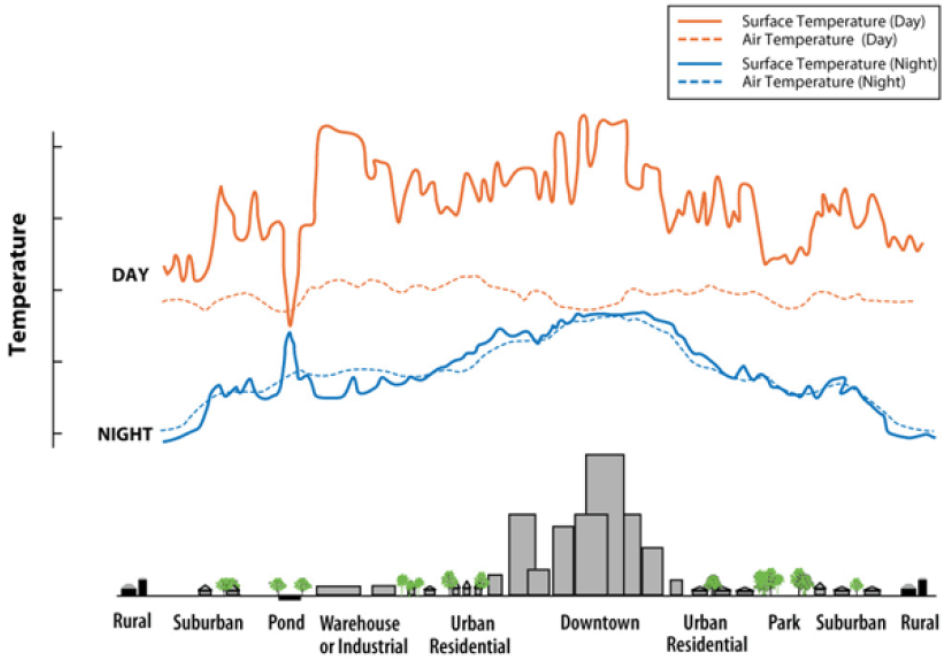
Source: KNMI, 2015.

In the past, Dutch climate adaptation policies were to a large extend focused on the expected water-related issues. The heat wave of 2003 however, raised awareness of the increased heat-related issues to be expected (Boezeman & Kooij, 2015). This heat wave resulted in 1400 to 2200 heat-related fatalities in the Netherlands (Van Loenhout et al., 2018). Adjusting to temperature is, much like dealing with floods, not something entirely new to humans. Much of the urban design can be attributed to this concept. In Mediterranean countries, the streets are often very narrow in order to provide for shading and in the larger streets long rows of trees will take care of this. In the Netherlands however, this has not been the case. Heat was never an issue in this country with an oceanic climate. Relatively warm winters are followed by relatively cool summers. This implies that traditionally the Dutch urban areas are not designed to provide

a cooling function. The consequences of increased temperatures could therefore be substantial for Dutch cities.

Cities are much more vulnerable to increased temperatures compared to the countryside. Temperatures in cities could be significantly higher than in rural areas due to the characteristics of the materials used for the built areas accompanied by the reduced amount of greenery. This phenomenon is called the Urban Heat Island effect (UHI) (Masumoto, 2014). The use of the term island shows that this increase in temperature is local; the areas with an increased temperature compared to other areas could be perceived as islands of heat. On average, Dutch cities are 2.9 °C warmer during the day than their surrounding rural areas and 2.4 °C warmer at night. Maximum differences can grow up to 9 °C during the day and 7 °C during nights (TNO, 2012).

Figure 1.2: UHI effect; the variation in air and surface temperature between urban and rural areas during day- and night-time.



Source: EPA, 2018b.

Global warming is not just a predicted trend for the future. It is a trend that has already commenced since the beginning of the 20th century. In the year 2015, the earth's average temperature was 1 °C warmer than in the period 1850-1900. In the Netherlands, this difference was 1.8 °C, almost double the world's average increase in temperature (NAS, 2016). In case we succeed the targets set in the Paris agreement, the world's average temperature will continue rise with a maximum of 2 °C (Rijksoverheid, 2018). This is the difference in temperature between 2015 and 2050. This increase in temperature, together with the increase in

temperature from the previous century and the UHI effect, Dutch cities would be an average of 6.7 ℃ (1.8 + 2 + 2.9 = 6.7 ℃) warmer during the day in the year 2050 than the conditions these cities were initially designed for before 1850. A variation that could have serious consequences for Dutch urban areas. Future warming in the Netherlands is projected to range from an average of 1,0 ℃ to 2.3 ℃ in summers in the year 2050 (KNMI, 2015). This means that even if mitigation strategies succeed, adaptation is still a necessary enterprise.

In Appendix 1, the various major negative impacts of increased heat for urban environments are depicted in a mind map. The National Adaptation Strategy (NAS, 2016) also made a mind map, presenting all predicted impacts for the scenario of a warmer country (Appendix 2). In chapter two, this will be elaborated more extensively. These figures show that there are a myriad of consequences for urban areas in encountering increased temperatures. Each of these impacts demands a different approach, which makes the issue even more complex. For instance, dealing with increased mortality requires a different approach than dealing with a reduction in comfort.

1.2 Approach

Local governments are increasingly considered to be the most important initiator of effective climate adaptive planning because of their ability to align the costs and risks on the local scale with the involved stakeholders (IPCC, 2014; Storbjörk, 2007). This alignment is necessary because the risks – and thereby the preferred form of adaptation – are context specific. Even though more and more scholars investigate the role of private parties and citizens in resolving the issues, municipalities can still be seen as the key players in adaptation planning, mainly because the primary facilities and the shared space that could suffer from hazards are the municipalities' responsibility, e.g., water facilities and the maintenance of urban greenery (Lehmann et al., 2013). This is why this research mainly focuses on the coordinating and facilitating role of local governments in anticipating and dealing with heat.

In order to stimulate a local approach, the Dutch government developed a national adaptation strategy: the Deltaprogramme (Deltacommissaris, 2018). The goal for climate adaptation is to be climate proof in 2050. To achieve this, all levels of government have to adopt climate proof activities into their policy. A first commitment is made by forcing all municipalities, waterboards, provinces and the state to perform a stress-test before 2019 to gain insight into the areas most vulnerable to the consequences of climate change (Deltacommissaris, 2018). Because of the multi-faced character of the issues concerned with climate change, and the possibilities for improvement of adaptive capacity within several sectors and institutions, the

aim of the strategy is to let climate adaptation be an integral part of all municipal policies. The term often used for this concept is *mainstreaming*.

The adaptation strategy works in three phases: Analysis, Ambition, Action (Deltacommissaris, 2018). Currently, the process is still in the Analysis phase. Local governments are currently working on developing stress maps in order to depict the locations of the UHIs (Deltacommissaris, 2018). However, these stress tests are a mere indication of possible risks within the area and do not describe measures or establish norms (Van der Strate, 2019). So, in order to move to the Ambition phase and therefore to increase awareness of the problem and its possible solutions, a general understanding of the issue of heat stress should lead to policy designed to counteract these impacts (NAS, 2016; Deltacommissaris, 2018). However, this general understanding is still missing so a general sense of urgency is absent as well, more research is therefore favoured (Lanting, 2017). Various local governments are responding to the call from higher authorities to do something about the heat issue. But because of uncertainties about the task itself and how to approach the issue, many municipalities are struggling to translate their knowledge to practice (Wilschut, 2018; Klok & Kluck, 2018). Because of these uncertainties there is a risk of fragmentation. Where one would focus on reducing health problems by developing heat protocols, others may do this by increasing the indoor thermal comfort, the outdoor thermal comfort or implementing measures reducing the temperatures at night-time. These are fragmented solutions with diverging intentions, but all addressing the issue of heat. But then what is the target to aim for? When is an area heat resilient?

1.3 Purpose

Because of the desire to act, but diverging reasons why, the issue of heat stress risks being ignored and therefore failing to gain a firm spot on the agenda (Klok & Kluck, 2018). Since there is a call for more awareness, this research aims to investigate why some Dutch municipalities take on the issue of heat stress and how they approach the issue. This would provide insight into the urgency of the issue and possibly allow a statement to be made about success factors for implementing heat stress policy. One might see local issues as a stack of priorities. In one municipality, the issue is placed higher on the stack than in others. The goal of this research is to find out why and how heat stress is prioritised by local authorities and their approach toward the issue.

1.4 Research design

The central question this research focuses on is:

How is the issue of urban heat stress prioritised and approached by medium sized cities in the Netherlands?

Since the goal of this research is to gain insight into what led to the development of these approaches and how municipalities aim to ingrain climate adaptive thinking and behaviour into their own activities and those of the public. This means that there are two components in this research: a review on the agenda setting process and a preview on the approach towards the issue. See figure 1.3 for a visual representation. In order to draw lessons, the various efforts carried out by the municipalities included in this research shall be conceptualised by linking the empirical data to the theory. This will provide the necessary input to answer the main question and sub-questions.

The central question will be addressed by posing the following sub-questions:

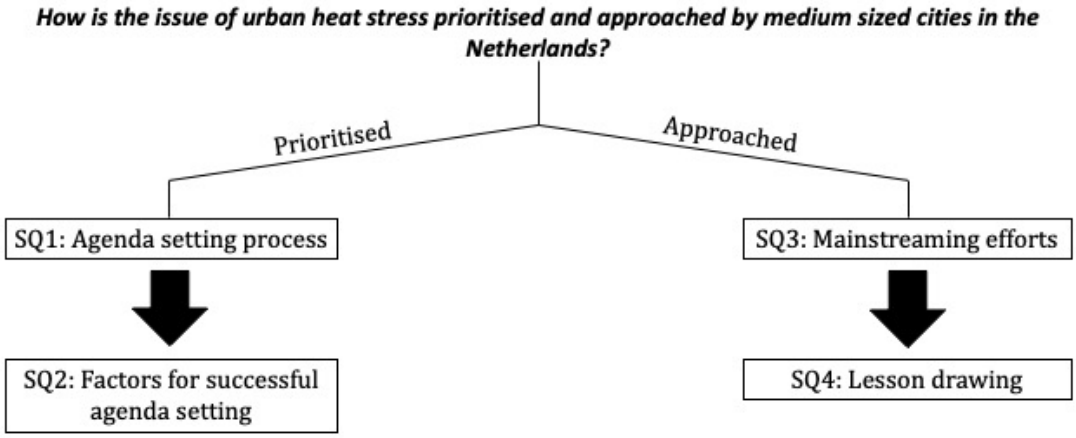
SQ1: *How did the successful municipalities accomplish the establishment of heat stress onto the policy agenda?*

SQ2: *Which factors contribute to the successful establishment of heat stress into local policy?*

SQ3: *To what extent has the objective of heat resilience been mainstreamed into the local policies of the researched municipalities?*

SQ4: *What can other municipalities learn from these examples?*

Figure 1.3: Composition of the research question.



1.5 Explanation of concepts

As explained earlier in this chapter, mainstreaming climate adaptation is the integration of adaptation as an objective into established policy sectors and decision-making processes (Bouwer & Aerts, 2006; Uittenbroek et al., 2016). This means that by mainstreaming, an attempt is made to achieve climate adaptation goals through contemporary structures. If a municipality aims to mainstream climate adaptation and to develop a strategy to achieve this, the issue has successfully been established on the policy agenda. More intensified explanation of these concepts follows in the next chapter.

2 Theory

To answer the research questions, adequate knowledge on the various concepts is required. In order to be able to draw lessons and to make statements, the empirical data needs to be conceptualised. This means that insight must be gained into the basics of the concepts of agenda setting and policy formation as well as the problem of heat stress. In this chapter, the framework will be created by which the empirical data can be examined. First, a deeper explanation on the issue of urban heat will be given. Knowledge on the issue will increase understanding on the motivations of a particular approach. Secondly, the theory concerning agenda setting will be elaborated. This will provide knowledge on how and why certain issues become eligible for the development of policy. Thirdly, the formation of climate adaptive policies will be studied. This will help to understand what strategies municipalities employ to achieve their ambitions. Finally, the relations between these theoretical domains will be visualised in a conceptual model. The structure of this model will be the guiding principle for the remainder of this research.

2.1 Heat Stress

As stated in the previous chapter, due to forecasted increases in temperature, serious threads are expected in terms of health risks and potential economic damages. Especially urban areas are at risk as a consequence of increased temperatures due to the urban heat island effect. With expected climate changes, this risk will increase even more. First an explanation will be given on the UHI-effect, followed by an analysis on the social and economic impacts of increased temperatures for urban areas. This paragraph will end with an overview of the different strategies of various governmental organisations, acting on different levels of scale.

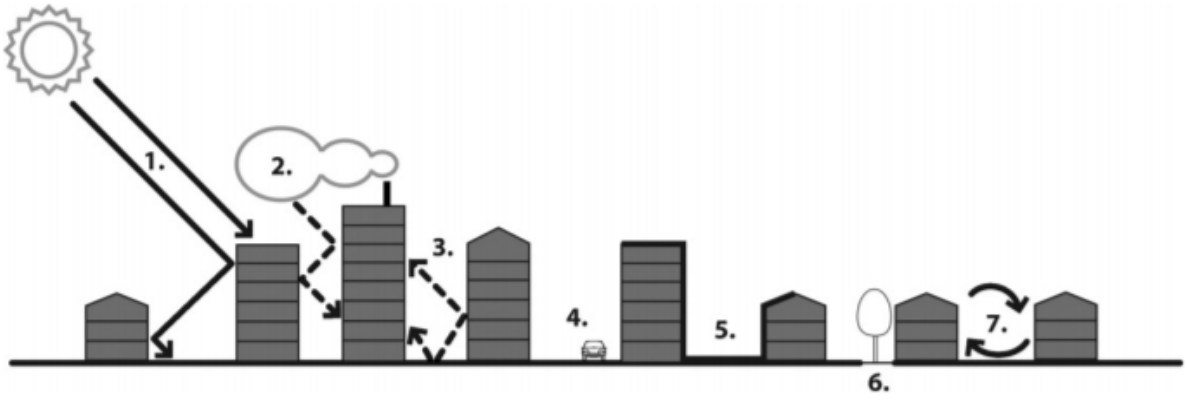
2.1.1 UHI

Cities are often warmer than their surrounding rural areas. Human interventions are the cause of this phenomenon, to be described as Urban Heat Islands (UHIs). Variations in temperature can occur at a very local scale, sometimes a few meters can show a significant difference in temperature. Differences in temperature between cities and their surroundings occur due to various urban, meteorological, temporal and geographical characteristics (Kleerekoper et al., 2012).

According to Kleerekoper et al. (2012), the urban characteristics influence UHIs in the following ways:

1. Urban materials have lower 'Albedo'. This is the fraction of sunlight that is reflected by the surface. Lower albedo means that more solar radiation is absorbed and less is reflected by urban materials.
2. Due to air pollution, higher concentrations of greenhouse gasses, more water vapour and higher temperatures of the atmosphere above the city, radiation is absorbed and re-emitted into the urban atmosphere. This is called the urban greenhouse effect.
3. The fraction of sunlight that does get reflected by the urban surfaces is likely to be intercepted by the walls of surrounding buildings. This way, solar radiation is trapped in the urban environment.
4. Anthropogenic heat is added to the urban area. This is heat produced by human activities such as industries, traffic and households.
5. Urban areas are characterised by a high density of built surface compared to the rural areas. In general, these surfaces have a much higher thermal admittance, causing cities to store the heat, rather than to reflect it.
6. Buildings and paved surfaces are at the expense of vegetation. Urban materials have lower levels of evaporation compared to vegetation. So instead of using the energy to evaporate the water, this energy is used to warm up the urban surfaces and the air above it.
7. Wind plays a smaller role in the transportation of heat, as buildings block the wind and slow it down. Lower wind speeds lead to less cooling of buildings and street surfaces.

Figure 2.1: Causes of the urban heat island effect



Source: Kleerekoper et al., 2012.

Weather conditions also influence the urban heat effect. In the Netherlands, variations in temperature due to the UHI effect could run up to 9 °C (TNO, 2012). Clear, windless summer days offer the optimal conditions for the UHI effect to be at its peak. Less clouds allow more radiation to reach the surface, so more can be absorbed by urban materials. Less wind means less exchange of air between the urban and rural areas, so relatively higher air temperatures (Klok et al., 2011).

The temporal element of the UHI effect involves the occurrence of a daily pattern. Right after sunrise, the UHI effect is minimal. Sometimes the city is even cooler than the surrounding area, due to the shadows of buildings and urban materials storing the incoming heat instead of reflecting it (Van Hove et al., 2010). During the day, there is a steady, but limited increase in the urban temperature compared to the rural. After sunset, the UHI effect intensifies rapidly, because urban materials cool down at a slower pace than vegetation. After a few hours after sunset the effect reaches a maximum value. This will remain constant until sunrise (Van Hove et al., 2010).

Because there are meteorological differences between cities, there can be a variation in the way UHIs manifest between geographical locations. Urban areas close to the shore for instance, can experience additional cooling because of the cooler surface temperatures of the water and higher wind speeds. An onshore wind will then have another impact on these cities than on cities more land inward (Oke et al., 1991).

2.1.2 Impacts

Because of climate change, the urgency of mitigating the adverse effects of UHIs has grown in the past decades. Due to the combined effects of both climate change and UHIs, cities will be significantly warmer compared to the conditions they were initially designed for. Especially cities in the northern, colder parts of the globe will have to adjust to new circumstances. These urban systems are often designed to keep the warmth in and the cold out. Besides, they are generally designed without concerning cooling elements for the urban areas. While parks and water are often present, the overall consideration on reducing the UHI effect is mostly lacking in these cities (Oke, 1988). In other words, reducing heat is not an integrated topic in urban plans in countries such as the Netherlands. This is why, in the current form, the negative impacts of heat in Dutch cities are expected to amplify in the future.

Heat has several negative consequences in the urban environment. Klok and Kluck (2018) divided the negative impacts for heat in the urban environment into five clusters of impact:

health, open space, liveability, water and infrastructure. A brief summary on each of these clusters will help elucidate these risks. See appendix 1 for a visual representation.

Health

The impacts of heat on human health and wellbeing have been researched extensively in the past two decades (Klok & Kluck, 2018). Heat stress can lead to disease such as heat syncope, cardiovascular stress, thermal exhaustion and even death among vulnerable people (Kleerekoper et al., 2012). This group consists of sick people, the elderly and young children (IPCC, 2014). The health impact is not something to take lightly. Extreme temperature events accounted for more than three quarters of the fatalities due to natural hazards in Europe between 1998 and 2009 (EEA, 2010). Health problems result in an increased pressure on healthcare. Next to that, because of the heat the sleeping quality deteriorates, which could also cause cardiovascular morbidity among the weak and vulnerable (Brindle & Conklin, 2011). Other than the direct impacts on health, heat also induces indirect impacts on the wellbeing of urban citizens. The hot air, combined with nitrogen oxide emissions from motorised vehicles and factories, result in smog. This phenomenon, typical for larger urban areas and toxic for humans and animals, will occur more often due to forecasted weather conditions (EPA, 2018a).

Open space

With high temperatures, extra pressure on open spaces is expected. People will move to parks, lakes and city beaches for cooling and recreation. This means that additional forces are needed to facilitate this trend. Next to that, longer periods of heat can result in damage to the flora and fauna in the city, as these are often not capable of dealing with high temperatures on their own. Subsequently, dry vegetation can be vulnerable to fire, especially when a lot of people are making use of green spaces (Klok & Kluck, 2018).

Liveability

It is not a coincidence that our main holiday is during the hottest period of the year. Having to work during high temperatures has a large impact on our labour productivity (Hancock et al., 2007). We simply need to rest and drink more often and people are easily exhausted from light manual work. This effect also impacts our working efficiency. An increase in the core temperature results in a decrease in working efficiency (Daanen et al., 2006). Heat can also have an impact when we are performing other activities such as sports, shopping or enjoying a cold beer on a terrace. For each of these activities, a variety of thermal conditions are favoured. This phenomenon is called thermal comfort and is different for each individual (Kleerekoper, 2016).

Water

Stagnant warm water provides the perfect breeding ground for toxic algae. This puts people in danger who go for a swim in natural waters in order to cool down from the heat. These people then risk serious stomach and intestinal problems (Rijkswaterstaat, 2018). Next to the surface water quality, also the surface water quantity can suffer a decrease. Lower water levels in rivers and an increased demand for cooling water can result in shortages. This can have a negative impact on industries and the transportation of cargo on water (NAS, 2016).

Infrastructure

Because of the higher temperatures, the demand for energy increases due to the use of cooling devices. This puts extra pressure on the energy infrastructure. Higher demand means more supply, so the amount of greenhouse gas emissions from power plants increase as well, resulting in a degraded air quality (EIA, 2018). Sometimes, demand exceeds supply, due to an unexpected rise in demand. This can happen for instance during hot days when a lot of people unexpectedly make use air conditioning. A blackout might occur, leaving a large group of people deprived from electric energy (NAS, 2016). Another aspect of heat is that it causes steel to expand. This has implications for railways and bridges. The risk of the derailment of trains and the malfunctioning of bridges could cause delays in transportation. Besides, for the cooling of steel, often water is used in great quantities, which results in additional pressure on the water system (NAS, 2016).

2.1.3 Measures

There are several measures municipalities can employ to adapt to heat. On the one hand, measures can be taken in order to mitigate UHIs in some heated locations. On the other hand, measures can be taken in order to prevent or mitigate some of the adverse impacts urban heat. This means that some measures focus on addressing the causes of the UHI effect, while others aim to reduce the negative impacts of heat on humans (Kleerekoper et al., 2011). Five different themes can be distinguished by which the measures can be categorised. These themes are greenery, water, buildings, urban structure and behaviour.

Greenery

Greenery has a positive impact on reducing heat because of two reasons. The first is that trees can provide shading. A second characteristic of greenery is that it has a cooling effect due to evaporation (Pötz. & Bleuzé, 2012). This means that plants have a cooling factor. Examples of measures are trees, green facades, green roofs, parks and forests.

Water

Surface water can also reduce heat because of evaporation, although the cooling effects are less intense than with vegetation. Other forms of water-related measures have a much larger cooling effect. Examples of such measures are wet roofs, fountains and wet streets (Pötz. & Bleuzé, 2012).

Buildings

Adjustments to buildings can have a substantial impact on heat reduction. As pointed out above, green or wet roofs as well as green or wet facades provide cooling. This does not only involve the reduction of temperature outside the building, but also inside due to the insulation characteristics of greenery and water (Kleerekoper et al., 2011). Other measures involve increasing the Albedo of roofs and walls by mostly using light materials that reflect the sunlight (Pötz. & Bleuzé, 2012).

Urban structure

The size, density and composition of a city have impact on the development of the UHI effect. By considering the orientation of a new development to the position of the sun and wind, the impact on the UHI effect can be reduced. Providing shade and ventilation are features of the urban layout that contribute to reducing temperatures. Also, the Albedo of urban surfaces can be reduced. For instance, roads that are painted white or the use of pavement materials that have low heat absorption (Kleerekoper et al., 2011).

Behaviour

People are also able to do something themselves in dealing with heat. There are national heat plans in the Netherlands that provide practical tips in case of heat events. These tips include drinking enough water, avoiding physical effort, avoiding heat, providing coolness and helping vulnerable people.

2.1.4 Windup

As described in this paragraph, the issue of heat has a myriad of causes, consequences and possible solutions. With awareness rising, various municipalities in the Netherlands are exploring the multiplicity of the issue and thereby conceptualising the problem and developing an approach towards the issue (Ligtvoet et al., 2015; Werkgroep Klimaatadaptatie Benelux, 2017). However, urban heat is a relatively new concept in the Netherlands and has not yet fully been accepted as an urgent matter everywhere (Wilschut, 2018; Klok & Kluck 2018). Additionally, the issue is a policy theme in development so an understanding of this policy

formation process and the motivations behind these decisions could benefit the framing of the issue. This is why the next paragraph is dedicated to policy theory.

2.2 Policy Theory

In the previous paragraph, the issue of heat stress is elaborated in terms of causes, consequences and possible solutions. In order to answer the main question, it remains necessary to understand what policies are. This is why this paragraph is dedicated to policy theory. First, the concept of policy will be defined, followed by a classification of various types of problems and their appropriate approaches.

2.2.1 Defining policy

Hoogerwerf and Herweijer (1999) define policy as *"an endeavour to arrive at certain purposes, with the use of certain assets and in a certain time sequence."* Hogwood and Gunn (1984) summarise the concept as follows:

- 'Policy' should be viewed independent from 'decision'. A policy generally encompasses a chain of decisions. Whilst a decision is usually connected to a certain actor, a policy also incorporates the interactions between various actors.
- 'Policy' is harder to discern from 'governance'. It is within governance where policy is developed and executed. Policy on the other hand, is a series of governance activities.
- 'Policy' encompasses both behaviour and intentions. It concerns not only the specific purposes, but also the manner in which these words are interpreted and operationalised.
- 'Policy' concerns both acting and non-acting. Policy can thus also involve the act of doing nothing.
- 'Policy' can have both predicted and unpredicted outcomes.
- 'Policy' concerns goal-oriented actions, but these goals can also be interpretations in hindsight.
- 'Policy' and its execution implicate a joint effort between various actors and organisations and the establishment of relationships between them.
- In 'public policy' there is a key role, but not an exclusive one, for governmental organisations.
- 'Policy' is defined subjectively. This means that what policy is, relies mostly on the observer of the policy.

In this context, public policy serves as a governance mechanism in order to accomplish certain goals and with that meet the wants and needs of its citizens. From a policy plan can thus be expected to contribute to resolving a particular problem. This means that policy is shaped by the problem it intends to address. So, to conceptualise policy, gaining knowledge on problems would be essential.

2.2.2 Problems

Hoppe (2010) defines a problem as *"a disconnection between existing conditions and desired states of affairs".* A desired state however is a subjective matter. This implies that problems are not objective facts. Instead, problems are social constructs. Humans assign values, norms and ideals to objects or relations. A disconnection between a desired value of an object or relation and the current state of it can therefore be described as a problem. Problems are thus full of normative elements. What one might consider a problem, another might not due to a difference in opinion. Additionally, perceptions of current or expected situations are constructs made by the observer and hence are subjective matters as well (Van de Graaf & Hoppe, 1992).

According to Douglas & Waldavsky (1983) there are two variables that create diversity among problems. These are the level of consensus over the normative elements and the level of knowledge about the situation. At what level do people agree there is a problem and what do we know about the situation? With these variables, 4 types of problems can be distinguished.

Figure 2.2: Types of policy problems

		Consensus on relevant norms and values	
		Yes	No
Certainty about relevant knowledge	Yes	**Structured problem**	**Moderately structured problem (means)**
	No	**Moderately structured problem (ends)**	**Unstructured problem**

Source: Hisschemöller & Hoppe, 1995.

Structured problems

A problem is *structured* when there is, to a large degree, consensus over the normative elements and a large degree of certainty on the knowledge of the existing situation, the expected situation and the way in which the problem should be addressed (Van de Graaf & Hoppe, 1992). Rittel and Webber (1973) call these problems 'tamed', because of their highly solvable character. These problems are well defined and can be solved through standardised procedures and techniques. Because of their procedural and solvable character, structured problems can be handled by one actor and its solutions are often technical in nature (Hisschemöller & Hoppe, 1995). Solutions are mostly technical because there is consensus on the problem, the desired state and the solution, the only hurdle is implementing this solution. This means the issue is linear; there is a problem which can be solved by a certain measure. The focus is on the content and the goals because the issue is controllable. Although in practice, most planning issues are not (de Roo, 2010; de Roo & Porter, 2006).

Unstructured problems

On the contrary, for *unstructured* problems technical methods will proof ineffective. This kind of problems are hard or even impossible to define due to disagreement on the normative elements, the uncertainties in the knowledge of the context and the preferred trajectory for problem solving. This is why unstructured problems are also referred to as 'wicked' (Rittel & Webber, 1973). Another characteristic of unstructured problems is that there are no hard boundaries between the problem and other problems so they can barely be isolated (Hisschemöller & Hoppe, 1995; Rittel & Webber, 1973). Because of conflicting values and facts, many actors are involved in the process. That is why these problems are referred to as political in nature, because people meet each other exclusively as politicians or citizens to discuss the issue. In more structured types of problems, a division could be made between laymen and experts, but with unstructured problems, no one knows more than the other (Van de Graaf & Hoppe, 1992).

Moderately structured problems

In between structured and unstructured (tamed and wicked) problems, lie the *moderately structured* problems. These are problems that either have a solid scientific basis for problem solving or a high agreement on the normative elements which increases the possibility of problem solving. With moderately structured problems, it is still not certain that they will be solved eventually. Once progress has been made, the problem moves to the structured type of problem as either the consensus on the normative elements or the level of certainty on the relevant knowledge has increased (Van de Graaf & Hoppe, 1992). In problems where there is a

conflict on the relevant knowledge, but consensus over the normative elements, there is agreement on the ends of the issue, i.e., the preferred situation, but disagreement on the means necessary to reach the policy goals. In problems where there is a conflict on the normative elements and consensus on the relevant knowledge, there is agreement on the means to reach a preferred situation, but not on the ends; the preferred situation itself (Hisschemöller & Hoppe, 1995).

2.2.3 Policy strategy

With each type of problem, policy will serve a different function. The policy strategy for structured problems will be 'policy as rule' as the solution for these problems is straightforward. For moderately structured problems (means), the strategy will be 'policy as negotiation'. Since there is agreement on the relevant knowledge needed to address the issue, agreement on the normative elements should be the aim to structure these problems. The policy strategy for moderately structured problems (ends) will be 'policy as accommodation'. The goal of policy here is to increase understanding of the situation in order to structure the problem. With unstructured problems, 'policy as learning' is required. All different parties have to learn about their conflicting interests and information as nothing is certain with this type of problems. Additionally, learning reflects the capacity for problem finding, as unstructured problems are hard to define and interrelate with other problems. Learning is therefore required as a tool to form some kind of framework (Hisschemöller & Hoppe, 1995).

2.2.4 Windup

In definition, policy is the endeavour of arriving at a certain purpose. In public policy, this purpose encompasses the wants and needs of the citizens. A distinction between the current and desired state can be viewed as a problem. A problem can thus be solved by good policy, to arrive at a certain purpose – the desired state – and therefore meet the wants and needs of the citizens. In terms of the issue of heat, one can state that there is rather little certainty on the normative values. There is still no consensus on when an area is heat resilient and on the topic being a problem or not. By carrying out the stress tests however, the certainty about the situation is increasing. The issue of heat can therefore be labelled as a moderately structured problem (means). The logical next step is to conceptualise the problem by formulating a commonly agreed desired state. From analysis to ambition. Different problems call for different approaches, but knowledge of how to solve a particular problem does not necessarily mean that this problem also gets to be solved. Because of the subjectivity of perceiving problems, in the public domain there is a political layer of judgement. How this judgement leads to the actual

development of policy addressing a certain problem is the agenda setting process and will be elaborated in the next paragraph.

2.3 Agenda setting

It remains impossible to solve all problems at once. With a solution to one problem, new problems may arise. Societal changes shape new perceptions, changing the way in which things are valued. Both the physical and the social world constantly transform, creating an endless stream of issues. For the amount of problems public authorities can solve, they have to make a selection on which problems are considered more urgent than others. This process of prioritising and deciding which problems to address by creating policy is called 'agenda setting'.

2.3.1 Agendas

Van de Graaf and Hoppe (1992) distinguish three types of agendas:

1) Policy agenda: A list of subjects that have the attention of a policymaker and for which he or she is engaged in developing or implementing measures.
2) Political agenda: A list of subjects that have the attention of politicians and public administrators.
3) Public agenda: A list of subjects of which the general public deems should be incorporated onto the political agenda.

The way in which a subject is adopted onto the policy agenda is called the agenda setting process (Van de Graaf & Hoppe, 1992). If this process starts with the public agenda, it is called an external initiative; a call from the public can be adopted by members of the city council and then get the attention from the aldermen. This way, the subject moves from the public agenda, to the political agenda, onto the policy agenda. Internal initiatives also occur as politicians often have internal access to the policy agenda. They are able to give direct orders to policy makers and therefore placing it on the policy agenda. It does not matter which trajectory an issue takes. For policy to be made, this topic will always have accessed the policy agenda. However, not all topics will reach this agenda (Van de Graaf & Hoppe, 1992).

2.3.2 Prioritising

As stated earlier, a problem is a subjective construction. When there are multiple problems, decision makers have to select which problems and which solutions to include in policy and which to neglect. This is a matter of prioritising. As different people worry about different things, the level of urgency allocated to each problem will differ as well. This also counts for selecting the preferred solution; some may believe in its desired effect, whilst others may

disagree. There is a choice involved. It is not an undisputed objective fact that economic risks are more important than environmental risks. Just as it is not an objective fact that mitigation strategies are more effective than adaptation strategies in dealing with climate change. Each of us assigns a particular level of urgency to these problems and each of us has a certain amount of faith in its solutions. Whether this is based on our own experiences and interpretations or those of others, it remains a construction of the human mind or a collective social construct. For public policies however, a desired state needs to be formulated that depicts the 'common good' (Van de Graaf & Hoppe, 1992). Individual preferences here are subordinate to our collective preferences. In democracies, what can be defined as the 'common good' is not delineated by one single, all-knowing individual. It is shaped by society as a whole, by the collection of perspectives (de Roo, 2010).

2.3.3 Streams model

If problems and their priority on policy agendas are social constructs, then why do some problems get accepted for policy making and others not? In his book 'Agendas, Alternatives, and Public Policies' (2014), John W. Kingdon researched agenda setting in governmental organisations. He argued that there are three streams, moving independent from another and when they are coupled, changes in the agenda can occur. This moment is called the *policy window*. The three independent streams are the *problem stream,* the *politics stream* and the *policy stream*. For a visual representation, see figure 2.3.

Problem stream

The problem stream is essentially about problem recognition, public matters that require attention (Guldbrandsson & Fossum, 2009). There are several factors that can lead to the recognition of a problem. For political agenda setting, it is important how an issue gets the attention of the participants. One way to get the attention of political actors is in an evaluation process of existing policy. Feedback from this process will have a higher chance of getting attention of the policy organisation than topics outside the organisational scope (Rein & Schön, 2002). Another way problems can obtain attention is through the occurrence of focusing events, such as crises. In this case, the political actors are forced to put the problem onto the political agenda (Birkland, 1997; Kingdon, 2014; Huitema et al., 2011; Van Slobbe et al., 2013). Additionally, indicators can serve as a means to get attention on a problem. Indicators can show for example that there is an increase in poverty, which will open the eyes of the political participants (Van der Brugge et al., 2005). As least as important as getting attention for a problem, is that the way in which it can (possibly) be framed as a problem. The possibility that something will be recognised as a problem will increase as soon as the participants agree that

there is a possibility that the problem can be solved. This is also the case when the issue can be connected to already established problems (Kingdon, 2014; Van de Graaf & Hoppe, 1992).

Politics stream

Entirely independent from the process of problem recognition is the process of political events. These are events such as elections, changes in the government's organisation, interest group pressures, etcetera (Huitema et al., 2011; Enserink et al., 2013). The politics stream encompasses a broad stream of legislators and administrators. They are the ones that make the decisions. These actors and events are a representation of the political climate, or as Kingdon (2014) puts it: "Swings in the national mood". Issues that best fit the political atmosphere as it is are more likely to make it up to the political agenda. This political climate can change quickly, so the window of opportunity for new issues to reach the political agenda will only remain open for a limited amount of time (Kingdon, 2014).

Policy stream

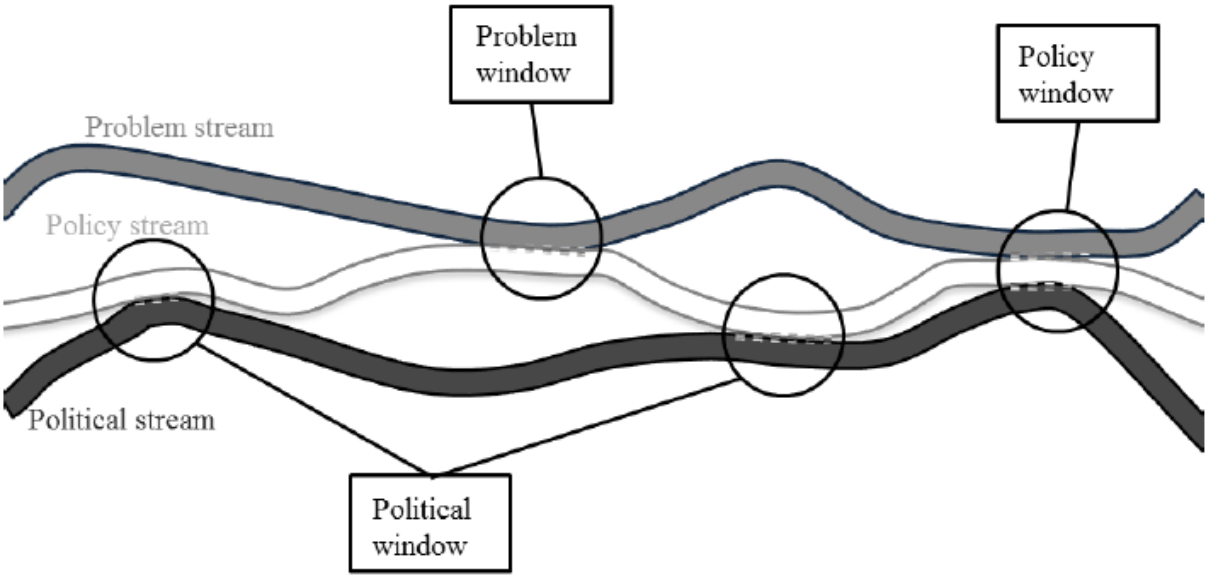
Thirdly, the policy stream is essentially the process of the formation and refining of policy proposals. This can be seen as an agglomeration of solutions (Enserink et al., 2013). The participants of these processes are primarily communities of experts that are embroiled in a continual discourse on which solution is better in terms of technical and financial feasibility, normative criteria and visibility (Kingdon, 2014; Enserink et al., 2013). From this discourse, a selection is made from the various proposals, that will be most competent for implementation. These are the so-called 'best solutions' (Kingdon, 2014).

Policy window

As specified by the stream model, the three streams move independent from each other. The moment when topics are most suitable to reach the policy agenda, is when the three streams coincide (Figure 2.3) (Kingdon, 2014). Sometimes, solutions and problems are coupled but without a suitable political climate to put it on the political agenda. Sometimes there are moments with proposals but without the sense that an urgent problem is being addressed. There could also be a decision to deal with a problem that demands action, but without a feasible solution at hand. This also means that within an organisation, there must be a sufficient amount of expertise in order to propose a solution and work it out (Birkland, 1997). The right ingredients for a topic to settle itself firmly onto the policy agenda, is when the three streams meet each other. These moments are called 'policy windows'; certain moments in time where there is a solution to a problem with the support from the political actors (Kingdon, 2014). These windows often open as the result of coincidence; a problem may emerge for which there

is a suitable solution or a technological development allows for new solutions that can tackle old problems (Enserink et al., 2013). Another way to open windows is through the efforts of the so-called 'policy entrepreneurs'. These entrepreneurs can be all sorts of actors, both in and out of government (ministers, administrators, legislators, lobbyists, etcetera). Their goal is to push their preferences through as soon as a window of opportunity opens. Policy entrepreneurs spend their time, money and skills in order to pass their 'pet problems' and 'pet solutions' so legislators and administrators will adopt them in the policy agenda (Kingdon, 2014; Huitema et al., 2011).

Figure 2.3: Kingdon's 'streams' model



Source: Pauli, 2001.

2.3.4 Policy Entrepreneurs

In order to attain a desired outcome, and therefore for an issue to reach the policy agenda, the main tasks of policy entrepreneurs are to draw attention to the urgency and characteristics of their pet issues, to make innovative policy proposals and to orchestrate compromises (Young, 1991). This means that it is critical for successful policy entrepreneurs to possess networking, bargaining and diplomatic capacities. Additionally, Huitema & Meijerink (2010) distinguished five strategies that policy entrepreneurs apply in the watershed policy making process. These are: (1) the development of new ideas, (2) to build coalitions and sell ideas, (3) to recognise and exploit windows of opportunity, (4) to recognise, exploit, create and/or manipulate the multiple venues in modern societies, and (5) to orchestrate and manage networks. These strategies are mostly carried out in combined form in compliance with the different conditions and character of the various policy entrepreneurs (Huitema & Meijerink, 2010). Below, a short elaboration on these strategies will help to elude their characteristics.

1. *The development of new ideas*

To configure the prevailing system into a new desired state, alternative ideas are needed that aim for policy change. These new ideas can be seen as alternative policy paradigms. It represents a new path towards a desired state. New ideas can involve the representation of this desired state or the approach towards this representation (Huitema & Meijerink, 2010).

2. *Build coalitions and sell ideas*

To change policies, support is necessary since most actors cannot induce policy change on their own. Because there can be different values and opinions among actors and variances in power, the building of coalitions can be a sensitive endeavour (Huitema & Meijerink, 2010). Buttel & Hajer (1997) argue that in the coalition building process, storylines and narratives are vital in alluring new actors to the alternative ways of thinking about the issue (the new ideas). These narratives should be developed in cooperation, creating a joint vision and thereby alignment between the actors involved.

3. *Recognise and exploit windows of opportunity*

The challenge of policy entrepreneurs is to recognise possible windows of opportunity and to put effort in opening them. This process is managed by linking problems to solutions and vice versa (Meijerink & Huitema, 2010). Next to this, policy entrepreneurs have to work to get the acceptance from decision makers on the policy package, i.e., the solution to a problem. By doing this, the policy entrepreneur effectively links the three streams together, creating a policy window of opportunity. This process demands for policy entrepreneurs to possess over good networking skills, willingness to invest time and a good reputation (Kingdon, 2014).

4. *Recognise, exploit, create and/or manipulate the multiple venues in modern societies*

This strategy, also referred to as 'venue shopping', is about the choice policy entrepreneurs make in selecting which actors or institutions will be addressed in mobilising support for their idea (Holyoke et al., 2012). A venue in this case, can be considered as a forum such as the political or administrative arena, scientific working groups or the media (Huitema et al., 2011). The policy entrepreneur has the ability to steer an issue from one venue to another where the issue might have a better chance of receiving support. The policy entrepreneur selects the venue which has the most suitable prevailing institutional environment for the issue to 'catch on' (Holyoke et al., 2012). Policy entrepreneurs can try to alter the venues to their liking, so they will for instance bypass opponents or only have their own supporters represented. They are thus able to select, manipulate and create their own, most favourable, venue (Huitema & Meijerink, 2010).

5. Orchestrate and manage networks

As coalitions are based on agreement and consensus on policy ideas and objectives, networks are a much broader composition of actors. Within networks, the capabilities of others are capitalised on. One actor might be very capable in crafting an alternative policy design, while another might have the necessary connections to push it on the agenda. The policy entrepreneur should be aware of these existing networks and use it to his, her or their liking. Next to that, policy entrepreneurs can create their own networks (Huitema & Meijerink, 2010). As policy changes, the composition of the networks changes as well.

In table 2.1, conclusions from research by Meijerink & Huitema (2010) have been summarised. These points represent what factors cause success in the policy transition process. The various points are derived from case studies.

Table 2.1: Findings on water policy transitions, policy entrepreneurs, and change strategies

On patterns of change	
1	New policy ideas (paradigms, discourses, or ways of knowing) do not replace the "old" ones, rather they are placed alongside them or are integrated with them.
2	After new policies have been adopted, those who have an interest in maintaining the status quo have ample opportunities to delay or frustrate policy implementation.
On policy entrepreneurs	
3	Policy entrepreneurs can be found anywhere, but what they have in common is a good reputation within their respective communities, good networking skills, and perseverance.
4	Successful entrepreneurship often is collective entrepreneurship in which individuals play complementary roles.
On strategies (and institutions)	
5	A combination of bottom-up and top-down strategies makes most transitions happen, and their relative importance depends largely on the particular institutional context or opportunity structure.
6	Successful (individual or collective) entrepreneurs are able to balance advocacy and brokerage strategies.
7	Successful policy entrepreneurs build networks across different ways of knowing water (different meanings).
8	Successful policy entrepreneurs use narratives to frame issues strategically and thereby justify change and attract supporters.
9	Successful policy entrepreneurs anticipate windows of opportunity by developing and testing attractive policy alternatives and demonstrating their feasibility.
10	Successful policy entrepreneurs employ strategies of venue manipulation and venue-shopping, and/or create new venues to be able to insert new ideas into decision-making processes.
11	Successful policy entrepreneurs manage to institutionalize new ideas (discourses, images, or ways of knowing), and in this way create barriers to future change.
12	Successful policy entrepreneurs have a full and thorough knowledge of the institutional system they are working in and know how to use that system.

Source: Meijerink & Huitema, 2010.

2.3.5 Windup

We now know that agenda setting is the process of awarding a certain priority to an issue and to make sure that efforts will be made to address this problem. Before this commitment is made, the problem and a possible solution need to be coupled and harmonised with the political perspectives. Actors that are committed to the issue, the policy entrepreneurs, have several strategies at hand to steer this process of coupling the three streams. But then what would be the next step? How will this promise for action result in an actual approach?

2.4 Policy formation

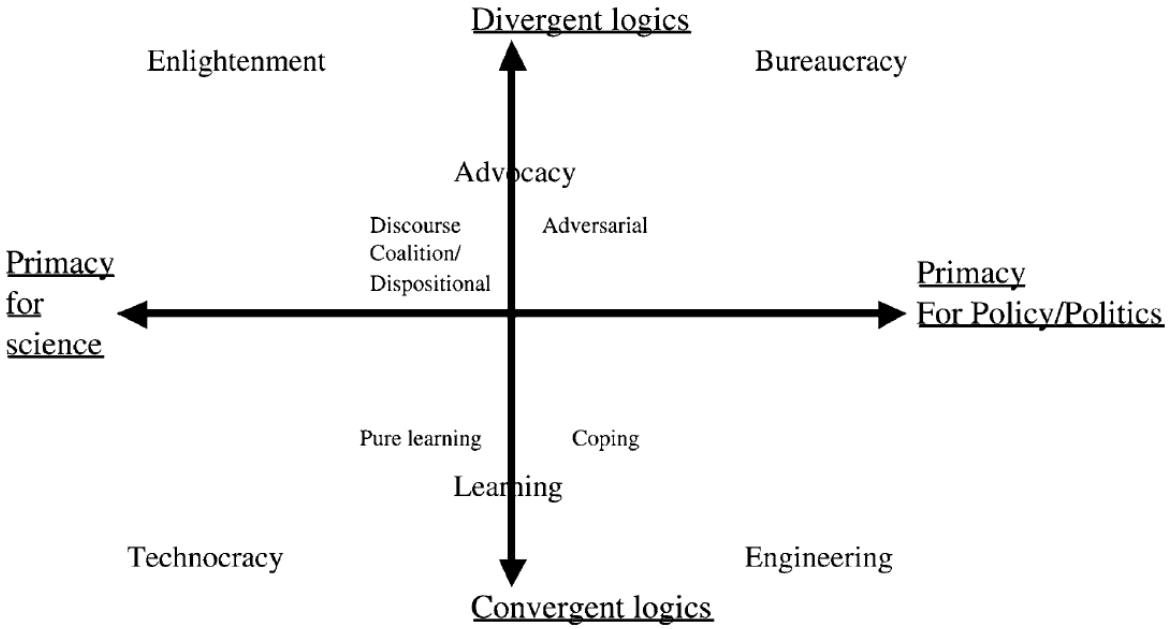
According to Lasswell (1971), policy science encompasses "the production and application of knowledge of and in policy". Until now, mainly the *knowledge of policy* has been discussed. This type of knowledge is concerned with how policy and policy processes emerge and evolve. The other aspect of the policy sciences is *knowledge in policy*. This type of knowledge is concerned with the obtainment of the results of scientific practices, using this as input for the policy plan. Successful policy plans are dependent on the accessibility and availability of scientific knowledge (Van de Graaf & Hoppe, 1992). Scientific knowledge concerns compositions, processes and impacts that are relevant for shaping the content of policy plans. In contrast, knowledge of policy relates to the factual situation of a specific policy area, the relationship between means and ends in policy and the normative principles in order to make political judgements (Van de Graaf & Hoppe, 1992). This paragraph will elaborate on the transference of scientific knowledge into policy. How knowledge can serve as input for making policy plans.

2.4.1 Science-politics relationship

Hoppe (2005) researched the various interactions between science and politics and constructed a typology representing the different ways in which scientific knowledge is used to shape policies. The typology consists of two dimensions, representing the degree to which science and politics converge or diverge and the way in which they depend on each other. This first dimension, named 'logic of social function' by Hoppe (2005), is generally a representation of the correspondence between science and politics. Is there a strict boundary between science and politics (divergence) or do the two work in synergy (convergence)? The second dimension, named 'primacy' by Hoppe (2005), represents the degree of precedence of politics over science or vice versa. In this second dimension, there are three conditions which are worth elaborating. The first condition is where science is predominant over politics. This is called a *technocratic* relationship. Here, definitions of policy goals and procedures are dictated by science. Science in this condition is the legitimacy of political judgement and reasoning. On the other side of the

spectrum, where politics is predominant over science, the political bodies call upon science when needed. This is called a *decisionist* relationship. Science in this sense merely serves as instrumental knowledge used by politicians when needed. These political actors are the ones that can decide which knowledge they deem usable for their political endeavours and when they want to use it. Settled in the middle of the spectrum is the third dimension, which is called the *pragmatist* relationship. Science and politics mutually influence each other. Science now reflects on the selection of both policy ends and means and political bodies critically reflect the usability of the scientific knowledge for the development of policies. In figure 2.4, the two dimensions are constructed along two axes and form a diagram on which several models are positioned.

Figure 2.4: Relationships between science and politics



Source: Hoppe, 2005.

2.4.2 Windup

In this paragraph, the knowledge IN policy has been elaborated. How does an ambition get translated into policy? A key ingredient in this process is the availability of a sufficient amount of scientific knowledge. The interaction between politics and this scientific knowledge can occur in multiple ways. This framework consists of the matter of convergence or divergence between scientific and political purposes and the primacy of science over politics and vice versa. In other words: how is scientific knowledge produced and how is it used by politicians? Do politicians decide which knowledge should be produced or does science evolve independently? Does

science dictate politics or do politicians only use science at their own advantage. This relationship is an important factor in the policy formation process and will therefore have a large impact on the actual approach towards the issue. In the next paragraph, the strategies that can be employed to address the issue will be explained.

2.5 Synthesis

In the year 2015, a new policy window opened in the global climate change challenge. In Paris, 194 states and the European Union signed an agreement to collectively counteract climate change and its adverse effects. By signing the agreement, targets have been set and responsibilities dispersed (Huitema et al., 2018). The agreement can thus be seen as a promise to put climate related issues on the policy agenda. This paragraph will be dedicated to exploring the actual approach to the issue, the theories underpinning this strategy and possible barriers in this endeavour.

2.5.1 Approaching the issue

The spatial layout of a city influences the occurrence of UHIs. From municipalities can thus be expected to set the tone through their land-use plans and spatial development strategies in order to stimulate the development of measures addressing heat stress and UHIs. Not only spatial planners are to be held responsible for finding solutions. Also, the healthcare, construction and energy sectors can and should play a role in dealing with urban heat (Uittenbroek, 2011).

In their assessment report on climate change, the International Panel on Climate Change (IPCC, 2014) explained the following five presumptions to be leading in defining strategies for managing the risks and dealing with the consequences of climate change:

- *Adaptation is place and context-specific, with no single approach for reducing risks;*
- *Adaptation planning and implementation can be enhanced through complementary actions across levels, from individuals to governments;*
- *Reducing vulnerability to present climate variability will demand actions with co-benefits for other objectives;*
- *Recognition of diverse interests, circumstances, socio-cultural contexts and expectations can benefit decision-making processes;*
- *Economic instruments can foster adaptation by providing incentives;*

The issue of adaptation is thus context-specific. There is not one perfect approach. In other words, the problem is not structured. Thereby, because of the cross-sectoral nature of the issue, adaptation planning is a collective purpose. The main strategy proposed by the various reports by authorities such as the 'IPCC' (2014), the Dutch 'Deltaplan' (Deltacommissaris, 2018) and the Dutch 'National Adaptation Strategy' (NAS, 2016) is that municipalities should aim for the mainstreaming of adaptation in various disciplines.

2.5.2 Mainstreaming instruments

There are three types of instruments municipalities can select in order to integrate policy in one or more policy disciplines. These are legal, economic and communicative instruments and can also be perceived as sticks, carrots and sermons, respectively (Uittenbroek, 2011; Runhaar & Driessen, 2007).

Legal steering instruments

Legal steering instruments are used to create a desired framework in which actors are allowed to act. Adjustments to the law can perform as a tool for municipalities to achieve a desired outcome as actors will be legally obliged to play by the newly established rules. In the context of adaptation measures for example, municipalities can legally force developers to only use certain materials, build green roofs or increase the amount of greenery where new developments are planned (Uittenbroek, 2011). This is why the stick is used as a metaphor. The participants are forced to follow the directions set by the authorities.

Economic steering instruments

Instead of forcing, municipalities can choose to stimulate individuals or organisations by creating financial incentives. The idea behind economic steering instruments is that actors will always select the most financially attractive option. Municipalities can create these incentives by awarding grants for beneficial developments such as the planting of greenery or reducing taxes for the construction of green roofs. Next to creating incentives, also financial punishments can help guiding actors into the right direction. For instance, penalties can be given to those who develop new constructions that increase the UHI effect. The metaphor of the carrot refers to the carrot that was used to lure the animal towing the cart in the desired direction. This in contrast to the stick, that was used to force them forward.

Communicative steering instruments

A third type of instrument municipalities can use is a communicative strategy. The philosophy behind this steering model is that actors base their choices on what is best in their opinion

(Uittenbroek, 2011). Steering this opinion can therefore be a strategy to guide actors to make certain decisions in favour of what is desired by the steering authority. Municipalities using this type of steering instruments can influence actor's decisions by, for instance, put a green roof on all municipal buildings or inviting citizens to think of solutions to heat-related issues. Evacuation plans and websites are likewise communicative instruments municipalities can implement in order to guide actor's decisions (Uittenbroek, 2011).

2.5.3 Selecting mainstreaming instruments

Making a decision on which steering instruments to apply depends on a few factors (Bemelmans-Videc et al., 2003). First of all, the instrument has to be effective, the steering model has to fit within the main goals of the municipality. Does it contribute to the municipality's general strategy or does it interfere with the process? Secondly, the type of steering instrument has to be efficient. Municipalities must realise which problems emerge when implementing a certain steering instrument. Thirdly, the instrument has to fit within the municipality's legal climate. It should be considered whether it is justified, for instance, to charge citizens for something on their private grounds. Finally, there is a democratic condition in the selection process. The municipality should be able to give grounds for the steering tools they use. Charging citizens for the fact that the municipalities aim is to be a frontrunner in climate adaptation is not an acceptable rationale. However, when for example the public health is jeopardised, it surely is justified to charge a person or organisation.

2.5.4 Policy integration

In the process of policy making for heat-related issues, policy makers have to ask the following questions (Uittenbroek, 2011):

- What causes the heat problem in the city?
- What are the consequences of this problem?
- Which of these consequences should the municipality address?
- Which measures are effective?
- How high is the urgency and awareness amongst the private sector for the problem?

In practice, making adaptation policy proves to be quite the challenge. Because the issues are so complex and divergent, a single 'best approach' will not be sufficient. The proposed strategy to integrate adaptation into the plan making processes of various disciplines will therefore be a large task for authorities and policy makers in various disciplines. They will have to add additional elements to their already complex task of crafting policies and making decisions. According to Lafferty and Hovden (2003), who investigated the strategy for environmental

policy integration, policy integration consists of two components; a vertical and a horizontal component. Vertical policy integration concerns the level in which a specific governmental sector has adopted certain objectives (in their case, environmental objectives) into their own portfolio of objectives this sector traditionally pursued. Horizontal integration on the other hand concerns the extent in which a higher overarching authority formulated a strategy for the integration of the topic among the several policy sectors (Lafferty & Hovden, 2003). The aim for policy integration should be that the new objectives will be balanced with the existing ones under the condition that instead of overpowering the existing ones, new objectives become part of the old ones (Lafferty & Hovden, 2003). This definition implies a certain degree of synergy between the existing interests and those to be integrated. Because each field differs from others, each sector has to find out how to balance these interests with their own existing ambitions.

2.5.5 Barriers

Biesbroek et al. (2011) investigated the barriers specific for the issue of integrating climate change adaptation into local policies. They came up with a list of 7 barriers to climate adaptation. These barriers are: (1) conflicting timescales, (2) substantive, strategic and institutional uncertainty, (3) institutional crowdedness and institutional voids, (4) fragmentation, (5) a lack of awareness and communication, (6) a lack of motives and willingness to act, (7) lack of resources. Each of these barriers will briefly be explained.

Conflicting timescales

Contemporary politics benefit from pressing issues with quick, visible results. Politicians are celebrated when they make an end to problems and when they are able to deal with the dynamics and volatility of modern societies. Adaptation however, is characterised by the prevention of forecasted problems rather than solving existing ones. In addition, the benefits from implementing climate adaptive measures will only be visible in the long term (Storbjörk, 2007; Biesbroek et al., 2011). So, return follows a long time after investment. Something our political system does not always appreciate.

Substantive, strategic and institutional uncertainty

As stated earlier in this thesis, wicked problems, such as climate change and adaptation, involve a lot of uncertainties. Substantive uncertainties are uncertainties about our knowledge of climate change, uncertainties about the instability of natural systems and uncertainties about the reflexive behaviour of humans. Substantive uncertainty involves uncertainty about the information that is used for decision making (Koppenjan & Klijn, 2004). Strategic uncertainty involves uncertainty about the strategies decision makers employ in order to attain their

targets. Institutional uncertainty involves the various institutional backgrounds of the different decision and policy makers in the process of policy making (Biesbroek et al., 2011). This last type of uncertainty can also be described as uncertainty as a result of different perceptions about the issue of heat stress.

Institutional crowdedness and institutional voids

An institutional void means that there are too little institutions giving guidance to actors in dealing with climate change. No shared understanding of the problems, no formal or informal norms, rules or values about the subject means there is no general understanding of what strategy actors can hold on to in the policy making process. An institutional void also involves a lack of instruments, protocols and mechanisms aiding the actors in the process. Institutional crowdedness however is the opposite of this. Too many institutions make it almost impossible to act. All the rules, norms and values combined create an impenetrable landscape for new solutions to get through. Old and new institutions collide due to divergent goals and conflicting perceptions (Biesbroek et al., 2011).

Fragmentation

Adapting to the consequences of climate change is a cross-sectoral and multi-levelled challenge. Coordination and connection between the various actors, institutions, organisations and policies from various disciplines, at different levels of scale, are therefore crucial factors in approaching the issue in a holistic manner (Biesbroek et al., 2011). A lack of coordination and connection will result in fragmentation. Disconnected policies and approaches will only solve part of the problem. As said earlier, there is a need for the integration of adaptation in all related fields of policy. Fragmentation will therefore make it almost impossible to mainstream adaptation into these different disciplines.

Lack of awareness and communication

Public awareness about climate change and its consequences is crucial for adaptation to be an integrated part of plans and policies. The acceptance of adaptation and its urgency can only occur once it has been communicated in a beneficial manner. As soon as the public perceives the urgency of adapting to climate change, the developments in this field will accelerate. Influencing these opinions should therefore be performed with care. Namely, negative opinions will decelerate the development of adaptive plans and policies (Biesbroek et al., 2011).

Lack of motives and willingness to act

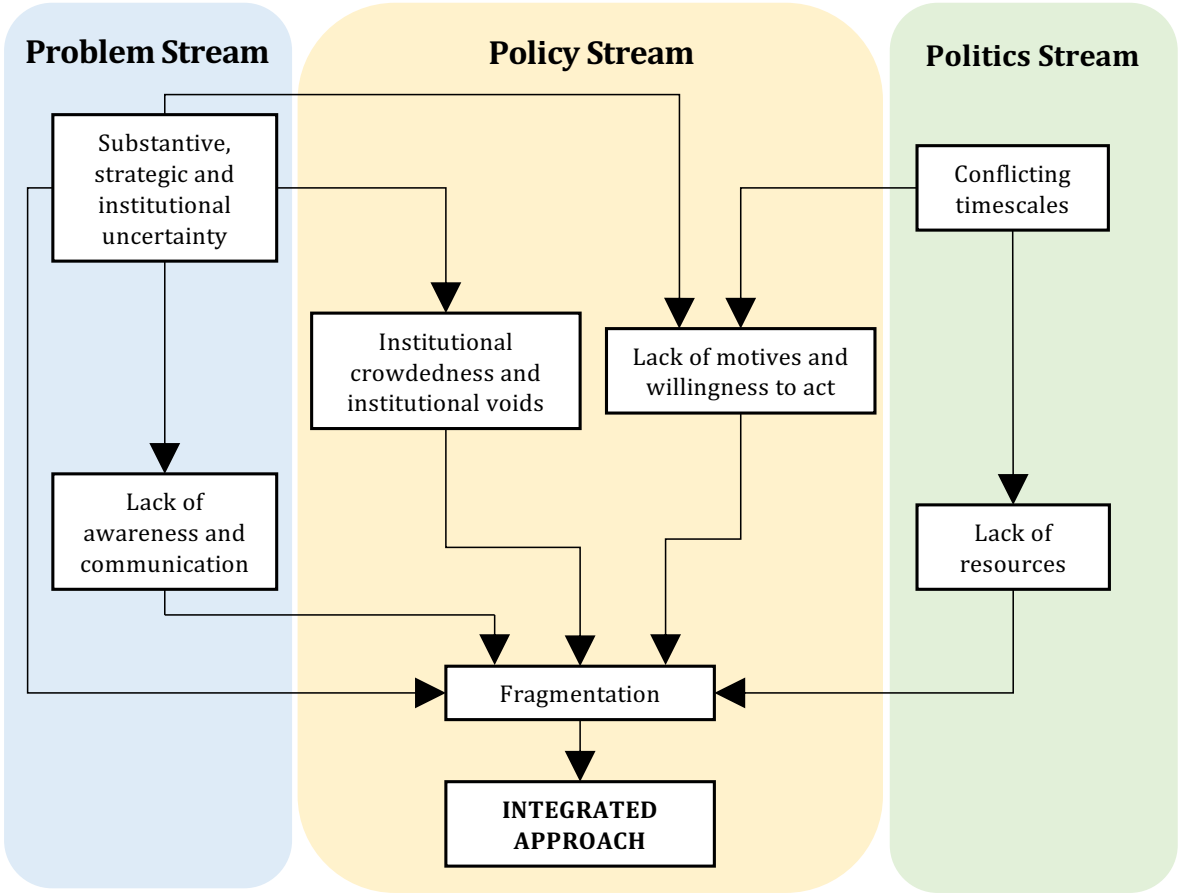
There are several factors that lead to people engaging in adaptive behaviour. These factors influence the willingness to act. Among these factors are ethical beliefs, norms, values and attitudes. These factors can be influenced by for example a crisis or event or by leadership. Another way to influence people's willingness to act is through good policy entrepreneurship (Biesbroek et al., 2011). In other words, good governance can lead to an increase in the motivations and willingness of people to deal with climate change in an adaptive manner. When certain elements are missing, this will create a barrier in mainstreaming adaptation.

Lack of resources

Resources are a key ingredient in the creation of adaptive capacity (Füssel, 2007). A deficiency of resources will therefore create a barrier for the integration of adaptation into local policies. Among resources can be considered human, financial, information, physical and natural resources. Each of these has its own specific impact in the field of climate adaptation. Human resources are needed for their expertise and management skills. Financial resources are needed to support the processes of finding solutions and implementing adaptive measures. Information resources are needed in order to do proper research, which needs contextual knowledge and credible data. Physical resources are valued for the measures themselves. And finally, natural resources are needed because land and/or space is needed for climate adaptation (Biesbroek et al., 2011).

Logically, these barriers interact with each other. For instance, a lack of motives and willingness to act influences a lack of resources; when one is not willing to deal with an issue, they would not invest in it. Another example is institutional crowdedness or institutional voids leading to substantive, strategic and institutional uncertainty; if there are no instruments or tools guiding the decision-making process, this could lead to project managers deciding to incorporate the issue in their plans or not, hence institutional uncertainty. In figure 2.5, these interactions between the barriers have been depicted.

Figure 2.5: Interactions between the various barriers to the integration of climate adaptation in local policies.



As depicted in figure 2.5, the barriers can be connected to the three streams from Kingdon's model. The various types of uncertainty have their origin in the problem stream, since it can be associated with problems regarding the structuring of the problem. In other words, it is a characteristic of the problem that it is hard to structure due to several uncertainties. The same counts for the lack of awareness, which is a result of opposing perspectives and a lack of clarity in how to approach the issue (Biesbroek et al., 2011; Uittenbroek et al., 2012). The same can be illustrated in the politics stream, where conflicting timescales is clearly a characteristic of politics which causes a barrier towards approaching long term issues. This can result in the decision to refrain from taking responsibility and deal with the issue, which implies no allocation of resources and an unwillingness to act. Since the combined impact of these barriers result in fragmented approaches, working towards an integrated approach could be a solution in dealing with these barriers.

2.5.6 Windup

In general, strategies from higher authorities such as the IPCC, Deltacommission and the NAS, suggest that municipalities should aim for an integrated approach towards heat stress and climate adaptation in general, thereby mainstreaming climate adaptive thinking and behaviour into their decision-making processes and day-to-day activities. Municipalities can select different instruments in order to carry out this mainstreaming process. These steering instruments can be classified by carrots, sticks or sermons; respectively economic, legal and communicative steering instruments. The decision of which instrument to apply depends on the fit with the organisational institutions and ambitions. This integration has two facets, namely vertical and horizontal integration, wherein horizontal integration encompasses the embedding of the issue across all departments and in the vertical sense through the entire sector. This allows each department to formulate climate adaptation through their own lens and commands them to balance these interests with their existing ambitions. Because there are various barriers to the integration of climate adaptation into local policies, these have also been elaborated in this paragraph.

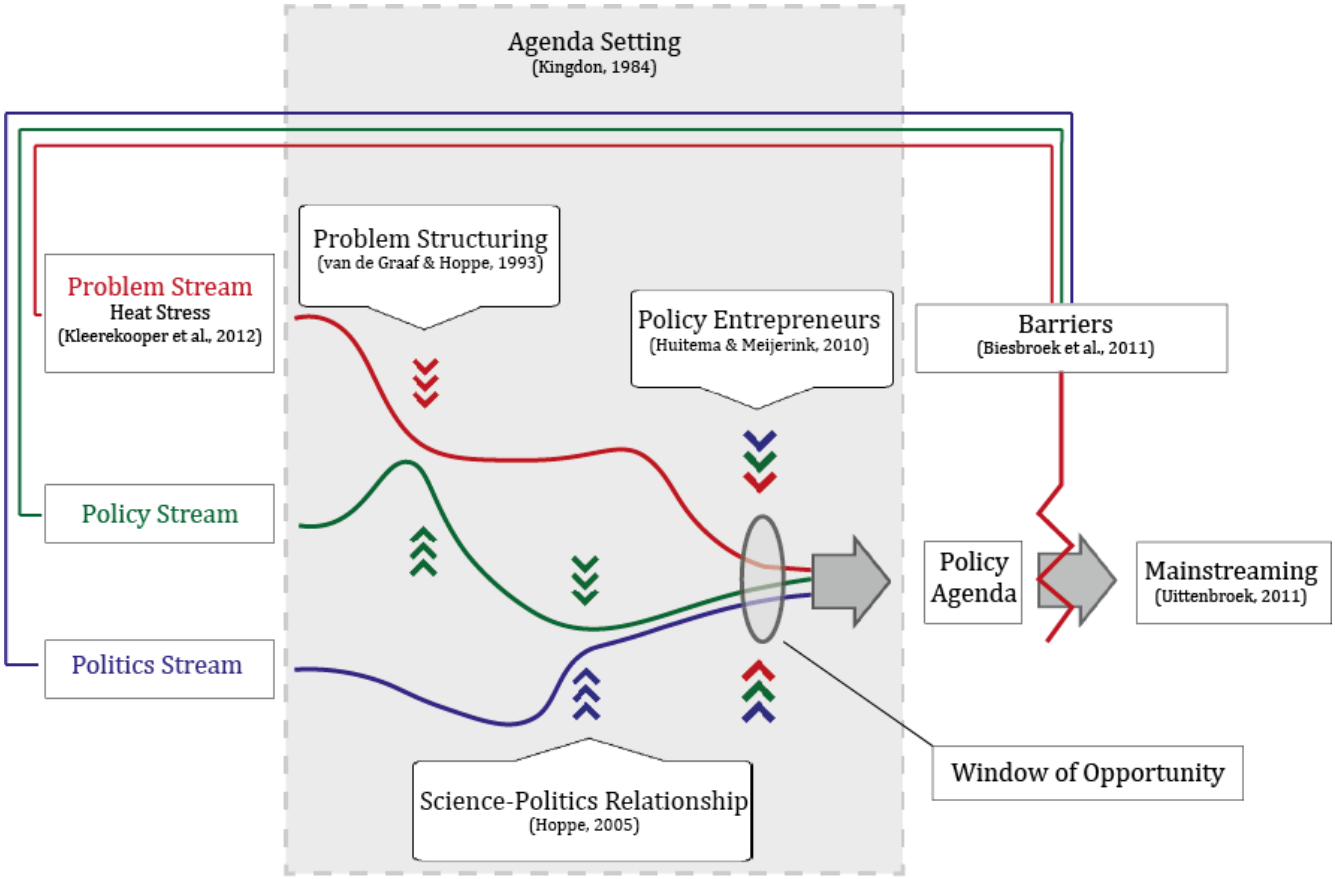
2.6 Conclusion

With heat stress and UHIs, Dutch cities have a relatively new problem to deal with. Attention and awareness are growing, but various barriers are still obstructing the complete integral adoption of heat adaptation in various policy processes (Biesbroek et al., 2011; Uittenbroek et al., 2012). This still causes a lot of uncertainties about the size and consequences of heat in the city. The problem with these uncertainties is mainly that this holds back climate adaptive progress as authorities are not fully committed to act (Biesbroek et al., 2009; Storbjörk 2007; Kingdon 2014; Uittenbroek 2014). There are risks due to uncertainties. Risks can reduce the willingness to act and provoke a 'wait and see' mentality among decision makers. And without action, the strategy of learning by doing will not work at all (Vulturius & Gerger Swartling, 2015; Surminski & Lopez, 2014; Moser, 2009. These uncertainties are caused by several factors, such as the unquantifiable character of the adverse effects of urban heat and the incidentality of heat waves. With this lack of awareness, willingness and resources, the various urban issues that do possess a clear sense of urgency and means to an end will have primacy over the issue of urban heat (Biesbroek et al., 2009; Storbjörk 2007; Kingdon, 2014; Uittenbroek et al., 2014). Short term certainty is usually valued over long term speculation just as quick returns are generally valued over long term investments. Nevertheless, various municipalities are taking on the task as uncertainty reduces due to evaluations of various fragmented initiatives and the emergence of strategies with increasing specificity from higher authorities (Bulkeley & Betsill, 2013; de

Graaff et al., 2017). Various cities take different initiatives in the adaptation process, leading to a variety of urban laboratories to derive new knowledge from. Their motivations, efforts and results will be investigated in the remainder of this research.

2.7 Conceptual Model

Figure 2.6: Conceptual model



The conceptual model (Figure 2.6) portrays the policy formation process in accordance to the theory used in this chapter. The first part of the model is the agenda setting process, which is presented with the aid of the streams model (Kingdon, 2014). This model consists of the three streams which are coupled to the topic. The problem is heat stress, the solution is climate adaptation, and the politics is about awareness on the urgency of the issue. The streams can be forced towards each other through the theoretical concepts of problem structuring (Van de Graaf & Hoppe, 1992), the science-politics relationship (Hoppe, 2005) and policy entrepreneurs (Huitema & Meijerink, 2010). The concept of problem structuring forces the problem stream and the policy stream towards each other, because this theory encompasses the problem description and consequently a categorisation of the problem accompanied by a type of policy approach suited for this kind of problems. The relationship between science and politics allows

the policy stream and the politics stream to converge or diverge. This has to do with how science informs politics and vice versa on how to solve the issue. Policy entrepreneurs in this process have the ability to bring the problem under the attention of politicians. With the right timing on the window of opportunity, this creates the momentum needed to accept the problem on the policy agenda. Once on the policy agenda, local authorities start developing policy concerning the issue. As argued previously in this research, municipalities are aiming for the mainstreaming of climate adaptation to build resilience towards the adverse effects of climate change. Underpinning this process are the theoretical concepts of mainstreaming (Uittenbroek, 2011) and the possible barriers (Biesbroek et al., 2011) that can be encountered and should be overcome. These barriers originate from the various streams and have their impact on the formation of policy concerning the mainstreaming of climate adaptation in local policies. This model forms the framework to which the empirical data can be reviewed and analysed.

3 Method

In this chapter, the method used to collect the empirical data will be described. The various choices that have been made in order to select the most appropriate method will thereby be legitimised. Furthermore, this chapter will explain the selection of the cases used to substantiate the answers to the research questions; the selection of the cases and to what degree they stand in comparison will be motivated.

3.1 Ontology

The course of the conceptual design as depicted in the previous chapter, shows the progress of moving from theoretical knowledge to practice. With the use of empirical data, a bridge can be built between the two realms. The process of extracting this empirical data will be defined in this chapter as this is what the research methodology encompasses. The methodology can be defined as being the justification of the choice and use of a particular method. Underpinning this methodology lies a fundamental philosophical stance on theoretical perspectives, motivating the logic and criteria of this methodology (Crotty, 1998). This means that in essence, research is conducted within a philosophical framework of fundamental principles concerning knowledge, validity and reality. In light of the theory examined in the previous chapter, the fields of agenda setting and policy design are heavily dependent on context.

Various forces provide input to these processes. Often these forces are subjective matters such as ideas, values and believes, the assumption of a reality that is 'out there' can thus be rejected. In this view, reality and rationality are social constructs, created by humans through the exchange of opinions and experiences. A theoretical perspective very much in line with the subjective, dynamic, complex and non-linear character of agenda setting and policy making processes is the post-structuralist stance (Hurst, 2017). Because post-structuralists believe that reality is composed of continuous social interactions, reality is in constant flux. Spatial planning is therefore more about understanding and guiding change than being deterministic. This highlights the connectivity between the social and the physical realm as changes in the physical realm are the result of interacting social, physical, biological and cultural processes (Allmendinger, 2017).

What this perspective means for this research, is that the actual implementation of climate adaptive measures and policies is the outcome of various interacting processes and the efforts of various actors within the system. If and how these policies and policy outcomes are produced

is therefore dependent on a lot of different forces, both internal and external. This is where the true challenge lies. Because there are so many influencing forces from different areas, guiding the system towards a more climate resilient future is a very complex task and will demand governing agencies to recognize changes in patterns and capitalise on opportunities as they appear.

Gaining an understanding of how certain municipalities are working towards a more climate resilient future will require context specific information on the efforts these organisations undertake in order to mainstream climate resilience into their existing institutional context, taking advantage of emerging patterns and connections. So, in order to answer the research question, and therefore to gain an insight in how these municipalities approached the issue and the motivations underpinning those decisions, empirical data will be required. This means that a qualitative method will be used to extract the information needed to support this research.

3.2 Research Design

The choice is made to gather the required data using a qualitative case study. Because this research focuses on the how and why of municipal efforts in climate resilient agenda setting and policy making, empirical data is essential in understanding the context-specific and complex nature of the research subject (Yin, 1981). This allows the researcher to understand the behaviour and opinions that characterise the respondent. As a result a narrative can be created explaining why and how heat stress—and climate adaptation in general—are adopted in local policies. Because the aim of this research is to gain insight in the motivations of certain choices and the storyline leading to the outcome, quantitative research methods will not be incorporated in the research design. Additionally, only a small group of municipalities has an appropriate fit within this research because the number of medium-large cities in the Netherlands is only limited, especially the front runners. This leads to the research objective of generating in-depth knowledge from some key players instead of more comprehensive knowledge from a larger population (Longhurst, 2013). The application of a focus group as a research method has also been explored. However, because the aim is to gain insight into the local endeavours concerning heat resilience, having these actors from different municipalities interacting with each other will not be satisfactory for this research. Additionally, because the topic is rather new and the number of actors actively working on the issue within the local organisations, these actors are invited to contribute to a lot of different researches. Having them cooperate to a single interview will therefore be a satisfactory favour.

3.2.1 Semi-structured interviews

The empirical data required to create this narrative will be gathered by performing semi-structured interviews. In this type of qualitative research, the interviewer aims to obtain information from the respondent by asking questions in a conversational fashion, although with the use of some pre-established questions (Interview Guide: appendix 4). This open manner of interviewing contributes to the acquirement more in-dept information about the context and the subjective forces driving the respondent in their efforts (Longhurst, 2013). It is thereby important that the interviewer creates a comfortable environment, is paying attention to what the respondent has to say without being judgemental in order to provoke candid statements (Krueger & Casey, 2000). While conducting these interviews, the interviewer must steer the conversation where necessary as to prevent deviating from the topic of interest. The informal tone of the conversation allows for open responses instead of yes or no type of answers.

3.2.2 Policy analysis

Next to acquiring the knowledge about the topic necessary to create the right questions and to be able to conversate on a certain level of depth, context specific knowledge is also important. This means that the researcher must immerse oneself in the local efforts combating the adverse effects of climate change (Longhurst, 2013). This is the reason why an analysis of local climate adaptive policy pieces will be added to the research design. These policies will be gathered by requesting the respondents via e-mail or by scanning public policy documents. The various local policy pieces used for this analysis are shown in table 3.1.

Table 3.1: Documents for policy analysis.

Policy Document	**Source**	**Municipality**
Structuurvisie Arnhem 2020 - doorkijk 2040	Gemeente Arnhem, 2012.	Arnhem
Impuls Ruimtelijke Adaptatie Breda	Gemeente Breda, 2016.	Breda
Beleidsregel: Klimaatrobuust (her)inrichten en ruimtelijk ontwikkelen	Gemeente Eindhoven, 2018.	Eindhoven
Klimaatplan 2016 - 2020	Gemeente Eindhoven, 2016.	Eindhoven
Stresstest Klimaatadaptatie Groningen - Ten Boer (Rapportage + Bijlage)	Gemeente Groningen, 2018.	Groningen
Klimaatadaptatie Agenda	Gemeente Haarlem, 2017.	Haarlem
Concept GRP 2019-2020	Gemeente Leeuwarden, 2018.	Leeuwarden
Advies Klimaatadaptatiestrategie Leiden	Leidse Milieuraad, 2018.	Leiden
Plan van aanpak Klimaatadaptatie	Tauw, 2015.	Tilburg
Groen- en waterplan Zaanstad	Gemeente Zaanstad, 2018.	Zaanstad

3.3 Case Selection

The study of climate adaptive policy making mainly focuses on municipalities, as they are the ones translating theory into practice. Municipalities have the responsibility to connect several contextual elements to the ambition of climate resilience. It is at this governmental level that input is assembled to create climate adaptive policies and to integrate climate adaptation within their existing institutional framework. Dutch municipalities in general are therefore the case selected for this research. At the centre of the debate, the people are concerned with the task of creating the policies and pushing the topic onto local political agendas. As stated in paragraph 2.1, larger urban areas are more vulnerable to the consequences of climate change, this will be the focus of this research. However, because the largest Dutch cities are different from the medium sized cities in terms of resources, their approach to climate adaptation will be different as well and therefore hard to compare and to make general statements. This is why the choice has been made to focus on the middle-sized cities. But not every medium sized city is a suitable candidate for this research, as some municipalities are still struggling. In these cities, climate adaptation is not quite firmly on the political agenda. Gaining insight in their efforts of coupling of climate adaptive goals to their local ambitions will not be satisfactory for this research as these efforts are minimal. To summarise, the case this research focuses on are the municipalities of medium sized cities in the Netherlands that have climate adaptation on their political agendas and are therefore advanced in their policy making process. Some suitable cases were identified because of their involvement in the research project 'Hittebestendige Stad' (Heat reslilient city) by the HvA. Others were identified through news articles or other research projects, representing their local efforts in dealing with urban heat.

3.3.1 Selection of respondents

The research population for this study consists of actors directly involved in the local climate adaptation policy making process, preferably the so called 'policy entrepreneurs'. The aim of this research is to get insight into the efforts, motivations and choices that lead to the adoption of the climate adaptive policy in the specific local context. Key figures in these processes would therefore make suitable candidates as they actually experienced and participated throughout the entire policy cycle. They should therefore be able to answer questions as to why certain decisions were made, who were involved and what the consequences of these decisions were.

As stated earlier, the suitable cases were identified from their participation in the research project 'Hittebestendige Stad' or from news articles concerning local efforts on the issue of heat stress. Because the project 'Hittebestendige Stad' is supervised by Jeroen Kluck, who is involved

with both the HvA and Tauw, connections were made by using his network. Others were identified through analysing local endeavours in order to locate the key figures.

The nine suitable respondents were approached per email or telephone. Table 3.2 provides an overview of these participants. The interviews would take place at their municipal office. This way the interviews would not be too much of a nuisance for the respondents and take place in a familiar environment. Ahead of the interviews, the respondents would receive an email with an explanation about the research and the questions that would be asked. This way the respondents had some time to prepare for the interview.

From the nine respondents, five can be labelled as policy entrepreneurs, being the respondents from the municipalities of Breda, Groningen, Tilburg, Arnhem and Eindhoven. The others indicated that they were involved in a later state and that someone else initiated the agenda setting process. The respondents with the role of policy entrepreneurs have declared to be the drivers for change in their local organisation concerning the topic. While several other persons from other municipalities in this role have been approached to contribute to this research, they either refused the request or appointed a colleague to be of assistance. According to them, these colleagues would possess over the right knowledge to answer the questions in the interview guide. In practice, this turned out to be satisfactory as well.

Table 3.2: Information about the interviews and respondents

Respondent	**Municipality**	**Date interview (d/m/y)**	**Role**
Resp. 1	Zaanstad	10/10/2018	Consultant Climate Adaptation / Soil Specialist
Resp. 2	Breda	12/10/2018	Consultant Spatial Adaptation and Water
Resp. 3	Groningen	15/10/2018	Policy Officer Urban Green / Process Manager Climate Adaptation
Resp. 4	Leeuwarden	16/10/2018	Water Ambassador / Initiator Spatial Adaptation
Resp. 5	Tilburg	22/10/2018	Policy Officer Water / Process Manager Climate Adaptation
Resp. 6	Haarlem	23/10/2018	Programme Manager Climate Adaptation
Resp. 7	Leiden	25/10/2018	Policy Advisor Water and Spatial Development
Resp. 8	Arnhem	31/10/2018	Strategic Management Consultant on Climate Adaptation and Energy Transition
Resp. 9	Eindhoven	01/11/2018	Consultant Climate Proof Eindhoven / Consultant Governance and Spatial Planning at Deltares

Since this research aims to create a general image of municipal efforts in dealing with urban heat, one interview and one policy document per medium sized city would sufficiently contribute to the creation of this image. This because the focus is not on gaining depth through analysing the specific effort and underlying motivations of each specific heat related intervention. Rather, local strategies will be analysed as well as the specific choices that have been made in the creation of these strategies. These strategies in turn will justify the specific local efforts and therefore be a suitable input for comparing the various municipalities and thereby creating a general representation of local policy addressing urban heat stress.

3.4 Data Analysis

The first step after conducting the interviews is to transcribe the tape recordings to written text. Subsequently, the transcripts will be analysed with the use of Atlas.ti Cloud. This is a free online tool that supports the analysis of qualitative data. With Atlas, the transcripts are used to label the respondent's various quotes. These labels are called codes. Codes are created in the process of analysing the transcripts. By combining the various specific insights derived from the individual interviews, patterns can be recognised and based on this, assumptions can be made. Because of the wide variety of input given by the respondents, it can be hard to draw conclusions due to a lack of overview. Grouping the different codes into categories is therefore the next step of the methodology. This allows the researcher to generate a theory on a specific topic based on the experiences and insights of the various respondents in correspondence to the theoretical concepts discussed in chapter 2. This means that the codes are grouped in categories representing the different theoretical fields incorporated in the conceptual model: the agenda setting process, problem recognition, policy entrepreneurs, science-policy interaction, policy design, mainstreaming efforts and barriers. These categories have further been divided into subgroups when necessary, see table 3.3. In chapter 4, these categories will be addressed in separate paragraphs. While analysing these categories, it is important to investigate how the different codes within the categories relate to each other. This is an iterative process of coding and categorising. Some codes can thereby be allocated to multiple categories or none at all. It is also possible that opposing codes turn up in the same category. The various codes used to analyse the transcripts can be viewed in appendix 5. The transcripts themselves are not included as appendices for reasons of confidentiality. They are in the possession of both the author and supervisor.

Table 3.3: Grouping of codes

Categories	**Subgroups**
Agenda Setting Process	Agenda Setting Ambitions
Problem Recognition	Awareness Analysis
Policy Entrepreneurs	Idea Development Coalition Building Managing Networks Opening Windows Venue Shopping
Science-Policy Interaction	Politics Governance Stress Test
Policy Design	Strategy Steering Instruments
Mainstreaming Efforts	Integration Vehicle
Barriers	Conflicting Timescales Uncertainty Institutional Crowdedness & Voids Fragmentation Lack of Awareness Lack of Motives

4 Data

In this chapter, the results from the interviews will be elaborated as well as the results from the policy analysis. These results will provide the empirical information required to answer the main and sub questions of this research. In the first paragraph, the results of the policy analysis will be elaborated. In the second paragraph, some of the input delivered by the respondents will be portrayed. Because the theory from chapter 2 is structured according to the conceptual model, the data acquired in the interviews will also be structured in this order. This will benefit the process of composing the conclusion as well as reading comfort, since both the empirical data and the theory from the literature have been structured in the same way and will therefore be less challenging to compare.

4.1 Policy Analysis

Before the empirical data obtained from the respondents in the semi-structured interviews will be elaborated, a brief policy analysis will help elucidate the essence of the climate adaptive endeavours by the various municipalities. Next to that, a general insight can be gained in the different approaches between the researched cities. This paragraph therefore contains a brief report on the approaches of each city based on the analysis of several policy documents. The various municipalities dealt with separately in order to deliver an insight into the differences in approach towards the issue.

Zaanstad

The issue of climate adaptation is mainly covered in the 'Groen- & Waterplan' (greenery and water plan) of the municipality (Gemeente Zaanstad, 2018). Although the plan is mainly focused on water-related issues, the municipality aims to tackle the heat-related problems by increasing vegetation near the main routes and large parking areas and by adding small-scale parks in neighbourhoods lacking greenery. Next to these physical interventions, the focus will be on stimulating private individuals and increasing the awareness on the issue. Their plan of action is to establish a core team, encourage local initiatives, formulate objectives and develop a yardstick to monitor progression (Gemeente Zaanstad, 2018).

Breda

In their report on the challenge concerning climate adaptation, the municipality of Breda employs the term spatial adaptation rather than climate adaptation. They emphasize that next to adapting to climate change, the city faces the challenge of adapting to urbanisation. These

challenges combined shape the term spatial adaptation. The ambition of the municipality of Breda is to keep the urban environment attractive regardless of these challenges. In order to fulfill this ambition, the focus will not be on regulation and employing norms, but on coupling, stimulating and facilitating (Gemeente Breda, 2016). In addition, the municipality of Breda has initiated several pilots concerning heat adaptation in their project "Breda koel als het moet". This involves the development of heat resilient schoolyards as well as making urban green areas more accessible (Gemeente Breda, 2016).

Groningen

In order to formulate the climate adaptive challenge per sector, the municipality of Groningen employed the systematics of the NAS (2016). The NAS shows the consequences of climate change and groups these consequences in different sectors. While performing the stress tests, municipality of Groningen used this information in order to formulate climate change within their context and what this means for the various sectors. This allowed them to prioritise certain neighbourhoods with increased risks. As an approach towards integrated climate adaptive policy, the municipality of Groningen adopted the seven ambitions from the DPRA (Deltacommissaris, 2018). According to this strategy, next to mapping out vulnerabilities, the municipality should conduct a risk dialogue; they should find out what should be considered the biggest challenges, involve more actors and gain more in-depth knowledge. In other words: prioritise, gather support and more detailed research. This risk dialogue allows them to start with the development of an implementation agenda, which involves the exploration of stimulating and legal instruments, the opportunities for the coupling of interests and responses to disasters (Gemeente Groningen, 2018).

Leeuwarden

In similar fashion as the municipality of Groningen, Leeuwarden adopted the seven ambitions from the DPRA (Deltacommissaris, 2018). However, the main target for the Netherlands established by the Deltacommission, to be climate adaptive in 2050, has been scaled up to 2035 in Leeuwarden. In order to attain this target, the municipality abides by four principles. The first principle is that the city will become more climate resilient with every revitalisation and infrastructural project. The second principle is a strong focus on greenery; green is good, greener is better. Thirdly, climate resilience will not only be achieved through large projects, also a lot of smaller adjustments should contribute to the challenge. The fourth principle is that of cooperation; governments, companies and residents should work together. The issue is mainly secured through the municipal sewerage plan (Gemeente Leeuwarden, 2018).

Tilburg

The ambition of the municipality of Tilburg is to be climate adaptive in 2040. In order to accomplish this, three working pathways have been formulated. The first is that of the safe, healthy and liveable city. The objective here is to gather knowledge upon both the physical and the social risks and risk locations. According to this knowledge, the spatial design can be adjusted. This involves taking water and greenery into account with every development and to analyse the risks outside of the planned area to prevent cascading effects. The second working pathway is the integrated approach, the internal strategy. This pathway focuses on raising the internal awareness and experimenting with pilot projects. It is a dynamic cyclical process where learning is the central aim. These lessons can later be used for the development of policies. The third pathway comprises the external strategy; the municipality as a partner and a source for knowledge and inspiration. Within this pathway, the municipality aims to stimulate and facilitate cooperation and bottom-up initiatives and innovations. Additionally, the municipality will work on increasing support and awareness among the public (Gemeente Tilburg, 2015).

Haarlem

For Haarlem to be climate adaptive in 2050 and to have climate adaptive policy in 2020, the municipality formulated fourteen principles which will lead to an annual collection of measures. In Haarlem, climate adaptation is adopted in the municipal sewerage plan, the maintenance programme and in their vision for the future for the Environmental Planning Act. Next to that, climate adaptation will be a key demand in urban plans. This means that the plan should be in accordance with certain requirements, based on neighbourhood typology and type of soil. Additionally, these plans should require a climate adaptation paragraph. In the climate agenda (2017), the municipality of Haarlem denotes to start research on the added value of climate adaptation, subsidised green roofs and the possibility to work with a discount on property tax for climate adaptive houses in order to stimulate the public (Gemeente Haarlem, 2017).

Leiden

Because the climate adaptation strategy has not yet been confirmed by the bench of Mayor and Aldermen from the municipality of Leiden, a letter from the Milieuraad (environmental council) advising the authorities on the concept version of the strategy will provide the input for this policy analysis. In the letter, the Milieuraad highlights the focus on sustainable development in the climate adaptation strategy. Next to the aim that climate adaptation should be considered in the development of policy guidelines, in every governmental sector, this means that urban design directives should be created for the development of new houses. In addition, simulations should indicate the impact of new developments on the issue of heat and the amount of

greenery should be amplified. The type of strategy by the municipality can be categorised as a decentralised neighbourhood-oriented approach. This means that there is much room for participation and public consult (Leidse Milieuraad, 2018).

Arnhem

In their vision for the future, Arnhem has formulated six principles that form the spatial development perspective for the city. One of those principles is cyclical and adaptive development. This means that the city will focus on restructuring and transforming the city in accordance to new challenges such as the energy transition and climate adaptation. There is specific attention to the issue of heat, as water-related issues are already secured through the municipal sewerage plan and the local water plan. Arnhem formulated being climate adaptivity as "being comfortable, both in- and outside, and to avoid health risks". In order to achieve this, Arnhem aims to make use of its geographical positioning where advantageous air flows can provide a natural cooling effect. This ambition has been used to formulate the three policy ambitions for the municipality. The first ambition is to secure and utilise the cooling functions of the natural air flows around the city. Secondly, efforts should be made to prevent further heating. The third ambition is to reduce heat stress, both in- and outside, to improve local well-being. These ambitions will serve as fundament for further recommendations for the city in the future (Gemeente Arnhem, 2012).

Eindhoven

Every five years, Eindhoven constitutes a municipal climate plan. The latest is climate plan 2016-2020 and encompasses both mitigation and adaptation. The adaptation side is divided into the four challenges of rain, heat, drought and secondary effects (Gemeente Eindhoven, 2016). In order to develop policy instruments to address these challenges, two projects were started: the climate adaptation test and monitor. The test encompasses three guidelines: infiltration, storage and cooling. Based on these guidelines, development directives were formulated accompanied by a set of possible measures. The aim is to secure these directives and measures in the next municipal sewerage plan. The climate adaptation monitor should help observe the process made for each municipal sewerage plan. This instrument works with pre-established criteria for the amount of greenery and pavement, available water storage, shadow in the pedestrian areas and the distance to a cooled zone. The quantities of these criteria are grouped in labels, with label A being the most climate resilient and E the least. The climate adaptation test and monitor are incorporated in the policy rule for climate resilient development. The policy rule states that the entire area of the municipality of Eindhoven should

meet the requirements of label B of the climate adaptation monitor and thereby be in accordance with the guidelines from the test (Gemeente Eindhoven, 2018).

4.2 Semi-Structured Interviews

In this paragraph, the empirical data from the interviews on the efforts of the various municipalities in setting agendas concerning climate adaptation and heat stress in particular will be presented. In the previous paragraph, a distinction has been made between the various municipalities. This paragraph however follows the path of the conceptual model, meaning that the information gathered in the interviews will be presented in accordance to the theoretical domains depicted in the conceptual model. First, the general agenda setting process will be elaborated, followed by a more detailed illustration of the various forces that shaped this process, being problem recognition, policy entrepreneurs and the relationship between science and politics. In the fifth sub-paragraph, the local mainstreaming efforts will be portrayed. Finally, the various barriers encountered through the entire cycle will conclude this chapter.

4.2.1 Agenda setting process

With the exception of the municipalities of Leiden and Arnhem which were stimulated to create climate adaptive policy through EU subsidised projects, all municipalities approached climate adaptation through the water sector. Although the motivations for this approach were different, all respondents agree that approaching climate adaptation from the water sector is a logical first step since the water-related consequences of climate change are the most tangible. In five cases, the establishment of climate adaptation on the policy agenda was the result of external pressures such as the Delta Decision Spatial Adaptation (DBRA) 2014, KNMI scenarios, focusing events or the EU. In the remaining four cases, the call for action came from the political domain; aldermen or local members of council. For the municipality of Tilburg, the issue remained on the shelf for a few years:

Resp 5

"In Tilburg we have been working on the mitigation-side of climate change for a long time. After an evaluation of the 2009 climate plan, members from the political party of GroenLinks argued for more attention on adaptation since the focus was solely on mitigation. This request to do something with this adaptation remained for years and somehow I was interested to pick up this challenge."

Seven respondents specifically emphasized the role of policy entrepreneurs in the agenda setting process. According to them, efforts from within the organisation in concurrence to growing awareness and external pressures proved crucial for the agenda setting.

Resp. 3

"In terms of water, we have been working on climate adaptation since the floods of 1996. What we did not have though, was that integrated approach on climate change. Two years ago, we – myself in particular – started working on this. We saw it heading our way, especially after the announcement from The Hague, but also because of growing political awareness. And then the DPRA came, by which I, as a local government official, had a big stick to get it on the political agenda, with that integrated scope. And so it came to pass…"

4.2.2 Problem recognition

In the interviews, the respondents often emphasized the unknown component of climate adaptation. They seemed to struggle with defining climate adaptivity, the desired state.

Resp. 8

"But actually being climate resilient, I don't know what that is. Does this mean that in 2050 we do not suffer from the consequences of heat events? That is utopian, it will not happen. It is unattainable".

Especially the issue of heat provoked confusion. Several respondents pointed out that water-related issues could be solved mostly through technical measures, but with heat-related issues this would not be possible because next to a physical component, this issue had a large social component such as health and behaviour. Problems concerning water could therefore be expressed in numbers in contrast to problems caused by heat. The issue of heat would therefore proof to be arbitrary and even harder to measure, let alone define the state in which the problem is solved. According to the respondents, it should therefore be defined through discourse, both within and outside the organisation.

Resp. 4

"Not every red dot on the map needs to be solved, that is the dialogue".

Resp. 9

"What I was interested in was what could be defined as climate resilience. No one knows. It has not been defined, so let's determine this together".

However, not being able to fully define the problem does not mean that municipalities should not act. According to all respondents, solving issues concerning heat is mainly through common sense in the local context.

Resp. 5

"I would say "just do it", not only keep waiting on stress tests, because in my opinion, common sense could take us far as well".

Because the issues concerning climate change have a myriad of diverging impacts, the respondents suggest a more integrated approach.

Resp. 2

"*We have to think and work in a more integrated fashion than which is possible now".*

Some respondents think that there is a role for the new Environmental Planning Act as this demands more cross sectoral cooperation and development of integrated plans.

Resp. 1

"I think it has to be integrated, especially with the new Environmental Planning Act where everything needs to be approached in an integrated fashion. If you see the multi-faced character of climate adaptation, this Act comes at the right moment".

4.2.3 Policy entrepreneurs

As stated in paragraph 2.3.4, the efforts of successful policy entrepreneurs can be divided into five categories: 1) Idea development by performing pilots and experiments, 2) Coalition building by gathering support, 3) Opening windows of opportunity, 4) Managing networks to make sure how others think, 5) Venue shopping by using different platforms to raise awareness.

Idea Development

Six respondents stated that they were actively working with pilots. They argued that by implementing these measures, awareness rose, both externally and internally, and it was therefore easier to strike up a conversation about the subject. According to them, this step is necessary in the process of concretising the issue. Dialogues should be helpful in order to

optimise and to more effectively link climate adaptation to other topics. According to the respondents, learning about the possibility of coupling climate adaptation with other intentions of various actors is the main reason for working with pilots.

Resp. 9

"*We're working with pilots, such as Geestenberg, where we start experimenting how we can get in touch with the residents. We also have an action programme for Strijp-S, where we are more dealing with project developers".*

Coalition Building

All of the respondents stated that they were not alone in their venture pushing adaptation on the agenda. At some point in the process they started looking for support within the organisation. Adherents were found and core groups were formed with colleagues from inside and outside the respondent's department. In order to find support within the organisation, one must find out how the organisation is composed.

Resp. 9

"It really helps to understand the organisation so I can see what paths to take in order to get things done".

Also, in politics coalitions proof useful. Six respondents declared that adherence from an alderman was a crucial factor in the effective policy agenda setting process. In three cases the support of the political party GroenLinks was helpful for agenda setting since this party values sustainability and therefore climate adaptation. Many respondents also put effort in finding support outside the organisation. By involving private parties such as housing corporations, insurance agencies, health services and companies, new alliances were formed. According to four respondents, some third parties have been working on the issue already separately.

Resp. 5

"... it turned out that the GGD (municipal health service) was also working on this, only they chose a different approach. But that is not a bad thing, because this way we can reinforce each other. The important thing is that you both know you're working on it and that you try to tell the same story more or less".

Opening Windows

In table 4.1, the various windows of opportunity that have been opened up for the development of an integrated approach to climate adaptation have been summed up.

Table 4.1: Capitalised windows of opportunity

Municipality	**Window of Opportunity**
Zaanstad	Motion Duurzaan
Breda	EU-project (CoolTowns)
Groningen	DPRA
Leeuwarden	DPRA
Tilburg	Evaluation climate plan
Haarlem	Integrated waterplan
Leiden	EU-project (Sponge2C)
Arnhem	EU-project (Climate Active Neighbourhood)
Eindhoven	New Climate Plan

Managing Networks

Several respondents pointed out that working in networks is important for knowledge exchange. This way different actors from different areas and disciplines can learn from each other. All respondents indicated to be working in network groups outside their organisation such as the DPRA support group, VGE network (association for health economics), network of Dutch cities and the MRA (Metropole Region Amsterdam). Next to that, also working with the waterboards, other municipalities and the GGD were pointed out to be part of the respondent's networking efforts.

Resp. 5

"The GGD is controlled by the municipality. Every year they develop a policy plan. This means that via my colleague from the social department who is the contact person for the GGD, I can make sure that they take on this subject. There are many lines, so it is key to have a clear image of them and by making use of them make sure that the topic gets a little further".

Other than mere knowledge exchange or the involvement of new partners, policy is developed in collaboration and by combining forces, national institutions can be influenced and pressured as well as other local governments.

Resp. 6

"With the MRA, that represents 33 municipalities, we can generate a mass that is able to lobby in the direction of the DPRA, the NAS or the VNG to put it on the agenda. A single municipality has more trouble to do so".

Venue Shopping

Various venues came up during the interviews. The idea is that by constantly emphasizing climate adaptation on different venues, awareness will rise.

Resp. 3

"So in a way it is the marketing of climate adaptation and organising a roadshow for this theme. That is what we do to draw attention. I have been presenting like hell the past few weeks!"

Most of them were local initiatives such as: Breda koel als het moet, the most sustainable kilometer, climate cafes, project market, specialist market, city cafe, 1000 blue gardens, architecture platform, a local library, Lets Gro, platform warm and climate proof, Duurzaan, or the climate event Fryslan. Some of these venues have been established with the purpose of raising awareness for climate adaptation, while others provided opportunities for climate adaptation to join the activities. The most common venue in all cases is 'Operatie Steenbreek'. This national campaign encourages people to take out paving and to replace this with greenery. The personal approach of this campaign stimulates conversation and thereby the learning process of climate adaptation.

Resp. 7

"Experiencing climate adaptive thinking is much more effective than informing them on the risks by telling them how many people died in a heatwave some years ago in Paris".

Respondent 2 stated that by implementing climate adaptive measures under the name of 'Breda, koel als het moet', additional media attention was generated and that this had a stronger appeal to people than simply stating that a certain intervention is climate adaptive. Because of the high degree of fragmentation of different forums, some respondents stated to be working on a

platform combining all these different campaigns. So multiple venues, both in- and outside the organisation are being used to raise awareness and thereby embed climate adaptive thinking into everyone's minds.

4.2.4 Science vs policy

Several respondents stated to have involved external experts to help with the creation of an action plan. These experts were engineering consultants and scientists.

Resp. 5

"We hired a consultancy firm, Tauw, to develop a plan for action with us on climate adaptation. From there on we started working on it".

The involvement of external expertise also occurred during the execution of the mandatory stress tests. Many respondents stated that the results of this stress test would indicate the level of priority and therefore instigate the preparation of the next steps in the process. One respondent however stated that the results of the stress test were merely to take stock of the possible risks and to help with the formulation of ambitions.

Resp. 3

"We didn't establish a priority yet, we didn't determine the ambitions. But in the end money is an important factor as well. And we're already doing a lot and that costs money as well. We will use the stress tests to say: "In the health sector we see this in case of heat and for infrastructure we see that in our municipality". Defining the ambition is the next step.

The respondents also pointed out that the results of these stress tests contributed to raising the awareness among both politicians and local officials.

Another interaction between science and politics occurs through national policies. The primary effects in the NAS have been used in many cases, as well as the ambitions established in the DPRA. The NAS diagram on the implications for heat on various sectors can be viewed in appendix 2, the DPRA ambitions in appendix 3. All respondents stated to be using the overall strategy of the DPRA, which are the milestones and ambitions, but the actual strategy is being ignored.

Resp. 8

"Every once in a while, you have to audit these ambitions and constantly adjust your strategy".

Resp. 7

"Off course, we do look for a certain guidance or standardisation, but in the end you will have to do it on your own".

Because the DPRA employs a strategy from A to Z, it is not very applicable to municipalities that have been working on an approach towards climate change for a longer period. However, it can therefore be useful for struggling municipalities.

Resp. 3

"I can very well imagine that it can be very useful for municipalities that do not have the in-house knowledge and expertise. It will surely make a valuable contribution"

4.2.5 Policy instruments

Legal instruments

In terms of legal steering instruments, four respondents declared to be actively working on the development of norms. Their motivations generally corresponded to the statement that without norms little would happen and detrimental behaviour would still be tolerated. Simply proposing ambitions would therefore not create enough incentive for project developers, project managers and property owners to incorporate climate adaptation into their spatial plans.

Resp. 9

"On the level of ambitions and issues, people think 'fine', but the instant there are concrete directives, people are limited in their possibilities and will have to involve these directives into the design of a street for instance. This is when it starts to aggravate and the discourse takes off".

Another argument in favour of norms is that there is a need for the translation of climate adaptation to numbers in order to concretise the issue.

Resp. 5

"It might become very silly rules such as a minimal percentage of shadow or a maximal percentage of pavement. Those are in any case easy measurable. The execution is up to the project leaders."

Economic instruments

In the interviews, the respondents claimed not to intend to create financial incentives. Only the municipality of Arnhem is working with small-scale financial incentives. The municipalities of Groningen and Haarlem are investigating the possibility of employing these instruments.

As multiple respondents stated, mainstreaming climate adaptation into existing policies will require additional funding. Two municipalities secured this funding through the sustainability programme, stimulating green urban development. Two other municipalities obtained funding through EU subsidised projects. The municipalities of Eindhoven and Leeuwarden secured funding for climate adaptation through the sewerage plan motivating that accumulating and storing rainwater on the same location as where it falls means lower costs for the sewage system. Breda stimulated urban greenery by highlighting its purpose for attractivity and thereby its support to local businesses such as restaurants, cafes and hotels, but also for real estate and schools.

Communicative instruments

Several communicative instruments have been discussed in this chapter. All these multiple activities had the purpose of raising awareness and cultivating people's activities. The NAS implies all municipalities to perform stress tests, considering the risks of climate change in the local context. In the interviews this was a frequent topic. Namely, the stress tests allowed for focused approaches to various target groups in society. Several respondents stated to be working on different strategies in approaching different target groups in order to improve the efficacy of their approaches.

Resp. 7

"*You should find the right triggers in my opinion, you should find a specific approach per street or target group".*

According to most of the respondents, establishing ambitions translates to the municipality articulating its values and thereby its approaches to the issue. This means that by stating their ambitions, municipalities declare till how far they will go in dealing with the issue and thereby leaving the remainder for others to deal with. This will strike up the discourse with other parties on how much they value dry feet and cool towns and what they are prepared to contribute. According to all respondents, these dialogues are the most important communicative tools in mainstreaming climate adaptation.

Resp. 5

"It is an interplay between what comes from the bottom up and the space available versus how much you can facilitate".

In order to stimulate internal conformance between the sectors, three respondents stated to work in multidisciplinary platforms, where various actors from different layers and sectors are challenged to discuss climate adaptation.

Resp. 1

We have a specialist event, where every project passes once a week. It is therefore up to me to make sure that climate adaptation gets the attention".

This is also a strategy that is being used more outward. Bonds have been established where different actors and organisations are associated through shared ambitions. The covenant climate adaptive building of the province of Zuid-Holland is a recent example of such a bond.

Resp. 6

"In the province of South Holland, they have made a covenant with their allies for climate adaptive ambitions and principles. You could say that we're doing the same with the MRA, but then a little more concrete".

4.2.6 Mainstreaming efforts

The respondents were asked to what extent they perceived the mainstreaming of climate adaptation into their local policy environment. The questions asked in order to portray the extent of mainstreaming where: "Is climate adaptation a primary or secondary priority for new developments?", "Is climate adaptation structurally considered?" and "What topic would serve as a vehicle for climate adaptive development?". The answers to these questions are depicted in table 4.2.

Table 4.2: The extent of mainstreaming climate adaptation.

Municipality	Priority	Consideration	Vehicle
Zaanstad	Secondary	Incidentally	Sustainability
Breda	Secondary	Incidentally	Attractivity
Groningen	Secondary	Incidentally	Economic benefit / Energy transition
Leeuwarden	Secondary	Incidentally	Liveability
Tilburg	Secondary	Incidentally	Health / Liveability
Haarlem	Primary	Structurally	Urban Green / Sustainability
Leiden	Secondary	Incidentally	To be considered
Arnhem	Secondary	Structurally	Energy transition
Eindhoven	Secondary	Structurally	Municipal sewerage plan

While most respondents pointed out that climate adaptation was not a structurally considered topic, all of them suggested that structural consideration is a target they are aiming for.

4.2.7 Barriers

In this paragraph, several barriers the respondents encounter in the process will be highlighted. The various expressions will be categorised according to the barriers described in chapter two.

Substantive, Strategic and Institutional Uncertainty

As argued by all respondents, the main problem with heat is its ambiguity.

Resp. 7

"It's a big difference between water and heat. For one person 30 degrees is perfect, while someone else may experience serious discomfort. Nobody wants water in their house".

Resp. 4

"Heat, in my opinion, is unfamiliarity and therefore needs a lot of research".

Fragmentation

In addition, in the municipal organisation, the decision for climate adaptation is often dependent on the project leaders. This means that some will take heat stress into consideration while others do not.

Resp. 5

"It still depends on the project leaders' affection with the topic, so if they don't, it will get a lot more difficult".

Resp. 8

"It does depend too much on coincidences. It is not that all project leaders consider it. Unless a project leader has the ambition to make a project heat resilient, it does not happen. It is there, but it's still not implied".

Lack of Resources

Several respondents argued that there is a need for someone that constantly emphasizes the need for adaptation within projects, but due to a lack of manpower, some opportunities are still wasted.

Resp. 6

"You can say and want a lot of things, but if there are no men and women that will execute this, it will be just another rule".

In addition to a lack of personnel, there is a lack of financial resources.

Resp. 5

"The problem I am running into the whole time, is that in the end, when the design and the budget have been established, that most often the project is more expensive than expected. That is still a problem, because there is not really a budget for this".

Institutional Crowdedness and Institutional Voids

Because of this lack of resources, the ambiguity of the issue and the fact that it is yet another factor the project leader has to take into account, the complexity of the plan making process is being increased.

Resp. 3

"For project leaders it will definitely get more complex. They simply get another issue on their plate where they should do something with".

Conflicting Timescales

Several respondents argued that the focus of politicians, project developers and housing corporations is often on the short term, rather than the long term.

Resp. 2

"A political term is only four years; a politician should earn its successes in this term and therefore long-term investments could obstruct these successes as the gains are only after the politician's period".

Resp. 3

"Housing corporations look ahead for only five years for their maintenance. We have to seduce them to look further, that's already a big complicated challenge".

Lack of Motives and Willingness to Act

According to various respondents, this long-term character and increased complexity are the reasons the issue is often being dropped in the decision-making process.

Resp. 8

"Then you see that in the process of the economic consideration, heat often loses out".

Resp. 8

"Water we grew up with in the Netherlands, but heat is more difficult. So, it often comes down on measures 'put in a green facade or green roof'. And then you'll see that in the decision-making process it will be dropped".

Lack of Awareness and Communication

All respondents therefore agreed that there is a need for climate adaptation to be firmly embedded into local policies. However, for this to happen the internal awareness needs to increase even more.

Resp. 3

"This moment, defining the ambition is very important, but if you're really speaking of policy integration, the internal awareness should grow a lot more. It really has to seep through in the thinking and behaviour of a lot of people, from operators to urban planners. You really see that my colleagues find themselves on various different levels. For one it is an issue and for another definitely not".

Resp. 5

"We have an organisation with 15 departments, from which a few primary departments. It is very difficult to sell your topic to other primary departments. Really, you want the department of economics and labour market to secure climate adaptation in their processes. It might happen in the future, but it did not so far. There are a lot more conversations necessary in order to get there".

5 Discussion/Conclusion

There is no preordained path towards resilience. For an outsider, it may seem that the local authorities are all trying to reinvent the wheel, lacking overall coordination and therefore inducing fragmentation. However, the true intention is far from that. These differences in approach are the result of the balancing of the objective of climate adaptation with a blend of other local objectives and ambitions. Since the effects of climate change are so widespread, adjustments are required in various domains. Furthermore, due to varied perspectives, the framing of the issue will be different for each person or community. Because of these variables, standardised protocols are not an option. The overall strategy is to create a collection of tailored local approaches pursuing the same objective: climate adaptation. A comparison between these approaches in association to the theory will provide the necessary input to answer the main question.

-SQ1-

How did the successful municipalities accomplish the establishment of heat stress onto the policy agenda?

To answer this question, the agenda setting process will be divided into its three components: the problem stream, policy stream and politics stream.

Problem stream

Climate adaptation has mainly been approached through the water sector by the municipalities. This is due to the fact that the problem of pluvial flooding is more straightforward. If a problem is the disconnection between the current and the desired state, then water-related problems can be illustrated by the fact that the current urban layout is not capable of discharging the forecasted quantities of precipitation. As a result, floods will cause economic damage, which is something we can agree on not to desire. The desired state is simply to keep our feet dry. Heat stress however, is more complicated to frame because the consequences are so diverse and value laden. This is a problem in itself i.e., an unstructured problem. There seems to be no agreement on the normative elements, a clear-cut desired state. Since the water-related issues were more tangible, municipalities started developing policies addressing this specific issue. As we saw in the municipalities of Groningen and Eindhoven for instance, the realisation started to emerge that climate change had more consequences for urban environments than floods alone. Internal pressures from policy entrepreneurs and local politicians as well as external pressures

from the DPRA and the public led to the application of a wider scope on the issue. However, the involvement of heat and drought did increase the complexity of the issue. In order to structure the problem, various municipalities started indicating the consequences of extreme weather events by performing stress tests. By increasing the certainty on the relevant knowledge, the issue became more structured. With that, the problem of heat can be labelled as being moderately structured (means). The problem will become structured once there is consensus in the relevant norms and values, the desired state. For this to happen, policy as negotiation is required, which is exactly what the respondents and the DPRA suggested. Identifying the desired state by framing it as the collection of norms and values i.e., the intersubjective truth. Once linked to the relevant knowledge on the issue, a concrete approach is possible.

Policy stream

Not being able to formulate a concrete problem description does not imply that municipalities cannot take action. By experimenting with pilots like they did in Tilburg or Breda, various actors with different backgrounds can learn about the possibilities for coupling and discuss the problem in an integrated fashion. The comprehensiveness of the problem may indicate a high degree of complexity, it also increases the number of possible approaches since there are multiple linkages to different topics. This is reflected by the various diverging couplings municipalities make to carry the issue. The multi-faced character of the problem also calls for a cross-sectoral approach. This means that climate adaptation, in the broad sense, would become an integrated part of the system as a whole, deprived of sectoral boundaries. The process of mainstreaming requires sectoral actors to consider the effects of climate change from their own perspective, resulting in the articulation of climate adaptation from various angles and thus the development of a multi-faced problem definition as the foundation for integrated comprehensive climate adaptive policies. This definition of the problem, specific to each department, will subsequently form the foundation for the sectoral agenda setting process. Mainstreaming in this view involves separating the problem into various smaller problems that can be assigned to specific departments.

Politics stream

In a way, politicians can be perceived as the gatekeepers for the policy agenda. By convincing them on the urgency of the issue, they might grant their permission for the issue to enter the policy agenda. Various awareness campaigns will generate media attention which will benefit this process. The task for the promoters of adaptation is to constantly emphasize the importance of the issue on different venues and to try to get a seat at the negotiation table as much as possible. Gathering support will create the extra mass required to open the gate. This

was also the case for the respondents from the municipalities of Eindhoven and Arnhem, who by using their network, found adherents. This meant that a certain knowledge of the organisational layout was required. In the external network, one should be on the lookout for collateral advocates to partner with. The involvement of experts will help to indicate the magnitude of the problem as well as contribute to the development of policy goals. This will be in favour of structuring of the problem and setting out a pathway towards resolving the issue. Furthermore, a concrete indication of the problem will help increase the awareness on the issue. The relationship between science and politics can therefore be perceived in accordance to the engineering model. In the municipalities of Leeuwarden and Haarlem for instance, external consultants (engineers) have been hired to indicate the risks of extreme weather events. This knowledge in turn is being used as a basis for further negotiations on the normative elements. It is therefore up to the politicians to value this knowledge and to formulate ambitions. Agreeing on the normative elements is therefore a task for politicians rather than scientists.

-SQ2-

Which factors contribute to the successful establishment of heat stress into local policy?

The adoption of integrated climate adaptive policies for municipalities in general depends on four factors which can determine the failure or success of this enterprise. First of all, the political environment must value climate adaptation on some level. This could be in the form of a local alderman taking interest in the topic such as in the municipality of Leiden or the city council pressuring the local authorities as was the case in Groningen. Local politics can off course be influenced in many ways, if they have to be influenced at all. It is up to the policy entrepreneurs to develop the right strategy in order to trigger local politicians. The second contextual factor for success is therefore a concerned policy entrepreneur and its influencing efforts. They should develop ideas, build coalitions, exploit windows of opportunity, shop for venues and manage networks in order to notify the issue's significance and possible solutions. A good policy entrepreneur should therefore possess over a large network, organisational know-how and the ability to convince people. Thirdly, climate adaptation should be connected to the city's DNA. Existing ambitions which provide opportunities for climate adaptation to piggyback on will accelerate the process and shape the approach to the issue. Due to this link to the existing structures, the approach to climate adaptation is so distinct for each municipality. Where the municipality of Breda employs attractivity as a vehicle, Tilburg employs health. This does not put one approach over another, the idea stays the same, but the approach varies. The fourth factor contributing to the successful adoption of climate adaptive policy is the local

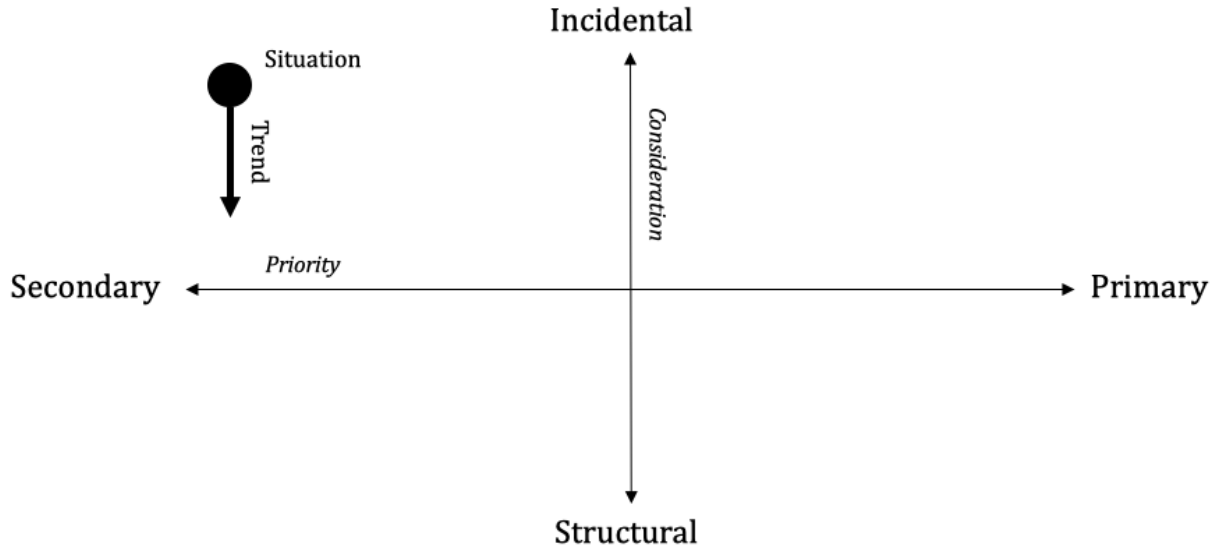
willingness to cooperate. The municipalities' maximum efforts are the complete integration of climate adaptation in all their local plans and conducts. The rest is up to the actors outside the public domain. They decide the final level of resilience by contributing to fend off the adverse consequences of climate change.

-SQ3-

To what extent has the objective of heat resilience been mainstreamed into the local policies of the researched municipalities?

As the respondents declared: heat stress will not be a top priority or starting point for new developments. This means that the issue should penetrate into the minds of the people and become an integrated part of what we think and do. The aim is therefore to structurally consider climate adaptation in the context of various plans and developments (Figure 5.1). This however is not yet the case. The vehicle selected by each municipality should ensure the structural consideration of climate change, since this vehicle is already structurally considered. The incorporation of climate change into this vehicle should therefore encourage climate adaptive thinking and acting in local plans. The instruments used by the researched municipalities to steer towards mainstreaming mainly involved communicative efforts in order to increase awareness about the issue. Although legal steering instruments so far have not been applied on a large scale by the municipalities, most of them do have the ambition of using these legal instruments in the future and are actively working on a path towards this prospect.

Figure 5.1: Matter of mainstreaming efforts



-SQ4-

What can other municipalities learn from these examples?

The first lesson drawn from this research, is that through discourse the problem will be described. Making heat stress resilient policy is therefore not only a matter of establishing norms and economic incentives, but in the first place developing a comprehensive problem description. In addition, in the interviews a lot was said on the insignificance of norms on the issue of heat. The respondents stated that heat should be approached through common sense and be viewed in its context only. General rules and standards should therefore be avoided. Instead, designing principles should be sufficient in giving guidance to the planners. A second lesson is that by experimenting with pilots, a municipality can find out what climate adaptive planning means in their local context. Through these experiments they can learn what works and what does not. Moreover, it encourages cross-sectoral cooperation and discourse as well as increasing awareness since the participants can experience working with the issue first-hand. The third lesson is that, other than suggested in reports from the IPCC, Deltacommission and NAS, implementing climate adaptive measures will require additional resources. This means that political support on the issue is crucial and that various options should be explored on how to combine issues and ambitions in order to obtain these additional resources. And this brings us back to mainstreaming. A sectoral approach to climate adaptation might have been one of the few options in order to kickstart the development of policy, in all cases a more comprehensive approach was required to combat the adverse effects of climate change in the broad sense. A focus on the issue, in every facet of the organisation remotely affected by climate change, proved essential in order to ensure the city's resilience to future weather events.

By means of coupling the multiple theoretical topics described in this research, a synthesis is created that forms a concept in itself. This is the framework in which the local agenda setting processes and formation of integrated policy concerning climate adaptation can be located. This research can therefore be of significance in the structuring of the issue as it highlights common grounds between fragmented intentions. This could in turn benefit the process of the development of local approaches as well as being an addition to the theoretical knowledge on the subject. Additionally, this research provides unique perspective that captures the transition of climate adaptation from an agenda topic towards the formation of local strategies in relation to the barriers obstructing the development of integrated approaches.

5.1 Recommendations

For municipalities, the next step in the process of developing policies addressing urban heat, is to start negotiating the normative elements of the issue. However, in the policy documents and interviews, it has not been clarified if this means that the public will be involved in the demarcation of the problems or that this is to be an internal affair. Since not all space is public domain, municipalities only have limited power in resolving the issue. This is why they state to deliver a certain level of climate adaptive capacity, which will be the basis from where the public can take it further. Therefore, they will decide the priority of the issue and with that, the extent of resilience to extreme weather events. It is thus up to the municipalities to investigate how much they are willing to invest in order to establish their contribution to the climate adaptive ambitions. This is probably where the true challenge lies for municipalities. The process of getting a consensus on the normative elements should therefore mainly occur within the organisation, before the public is being involved. By doing this, the problem is being structured and a new, less complex, problem occurs, which is the responsibility of the public. More research on the abilities and willingness of the municipalities can therefore be valuable in order to set the bar on adaptation.

In order to combat fragmentation, decisions based on personal preference have to be taken out of the equation. This means that the creation of design directives such as those that are being developed by the city of Eindhoven are important instruments in order to guarantee adaptive development. In the field of legal steering instruments, Eindhoven can thus be considered as a 'best practice'.

Another municipality that can be regarded as a best practice is Groningen. Unlike the DPRA strategy suggests, they take their time with formulating ambitions. In theoretical terms, they first structure the problem before linking it to a solution. By defining the problem for each sector, consensus will rise on both the normative elements and the relevant knowledge. Ambitions will be formulated according to these sectoral problem definitions. Groningen can therefore be defined as a best practice in the field of problem structuring

Haarlem and Tilburg on the other hand, are good examples of municipalities that focus a lot on cooperation. Tilburg does this more in the local context, by involving private parties and the GGD, while Haarlem uses their regional network, mainly in the form of the MRA. The municipality of Arnhem can also be perceived as a best practice, since they have much experience in the field of heat adaptation and thereby more consensus on the normative elements. In Arnhem it will therefore be easier to implement heat resilient measures.

6 Reflection

While writing this thesis, I learned that different issues should not be viewed as separate entities. When I started this research, I was wondering how policy on heat stress was developed in light of the local context. I was hoping that by analysing different cases in their efforts to set the agenda on heat stress, I could extract some general statements and perhaps a roadmap for other municipalities. However, as described in the conclusion, most municipalities created policy on heat stress on top of their existing policy on climate adaptation. It was therefore not so much a story on heat stress, but more on climate adaptation in general and the expansion of the scope of the issue from mainly focused on water towards the integration of all consequences related to climate change into local policies.

Another motivation for performing this research was to investigate the interaction between local authorities and reports from higher authorities such as the NAS, DPRA and the IPCC report on climate adaptation. I expected the municipalities to adopt the strategies of these parties and part of this research would be dedicated to depicting these strategies in practice. However, most respondents declared to develop their own strategies and only complied to the strategy by performing the mandatory steps.

Conducting the interviews went flawless. I managed to guide most of the conversations in the desired direction, while giving the respondents the freedom to articulate themselves and maintaining a natural conversation. Because this research is focused on policy formation rather than policy outcomes, the conversations could get a bit abstract. Because the respondents had various backgrounds and responsibilities, some conversations would get too much focused on the policy outcomes. By asking questions on the how and why of these concrete measures, the rationale of these policy outcomes could be motivated and thereby this information could be used.

The outcome of this research is quite satisfying, because I was able to articulate the empirical results within the boundaries of the theory on policies and agenda setting. By using the theory as a red line through this thesis, the various cases could be categorised and compared. This allowed me to answer the research questions.

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Appendices

Appendix 1: The major impacts of heat events on urban environments.

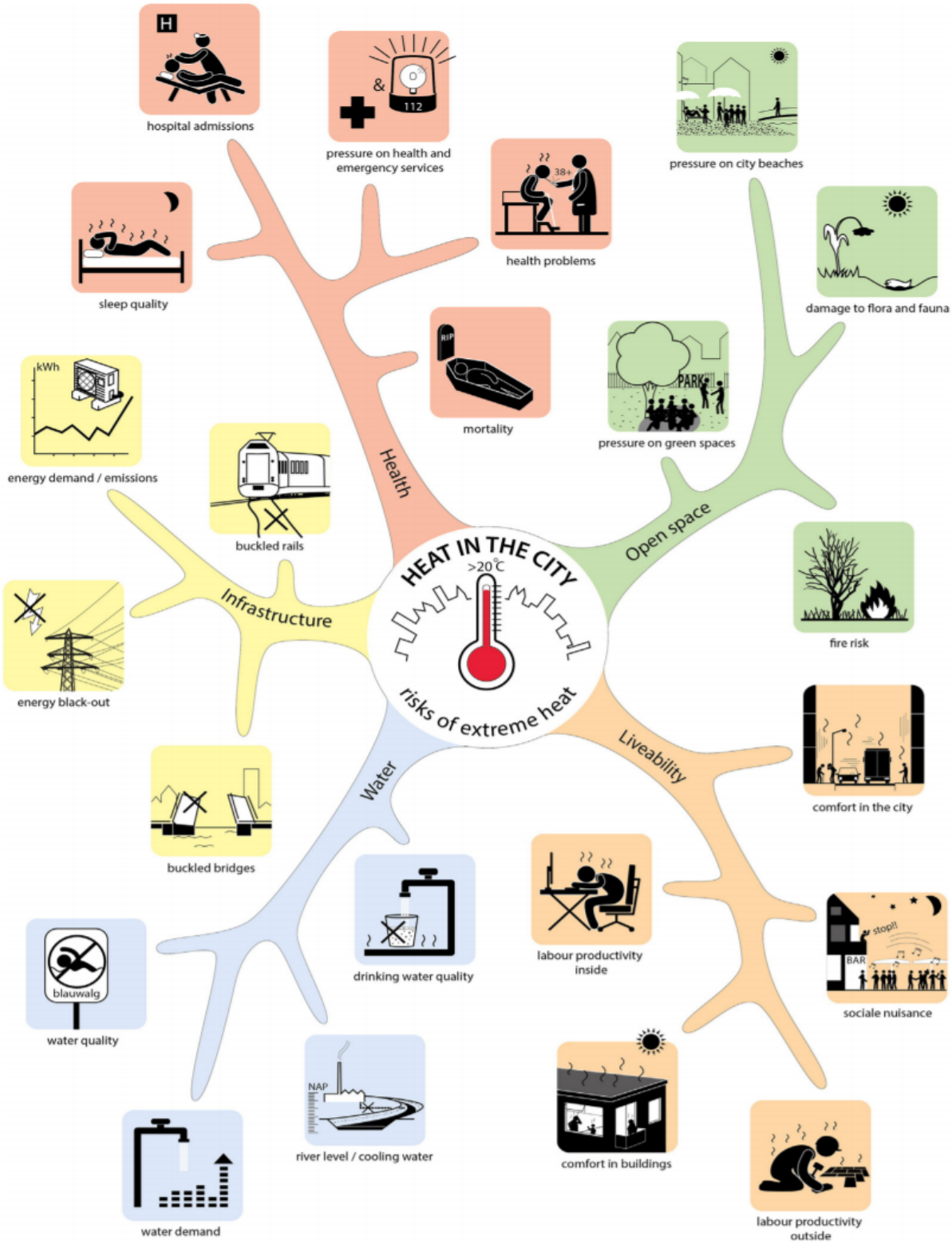
Appendix 2: NAS diagram on the effects of heat on various sectors.

Appendix 3: DPRA ambitions for climate adaptation.

Appendix 4: Interview guide.

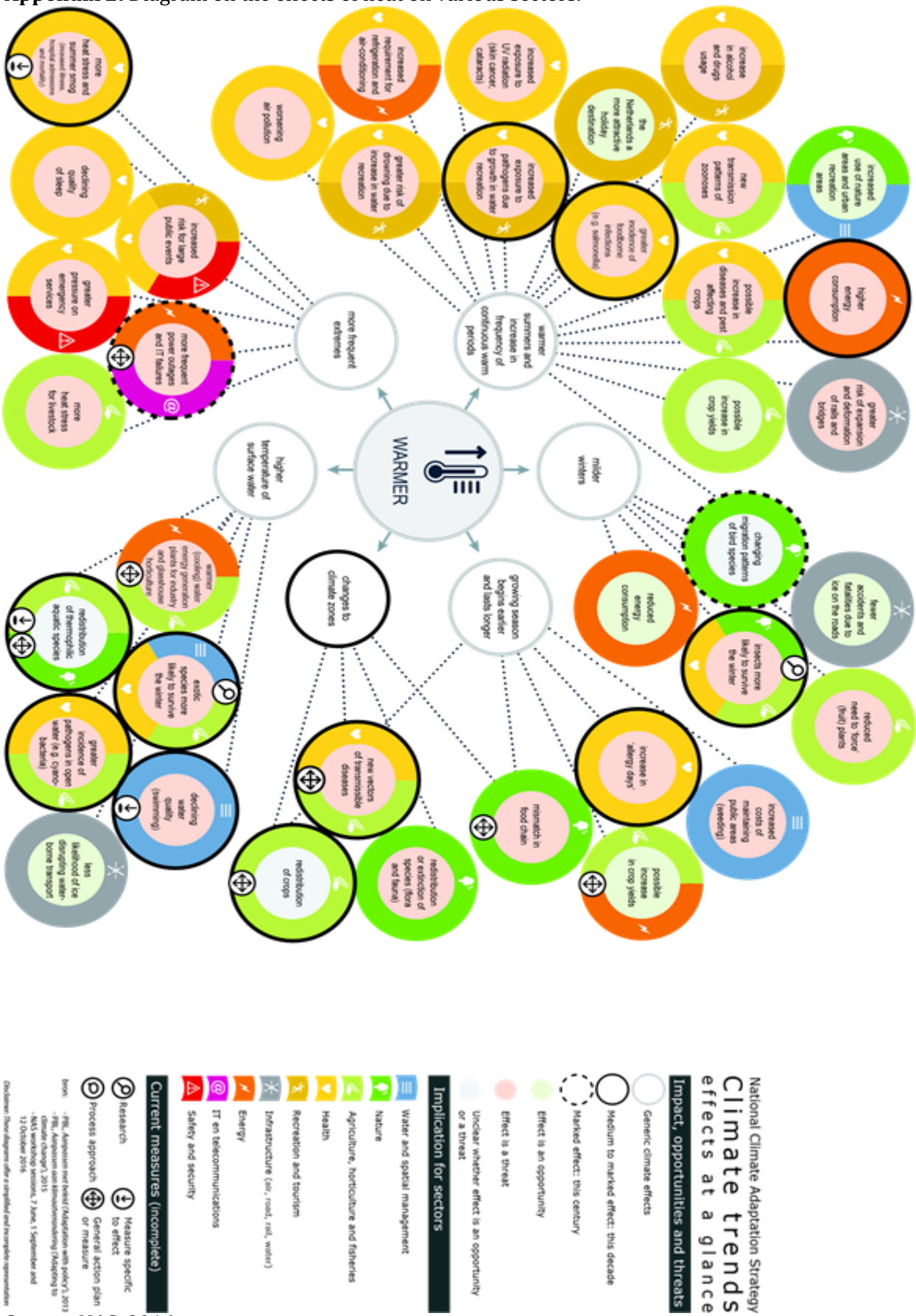
Appendix 5: Codes and groups from the data analysis.

Appendix 1: The major impacts of extreme heat events for urban environments.



Source: Klok & Kluck, 2018.

Appendix 2: Diagram on the effects of heat on various sectors.



Source: NAS, 2016.

Appendix 3: DPRA ambitions for climate adaptation.

Source: Deltacommissaris, 2016.

Appendix 4: Interview guide

Interview Guide – Agenda- en beleidsvorming van hitte-adaptatie – Caspar Dohle

Vertrekpunten onderzoek:

1. *Op welke wijze heeft de bestrijding van hittestress een plek verkregen op de gemeentelijke beleidsagenda?*
2. *In hoeverre zijn de doelen voor hitte-adaptatie geïntegreerd met de overige lokale opgaven?*

De gevolgen van hitte in de stad raken verschillende sectoren en ook het bestrijden van deze gevolgen vereist samenwerking tussen deze disciplines. Daarom heeft het Rijk een strategie ontwikkeld (Deltaplan Ruimtelijke Adaptatie en de Nationale Adaptatie Strategie), waarbij klimaatrobuust handelen een integraal onderdeel moet worden bij de toekomstige planvorming. Met deze strategie wordt dus van de verschillende sectoren verlangd de doelen van hittebestendigheid te koppelen aan de bestaande ambities specifiek voor de eigen sector. In sommige steden wordt er al gewerkt aan het beperken van hitte in de stad, terwijl bij anderen de beleidsvorming niet van de grond wil komen. In dit onderzoek wordt er getracht aan deze laatste gemeenten handvatten te bieden door de gemeenten die er al actief mee bezig zijn als voorbeeld te laten zijn voor hoe lokale uitdagingen kunnen worden gekoppeld met het streven naar een klimaatadaptieve leefomgeving. Daarnaast zal er worden gekeken naar de mate van integratie van het thema in de besluitvorming van de betreffende gemeenten.

Wat is tot dusver jouw rol geweest in het adaptatievraagstuk op het gebied van hittestress?

- Welke projecten in je gemeente zou je beschrijven als voorbeeldprojecten?
- Vanwaar de inzet voor klimaatadaptatie?

Wat is er in jouw werk de afgelopen jaren veranderd ten aanzien van de bestrijding van hitte in de stad?

- Waardoor kwam dit?
- Heeft je dit nieuwe inzichten opgeleverd bij de uitvoering van jouw werkzaamheden?

Kijkend naar de voorbeeldprojecten, welke thema's zijn hier met hitte gekoppeld?

- Waarom juist deze?
- Welke afwegingen zijn hier gemaakt?
- Wie waren daarbij de belangrijkste betrokkenen?

Wat zijn belangrijke momenten geweest voor de gemeente in de transitie naar een meer klimaat-adaptieve beleidsvorming?

- Waren dit toevallige of gestuurde gebeurtenissen?
- Wie waren hiervoor verantwoordelijk?
- Wat hebben deze veranderingen in gang gezet?
- Wat is de invloed van de politiek geweest bij deze momenten?
- Wanneer is de gemeente begonnen met de aanpak van hitte in de stad?

Soms kunnen doelen aan elkaar worden gekoppeld en soms werken ze elkaar tegen. In hoeverre heeft hitte-adaptatie prioriteit ten opzichte van het bereiken van andere doelen?

- Wordt er structureel gekeken naar kansen voor het meekoppelen van hitte-adaptatie?
- Welke onderwerpen vormen een belemmering voor hitte-adaptatie?

Wat denk je dat er nodig is voor een effectievere/efficiëntere aanpak van hitte in de stad?

- Hoe zou dit gerealiseerd kunnen worden?
- Wat houdt deze ontwikkelingen momenteel tegen?

Appendix 5: Codes from the data analysis.

Code name	Occurrence
ontwerprichtlijnen	18
Ambities formuleren	17
meeliften op ontwikkelingen	17
Bewustwording door beleving	17
Dialoog essentieel	16
brede aanpak	16
concretiseren	15
bewustwording bestuur essentieel	15
Behoefte aan meer integraliteit	14
samenwerken	13
Platform bewustwording	13
Werken naar buiten in netwerken	13
zoeken naar koppelingen	13
opgave hitte onbekend	12
koppeling met groen	12
zorgen voor economisch voordeel KA	12
Bewustwording door onderzoek	12
Hitte vooral logisch nadenken	12
Op zoek naar dwingender instrumentarium	12
KA meeliften op KM	12
Wijkgerichte aanpak	12
KA altijd een afweging	11
stapsgewijs	11
matrixorganisatie	11
Constant KA benadrukken	11
Multifunctionele maatregelen	11
Koppelen aan belangen	11
Voorbeelden cre√´ren	11
lijn afspreken	10
afstemming sectoren	10
KA via GRP	10
KA koppelen aan DNA stad	10
Wat is klimaatbestendig?	10
KA vroeg in belangenafweging	9
KA meegenomen in afweging	9
zoeken naar handelsperspectief	9
Juridische verankering	9
toewerken naar beleidsregel	9
Zorgen dat burger meedoet	9
demografische benadering	8
integraliteit	8
Vanuit de watersector	8
kansen in meekoppelen KM	8
KA structureel overwogen	8
procesgericht	7
KA sneuvelt vaak in economische afweging	7
KA gekoppeld in brede context	7
Medestanders KA gevonden	7

Burger moet zelf meedoen	7
Interesse wethouder	7
Hitte weinig prioriteit	7
ka biedt kansen	6
interne bewustwording moet groeien	6
analyse impact	6
volgende stap is sociale impact	6
normen	6
Wateroverlast gekoppeld aan riolering	6
Groen en blauw sleutel hittestress	6
Aantrekkelijkheid is vehikel	6
Afgelopen zomer goed voor bewustwording	6
Tot nu toe vooral bewustwording	6
Bewustzijn KA persoonsafhankelijk	6
KA geen startpunt voor ontwikkeling	6
Hitte sneuvelt vaak in afweging	6
Geen budget meerkosten KA	6
KA afhankelijk van projectleiders	6
agendering	5
Grotere scope	5
uitdaging andere partijen betrekken	5
Druk op ruimte neemt toe	5
inventarisatie actieve organisaties	5
meekoppelen waar mogelijk	5
Link sociaal en ruimtelijk	5
betrekken wooncorpo's	5
Gewoon doen	5
Steenbreek speldenprik	5
Financiering vanuit GRP	5
strategie ka en km	5
aandacht media	5
Rijk moet lijn bepalen	5
kennis doorvertalen naar proces OR	5
Hitte lastig te normeren	5
Belang bij norm	5
KA geen prioriteit wooncorpo's	5
GroenLinks	4
Verantwoordelijkheid gemeente	4
Kansen omgevingswet	4
financiering vanuit duurzaamheidsprogramma	4
klimaattoets ipv watertoets	4
ka nog niet structureel overwogen	4
Water beter bekend dan hitte	4
Sector overschrijdend	4
bewustwording politiek	4
dpra om urgentie te duiden	4
Sociaal domein	4
Pilots	4
KA formuleren in eigen context	4
adviserend	4
Het draait om korte termijn doelen	4
Betrek verzekeraars	4

eigenbelang groter	4
hitte meegenomen in afweging	4
Zoeken naar economische impact hitte	4
KA soms startpunt in OR	4
Door bewustwording gaat men kijken naar eigen beleidsterrein	4
te weinig mensen op KA	4
Behoefte aan aanjager bij projecten	4
Groene stad is het vehikel	4
Lijn DPRA niet letterlijk gevolgd	4
Vanuit burgerperspectief	4
Vanuit duurzaamheid	3
beleidsmedewerker water	3
Leefbaarheid is vehikel	3
bewustwording door ingrepen	3
KA vergroot complexiteit	3
Door KA meer prioriteit groen	3
NAS systematiek	3
Extern persoon	3
bewustwording door beleid	3
Alleen mensen bereikt die er toch al mee bezig zijn	3
Geld verdienen grootste prioriteit	3
Breda koel als het moet	3
Door ingrepen bewoners inspireren	3
initiatief ondersteunen	3
DPRA te gestandaardiseerd	3
Doelstellingen DPRA gebruikt	3
wateroverlast kan technisch opgelost	3
Informeren helpt niet	3
Reden wijkgerichte aanpak	3
Aanleiding rol adaptatievraagstuk	3
bewustwording door dpra	2
lijn DPRA gevolgd	2
duurzaamheid is vehikel	2
kwalitatief groen	2
hitte te complex voor norm	2
nog geen ambities geformuleerd	2
vroeg de stad betrekken	2
participatie bij beleidsvorming	2
Beleidsmedewerker groen	2
blijven optimaliseren	2
actieve actoren binden	2
Bestemmingsplan toetsen op norm	2
Verschillende sporen	2
mensen komen niet in beweging	2
KA zit nog niet in het systeem	2
Vervuiler betaalt	2
hitte geen aanjager	2
Sterftecijfers hebben geen impact	2
Markt kijkt vooral naar zichzelf	2
stad minder aantrekkelijk door hitte	2
vehikel is KM	2
Per wijk ander thema partnerschap	2

Rol is constructief partnerschap	2
voorloopwijken burgerinitiatief	2
Bewustwording verschillend per wijk	2
Zonder norm blijf je verkeerd bezig	2
Hogere doelstelling vanuit raad	2
Startpunt aanpak hitte door EU project	2
DPRA gebruiken als het lastig gaat	2
DPRA nuttig voor steden die strugglen	2
Opgave droogte onbekend	2
Belang bij landelijke norm	2
Ambitie: situatie niet verslechten	2
KA bewustzijn door EU project	2
KA ge√Øntegreerd door EU project	2
Prioriteit gemeente bij KM	2
Prikkel makkelijker voor KM	2
KA geen activator	2
Vanuit bodem	1
Vakspecialist bodem	1
Gezondheid is vehikel	1
hittestress persoonsafhankelijk	1
aanpak bepalen	1
KA niet hoogste prioriteit	1
Tot hoe ver gaan als gemeente?	1
norm te makkelijk	1
Bewustwording door culturele hoofdstad	1
Mensen passen gedrag aan	1
te weinig aandacht psychologie	1
KA wordt hoofdzaak	1
KA is vehikel	1
groen prioriteit	1
Programmamanager KA	1
km bewustzijn groter dan ka	1
economisch voordeel is vehikel	1
stimulans vanuit rijk	1
Projectmatige aanpak	1
intern team vormen	1
GRP is vehikel	1
organisatie doorgronden	1
inspannings- vs resultaatverplichting	1
Klimaatadaptief is afspraak	1
nieuwe aanvragen toetsen aan norm	1
KA lastig te koppelen aan KM	1
ruimtelijke aanpak	1
innovatie gemeente stroef	1
fulltime bezig met KA	1
nu nog zachte regel	1
Stresstest voor communicatie	1
klimaatplan	1
adviseur governance en RO	1
sommige bewoners willen wel	1
Parkeren hogere prioriteit	1
Duurzame oplossingen	1

DPRA onbekend	1
Weinig problemen met water	1
Weinig kennis en expertise	1
Term ruimtelijke adaptatie	1
Juridische stappen niet mogelijk	1
goed gedrag belonen	1
Welvaart hogere prioriteit	1
Goed gedrag wordt niet gestimuleerd	1
Geen baat bij subsidie	1
Koppelen aan thema's met norm	1
uitzoeken wat KA betekent	1
bewustwording ambtenaren essentieel	1
adviseur stedelijk water	1
Per wijk andere rol gemeente	1
Wijk in kracht zetten	1
Partnerschap met wijken	1
Uitzoeken hoeveel nodig voor meeliften	1
Verbindingen leggen met wijken	1
Stimulans vanuit EU	1
Wijken met overlast lopen vaak voor	1
Transitie onomkeerbaar	1
Ambitie KA in elk project	1
Door toeval aandacht hitte	1
Plan subsidie vanuit raad	1
Wethouder heeft hitte op agenda gekregen	1
Veel gemeenten al verder met KA	1
DPRA niet relevant voor gemeenten die verder zijn	1
volgen DPRA lastig ivm geld	1
DPRA slecht te koppelen met context	1
DPRA begint op 0	1
Opgave wateroverlast kan technisch opgelost	1
Opgave waterveiligheid bekend	1
Doelstelling KM makkelijker	1
Ambitie: Kwetsbaren beschermen	1
Ambitie: Koele plekken beschermen	1
Ambitie: verminderen UHIs	1
Door EU project ambities gemaakt	1
Aanleiding aanpak hittestress van buitenaf	1
EU project is middel	1
Kracht KM groter	1
KA doorgedrongen bij ambtenaren	1
Koppelen KM makkelijker	1
KA weinig verdieneffect	1
Prikkel KM werkt niet overal	1
Wat kan ingreep betekenen voor burger	1
Scherpe grenzen	1
Grote tweesplitsing	1
Zoeken naar aanpak minder actieve wijken	1
Kijken wat bewoners beweegt	1
Sommige wijken zelf actief	1
Bestuursadviseur Klimaatadaptatie	1