INTEGRATED PLANNING

Research into integrated planning between the physical and social domain on the topic of heat stress in Dutch municipalities

Master thesis for the master Spatial Planning, specialisation Cities, Water & Climate change

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SUMMARY

Climate change is one of the current challenges for municipalities. In order to take measures, it is necessary to cooperate within municipalities since the problem concerns both the physical (e.g. decreasing water quality) and social domain (e.g. increasing UV exposure). This research focuses on collaboration on the theme of heat and examines how collaboration between domains within municipalities can be improved. By analysing and evaluating different characterizing components of integrated planning this research gains more insight in the way how integrated planning can be improved to limit the effects of heat stress on health. The following central question is formulated for this research:

"How can the integrated planning between the physical and social domain of Dutch municipalities be improved to limit the effects of heat stress on health?"

Theory

To answer the central research question, a conceptual framework has been drawn up based on four components. The four components are described by Walt & Gilson and consist of context, actors, process and content. Those components of integrated planning are more specified and applied to this research by linking various aspects used by Kickbusch and Buckett (2010), Lowe et al. (2018), Storm et al. (2010) and van der Klauw et al. (2012).

Methods

This research was carried out based on an embedded case study. The selected case is the pilot "Hitte en gezondheid" (Heat and public health), set out by the Ministry of Infrastructure and Environment. The units of analysis in this case are the four participating municipalities. In this research, qualitative research methods were used. Three data sources were used, namely: interviews, observations and secondary documents. The data derived from the named sources above have been analyzed by means of NVivo on the basis of a codebook, based on the above-mentioned literature.

Conclusion

The research has shown that the extent to which the various components of integrated planning have been developed differs per component. The context of integrated planning on the theme of heat develops positively and contributes to successful integrated planning. In general, understanding and support for the theme of heat and integrated planning are increasing. Although financial capacity is unanimously cited as the biggest obstacle. It is expected that a stronger sense of urgency, more clarity and certainty will influence the financial capacity positively when the components process and content develop further. For the component actors can be concluded that the added value of integrated planning is seen by both the physical and social domain. But successful integrated planning requires even more effort and attention for urgency and harmonization. For the component process can be concluded that the integrated planning process is relatively new. Successful integrated planning requires stronger, more structural relationships and an improvement in the quality of communication and knowledge exchange. More clarity in actions, roles and responsibilities will also contribute. Especially when this is formally recorded. This research shows that there is hardly any content produced in the studied case. It is therefore unclear whether the three other components are reflected in the content. Related to this, there is very little information about monitoring and evaluation. It can be concluded that the integrated planning between the physical and social domain of Dutch municipalities to limit the effects of heat stress on health can mainly be improved by focusing on the further development of the components actors, process and content.

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1 INTRODUCTION

1.1 PROBLEM STATEMENT

During the past years, a lot of research is done into climate change and the influencing factors. Changes take place on different scales, on specific or general locations, quickly or slowly (KNMI, 2015). Those changes have different consequences, which are categorized by the Dutch National Adaptation Strategy in four categories: (1) It becomes warmer, (2) It becomes drier, (3) It becomes wetter and (4) The sea level rises (Ministerie van Infrastructuur en Waterstaat, 2016). Since 2010, the Netherlands has been working on climate adaptation by setting up the 'Deltaprogramma klimaatadaptatie' (Deltaprogram climate adaptation)(DPRA). In the program owned by the Ministry of Infrastructure and Environment, there is a strong collaboration of a diversity of actors, the national government, provinces, water boards and municipalities. Besides governmental organisations also business, knowledge institutions and social organisations are involved in the program. The main focus of the program is providing solutions for problems related to the categories 'It becomes wetter' and 'The sea level rises', by using adaptation measures (Ministerie van Infrastructuur en Waterstaat, 2019).

1.1.1 WARMING

But as explained, climate change has four categories of consequences. Where the DPRA focuses mainly on the consequences related to water, different researchers argue that the consequences of a rising temperature are also very important (Patz, Engelberg, & Last, 2000). To cover all categories of consequences of climate change, the National Climate Adaptation Strategy (NAS) is developed by the Ministry of Infrastructure and Environment (2016). The NAS, in combination with the DPRA, covers the complete Dutch mission for climate adaptation.

The Intergovernmental Panel on Climate Change (IPCC), an organisation of the United Nations that evaluate the risks of climate change, argues that the warming of the climate system is unequivocal. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished and sea level has risen. The IPCC itself does not conduct any research, but evaluates research published in peer-reviewed scientific journals. Based on a large number of independent scientific analyses from observations of the climate system, paleoclimate archives, theoretical studies of climate processes and simulations using climate models, they expect that the global surface temperature change for the end of the 21st century is likely to exceed 1.5 degrees Celsius relative to 1850 to 1900 (IPCC, 2013).

The rise of the temperature in The Netherlands and the rise of the global temperature are almost parallel, although the temperature in the Netherlands shows a slightly higher amplitude (Oldenborgh & Ulden, 2003). Also in comparison with surrounding countries, the level of warming in the Netherlands is comparable (KNMI, 2015). Between 1901 and 2013 the average temperature, measured in De Bilt, increased with 1.8 degrees Celsius. The fastest increase (1.4 degrees Celsius) took place between 1951 and 2013 (KNMI, 2015). To research the level of warming in the Netherlands, the Royal Dutch Meteorological Institute (KNMI) set out four different climate scenarios. In the scenarios the research results of the IPCC report are applied to the Netherlands (IPCC, 2013). The scenarios reflect the change around 2050 and 2085 compared to the climate in the period 1981-2010. The scenarios differ in the extent to which the global temperature rises and the possible change in the airflow pattern. Although the changes in temperature are different for each scenario, in every scenario warming occurs. And in every scenario, mild winters and hot summers are more common.

1.1.2 EFFECTS

Warming is a complex problem: one consequence is due to a high outside temperature (expansion of bridge sections); the other due to a high internal temperature (sleeping problems) (Kluck et al., 2017). Some consequences are only noticeable after a continuous series of warm days (water quality); others already occur during a single hot day (power failure). This complexity ensures that there is not one universal heat measure with which all problems can be solved" (Kluck et al., 2017).

The NAS shows the effects of climate change for nine sectors: water and environment, nature, agriculture, horticulture and fishing, public health, recreation and tourism, infrastructure, energy, IT & telecom and safety. In contrast to the DPRA, the NAS includes a stronger focus on the rising temperature and the increasing drought (Ministerie van Infrastructuur en Waterstaat, 2016). As the list of nine sectors show, climate change in general has consequences on many different sectors. The NAS includes different figures that show the effect of climate change for each of the category. In contrast to the DPRA, the NAS includes a stronger focus on the rising temperature and the increasing drought (Ministerie van Infrastructuur en Waterstaat, 2016). As the list of nine sectors show, climate change in general has consequences on many different sectors. The NAS includes a figure that shows the effect of climate change for each of the category. Figure 1.1 shows the overview of the category 'Warming'.

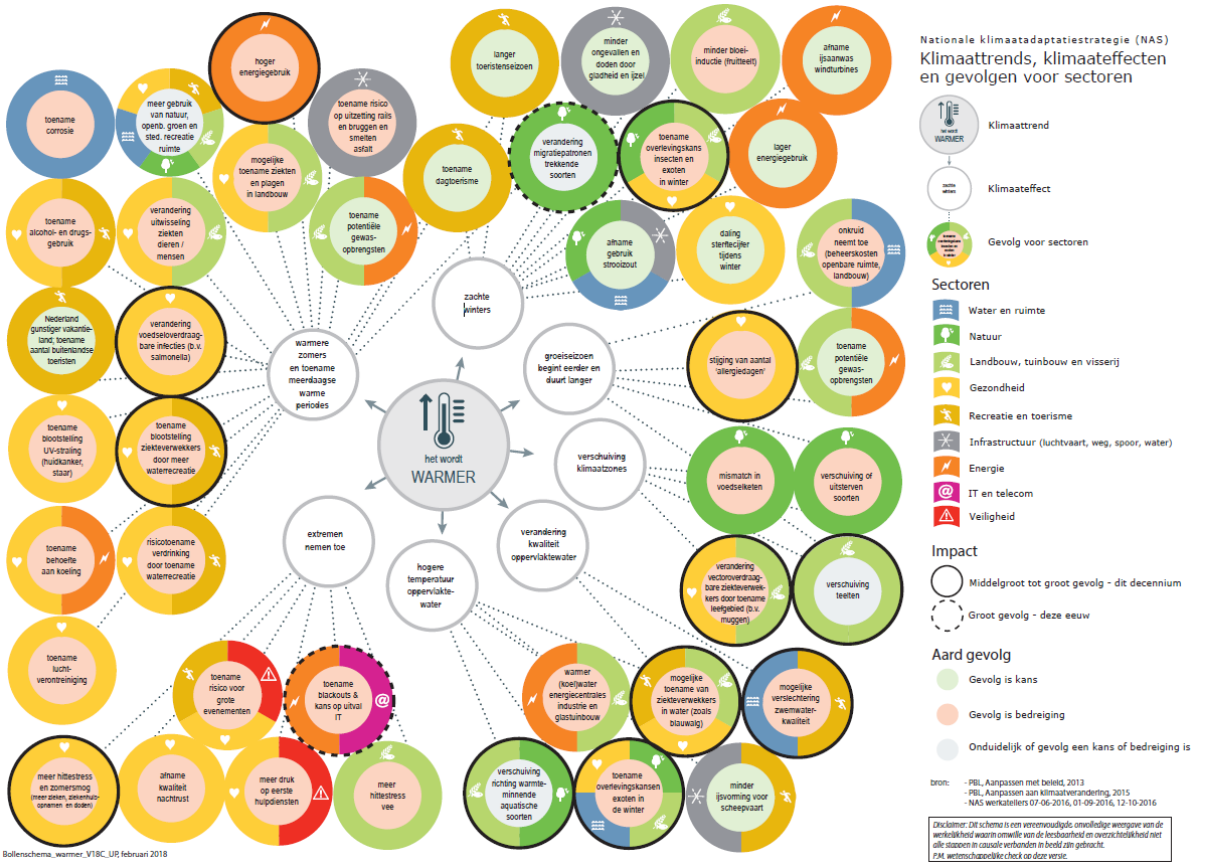

Figure 1.1 NAS overview 'It becomes warmer' (Ministerie van Infrastructuur en Waterstaat, 2018)

Sectors that come up are for example nature, agriculture, infrastructure and safety. The overview shows that especially the sector public health (yellow circles) is strongly represented. Examples of described effects are increasing UV exposure, increasing 'days of allergy', increasing need for cooling and increasing pressure on emergency services (Ministerie van Infrastructuur en Waterstaat, 2018).

A lot of research is done on the effects of high temperatures on the human body. Periods of extreme temperature can have significant impacts on health and present a challenge for public health and civil protection services (Kovats & Hajat, 2008). Different heat-related illnesses can come up, including heat cramps, heat syncope, heat exhaustion and heat stroke (Kilbourne, 1997; Luber & McGeehin, 2008; Lugo-Amador et al., 2004). Heat exhaustion is the most common heat-related illness of those four (Lugo-Amador et al., 2004). Research shows that daily mortality from all causes increases during heat waves (Patz et al., 2005). Also in the Netherlands, the effect of heat on the number of mortality is visible. In July 2006, which was a warmer summer month than on average, 60 more inhabitants of 75 years or older, died than in a general July (period 2001-2015). In comparison with a relatively cool July, like in 2007, there was an increase of 93 deaths of older inhabitants (Hoeven & Wandl, 2018). Those effects on the human body and numbers of death support that heat stress affects not only the natural and urban environment but also the population itself.

1.1.3 INTEGRATED APPROACH

The influence of heat on many sectors makes it hard to determine a problem owner of heat stress (Helmer & Meijs, 2018). The many effected sectors can be roughly classified in the physical and the social domain (Helmer, personal communication, 10 April 2019). Looking at Dutch municipalities the physical domain includes for example housing, spatial planning, nature and agriculture. The social domain focuses for example on public health, education and social support.

Based on the broad effects, the domains together are responsible for the approach of heat stress. The risk of heat can be reduced by taking measures, both in the social domain, in buildings and in the outdoor area. Measures in the social domain include care plans, tropical schedules and heat plans. In buildings, measures can include sun protection, ventilation and climate control. Spatial adaptation includes adjustments to the urban layout such as greenery, shade and water forms (Kluck et al., 2017). But although it seems both domains are responsible, today, heat is often seen as a spatial problem that needs to be addressed from the physical domain. Even though the effects on public health are strongly represented in the overview of all the effects (figure 1.1). Although measures, taken in one domain, could strength solutions for problems in both domains (Helmer, personal communication, 10 April 2019).

To raise awareness about the broad effects of warming and to give heat more priority in all different sectors, the NAS organised a congress about heat stress in 2018. The congress focused on three different themes: (1) The relation between heat and health, (2) The relation between heat and nature and (3) The relation between heat and the liveability of urban areas (Helmer & Meijs, 2018). According to the relation between heat and health, the congress resulted in four conclusions:

1. Heat stress is owned by everyone and at the same time by no one
   There is no owner of the problem, the rising temperature affects everyone. To limit the effects of the rising temperature, it is therefore important to focus and to know what role everyone has.
2. The important actors in the process face major social challenges
   Limit heat stress is not a priority on the actors' agenda. In fact, many actors are so busy that it is difficult to discuss the problem with them.
3. Collaboration cannot be taken for granted
   Every domain and every actor has its own task, additional work is seen as a hindrance.
4. Finding synergy between current programs requires extra effort
   Current programs have been set up for a specific purpose and target group. It is often difficult to connect to these programmes (Helmer et al., 2019, p. 2)

As explained earlier, there is no specific problem owner for heat stress. Both actors in the physical and social domain are responsible, and an integrated approach is needed. But the domains have their own 'world' and speak a different language in terms of content (Rijkswaterstaat, n.d.). Besides that, especially actors in the social domain face already other major social challenges, like the changes that the program 'Langer thuis' (Live at home longer) entails (Helmer, personal communication, 10 April 2019; Ministerie van Volksgezondheid, Welzijn en Sport, 2018). Thinking and talking about an integral approach for heat stress is seen as additional work. This makes it difficult to involve them and to start a joint approach. That is why it is important to find synergy between programs from both the physical and social domain. In this way the domains can support and strengthen each other. But finding synergy takes time and involvement of both sectors.

1.1.4 PILOT

One of the aims of the NAS is to connect the actors from different domains and to improve an integral and joint approach (Ministerie van Infrastructuur en Waterstaat, 2016). Although there is attention for an integrated approach on a national level, the implementation on local level seems to be lagging behind (Helmer, personal communication, 10 April 2019; Helmer & Meijs, 2018).

That is why the Ministry of Infrastructure and Environment asked the two companies Klimaatverbond Nederland and Tauw to set out a pilot. The pilot focuses on the relation between heat and health. Four Dutch municipalities; Utrecht, Groningen, Tilburg and 's-Hertogenbosch, are participating in the pilot. The selection of these four municipalities is further explained in chapter 4. The pilot should gain more insight in the way the different domains, within municipalities, can be brought together to jointly limit the effects of heat stress.

1.2 RESEARCH OBJECTIVE

The pilot, described above, is selected as case study for this research. By analysing and evaluating different characterizing components of integrated planning this research will gain more insight in the way how the integrated planning between the physical and social domain of Dutch municipalities can be improved to limit the effects of heat stress on health. Based on this gained insight recommendations for Dutch municipalities can be done.

1.3 RESEARCH FRAMEWORK

The research framework presents the steps that need to be taken in order to achieve the research objective. Figure 1.2 provides a visual representation of this research project.

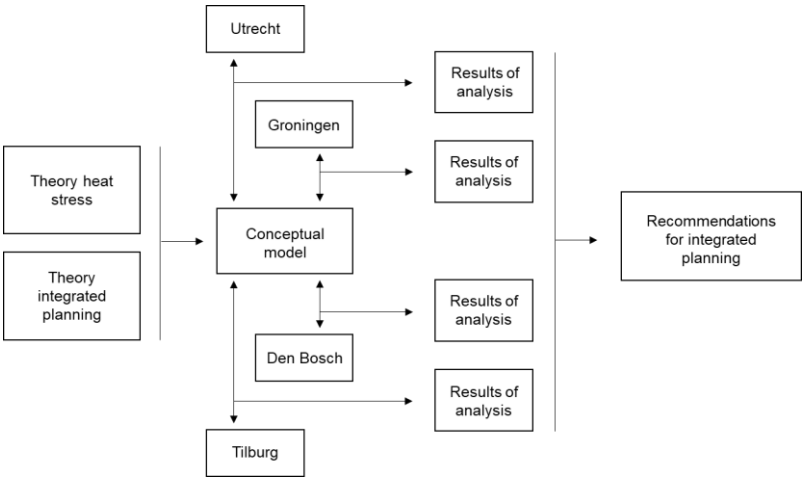

Figure 1.2 Research Framework

An analysis of the cause and influence of heat stress and literature on the concept of integrated planning results in a theoretical framework with a conceptual model. The conceptual model consists of a set of factors that influence the integration of planning between the physical and social domain. Based on the set of factors the integration of planning in different municipalities is compared. The results of the analysis lead to the formulated recommendations.

1.4 RESEARCH QUESTION

1.4.1 CENTRAL QUESTION

According to the research objective, the following central question is formulated:

"How can the integrated planning between the physical and social domain of Dutch municipalities be improved to limit the effects of heat stress on health?"

1.4.2 SUB QUESTIONS

To answer the central question, the following sub-questions are formulated:

- What are the effects of heat on the human body and well-being?
- Why is integrated planning needed to reduce the effects of heat stress on health?
- What components characterize integrated planning?
- How do the characterizing components of integrated planning, influence the integrated planning between the physical and social domain of Dutch municipalities?

1.5 RELEVANCE

Research should make a relevant and useful contribution to existing knowledge. This relevance can be divided into two types; social and scientific relevance (Verschuuren en Doorewaard, 2007).

1.5.1 SOCIAL RELEVANCE

To reduce the risk of heat, a combination of measures in both the physical domain and the social domain is recommended (Kluck et al., 2017). As the overview of the NAS shows, heat has effects on many different sectors and the sector Health is strongly represented. It is important to find synergy between the different domains, jargons and programs (Helmer & Meijs, 2018). Nevertheless, the first focus is very often on the physical domain (Helmer, personal communication, 10 April 2019). Although at the national level this focus is changing. The Nationale Omgevingsvisie (NOVI) emphasizes an enhanced collaboration between the physical and social domain in general, on different themes (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2019).

More specifically the link between the physical and social domain in relation to heat is mentioned in the 'Handreiking lokaal hitteplan' (Ministerie van Infrastructuur en Waterstaat & NAS, 2019). This guide encourages municipalities to develop a local heat plan. Local heat plans are protocols for the local approach to the health effects of heat. They are a further elaboration of the National Heat Plan, aimed at practical implementation at the local level. Although the guide focuses mainly on people working in the social domain (not only government employees but also professional and voluntary carers, interest groups and intermediaries), the guide explains the possible, useful, link between the social and physical domain. The local heat plan could be part of the local climate adaptation strategy developed by the physical domain. In this way, the plan can contribute to the climate resilience of the physical domain, for example by green and blue measures in and on buildings and in public space (Ministerie van Infrastructuur en Waterstaat & NAS, 2019).

Since many municipalities have carried out the stress tests (had to before 2020) and are now conducting dialogues and working on a climate adaptation strategy and implementation agenda, now is the right time. Right now, before everything is laid down in the strategy and implementation agenda, it must be emphasized how important collaboration with the social domain is when it comes to climate adaptation. This is the moment when municipalities can still join the social domain.

This research contributes to further highlighting the necessary connection between the social and physical domain and gains more insight in the way the physical and social domains can be brought together to jointly reduce the risks of heat stress.

1.5.2 SCIENTIFIC RELEVANCE

Literature shows that the added value of the connection between the physical and social domain is recognized. Kent and Thompson (2014) argue that urban planning has an important role to play in supporting human health. An investigation by the National Institute for Health and Environment (RIVM) also shows that the domains of spatial design, environment and public health could benefit more from each other's knowledge and skills (RIVM, 2015). Research by Steenbakkers et al. (2011) shows that integrated policy appeals to municipal administrators and civil servants, but that few municipalities succeed in achieving intersectoral cooperation between policy sectors. The studies by Lowe et al. (2018) en Storm et al. (2010) specifically focus on strengthening and improving integrated planning.

However, these and other studies on the concept of integrated planning focus on "Health promoting spatial planning". In this research, the concept of integrated planning is applied to a new theme; heat as an effect of climate change. The concept of integrated planning has not previously been applied to the theme of climate change or specifically to one of the four effects. However, literature shows that the coordination of the heat problem is important, as there is a lot of discussion about who bears the responsibility for preparing and responding to extreme heat (Guyer et al., 2019; Mees et al., 2019). In the Netherlands, the effect of heat is dismissed as less important. Some studies even omit heat (and drought) (Mees et al., 2019). This research contributes to knowledge about the effect of heat in Dutch municipalities. And insight is gained into the application of the integrated planning concept to the climate effect of heat.

1.6 READING GUIDE

The next chapter will review the current literature. The subject is further explored and core concepts from the conceptual model are explained. In chapter three, attention is paid to the research approach, strategy, and methods used during this research. The case study and units of analysis are further explained in chapter 4. Chapter five examines the results and discuss what role different components of integrated planning have in the integrated planning between the sectors Spatial Planning and Public Health in their approach to heat stress. Finally, chapter 6 will answer the central research question and reflects on the conducted research.

2 LITERATURE REVIEW

2.1 EFFECTS OF HEAT ON THE HUMAND BODY AND WELL-BEING

As explained before, the health sector is an important sector in the overview of the effects of heat (figure 1.1), developed by the NAS (Ministerie van Infrastructuur en Waterstaat, 2018). Klok and Kluck (2018) explain in their article different risks of an increasing temperature, focusing on the urban area. Health is one of the five discussed sectors. Sleep quality is an example of a relatively harmless effect. But other effects like health problems, resulting in pressure on health emergency services, and even mortality, are effects with a lot of impact (Klok & Kluck, 2018).

2.1.1 EFFECTS OF HEAT ON THE HUMAN BODY

Intense thirst, heavy sweating, weakness, paleness, dizziness, fatigue and headache are just a few symptoms of heat-related illness that can emerge by long exposure to high temperatures (Kilbourne, 1997). Different heat-related illnesses can come up including heat cramps, heat syncope, heat exhaustion and a heat stroke (Kilbourne, 1997; Luber & McGeehin, 2008; Lugo-Amador et al., 2004). Heat exhaustion is the most common heat-related illness of those four (Lugo-Amador et al., 2004). But although heat exhaustion or heat stroke are illnesses that relate directly to heat, the majority of death resulting from hot weather are associated with pre-existing cardiovascular and respiratory disorders (Patz et al., 2000).

To a certain extent, the human body can adapt to rising temperatures. Healthy adults have efficient heat regulatory mechanisms, like perspiration, to cope with increases of temperature to a certain extent. The amount of heat exposure an individual can tolerate can vary, because human populations are acclimatized to their local climates, in physiological, behavioural and cultural terms (Kovats & Hajat, 2008; Patz et al., 2000). Koyats and Hajat (2008) argue that the human capacity to adapt to varied climates and environments is considerable. But although the human body can adapt to a certain extent, there is a turning point at which the human body can no longer adapt.

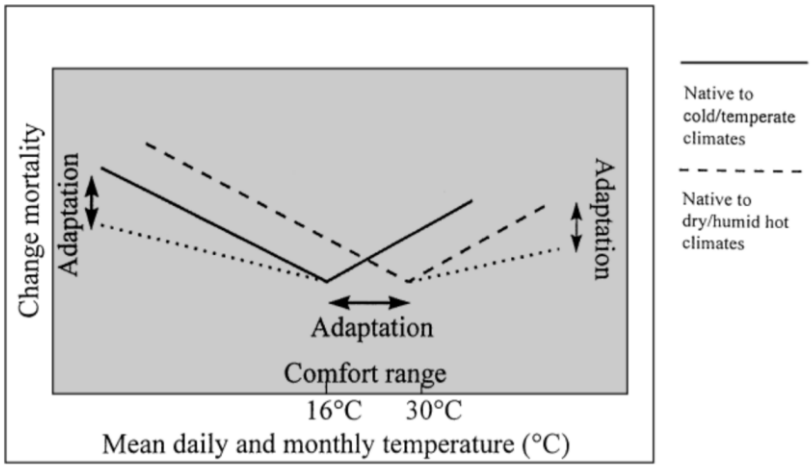

Figure 2.1 V-shaped relationship between outdoor temperature and mortality (Patz et al., 2000, p.279)

The relationship between temperature and risks of mortality is described and explained in different ways. Different researchers described the relationship as a V-shaped function (figure 2.1) (Martens, 1998; Patz et al., 2000; Takahashi et al., 2007). The comfortable temperature range varied between 16.5 degrees Celsius in the Netherlands and 29 degrees Celsius in Taiwan (Patz et al., 2000).

Curriero (2002) suggested that the relationship between temperature and mortality is J-shaped, indicating asymmetry with a steeper slope at higher temperatures (figure 2.2). On the other hand, McMichael, Woodruff and Hales (2006) argue that the relationship is typical U-shaped (figure 2.3). The trough represents the comfort zone; the steeper (right-side) arm of each line shows the mortality increase at hot temperatures, and the shallower (left-side) arm of each line shows the increase with colder temperatures (McMichael et al., 2006).

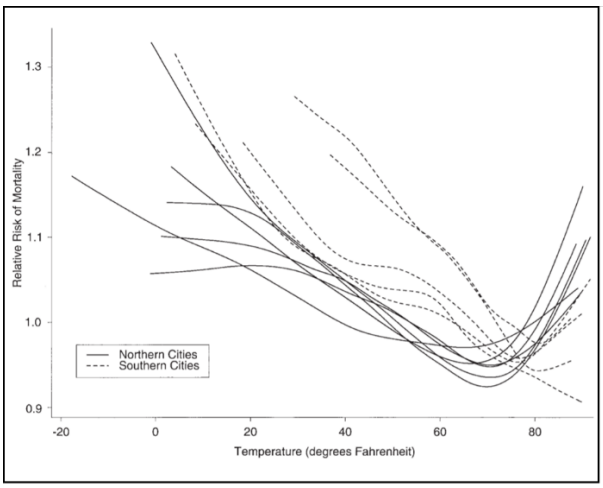

Figure 2.2 (left) J-shaped relation between temperature and relative risk of mortality (Curriero, 2002, p. 83)

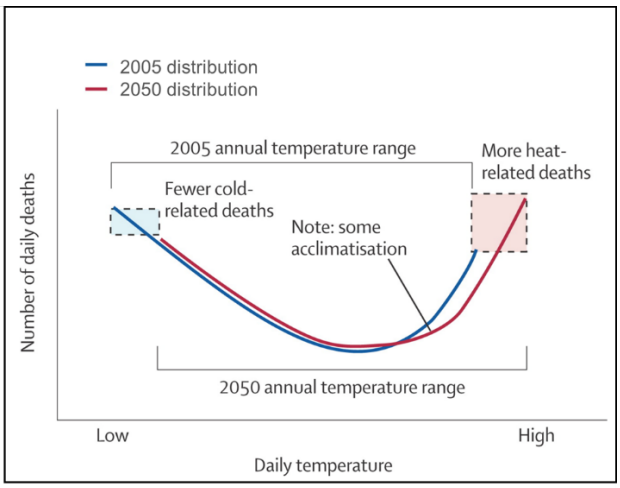

*Figure 2.3 (right) U-shaped relation between average annual temperature and effect annual total of temperature-related death*s (McMichael et al., 2006, p.862)

In all three models, exposure to extreme weather is associated with increased mortality and morbidity compared to an intermediate temperature range (Patz et al., 2000). Elderly, people with disabilities and young children are marked as vulnerable population groups . Risk factors can be categorized into two categories: intrinsic, like age, gender and disability, and extrinsic, like housing and behaviour (Havenith, 2005; Kovats & Hajat, 2008).

2.1.2 DRIVERS FOR HEAT-RELATED MORTALITY

Mortality is included as one of the possible effects of heat stress (Klok & Kluck, 2018). Luber and McGeehin (2008) describe three different drivers for heat-related mortality: Climate change, urban heat island effect and demographic changes. The three drivers will be discussed in this paragraph.

Climate change as a driver for heat-related mortality

The world average air temperature is rising, in the period 1880-2012 the temperature increased with approximately 0.9 degrees Celsius (IPCC, 2007). The IPCC expects that the global surface temperature change for the end of the 21st century is likely to exceed 1.5 degrees Celsius compared to the period between 1850 to 1900 (IPCC, 2013). But climate change does not only affect air temperatures, but also different other meteorological variables, related to heat, which might be as important to human health as temperature changes. For example humidity, barometric pressure and UV-radiation (Schneider & Breitner, 2016).

Besides a general rising temperature, the IPCC expects an intensification of heatwaves in magnitude and duration (IPCC, 2007). The term ‘heatwave' is loosely defined, there exists no universally accepted definition (Kovats & Hajat, 2008; Olde Rikkert et al., 2009). National weather services have developed their own definitions on a national or local basis (Kovats & Hajat, 2008). Luber and McGeehin (2008) argue that an extreme heat event is characterized by temperatures and humidities substantially

greater than the average for a specific time of the year. Olde Rikkert et al. (2009) are more specific and argue that an alarm signal should be given for frail older people when the outdoor temperature exceeds 32 degrees Celsius for three days or more. Although the definition is not always clear, the influence of heatwaves is noticeable. Scheneider and Breitner (2016) argue that the excess outdoor temperature in the summer has resulted in increased mortality during heatwaves, worldwide.

Urban heat island effect as a driver for heat-related mortality

In the period 1990 until 2015, the Dutch population grew from 14,9 million to 16,9 million. Especially the bigger cities in the Randstad grew strongly (17% urban area versus 10% countryside) (Beer et al., 2018). Besides the population growth, after 2010 a high percentage of the population moved into the bigger cities, while more and more people leave the periphery (Beer et al., 2018). Although several motivations exist for migration toward cities, for example, education, entertainment, housing, minimization of transportation, or health care access, the most dominant reason is the economic opportunities that are available in urban regions (Steeneveld et al., 2011). This process of urbanisation has increased the transformation of environments from native vegetation to engineered infrastructure. In 2015, 492.6 thousand hectares (14.6 percent) of the Dutch territory was intended for living, working and infrastructure. Compared to 1996, when the intended terroritory was 433.4 thousand hectares (13 percent of the total Dutch territory), this means an increase of 59,2 thousand hectares. Almost 90 percent of those added hectares is used for new living and working areas (CBS, 2019).

Research has shown that high settlement density, dominated by apartment buildings and lack of green space in neighbourhoods correlate significantly with higher temperatures (Luber & McGeehin, 2008; Rizwan et al., 2008). The concept of Urban Heat Islands (UHI) refers to the difference in temperatures measured inside and outside the city (Kovats & Hajat, 2008; Luber & McGeehin, 2008). The effect of UHI as a consequence of urbanization was first documented by Howard in 1818. His observations revealed that the city of London was warmer than the adjacent countryside (Heusinkveld et al., 2014; Oke, 1982). In 2011 Steeneveld et al. did research into the urban heat island effects in the Netherlands. They researched cities were different in size and urban morphology. All researched cities showed UHI effects (Steeneveld et al., 2011).

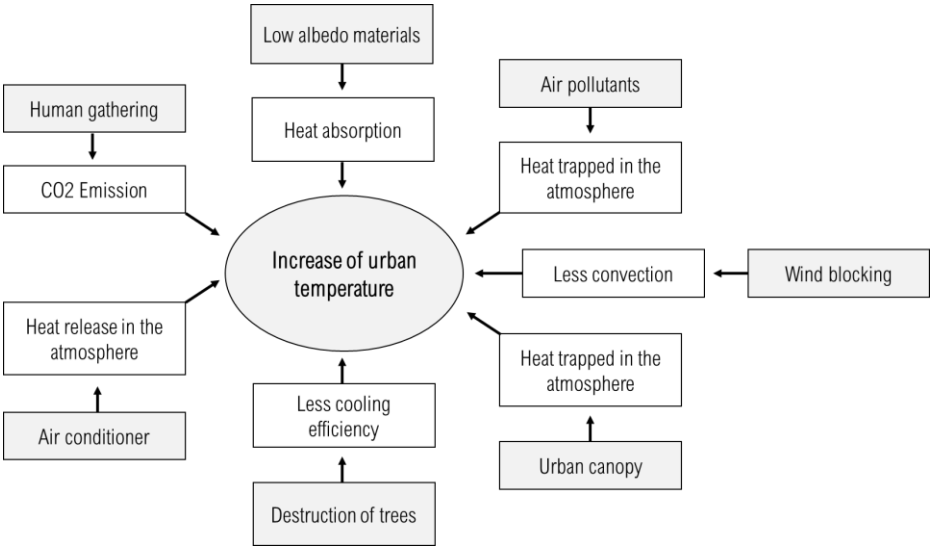

Figure 2.4 Process of urban heat island (UHI) formation (Nuruzzaman, 2015)

Differences in solar radiation heating in urban areas is a primary factor increasing the air temperature and surface temperature in urban areas (Leal Filho et al., 2018).But there are many other processes

that lead to UHI, Nuruzzaman (2015) summarises the most important causes for the UHI effect in an overview (figure 2.4).

The most important negative consequences of UHI are related to increased temperatures in urban areas. During warm summer periods, the temperature in urban areas can rise too high for vulnerable groups (Klok & Kluck, 2018; Luber & McGeehin, 2008). This is especially the case during the nights since the UHI effect enlarges the night time temperatures. Heatwaves are seen as one of the major risk factors of UHI as they can affect human health resulting in exhaustion, dehydration, circulatory disorders, and potentially death (Leal Filho et al., 2018). Leal Filho et al. (2018) explain *"Heat waves primarily pose a danger to vulnerable individuals, such as elderly people, the very young, those with social or physical impairments or those unable to afford mitigation measures (such as air conditioning)" (Leal Filho et al., 2018, p. 1141).* During the European heatwave in 2003, the excess mortality was especially high in big cities such as Paris (Fouillet et al., 2006; Laaidi et al., 2012). Olde Rikkert et al. (2009) describe that the death rate was particularly high in cities that were not accustomed to high temperatures. The mortality numbers were less high in cities with warmer climates, such as the cities in southern France (Olde Rikkert et al., 2009). Kovats and Hajat (2008) agree and argue that cities in southern Europe are more adapted to heat than cities that are located in northern Europe.

Demographic changes as a driver for heat-related mortality

Especially elderly, that live in warmer urban areas are vulnerable and bear the highest risk of heat-related morbidity. Because of their age, they are extra vulnerable, they are often not prepared for heatwaves and they spend all day inside poorly ventilated homes or uninsulated apartments without fresh air (Cannuscio, 2003; Hoeven & Wandl, 2018; Laaidi et al., 2012).

That is why ageing is seen as one of the most important drivers for heat-related mortality (Luber & McGeehin, 2008; Schneider & Breitner, 2016). You could even speak of a double ageing population, on the one hand, an increasing number of elderly, and on the other hand a rising life expectancy (Helmer, personal communication, 10 April 2019). The number of elderly as a proportion of the Dutch population is increasing. Since 25 years, the Netherlands know a trend of an ageing population. The percentage of people older than 65 increased from 12,8% in 1990 to 17,8% in 2015 (Beer et al., 2018). An additional trend is the decreasing percentage of youth under 20 years old from 25,7% in 1990 to 22,7% in 2015. The decline of the proportion of young people took place in all municipalities, except for the four major cities. The decrease was slightly stronger in the non-urban areas than in urban areas. The reverse trend applies to people older than 65. The number of older people rose the strongest in non-urban areas, slightly less in urban areas, but declined in the four major cities. For a long time, the four biggest cities did not have a trend of ageing, but since 2005 there is also a start of ageing there (Beer et al., 2018). The increase of the elderly as part of the population is expected to increase future temperature-related mortality and morbidity (Schneider & Breitner, 2016). Different heatwaves showed that the highest levels of excess mortality were located in the areas with larger elderly populations (Fouillet et al., 2006; Sun et al., 2014; Taylor et al., 2015). For example, the heatwave of 2003 in France caused excess mortality of 150% across all age groups, but the largest increase (160%-200%) was noticed in the group of elderly (Fouillet et al., 2006). The mortality rate of elderly aged above 75, living in retirement homes in France was even doubled (Fouillet et al., 2006).

During the process of ageing or during illness the tolerance range of an individual will narrow (Kovats & Hajat, 2008). Enlarged vulnerability to heat occurs because of changes in the thermoregulatory system (Flynn et al., 2005). Thirst and the capacity to conserve salt and water reduce with age (Olde Rikkert et al., 2009). Lack of thirst is one of the reasons that up to 25% of people aged 85 or older drinks less than one litre of fluid a day (Volkert et al., 2004). The limited physical fitness and the increased dependency on caregivers become important when a fluid balance is at risk, for example

during heat waves (Olde Rikkert et al., 2009). Besides increasing outside temperatures, there is also a relation between the indoor temperature and the physical performance of the elderly, according to Lindemans et al. (2017). Heat has a negative effect on the aspects ‘gait speed' and ‘chair rise performance' of the elderly. A better physical fitness might alleviate impediments of physical capacity and might provide resources for adequate adaptation for the elderly during heat stress (Lindemann et al., 2017). Thirdly, researches show that also the use of numerous drugs and medication can influence the level of heat-related mortality, which are used by elderly more frequential (Foroni et al., 2007; Schols et al., 2009).

In addition to the physical reasons, like diminished thermoregulatory and physiologic heat-adaptation ability, the level of social isolation among elderly is another reason for the level of vulnerability and the relation between elderly and heat-related morality (Fouillet et al., 2006; Klinenberg, 2015; Luber & McGeehin, 2008). Elderly are more likely to live alone, they often have reduced social contacts and experience poorer (mental) health, what makes it more difficult to maintain contacts independently (Foroni et al., 2007; Guyer et al., 2019; Luber & McGeehin, 2008). All those different reasons make this group of the elderly extra vulnerable. Naughton et al. (2002) argue the importance of social contact as protective for heatwave mortality. Research into the heatwave of Chicago of 1999 shows that 53% of the case study patients were aged older than 65 years, the strongest risk factors for heat-related death were living alone and not leaving home on a daily basis.

2.2 THE NECESSITY OF COLLABORATION

2.2.1 SOLUTIONS FOR HEAT STRESS

As became clear from the paragraphs above, both the physical and social domain are confronted with the effects of heat. Two drivers are related to the phyical domain: climate change and urban heat island effect, one driver is related to the social domain: demographic changes (Luber & McGeehin, 2008). This broad influence makes it hard to determine a problem owner of heat stress (Helmer & Meijs, 2018). Today, heat is today often seen as a spatial problem that needs to be addressed from the physical domain. Even though the sector health is strongly represented in the overview of effects (figures 1.1) (Helmer, personal communication, 10 April 2019; Ministerie van Infrastructuur en Waterstaat, 2018). This focus on the physical domain results in many physical solutions for the problem of heat stress. Kleerekooper, van Esch and Salcedo (2012) argue that cities can mitigate their UHI effect by diminishing the accumulation of heat and applying cooling techniques. They describe four categories of design principles: vegetation, water, form of the building and material. Filho et al. (2018) describe a variety of measures to strengthen the resilience of cities. They mention measures related to reflective colouring, urban design, urban greening, water features and green and blue infrastructure.

Additional measures

But those physical measures focus just on two of the drivers for heat-related mortality (Kleerekoper et al., 2012; Leal Filho et al., 2018). For some specific population groups, physical measures in the spatial area are not enough to solve the problem of heat stress. This is also the case for the elderly, which are one of the vulnerable population groups. Especially when they are mentally ill or socially isolated and stay home often (Cannuscio, 2003; Foroni et al., 2007; Guyer et al., 2019; Hoeven & Wandl, 2018). Naughton et al. (2002) argue that ‘not leaving home daily’ is one of the strongest risk factors for heat-related death. In this case, taking physical measures outside is not helpful, because the relevant target group does not take advantage of this type of measures. That is why Kluck et al., (2017) describe, besides physical measures for outside, also measures that could be taken inside or in the social domain. Examples for measures for inside buildings are sun protection, ventilation and climate control.

Measures in the social domain focus more on behavioural measures. Examples of these measures are care plans, tropical schedules and heat plans. Since behavioural measures do not take away the actual cause of heat stress and do not improve the situation for another heat period, both kind of measures, physical and behavioural are needed (Helmer, personal communication, 10 April 2019; Kluck et al., 2017).

2.2.2 COLLABORATION

Reducing the risks of heat stress requires collaboration between the physical and social domain. Collaboration between these domains is not new. The link between urban planning, spatial planning and health care has been strong traditionally. Urban planning has its roots in improving hygienic conditions, in order to ensure better living conditions (RIVM, 2015; Van Bree, 2015). Also, researchers argue that urban planning has an important role to play in supporting human health (Kent & Thompson, 2014). Although there is a strong traditional link and researchers argue that there is an important link between the two domains, collaboration is not taken for granted. Research has shown that Dutch professionals can benefit more from each other's knowledge in general (RIVM, 2015). One of the main bottlenecks in realizing intersectoral collaboration is insufficient knowledge (Steenbakkers et al., 2011). Taking advantage of each other's knowledge and experiences and creating more insight into the different backgrounds, motives and interests could strength the qualities of each sector (Brug et al., 2007; RIVM, 2015; Storm et al., 2010).

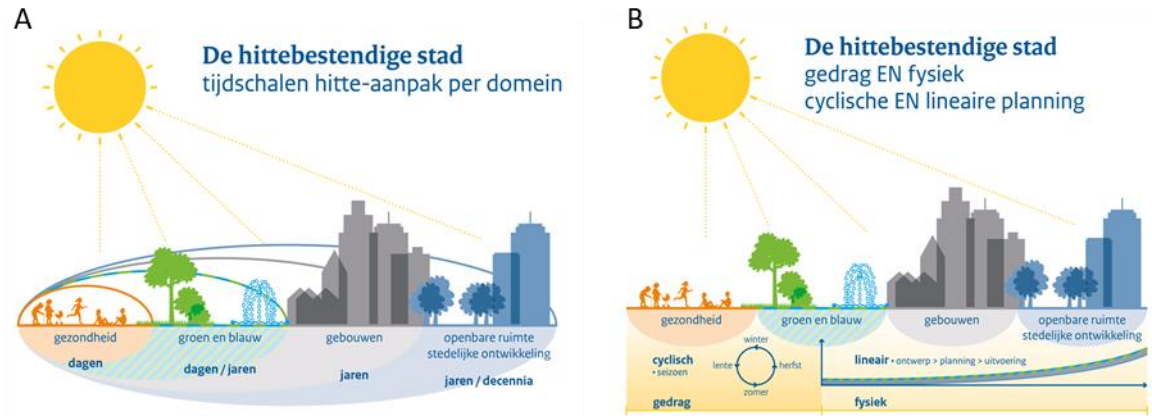

Figure 2.5 (A) Approach climate adaptation for different sectors. (B) Planning climate adaptation for different sectors. Note: the figures distinguish different sectors. The sector 'gezondheid' (public health) represents the social domain. The sectors 'groen en blauw' (green and blue), 'gebouwen' (buildings) and 'openbare ruimte, stedelijke ontwikkeling' (public space and urban planning) represent the physical domain.

The figure above shows that when it comes to heat, the approach and planning differ per domain. Where the social domain has a mainly short term approach, the physical domain has a long term approach. Both ways of working are essential. The short-term approach will show effect in a small period of time, in contrast to the long term approach. But too little commitment to the long-term approach will increase the pressure on the short-term approach (Helmer, personal communication, 10 April 2019). Besides the difference in approach, the domains differ also in planning. The social domain has a cyclic way of working (seasons), in contrast to the physical domain that works with a linear planning (Helmer, personal communication, 10 April 2019). In order to be able to collaborate well, it is important that both domains have knowledge of each other's way of working.

2.2.3 INTEGRATED PLANNING

The concept of collaboration between different sectors is discussed in a diversity of academic disciplines including organisational science, political science, public health and urban planning. Different terms are used and different definitions are given, like political science and public policy talk about whole-of-government and joined-up-government. Kickbusch and Buckett (2010) give in the rapport 'Implementing Health in All Policies' the following explanation: *"Whole-of-government' denotes public service agencies working across portfolio boundaries to achieve a shared goal and an integrated government response to particular issues."* The public health discipline uses the term intersectoral collaboration with a focus on strengthening the place of public health across other government sectors, the public sector and civil society (Lowe et al., 2018). This also becomes clear from the explanation Koelen and van den Ban (2004) give to intersectoral collaboration; *"The formal collaboration between different sectors with the aim to gain health profit in another discipline."* (Koelen & van den Ban, 2004). In the field of environmental and spatial planning, the terms policy integration and integrated planning are used. Holden (2012) gives the following definition of integrated planning: *"The management of cross-cutting issues that transcend the boundaries of established policy fields and that do not correspond to the institutional responsibilities of individual government departments"* (Holden, 2012, p. 306). Since this research is conducted from a spatial planning background, this definition of integrated planning is used.

There are different types of policy integration (Holden, 2012; Koelen & van den Ban, 2004). The first type is vertical integration between different organisations or different levels of government; for example national, provinces and local government. The second type is horizontal integration between different organisations or between different policy sectors within the same level of governance (Holden, 2012; Koelen & van den Ban, 2004). However these are not the only types that can be distinguished, Stead and Meijers (2009) also describe the division between intra-organisational and inter-organisational.

2.3 CONCEPTUALIZING AND CHARACTERIZING

2.3.1 CONCEPTUALIZING

Lowe et al. (2018) describe that integrated planning can be conceptualized as an issue of policy-making processes, policy content, actors and context. Those are the four pillars of integrated planning. The pillars align with the components in the policy framework of Walt and Gilson (1994). Although they developed this framework specific to health, the relevance of the framework extends beyond this sector (Walt et al., 2008).

Context

Policy is formulated in a specific context and is intended to seek interaction with the context and to have an effect on it. It is therefore important to have knowledge of this context. In this way, it is possible to find out whether the policy is complete and whether it is sufficient to achieve the desired effect (Araújo Jr & Maciel Filho, 2001). Context refers to the broader situational and structural factors influencing reform and can be researched very widely (Blaauw et al., 2014). Among other things, it includes culture and demographic, political and economic changes. The context can be divided into macro context and micro context. Macro context focuses on society as a whole, global interests and long-term goals. Micro context focuses on local or sectoral interests. This is more about understanding the personal interactions between people in everyday life, while the macro context is more concerned with the analysis of social systems or structures (Araújo Jr & Maciel Filho, 2001).

Content

Araújo Jr & Maciel Filho (2001) summarize content as 'the body of the policy'. Content is reflected in programs, projects, activities and objectives. By looking at content, conclusions can be taken whether the proposals in the policy meet the needs of the context, whether the measures are sufficient and necessary and whether they are designed coherently. As mentioned above Walt and Gilson (1994) argue content should reflect the other three components. The content initially focuses on analyzing the problems and attaches objectives to them. Subsequently, the resources that are needed are examined. This concerns material resources (e.g. money), technical and organizational resources (e.g. knowledge, organizational and administrative capacities) and political resources (authority to realize it) (Araújo Jr & Maciel Filho, 2001).

Process

The process analysis examines the way in which policy is identified, formulated and implemented. Different steps can be distinguished; problem identification, policy formulation, policy implementation and policy evaluation (Blaauw et al., 2014; Walt & Gilson, 1994). Problem identification and policy evaluation are treated under content, so process focuses mainly on policy formulation and policy implementation (Araújo Jr & Maciel Filho, 2001).

Actors

Policy analyses regularly focus on the actors involved, often the government. Actors add their values, political views, interests, roles and practical proposals to the process and determine in this way the course of a policy process (Araújo Jr & Maciel Filho, 2001; Blaauw et al., 2014; Walt & Gilson, 1994).

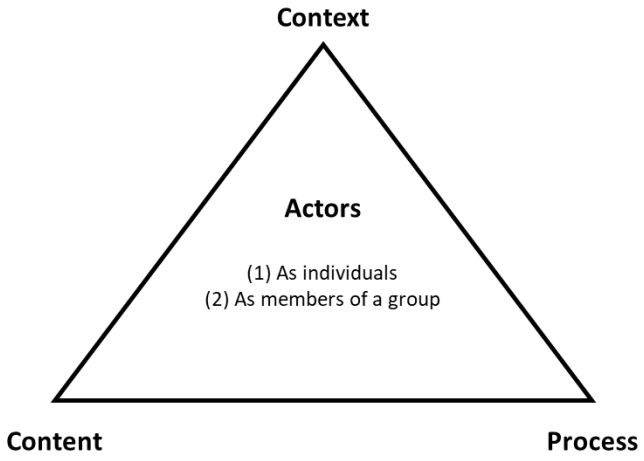

Figure 2.6 Model Walt and Gilson (1994)

Only by analyzing all those four components, it becomes clear how policy should be formulated and how results can be improved (Lowe et al., 2018). Besides taking all the components into account it is important not to accept the four components as independent (Araújo Jr & Maciel Filho, 2001). Policymaking is the result of the interaction of the four components (Walt & Gilson, 1994). Figure 2.6 shows a simplified model of the complexity of interrelationships between the four components. The actors are influenced by the context within they live and work. The actors themselves influence the process and content. The process is secondly influenced by the context and influences the content of the policy. Finally, the component content reflects some of all the other components.

2.3.2 SUMMARY

Figure 2.7 summarises the described literature. The three drivers on the left side influence heat stress vulnerability. The problem of heat stress and its vulnerability has to be solved in the physical domain as well in the social domain. The figure shows the necessity of integrated planning and the components that comprise integrated planning: actors, process, content and context.

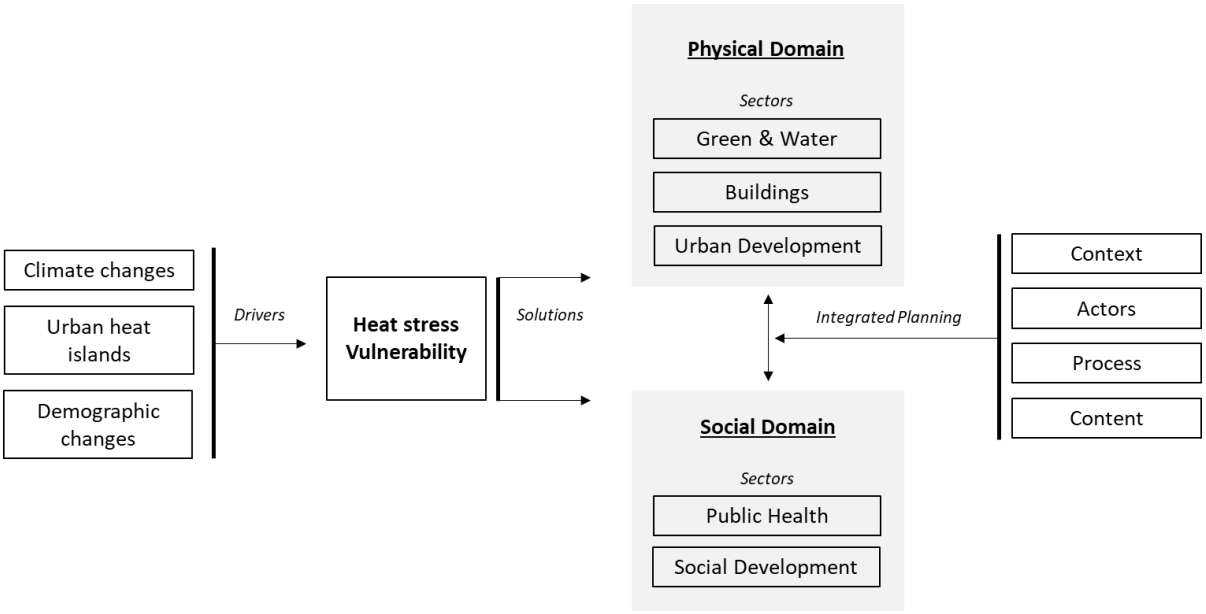

Figure 2.7 Summary

2.3.3 CHARACTERIZING

The described components: context, content, process and actors form the pillars of integrated planning. But what is necessary to ensure that all four components are present and how do you achieve effective integrated planning? Lowe et al. (2018) argue that processes of integrated planning require good collaboration between sectors and stakeholders. Kickbusch & Buckett (2010) describe the ideal conditions for effective intersectoral collaboration. (1) The different sectors identified a need to work together in order to achieve their goals. (2) In the broader operating environment, there are opportunities that promote intersectoral collaboration, for example community understanding and support. (3) Organisations have the capacity —the required resources, skills and knowledge— to take action. (4) The actors have developed a relationship on which to base cooperative, planned action. The relationship is clearly defined and is based on trust and respect. (5) The planned action is well-conceived and can be implemented and evaluated. The action is clear and there is an agreement to undertake it. Roles and responsibilities are clear. (6) There are plans to monitor and sustain outcomes.

To research the four components of integrated planning it is necessary to further specify them. Different researchers investigated integrated planning, using various aspects. In a qualitative research into health inequality, Storm et al. (2010) analysed the collaboration between the public health sector and other policy sectors based on five different aspects: involvement of the sectors in the public health policy network, harmonisation of objectives, use of policies by the relevant sectors, formalised collaboration and previous experience (Storm et al., 2010). In 2012, TNO researched how the intersectoral collaboration could be optimised in relation to the concept of the 'Gezonde Wijk' (Healthy neighbourhood) (van der Klauw et al., 2012). For this research TNO used a preliminary model of intersectoral collaboration, comprising of eight aspects: urgency, expectations, composition, funding,

commitment, structure, communication and results. They based their model on the article of Zakocs and Edwards (2006) who described in their article many different factors that influence intersectoral collaboration.

2.3.4 CONCEPTUAL FRAMEWORK

The central question in this research is: "*How can the integrated planning between the physical and social domain of Dutch municipalities be improved to limit the effects of heat stress on health?".*

That is why this research focuses on the arrow 'integrated planning' in the summary figure (figure 2.7). As was described, integrated planning between the physical domain and the social domain is necessary to reduce the risks of heat. Integrated planning consists of four components, namely context, actors, process and content (Walt & Gilson, 1994). Those components are more specified and applied to this research by linking various aspects used by Kickbusch and Buckett (2010), Lowe et al. (2018), Storm et al. (2010) and van der Klauw et al. (2012).

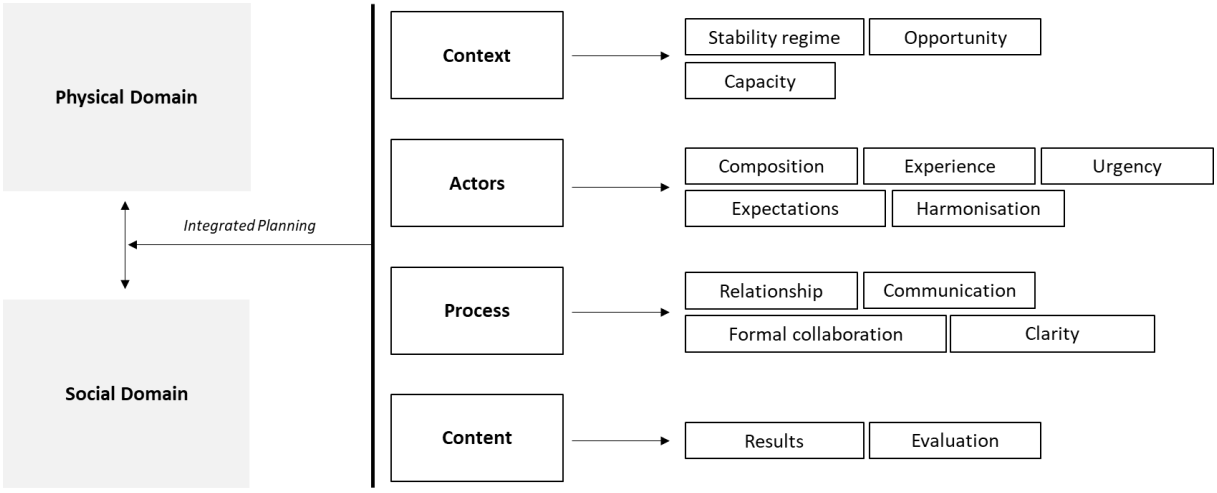

Figure 2.8 Conceptual framework

2.3.5 OPERATIONALISATION

The theoretical framework has enumerated four components of integrated planning. These components are further specified by linking them with more specific aspects from the literature. This research examines to what extent these components and aspects occur in the cooperation between the physical and social domain on the theme of heat and to what extent these components and aspects influence collaboration. The operationalization is intended to make the theoretical concepts measurable. A short explanation has been included for each aspect together with an assumption when integrated planning focused on the topic of heat stress is optimal.

2.3.5.1 Context

Aspect	**Explanation**	**Assumption** *Integrated planning focused on the topic of heat stress will be optimal when …*
Stability regime	Local developments in which the process finds place	… the regime is stable (Walt & Gilson, 1994)

Opportunity	Opportunities, understanding and support to promote intersectoral collaboration	… there is understanding and support in the different domains (Kickbusch & Buckett, 2010)
Capacity	The way in which collaboration is ensured by enough human capacity, financial resources and skills and knowledge	… actors have the capacity to ensure collaboration on the short and long term (Kickbusch & Buckett, 2010; van der Klauw et al., 2012)

Table 2.1 Operationalisation context

2.3.5.2 Actors

Aspect	**Explanation**	**Assumption** *Integrated planning focused on the topic of heat stress will be optimal when …*
Composition	The presence of sufficiently different actors from different sectors	… the composition of members is diversified but can be brought together (Storm et al., 2010; van der Klauw et al., 2012).
Experience	Experience with earlier integrated planning projects or processes	… actors have already experience with integrated planning or have a shared history (Storm et al., 2010)
Urgency	The degree of necessity to work together	… there is a degree of necessity that is felt by actors to work together (Kickbusch & Buckett, 2010; van der Klauw et al., 2012)
Expectations	The expectations of participants regarding forms and solutions of partnership	… the actors have positive, concrete expectations (Kickbusch & Buckett, 2010; van der Klauw et al., 2012)
Harmonisation	Agreement between the different sectors about objectives and priorities	… there is harmonisation of objectives and priorities across the different sectors (Storm et al., 2010; van der Klauw et al., 2012)

Table 2.2 Operationalisation actors

2.3.5.3 Process

Aspect	**Explanation**	**Assumption** *Integrated planning focused on the topic of heat stress will be optimal when …*
Relationship	Structures and connections between the different domains	… there is a clearly defined structure and relationship between the actors (Kickbusch & Buckett, 2010, van der Klauw et al., 2012)
Communication	Exchange of information and knowledge between actors of different sectors	… there is a good and clear communication between the different sectors and conflicts can be handled (van der Klauw et al., 2012)
Clarity	Clarity in the planned action, roles and responsibilities	… the action is clear and there is an agreement to undertake it. Roles and responsibilities are clear (Kickbusch & Buckett, 2010)
Formal collaboration	The way collaboration between different sectors is formally established	… arrangements about practical collaborative means are addressed (Storm et al., 2010)

Table 2.3 Operationalisation process

2.3.5.4 Content

Aspect	**Explanation**	**Assumption** *Integrated planning focused on the topic of heat stress will be optimal when …*
Results	The way the components: actors, process and context are visible in final documents so that actors continue to find it valuable.	… all the components come back in the content of the final documents (Walt & Gilson, 1994)
Evaluation	Monitoring and evaluating the outcomes	… there are plans to evaluate and sustain the outcomes (Kickbusch & Buckett, 2010)

Table 2.4 Operationalisation content

3 METHODS

In chapter two the theoretical background of the research is explained. To give a reliable answer to the formulated research questions a clear methodology is essential. The verifiability of the research is increased when the considerations and decisions can be justified. In this chapter the research philosophy and strategy, research methods and methods of data collection are discussed. Finally, the validity and reliability of this research are discussed

3.1 RESEARCH PHILOSOPY AND RESEARCH STRATEGY

3.1.1 RESEARCH PHILOSOPHY

Guba and Lincoln (1994) write about three fundamental questions to define the right research paradigm; ontology, epistemology and methodology, which are interconnected. Answering one question, constrains how the others may be answered.

Ontological questions are concerned with the nature of social entities (Brymann, 2016) What is the form and nature of reality and what can be known about it? (Guba & Lincoln, 1994). The central question is whether social entities can and should be considered as objective entities that have a reality external to social actors, or whether they can and should be considered as social constructions built from the perceptions and actions of social actors. Constructivism is an ontological position that asserts that social phenomena and their meanings are continually being accomplished by social actors (Brymann, 2016). This means that this research presents a specific version of social reality.

Epistemology questions about the nature of the relationship between the researcher and the researched, and what can be known. Guba and Lincoln (1994) describe the epistemology for constructivism as transactional and subjectivist. The researcher and the respondents are assumed to be interactively linked, so the researcher understands the subjective meaning of social actions (Brymann, 2016). Using observations and interviews as a method of data collection, result in an interactively link between the researcher and the researched. In this research, this is especially the case since the researcher herself visited the kick-off meetings and de work session organised for the pilot and conducted the interviews herself. Guba and Lincoln (1994) argue that individual constructions only can be elicited and refined through interaction between and among the researcher and the respondents.

The characteristics of the constructivism philosophy that apply to this research will now be elaborated on. The first characteristic is the inductive approach of the research, an open-ended inductive exploration of the data (Farthing, 2016). For this research a new framework is developed, in which various components and aspects from already existing literature have been combined into one framework. The framework is during this research tightened, by input from observations and interviews. In this way new insights are formulated and theory can be supplemented and tightened. As mentioned, the strategy that will be used to carry out this research is observations and interviews. By using data collected from observations and interviews the research strives to take a subjective approach, which is a second characteristic of constructivism. The research emphasizes how individuals interpret their social world.

3.1.2 RESEARCH STRATEGY

According to this subjective approach and the emphasis on individual interpretation an embedded case study strategy is used in this research. This strategy prefers in-depth research instead of breadth

research and consist of a small number of research units (Verschuren & Doorewaard, 2010). There are four different types of case study. A study can consist of single or multiple cases, which can be labelled as single- or a multiple-case study. Whether single or multiple, it is possible to choose to keep the case holistic or to have embedded subcases within an overall holistic case (Robert K. Yin, 2011). The difference between holistic and embedded type is attached to the units of analysis that determined for the research. The holistic type is used when no clear units of analysis have been recorded. If units of analysis are recorded, it is an embedded type. Within the holistic approach, the analysis units are not logically constructed from the proposed problem definition. The opposite applies to the embedded approach, where the units of analysis have been deduced logically and step by step from the problem definition. The four types of case study design are combinations of the four characteristics mentioned.

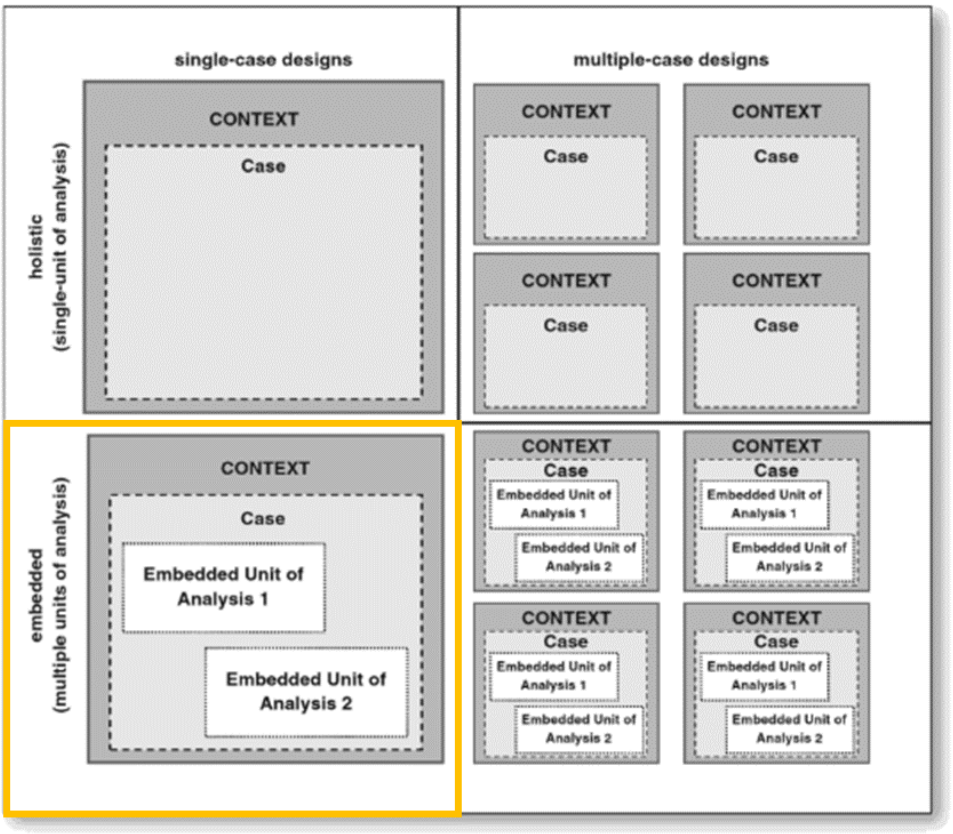

Figure 3.1 Types of case study design (Robert K. Yin, 2011)

In this research clear units of analysis have been recorded and can be logically deduced from the problem definition. That is why an embedded case study strategy is used in this research (marked yellow in figure 3.1). The embedded case that is selected for this study is the pilot set out by the Ministry of Infrastructure and Environment in collaboration with Klimaatverbond Nederland and Tauw. The units of analysis are the four participating municipalities: Utrecht, Groningen, 's-Hertogenbosch and Tilburg. The case study and units of analysis are further explained in Chapter 4.

3.2 DATA COLLECTION AND ANALYSIS

The chosen methods to collect data follow the research philosophy of constructivism in which context plays an important role. The case study strategy offers the opportunity to study contemporary topics and social phenomena. However, there is debate about the validity of this type of research design (Yin, 2009). According to Yin (2009), the use of multiple sources of data can contribute to a stronger validity of a case study. This method is called triangulation. The principle of triangulation is based on

two or more sources of data (Brymann, 2016). That is why three research methods are applied within this research to collect the necessary data. Those methods are observations, interviews and desk research.

3.2.1 PARTICIPANT OBSERVATION

As already mentioned, the selected case was a project running during this research. This provided the opportunity to collect additional data through participant observation. This form of participation means that processes and projects within the municipalities have been observed and that the researcher has also directly participated in these activities (Creswell, 2013). Observations can be used as an addition to interviews in qualitative research. Brymann (2016) set out different advantages of observation as an addition to interviews:

- Seeing through other's eyes
- Learning the native language
- The taken for granted
- Ability to observe the behaviour
- Deviant and hidden activities
- Sensitivity to context
- Encountering the unexpected and being flexible
- Naturalistic emphasis
- Embodied nature of experience

By using observation in addition to interviews an integral picture can be created of the local situation. Table 3.1 gives an overview of the different meetings that are used for observation. Some of the meetings are officially part of the pilot, other meetings are related to the topic of heat stress health, but are not officially part of the pilot. An overview of those meetings is given in table 3.1 and 3.2.

Code	Location	Date	Meeting	Part of Pilot
O1	Utrecht	14-03-2019	Work session	X
O2	Groningen	19-03-2019	Kick-off meeting	X
O3	Groningen	23-04-2019	Work session	X
O4	‘s-Hertogenbosch	29-03-2019	Kick-off meeting	X
O5	‘s-Hertogenbosch	15-04-2019	Work session	X
O6	Tilburg	16-03-2019	Kick-off meeting	X
O7	De Bilt	02-04-2019	RIVM Werksessie Hitte en gezondheid	
O8	Amsterdam	04-04-2019	HvA Hitte Consortium	
O9	‘s-Hertogenbosch	17-04-2019	Province of Brabant	

Table 3.1 Observation moments

Code	Explanation meeting	Presence
O7	RIVM Work session: Work session about heat stress with different actors from different domains	NAS, VWS, RIVM, KNMI, CAS, GGD, WUR, HvA, Tauw and Klimaatverbond Nederland
O8	Consortium Heat Stress organized by the HvA	HvA, WUR, Tauw, Klimaatverbond Nederland and different municipalities
O9	Meeting about the topics cooling and heat stress with different organisations	Province of Brabant, Klimaatverbond Nederland, Tauw

Table 3.2 Explanations meetings

3.2.2 INTERVIEWS

The second method to collect data is doing interviews. Following the research philosophy and the research strategy, the interviews have a qualitative nature (Brymann, 2016; Guba & Lincoln, 1994; Verschuren & Doorewaard, 2010). Qualitative interviews give the option to investigate the respondents own perspective. Farthing (2016) set out four choices to select a form of interviewing: (1) unstructured or structured, (2) depth or breadth, (3) individual or group, (4) formal or informal. The interviews in this research are semi-structured. The structure ensures that the various interviews have the same themes so that they can be compared with each other (Brymann, 2016). Interviews were done face to face or by phone. Since it was not possible to make an appointment with two respondents, these interviews were conducted in writing. The content of the interviews is based on the results of the desk research and observations. The focus lies on the four components of integrated planning, found in the literature. The four components and aspects are operationalised and translated into clear and understandable questions. For this researchs two interview guides have been prepared. One for the respondents from the municipality and the expert from RIVM and GGD. And one for the respondents that were close related to the pilot and interviewed as expert. The used interview guides can be found in annex 1 and 2.

During the pilot, it became clear that the municipalities of Utrecht and Groningen will complete the entire pilot project. In contrast to the municipalities of Tilburg and 's-Hertogenbosch, for which a different route is taken. Since the pilot is the leading case in this study, the decision is made to focus on the interviews of the municipalities of Utrecht and Groningen. During the selection of respondents, the subdivision into domains (physical and social) was maintained. After the work sessions were held, it was determined which of participating respondents should be approached for an interview. In addition to the interviews with employees of the municipalities, some interviews were held with experts, who were involved in the pilot, to gather more information about the background of the problem and the necessity of collaboration between the physical and social domain. Table 3.3 and 3.4 give an overview of the respondents, as well as the domain to which they belong. The text refers to the contribution of respondents by means of the indicated code. Annex 3 contains the functions of the respondents.

Municipality	**Number**	**Domain**	**Code**
Groningen	R1	Physical domain	RP1
	R2	Physical domain	RP2
	R3	Social domain	RS3
	R4	Social domain	RS4
Utrecht	R5	Physical domain	RP5
	R6	Physical domain	RP6
	R7	Social domain	RS7

Table 3.3 Respondents interviews municipalities

Organisation	**Number**	**Domain**	**Code**
RIVM / GGD	R8	Social domain	RS8
Klimaatverbond NL	R9	Social domain	RS9
Tauw	R10	Physical domain	RP10

Table 3.4 Respondents interviews experts

3.2.3 DESK RESEARCH

Besides observations and interviews, desk research is used in this research. The documents studied vary from policy documents and articles to working papers of the pilot and maps (table

3.1). Desk research is used to provide more insight into the current state of integrated planning in the selected Dutch municipalities and the activities within the pilot. The information and knowledge gained from these documents were used to prepare the interviews and to gain insight into the different units of analysis.

The analysis of documents was started by studying the working papers per municipality. After that, the method of "snowball sampling" was applied. This means that references in these documents to previous policy or background documentation have also been studied in order to obtain a complete overview (Brymann, 2016). Table 3.5 gives an overview of the used documents. The documents can be requested from the author.

Title document	**Author**
Werkdossier gemeente Groningen	Tauw, Klimaatverbond Nederland
Werkdossier gemeente Utrecht	Tauw, Klimaatverbond Nederland
Werkdossier gemeente 's-Hertogenbosch	Tauw, Klimaatverbond Nederland
Werkdossier gemeente Tilburg	Tauw, Klimaatverbond Nederland
Opbrengsten proeftuin hitte en gezondheid. Hoe beschermen we de eenzame ouderen?	Tauw, Klimaatverbond Nederland
Presentation Pilot	Tauw, Klimaatverbond Nederland
Ruimtelijke strategie 2016	Municipality of Utrecht
Nota Volksgezondheid 2015-2018	Municipality of Utrecht
Klimaatadaptief Groningen	Municipality of Groningen
The Next City – Strategische Koers	Municipality of Groningen
Maps loneliness	RIVM
Programma Langer Thuis (live at home longer)	VWS
Gemeenten steeds concreter aan de slag met hittestress	Tauw, Klimaatverbond Nederland, Samen Klimaatbestendig

Table 3.5 Documents desk research 'secondary research'

3.2.4 APPROACH OF DATA ANALYSIS

The data collected through observations and interviews have been recorded in various ways. The interviews were audio-recorded and transcribed afterwards. During the observations, notes were taken. Additionally, during the meetings which are part of the pilot (M1-M6), the attendance list was captured. This provided information about the domain of the participant. The data collected by both methods is analysed thematically with the assistance of the computer software NVivo. For analysing, the Ethnographic Content Analysis (ECA) approach of Altheide and Schneider (2013) is used. With the approach of ECA, the researcher is constantly revising the themes or categories that are distilled from the examination of documents (Brymann, 2016). Before analysing the data, some themes or categories are pointed out, but they can change during reading and analysing the data. The coding schemes for the different strategies of data collection can be found in annex 4.

3.3 VALIDITY, RELIABILITY AND ETHICS

This paragraph discusses the validity and reliability of the research, both are a way to guarantee the quality of the research and to ensure its results (Boeije, 't Hart & Hox, 2009).

3.3.1 VALIDITY

Validity can be distinguished between internal and external validity (Brymann, 2016). Internal validity means that the research data obtained is accurate and that the research results reflect reality (Verschuren & Doorewaard, 2010). This can be increased by submitting the survey results and findings to respondents. Besides, this research uses various methods of data collection. According to Yin

(2009), the use of multiple sources of data can contribute to a stronger validity of a case study. Limitations to one form of data collection can be compensated by the possibilities that other forms of data collection offer (Verschuren & Doorewaard, 2010). External validity means that the research results can be generalized. The external validity is in a case study research often not very high, because the results are context-specific (Verschuren & Doorewaard, 2010). Although the production of generalizable data is not the purpose of this research, it is important to be aware of the external validity before starting a research.

3.3.2 RELIABILITY

Reliability is concerned with the question of whether the results of the research are repeatable (Brymann, 2016). It is important that interviews are replicable, that is why interview guides are prepared in advance based on theory. The interview guides can be found in annex 1 and 2. Also, all interviews are audio-recorded and transcribed, which is a good way to guarantee the replicability (Brymann, 2016). Respondents were asked if they gave permission to record the interview and to transcribe the recording. The transcripts of the interviews and the reports of the observations are analysed based on codes. Both deductive coding, the codes are determined by the theory established, as well inductive coding, where new patterns are discovered codes are added, are used. These codes can be find in annex 4.

3.3.3 ETHICS

It is important to think about ethics in social science concerning the privacy of the respondents. This applies to the writing of the research proposal and the execution of the research. Research ethics must be considered throughout the process (Farthing, 2016). Although this research is not expected to contain sensitive data, it is important to discuss this with the respondents. This gives them the opportunity to indicate whether certain information should be anonymised. Most of the researched respondents wanted to stay anonymously (Bryman, 2016). That is why in this research the names of the respondents will not be published (except the personal communication with Madeleen Helmer, April 2019). For each respondent, the only information provided is the municipality or organization where the respondent works and the domain (physical or social) to which they belong.

4 CASE STUDY

As explained in chapter 3 there is one main unit of a cases study with four embedded units of analysis. This chapter describes the selected case study and the embedded units of analysis.

4.1 CASE STUDY

As explained in the introduction of this research, the Ministry of Infrastructure and Environment asked Klimaatverbond Nederland and Tauw to set out a pilot. This pilot is selected as an embedded case study for this research. The pilot focuses on collaboration between the physical and social domain within Dutch municipalities to jointly limit the effects of heat stress. The pilot has a three-pronged approach:

- Making connections between the physical and social domain within municipalities;
- Ensuring connection with ongoing processes of the Delta Plan on Spatial Adaptation (DPRA), the stress tests and risk dialogues;
- Describing the collaborative process surrounding the alignment of the responsibilities in tackling heat stress, as a guide for other municipalities (Helmer et al., 2019).

4.1.1 CONNECTION DOMAINS

The connection between the physical and social domain, as it was made in the pilot, is explained with the help of the infographic below (figure 4.1). There are two national programs that (partly) focus on heat stress: Deltaplan Ruimtelijke Apdaptatie (DPRA) and the Nationale Adaptatie Strategie NAS. DPRA focuses on addressing the cause and focuses on the physical domain. NAS focuses on mitigating the consequences. One of the domains where the effects of heat are noticeable is the social domain.

4.1.1.1 Orange - Social domain

Various target groups are vulnerable to the effects of heat. The chosen target for the pilot is elderly who live at home and are socially isolated. In addition to target groups, various actors from the social domain are involved in tackling heat stress (Helmer et al., 2019).

4.1.1.2 Blue - VWS (ministry of Health, Welfare and Sport)

Various programs are running at the national level, in which the selected target group (elderly who live at home and are socially isolated) is central. In the program "Een tegen eenzaamheid" (One against loneliness), maps have been developed from this program to provide insight into the percentage and number of lonely elderly people at the neighbourhood level (RIVM, n.d.). The fact that this program has maps in the social domain triggered Madeleen Helmer. Displaying a phenomenon on a map is a typical way of communication within the physical domain. But this is much less common within the social domain (Helmer, personal communication, 10 April 2019).

4.1.1.3 Green - Physical domain

A large number of the municipalities have now carried out stress tests for the various themes of climate adaptation. The performance of stress tests follows from the first ambition of DPRA “to identify vulnerabilities through stress tests” (Ministerie van Infrastructuur en Waterstaat, 2019). A heat stress map shows the heat stress sensitive locations in a municipality, the physical vulnerability. However, it does not indicate where heat is actually a problem. The heat and solitude map has been developed as part of the pilot, a combination of heat maps from the Climate Effect Atlas and loneliness maps from RIVM (Helmer et al., 2019; Kennisportaal Ruimtelijke Adaptatie, 2020). In addition to heat stress, this map shows sensitive locations in the municipality, as well as places where heat is a problem for

vulnerable and lonely elderly people. The map shows in one storage which city districts lonely elderly people are at risk from heat (figure 4.2).

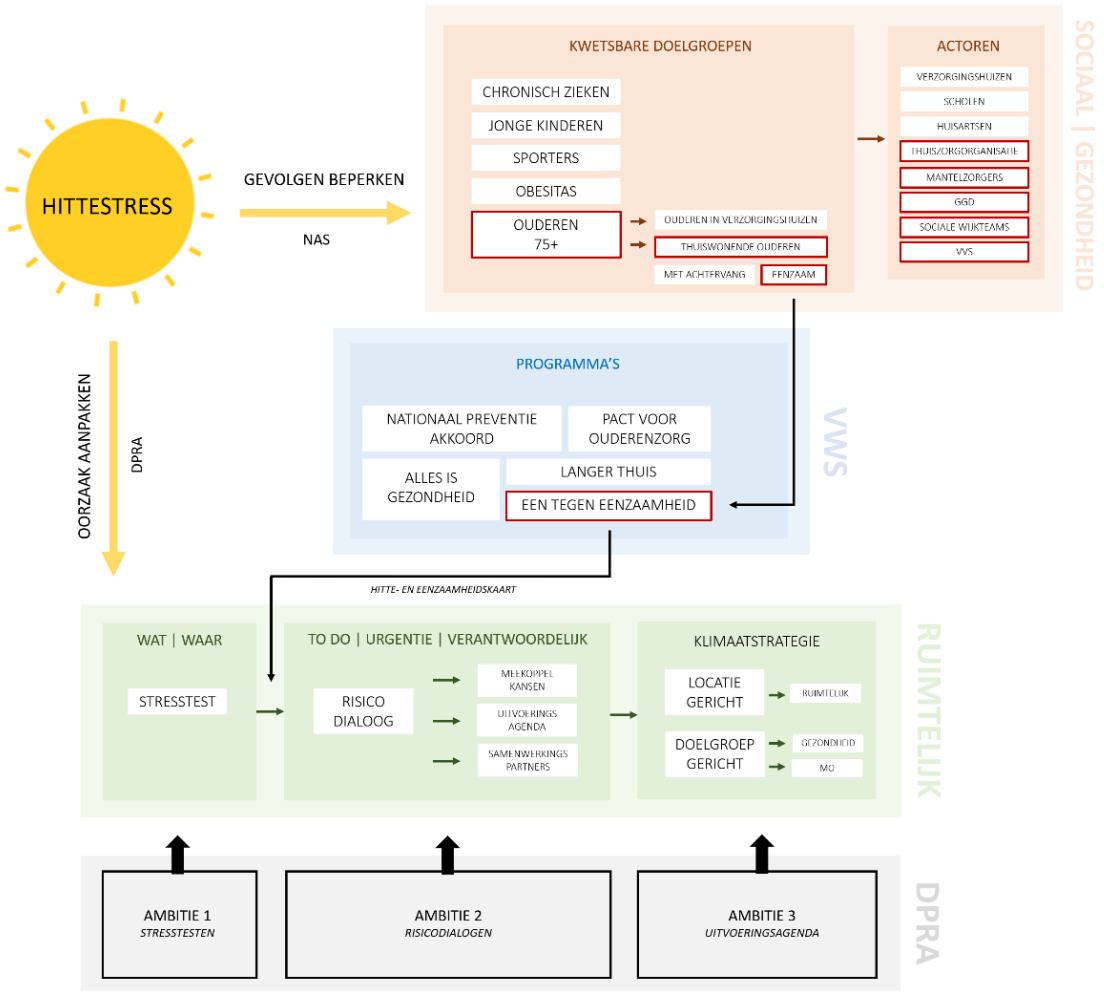

Figure 4.1 The relation between the different domains (adapted)(Helmer et al., 2019)

4.1.1.4 Grey - DPRA

The grey box shows the various ambitions of the Delta Plan. As mentioned above, most municipalities have carried out the first step "performing stress tests". In a stress test, the potential vulnerabilities for the climate themes of waterlogging, heat, drought and flooding within an area are identified. This makes it clear what a local adaptation strategy should respond to. The next step is to conduct the risk dialogues. These dialogues can be conducted internally and externally (with parties outside the municipality). This moment between ambition 1 and ambition 2 is the perfect time to point out the necessary role of the social domain to municipalities. Where the stress tests are almost always drawn up from the physical domain, the dialogues are the time to also involve the social domain in tackling climate adaptation. When the dialogues have been held, the step is then taken to draw up a climate adaptation strategy and implementation agenda.

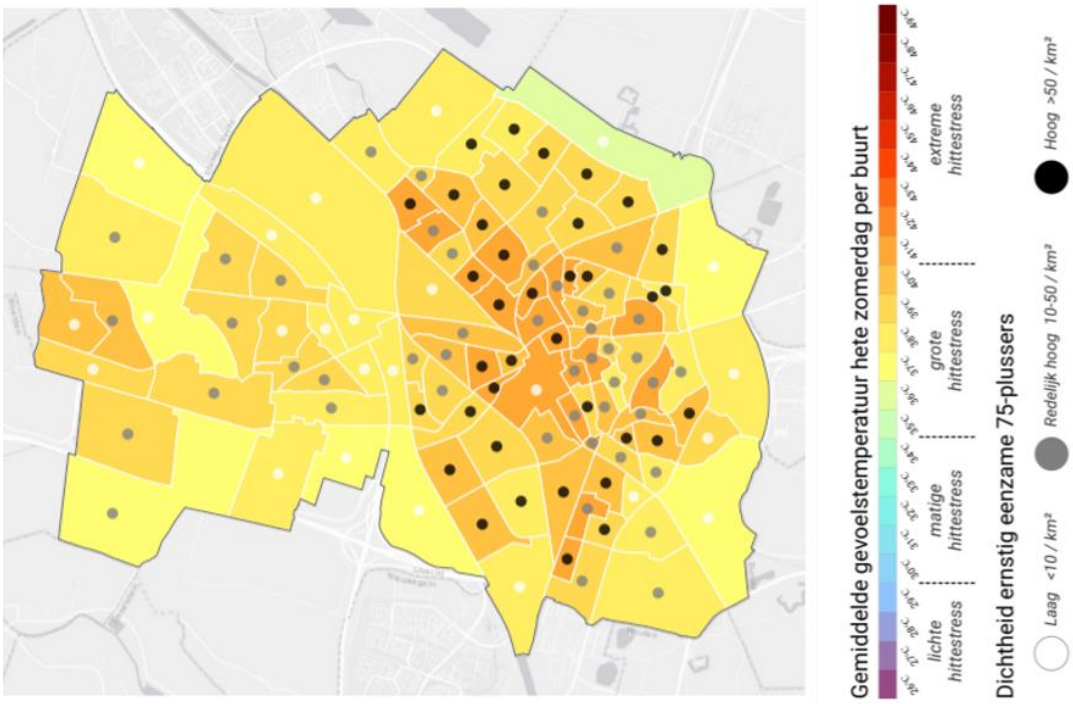

Figure 4.2 Example of the hitte- en eenzaamheidskaart (Municipality of Utrecht). One of the products of the pilot (Kennisportaal Ruimtelijke Adaptatie, 2020).

4.1.2 PILOT ACTIVITIES

The pilot started in all participating municipalities with a kick-off meeting to discuss the goal and approach and to jointly determine the focus neighbourhoods. Employees from both the physical and social domain were invited for these meetings. Subsequently, work sessions at district level took place in 's-Hertogenbosch and Groningen. The purpose of the sessions was to raise awareness about the problems of heat stress, to promote cooperation between the various parties that focus on the elderly and to determine what can already be done for the target group for the prevention of heat stress. The Municipality of Utrecht chose to integrate this work session into their risk dialogue about heat. Tilburg showed insufficient support for meetings at the neighbourhood level. Instead, the Climate Adaptation policy officer conducted internal discussions with colleagues in the social domain to explore the interfaces between the physical and social domain for heat (Helmer et al., 2019).

4.2 UNITS OF ANALYSIS

As explained in the introduction and chapter three, four municipalities are participating in the pilot. Those municipalities are selected by Klimaatverbond Nederland and Tauw following the criteria below.

- High percentage van social isolated elderly aged older than 75
- Frontrunner Climate Adaptation
- Presence of local coalition 'Een Tegen Eenzaamheid' (One against loneliness)
- Involved in RAAK Project Climate Adaptive City
- Member of the organisation 'Stichting Steenbreek'

Those criteria resulted in eight Dutch municipalities. These municipalities were asked if they would like to participate in the pilot. Five municipalities indicated that they were interested to participate, of which four, based on their motivation, are chosen; Utrecht, Groningen, Tilburg and 's-Hertogenbosch. In this research, those four municipalities are selected as embedded units of analysis and are explained briefly in this paragraph.

4.2.1 MUNICIPALITY OF UTRECHT

In 2018 the municipality of Utrecht participated in a regional climate stress test, that was executed in collaboration with the province of Utrecht, the waterboard Het Hoogheemraadschap Stichtse Rijnlanden, the safety region of Utrecht and 13 municipalities that are located near Utrecht. The stress test includes the four themes of climate change (Gemeente Utrecht, 2018). At the end of 2018, the municipality of Utrecht started with the risk dialogues on the four different themes of climate change (Kennisportaal Ruimtelijke Adaptatie, n.d.). As a result of this and with input from the risk dialogues the municipality is preparing a climate adaptation strategy and implementation agenda. It is expected to be completed in 2020.

4.2.2 MUNICIPALITY OF TILBURG

In 2018, the municipality of Tilburg started to gain knowledge within the municipality on the theme of heat. Various heat stress maps have been developed for this purpose. Besides maps, temperature measurements have been carried out and work sessions have been held. In 2020, the municipality has adopted an implementation agenda for climate adaptation, called "Koel Tilburg" (Stoffels et al., 2020).

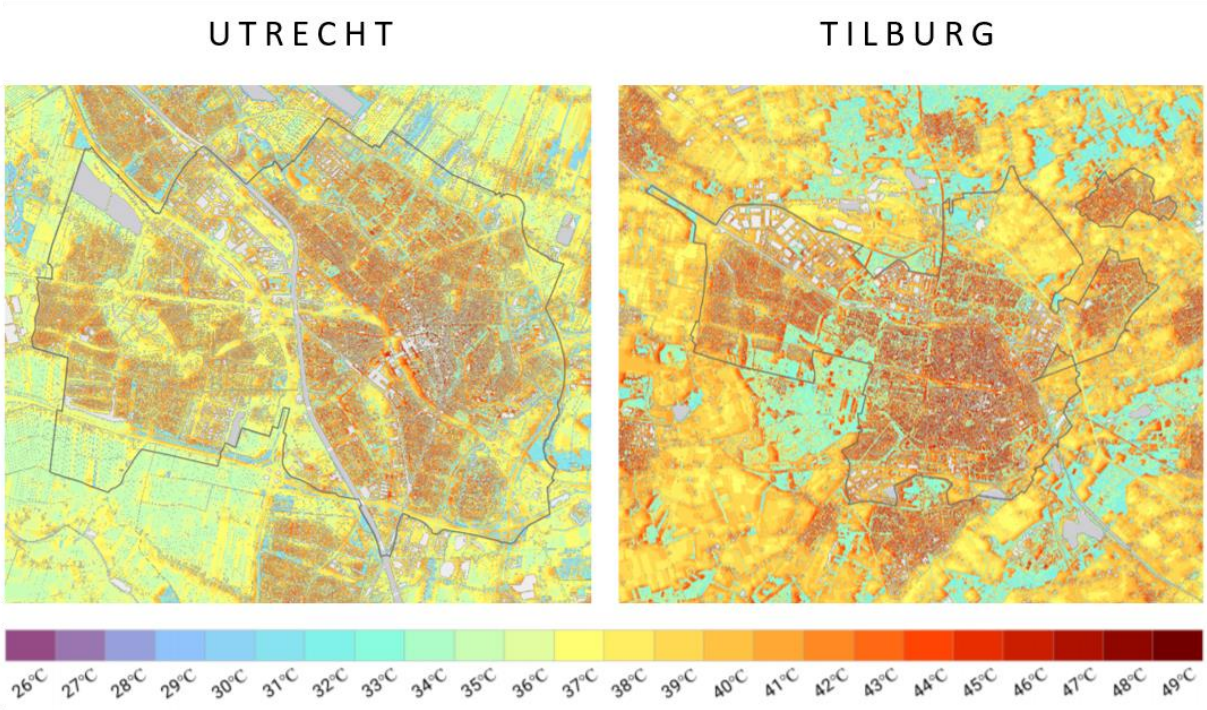

Figure 4.3 Heat map windchill Utrecht and Tilburg (Kennisportaal Ruimtelijke Adaptatie, 2020)

4.2.3 MUNICIPALITY OF GRONINGEN

The municipality of Groningen has conducted a stress test and risk dialogues in 2018. The stress test they did was sector-based instead of climate-effect-based (as it was in Utrecht). Different sessions were organised for the sectors health, infrastructure, water and green, environment and agriculture, safety and recreation (Gemeente Groningen & Gemeente Ten Boer, 2018). At this moment, the municipality of Groningen explores the possibilities to organise a new risk dialogue, based on the four themes of climate change. In that way, all different actors from different sectors will be brought together. In 2020 the municipality of Groningen presented its implementation agenda for climate adaptation (Gemeente Groningen, 2020).

4.2.4 MUNICIPALITY OF 'S-HERTOGENBOSCH

In 2014, two heat maps were developed for the municipality of 's-Hertogenbosch. As a result of these two maps, a dialogue was held with various sectors (ecology, environmental education, tree management, design of public space, sewerage, water plan advice, communication sustainability and spatial planning)(Tauw & Klimaatverbond Nederland, 2019).

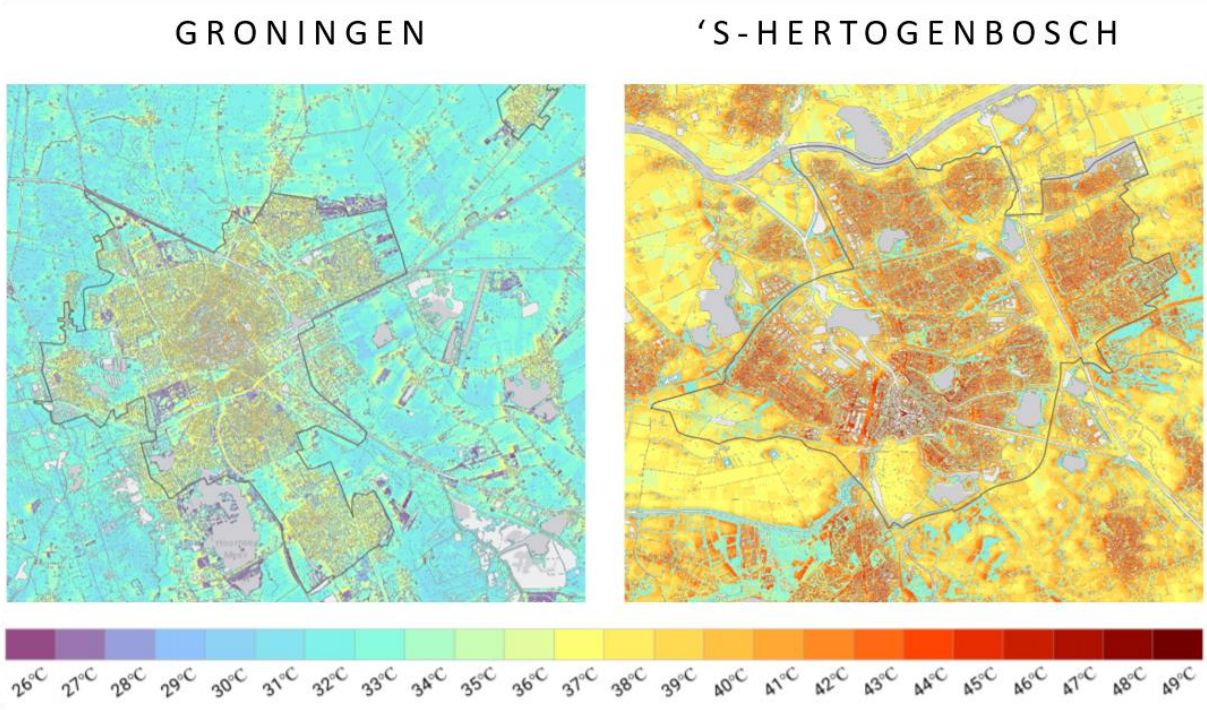

Figure 4.4 Heat map windchill Groningen en 's-Hertogenbosch (Kennisportaal Ruimtelijke Adaptatie, 2020)

5 RESULTS

In this chapter the results of the observations, interviews and desk research will be presented and analysed. By discussing all the different components and aspects of integrated planning an answer is given to the sub-question 'How do the characterizing components influence the integrated planning?'.

5.1 THE ROLE OF THE CONTEXT

The first component of integrated planning discussed in this paper is the component 'context'. Context is about the role of the state, but also about culture and the extent to which historical, cultural and economic factors influence political behaviour (Walt & Gilson, 1994). The role of the context will be discussed following different aspects; (1) stability, (2) opportunity and (3) capacity.

5.1.1 STABILITY REGIME

When the regime is stable, cooperation will remain necessary. The stability will contribute to a stable and sustainable cooperation between the different actors. Related to this research three trends stand out and can be highlighted as important.

The first trend is the increasing awareness for the climate change effect heat stress. The attention for climate change in general increased during the last century (Helmer, personal communication, 10 April 2019). Many universities and organisations worldwide are researching climate change and the different effects. Also in the Netherlands, the attention for climate change increased and different programs, like DPRA and NAS are developed (Ministerie van Infrastructuur en Waterstaat, 2016). But in the Netherlands the increase in attention for the effect of heat and drought appeared recently. Respondent 8, resident in society and health (RIVM) and working for the GGD, explains that there are historical reasons for the late time of attention (RS8, AIOS society and health (RIVM) and Doctor of society and health (GGD), personal communication, 20 May 2019). Because the Netherlands is a 'waterland', historically there is a lot of attention for possible water problems. This results in frequently and closely monitoring of the coast and the many dikes that the Netherlands have. Sea level rising and flooding, two of the effects of climate change, were included in plans and measures from the start. However, this is not the case for the effects of drought and heat. The awareness for those effects was much lower (RPS9, Project leader climate adaptation, personal communication, 6 June 2019). But with the development of the NAS the attention for those effects increased. The NAS highlights heat stress as one of the urgent climate effects that need action (Ministerie van Infrastructuur en Waterstaat, 2016). The work sessions of the pilot show that in all four municipalities there is awareness of all four climate effects (O1, 14 March 2019; O2, 19 March 2019; O4, 29 March 2019; O6, 16 March 2019). Despite awareness and knowledge are in the early stages. Respondent 6 from the municipality of Utrecht explains that water has become a well-known working field today, in contrast to heat stress and drought (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019). Much less is known about the effects of heat on human health, labour productivity and biodiversity. Respondent 5 explains that new research will start to collect new data for setting up a clear and realistic climate adaptation strategy (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019).

Madeleen Helmer, identifies another trend; the different domains develop a broader vision, they look further than their own tasks. An example is climate adaptation, that is moving to topics like health and healthy living environment (RPS9, Project leader climate adaptation, personal communication, 6 June 2019). This trend is also apparent from conversations with municipal employees both from the physical

as well from the social domain. Respondent 3, (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019) appoints herself as someone who looks beyond the borders. She explains that despite she is working in the social domain, her physical background helps her to understand the way the physical domain is thinking and working. Respondent 4 is advisor healthy living environment and working for the program of Healthy Ageing (personal communication, 23 May 2019). She argues that heat stress, a physical problem, is par excellence a topic that fits the perspective of health perfectly. Besides personal views, in both municipalities, there are teams and working groups or commissions that consist of people from different domains. Respondent 7, advisor healthy living environment, explains that those teams form the bridge between the social and physical domain (personal communication, 17 May 2019). In contrast to those two respondents, working in the social domain, respondent 2, working as an urban planner, does not see a reason why there should be direct contact between the different domains (RP2, Urban planner, personal communication, 21 May 2019). She argues that heat stress is a physical problem and therefore should be solved in the physical domain. But she indicates that she takes social aspects into account when designing an area.

The third trend is a demographical trend; ageing of the country. Madeleen Helmer argues that there is even a process of double ageing. Firstly, people become older and secondly, there is less population growth, so the ratio between young people and the elderly is skewed (RPS9, Project leader climate adaptation, personal communication, 6 June 2019). Elderly are identified as the most high-risk group during periods of high temperatures or during a heatwave. There are physiological reasons, like lack of thirst and fragility. But besides physiological reasons, political developments strengthen the vulnerability of elderly (RS8, AIOS society and health (RIVM) and Doctor of society and health (GGD), personal communication, 20 May 2019). The program ‘Langer thuis’ (Live at home longer) focuses on the large and growing group of elderly who live independently at home. The purpose of the program is to ensure that elderly are able to continue to live independently for as long as possible (Ministerie van Volksgezondheid, Welzijn en Sport, 2018). It seems a positive development, but it makes elderly, in particular social isolated elderly, more vulnerable. During heatwaves, there is no one to keep an eye on them and encourage them to drink (RPS9, Project leader climate adaptation, personal communication, 6 June 2019). Furthermore, high temperatures and heatwaves occur mostly during summer months, when caregivers are on holiday.

5.1.2 OPPORTUNITY

Harris (1995) explains in her book ‘Intersectoral action for health’ that a stimulus for actors to start integrated planning could be a crisis or a new policy. In this research, both can be pointed out. As explained climate change increases the chances of flooding, heat and drought. The climate change can be seen as a crisis and the effects create risks for the economy, health and safety. It is necessary to adapt. The Netherlands has been working for a long time already on spatial adaptations to climate change, but the urgency of adaptation increased. The mid-term evaluation of the Deltabeslissing Ruimtelijke Adaptatie showed that the implementation had started well, but the approach did not stimulate actors enough to ensure that spatial adaptation would be an integral part of policy and implementation from 2020 onwards. Besides that, an earlier evaluation showed that spatial adaptation had still a large degree of non-commitment and that there were major differences between regions and municipalities, both in terms of awareness, analysis and approaches. To stimulate actors and to speed up the developments new policies, the DPRA and the NAS are developed (Ministerie van Infrastructuur en Waterstaat, 2019).

The DPRA includes the requirement of the stress test. Every municipality should have done a stress test for all four climate effects by 2019 at the latest (Ministerie van Infrastructuur en Waterstaat, 2019). All four municipalities included in this research already finished a stress test (Stoffels et al.,

2020; Gemeente Groningen & Gemeente Ten Boer, 2018; Gemeente Utrecht, 2018). The stress test gives an overview of all the different effects of climate change in the specific region. Respondent 1, policy officer climate adaptation (personal communication, 23 May 2019) explains that the municipality of Groningen finished the stress test in 2018. They choose for a sector-based test that resulted in an overview of all the effects for each different sector, although it does not result in prioritizations or ambitions. To add prioritization and ambitions to the stress test, the DPRA requires municipalities to organise risk dialogues and to develop a local climate adaptation plan by 2020 at the latest (Ministerie van Infrastructuur en Waterstaat, 2019). The municipalities Groningen and Utrecht organised both risk dialogues, although they structured these in different ways. Groningen organised a sector-based risk dialogue, in which the effects for each sector were discussed with people from that specific sector (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). The municipality of Utrecht organized a climate-effect-based risk dialogue in which the effects for each climate effect were discussed with people from all different sectors (O1, 14 March 2019). The risk dialogues result in more knowledge, better understanding and support, which is essential for successful integrated planning according to Kickbusch & Buckett, (2010).

However, the developments initiated by the DPRA do not result in integrated planning yet. The NAS plays an important role in achieving integrated planning. One of the aims of the NAS is to connect all the different actors and municipal domains and to improve an integral and joint approach (Ministerie van Infrastructuur en Waterstaat, 2016). In this case, the pilot is the method to show municipalities the value of collaboration. The pilot connects different current national programmes related to the physical domain or the social domain and show the actors from the different domains the value for their own domain. For example, the value of the NAS or the DPRA for actors working in the social domain. Respondent 5, senior policy advisor climate adaptation (personal communication, 23 May 2019) explains that a whole new world opened up for some people. People from the social domain realized that climate change affects not only the physical living environment but also has direct consequences for the population by the means of health problems. This is especially the case for vulnerable population groups, like elderly (75+) that live at home (Helmer, personal communication, 10 April 2019).

5.1.3 CAPACITY

The aspect of capacity is discussed based on financial capacity, human capacity and knowledge.

Financial capacity

Many different respondents appoint financial resources as one of the largest obstacles for integrated planning (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019; RPS9, Project leader climate adaptation, personal communication, 6 June 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019; RS4, Healthy Aging program officer, personal communication, 23 May 2019) *"Yes, that is where it pinches the most. It is of course about hours and money. That is a real thing."* (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). Respondent 6 explains that in the end, the questions are about responsibility and money. Even when the different domains are only advising each other, there is already discussion about the distribution of costs (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019). But thinking about the financial flows is unavoidable. That is also explained by respondent 1 as he states: *"You can draft a nice document, but when you really want to develop successful integrated planning, talking about the financial flows is unavoidable"* (RP1, Policy officer climate adaptation, personal communication, 23 May 2019).

The research shows there is still a lot of uncertainty about the financial flows and distribution of costs. Respondent 5 explains that in Utrecht a plan for the distribution of costs is not developed yet, it will be part of the new climate adaptation strategy (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019). Also in Groningen, there is no certainty about the financial flows. Respondents from the municipality of Groningen as well from the municipality of Utrecht explain that budgets are strongly organized, every sector gets a certain amount of money (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019; RS4, Healthy Aging program officer, personal communication, 23 May 2019). When it comes to integrated planning, different sectors are involved. Costs could be distributed equally for each sector, every sector could pay a third of the costs, for example. But the budget of each sector is different, so a sector with a small budget may not be able to contribute a third. On the other hand, he who pays the piper calls the tune. So how can justice be done to all the different interests? (RS4, Healthy Aging program officer, personal communication, 23 May 2019). Respondent 5 recognises the problem and explains that it is difficult to bring all the actors together: *"They all sit on top of their heaps of gold."* To develop a financial plan, respondent 5 and here colleges try to combine projects or to assign projects to relating sectors. The sector water has a big budget, due to 'stadstaken' and sewer replacement. This would therefore be a good sector to assign projects to about flooding and drought. But heat stress cannot be paid with money that is reserved for sewer replacement. In that case, the sector Green, that also has a large budget, or the sector Health could be an option (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019, p. 6).

Another strategy for the financial flows could be to help other sectors by investing money in their programs. Different respondents explain that this is possible, but that it is very difficult to arrange (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019; RS4, Healthy Aging program officer, personal communication, 23 May 2019). However, sometimes it is possible. In Tilburg, for example, the physical domain proposed to invest in a local heat stress plan, when the social domain would see the urgency to develop this (O6, 16 March 2019).

Human Capacity

Human capacity is influenced by financial capacity, but the research shows that there are also other factors influencing the rate of human capacity. The first factor is the process of decentralization in the public health sector. At this moment, the social domain has not enough capacity for another task like heat stress (RPS9, Project leader climate adaptation, personal communication, 6 June 2019; RS8, AIOS society and health (RIVM) and Doctor of society and health (GGD), personal communication, 20 May 2019). Another factor that influences the human capacity is the degree of awareness and urgency (RS4, Healthy Aging program officer, personal communication, 23 May 2019). It is important that actors feel involved. Respondent 5, working on the climate adaptation strategy in Utrecht, explains that she tries to find ambassadors in each sector. Those ambassadors can encourage and convince the other people in that sector (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019). Besides awareness and urgency, understanding is very important (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019; RS8, AIOS society and health (RIVM) and Doctor of society and health (GGD), personal communication, 20 May 2019). People are willing to take action, but they are often busy and have a defined task description. To motivate those people, it is important that the message is clear and fits in their task description. This applies to colleagues on the municipal level, but also on the local level (RS8, AIOS society and health (RIVM) and Doctor of society and health (GGD), personal communication, 20 May 2019). Respondent 7, advisor healthy living environment, is distrustful in approaching colleagues on the local level, he explains that a colleague from the GGD in the eastern part of the Netherlands was very disappointed, because none of the people that he invited

for the program heat stress was interested. Everybody was too busy and did not prioritize heat stress (RS7, Advisor healthy living environment, personal communication, 17 May 2019). Where Utrecht is still searching for the right people and capacity, respondent 1 from the municipality of Groningen states that he arranged already enough capacity (RP1, Policy officer climate adaptation, personal communication, 23 May 2019).

Knowledge

Respondents both from the municipality of Groningen, as well from the municipality of Utrecht and from both domains are convinced that there is sufficient knowledge to start integrated planning on the case of heat stress. In Groningen, the municipality seeks cooperation with the university to arrange more knowledge on different topics (RS4, Healthy Aging program officer, personal communication, 23 May 2019). Respondent 4 thinks that there is enough knowledge available, but that the 'way of working' plays a more important role: *"Not everybody has the insight to take a look outside the borders of their own domain"* (RS4, Healthy Aging program officer, personal communication, 23 May 2019).

5.2 THE ROLE OF THE ACTORS

The second component of integrated planning discussed in this paper is the component 'actors'. Actors are the different parties that are involved in the integrated planning. The role of the actors will be discussed following different aspects; (1) composition, (2) experiences, (3) urgency, (4) expectations and (5) harmonisation.

5.2.1 COMPOSITION

The composition of integrated planning on the topic of heat stress includes in this research the physical and the social domain. Respondents were asked which sectors within those domains they thought would be involved in the integrated planning. The sectors green and water, buildings, urban development, public Health and social development (selected for the pilot) were always part of the list, which means that both the physical as well the social domain is seen as important for the integrated planning. Other sectors that were mentioned in the discussions, stress tests and developments of the climate adaptation strategy were: safety (R5, personal communication, 23 May 2019; R6, personal communication, 27 May 2019), safety region (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019), heritage (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019), agriculture, nature, recreation and infrastructure (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). Respondent 5 explains that in Utrecht the sector mobility is not yet involved, but that they try to involve them in the developments (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019).

The figures 5.1 and 5.2 show the attendance of the different domains (from the municipality) at the kick-off meeting and work session 1. The tables show that almost at every meeting the physical domain was in the majority, except for the kick-off meeting in Groningen. Cancellations at the last minute often came from participants from the social domain (RPS9, Project leader climate adaptation, personal communication, 6 June 2019). But, interestingly, the number of participants from the social domain increased with the second meeting. Again except the meeting in Groningen. A reason for this low attendance could be the time of planning, as the work session was planned during the holiday. Different invited actors could not participate because of absence due to vacation (O3, 23 April 2019).

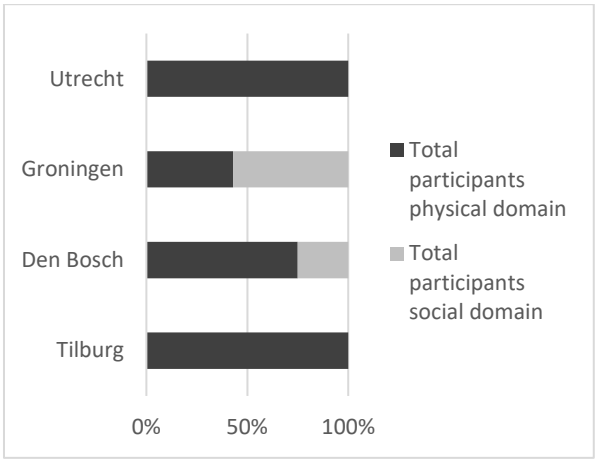

Figure 5.1 Attendance kick-off meeting

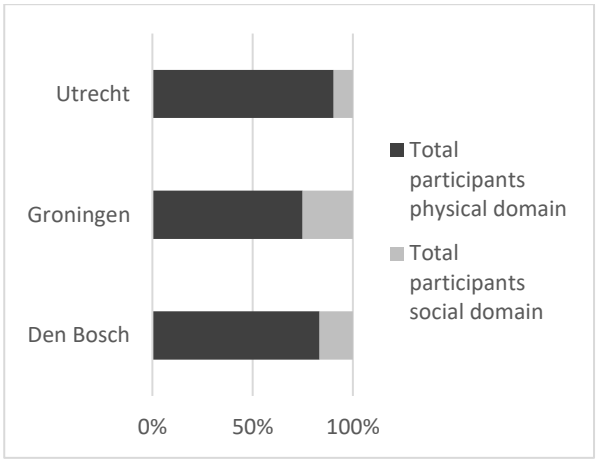

Figure 5.2 Attendance work session 1

During the interviews different reasons were given for the lower attendance of the social domain; they are too busy with other tasks and they do not see the urgency of the case (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RPS9, Project leader climate adaptation, personal communication, 6 June 2019; RS7, Advisor healthy living environment, personal communication, 17 May 2019). But even when all the different sectors are present it is important to be critical; did the right conversation took place? When there was someone of the sector public health, was that the right person or do we need another conversation with someone else (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019)?

5.2.2 EXPERIENCES

Actors from the municipality of Utrecht as well from the municipality of Groningen explain that they have some earlier experiences with a form of collaboration between different sectors or domains. In Utrecht, climate adaptation is part of an overarching program: Gezond leefklimaat (Healthy living climate). This program includes five subdivisions: (1) Circular economy, (2) Sport, play, move in the public space (3) Sustainable living environment, (4) Green living environment and (5) Climate adaptation. In this overarching program, different domains and many sectors are involved. Especially in the subdivision circular economy, that includes all the domains (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019). In this way, the municipality of Utrecht has already gained experience with integrated planning. The division of climate adaptation is developed as a collaboration with the sector water. But to make the urgency of the climate problem clear, a connection is sought to the sector of public health. The plans made in the physical domain are often strongly reasoned from a human health perspective. The purpose is to create a healthy living environment for the inhabitants of Utrecht. That is why public health is often a trigger to take or to not take measures (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019, p. 6; RS7, Advisor healthy living environment, personal communication, 17 May 2019) This combination of the physical domain with the sector public health is also known in the municipality of Groningen. The municipality also has a program Healthy living environment, but more important is the program Healthy Ageing (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). Healthy ageing is par excellence a program where different sectors come together (RS4, Healthy Aging program officer, personal communication, 23 May 2019). Next to these programs, the 'Omgevingsvisie Next-City' is named as an example of integrated planning (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019).

Besides collaboration on the strategic level, different actors from the municipality of Groningen indicate that there is already a collaboration between the physical and social domain on neighbourhood level (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019). Both domains are involved in teams on this level. Respondent 1 explains that this way of working has been the case for a couple of years (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). However, the collaboration seems hard sometimes, resulting in one dominating domain (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019). Respondent 9 agrees with the collaboration on a municipal and neighbourhood level but doubts the fact that the link is made with climate adaptation (RPS9, Project leader climate adaptation, personal communication, 6 June 2019). Besides doubts about this link, different actors have doubts about the actual implementation of the collaboration (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019; RPS9, Project leader climate adaptation, personal communication, 6 June 2019; RS4, Healthy Aging program officer, personal communication, 23 May 2019). Respondent 2, working in the design team of the municipality of Groningen, explains in line with those doubts that she worked together with other sectors of the physical domain, like ecology, but that she has no experience with collaboration with the social domain. She incorporates the principles of the social domain into the design, but there is no direct contact with one of the sectors of the social domain (RP2, Urban planner, personal communication, 21 May 2019).

5.2.3 URGENCY

Urgency is the degree of necessity to work together (Kickbusch & Buckett, 2010; van der Klauw et al., 2012). Working together or integrated planning in this research is all about heat stress and vulnerability. As mentioned before, plans in the physical domain often have a strong focus on human health. One of the purposes of measures in the physical domain is to create a healthy living environment (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019). That is why it is important that actors feel urgency on climate change resulting in heat stress, as well on the effects on human health.

The topic of climate change is known by every respondent. But the interviews make clear that the topic is not interwoven in all the different domains. In the municipalities, it is not clear yet how to deal with climate adaptation. Municipalities are just at the start of the development of strategies and policies. This starts with the stress tests and the risk dialogues (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019). In the municipalities of Utrecht and Groningen actors from the physical domain feel urgency to develop plans and they see the need to work together with the social domain. However, there are exceptions; during the first work session in Utrecht, a participant of the physical domain said *"I'm from the sector public space, so I do not interfere with this"* (O1, 14 March 2019). Another respondent explains that he still has to do a lot of work in the physical domain to show the urgency of climate change (RP1, Policy officer climate adaptation, personal communication, 23 May 2019).

> "For example in terms of new construction... But also management, or thinking about greening. It is always easier to fill a sidewalk tile, often also cheaper to maintain than installing a new piece of greenery. So these kinds of issues are still alive " (RP1, Policy officer climate adaptation, personal communication, 23 May 2019).

Respondent 6, program manager healthy living climate, indicates that natural phenomena help to increase the degree of urgency. For example the long period of heat and drought in 2018. Although she doubts the real effect:

> "People start thinking about what that means for our biodiversity in the city and everyone sees the yellow lawns. Is that really bad? Well, they think that will pass by itself. "
>
> "… But then you say many more people died. Significantly more older people than in the rest of the year. You still see people thinking; Yes, then they become 97.5 instead of 97. So there is no urgency there, how much do you mind that? (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019)"

Nevertheless, respondent is 10 argues that as long as the problem is not looked at integrally at higher management level, it remains difficult to motivate employees. As long as there is no official order, the urgency is not recognized (RP10, Advisor climate adaptation, personal communication, 6 June 2019).

In the social domain, the degree of necessity to work together on this topic of climate change is lower than in the physical domain. Respondent 10 argue that employees from the social domain do feel the urgency, but the urgency of the theme should be better put into perspective (RP10, Advisor climate adaptation, personal communication, 6 June 2019). Respondent 3, policy advisor GGD Groningen, is not so positive and explains that there are still people in the social domain of the municipality and the GGD that see climate change as a Mondial problem and not as their task. Municipalities do not ask advice related to climate change and respondent 3 explains that the official of public health has no interest in meetings about climate change (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019). Respondent 7 was asked by people from the physical domain to do some research for a local heat stress plan. He explains that he did not discuss this with his manager. *"For now this is urgent, so I do already some research, analyses and write a note. When we start seriously with developing a local heat plan it is different, then I have to discuss that"* (RS7, Advisor healthy living environment, personal communication, 17 May 2019). He is positive about the national GGD that started a new workgroup 'Climate and public health', part of the workgroup 'Public health and environment'. In this workgroup, there is for example collaboration between people from environment and people from infection control (RS7, Advisor healthy living environment, personal communication, 17 May 2019). However, when respondent 5 and 7 think about their colleagues in the social domain many of them do not see the urgency yet (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RS7, Advisor healthy living environment, personal communication, 17 May 2019). The low degree of urgency was also visible in the low rate of attendance of people from the social domain during the meetings. *"We need to talk with them to involve them"* (RS7, Advisor healthy living environment, personal communication, 17 May 2019). A reason that is mentioned several times is that actors from the social domain feel less urgency since they do not know the climate problems very well and there are at the moment greater challenges for public health than the approach of heat stress (RP10, Advisor climate adaptation, personal communication, 6 June 2019; RPS9, Project leader climate adaptation, personal communication, 6 June 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019).

5.2.4 EXPECTATIONS

In general, the collaboration between the two domains is viewed positively and respondents expect a positive result. In some places, the theme is already being taken up jointly (RPS9, Project leader climate adaptation, personal communication, 6 June 2019). But heat is a general theme, where many people experience complaints and there is no one, clear, responsible actor. Everyone will have to take a little action to achieve results. During the work sessions, participants became enthusiastic and various ideas were suggested to take action (O3, personal communication, 23 April 2019; O5, personal communication, 15 April 2019). However, several respondents indicated that the practice is more unruly. The pace of performance is slow and it takes a long time before everyone is hooked up and inline (RPS9, Project leader climate adaptation, personal communication, 6 June 2019; RS3, Policy

advisor GGD Groningen, personal communication, 16 May 2019). It is also expected that many actors will continue to view the theme as 'extra work' and as something that does not fall within their responsibility. It remains important that the effort results in results for both domains (RP10, Advisor climate adaptation, personal communication, 6 June 2019). Sufficient time, capacity and money can be disruptive factors (further elaborated in paragraph 5.1.3) and respondent 6 notes that collaboration is important, but that too much collaboration and too much linking can also result in delays and less efficiency (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019).

5.2.5 HARMONISATION

The national programs DPRA and NAS oblige municipalities to view and tackle the theme of climate adaptation in an integral way. This movement has started, but real harmonization takes a long time (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). In the municipality of Tilburg, there is hardly any harmonization in goals. Climate adaptation is part of the physical domain and the theme of heat is not yet addressed by the social domain. But there are opportunities to create a stronger connection. For example, a new policy document on positive health must be written in the social domain before the end of 2019. Climate adaptation could land well here (O6, 16 March 2019). Although there is sometimes only limited harmonization within municipalities, it is generally believed that harmonization is necessary for good collaboration (O6, personal communication, 16 March 2019; RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RS4, Healthy Aging program officer, personal communication, 23 May 2019). Both Groningen and Utrecht have taken the first steps in terms of integrality and harmonization. For example, the municipality of Groningen has formulated six attention points to improve the health of its inhabitants. These six points of interest include both physical and social components (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). Respondent 2, who works as an urban planner at the municipality of Groningen, indicates that the design team takes these points (both physical as social) into consideration for urban designs (RP2, Urban planner, personal communication, 21 May 2019). Within the municipality of Utrecht, there is a clear common goal for the theme "healthy urban life" where both the physical and social domain work together. There is a clear overlap in a number of dossiers. An example is climate adaptation, which is mentioned as a typical dossier where different domains come together (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). In the municipality of Utrecht, there is harmonization in climate adaptation in the knowledge of the relationship and the investigations to be carried out. They are working on a concrete shared goal (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019; RS7, Advisor healthy living environment, personal communication, 17 May 2019). No concrete joint actions have yet been formulated. The actual formulation of measures still mainly arises from the physical domain (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019). Although there is no clear harmonization in goals and measures yet, respondent 7 mentions the fact that the public health sector is actively involved, is already a first important step (RS7, Advisor healthy living environment, personal communication, 17 May 2019).

Another way in which harmonization of both domains takes place is through neighbourhood renewals. In the municipalities of Groningen and ‘s-Hertogenbosch, the physical and social domain are brought together in the neighbourhood renewal programs (O2, 19 March 2019; O4, 29 March 2019). In Groningen, the physical domain follows the social domain (O2, 19 March 2019). In ‘s-Hertogenbosch this is often the other way around; the social domain ties in with the physical domain (O4, 29 March 2019).

5.3 THE ROLE OF THE PROCESS

The third component of integrated planning discussed in this paper is process. The role of the process will be discussed following different aspects; (1) Relationship, (2) Communication, (3) Clarity and (4) Formal collaboration.

5.3.1 RELATIONSHIP

Both in the municipality of Utrecht and the municipality of Groningen, various connections have been made between the physical and social domain. However, physical meetings are rare. That is inherent in how the organization is organized. Where the different domains in Utrecht are generally located in the same building, they are spread over several buildings in Groningen (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019). This sometimes makes collaboration challenging. *"We don't see each other much physically and it is always a challenge to get that integrality together"* (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). Respondent 1 argues that there is often a stronger connection at the district level, for example in area teams, than at municipal level where the domains are often further apart (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). This topic is often addressed in policy documents, but the translation remains difficult. Nevertheless, respondent 1 and colleagues from the municipality of Groningen name various places where the connection is established between the domains. For example, Groningen has the "concern staff".

Respondent 3 describes the concern staff as an overall staff that mainly focuses on the strategic level (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019). The concern staff consists of different teams, including the strategy team and the program management team, in which subjects are (temporarily) addressed that do not clearly belong within a certain framework. This team tries to combine the physical and social domain. It is sometimes easier for this team to address topics in the other domain. The Healthy Ageing program is part of this team. Healthy ageing is a connecting program between different sectors. The degree of cooperation differs per theme within this program, but respondent 4 believes that climate adaptation is a theme where the connection can be made well (RS4, Healthy Aging program officer, personal communication, 23 May 2019). However, an important factor in this is the relevant project leader. Several respondents have identified the role of contact person as important. (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019; RS4, Healthy Aging program officer, personal communication, 23 May 2019). When someone is enthusiastic and cooperative, cooperation generally runs more smoothly. The quote below indicates how difficult it can be to make the connection:

> "But there are also themes within the municipality where people from the physical domain comment that people of the social domain cannot become concrete. And that people from the social domain say: people from the physical domain do not understand that we are talking about people here" (RS4, Healthy Aging program officer, personal communication, 23 May 2019).

Nevertheless, more and more connections are being sought between the domains and more and more connections are actually being established (RS4, Healthy Aging program officer, personal communication, 23 May 2019). People must know where to find each other. People don't even need to know exactly who they need from the other domain. *"… Once you enter somewhere, you can also have it spread again by that person"* (RS4, Healthy Aging program officer, personal communication, 23 May 2019). This is in line with the way of working in Utrecht. Respondent 5 talks about rolling out a

network and looking for ambassadors for the theme of climate adaptation. These ambassadors can bring the topic of climate adaptation further in the various sectors. In this way, more awareness is created and there are lines to all the different sectors, without everyone having to be involved. *".. there is always a part that has nothing to do with it, I don't think you should put the energy in it. Just get started with those who want "* (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019).

In addition to the concern staff, there is a core team for climate adaptation and heat stress within the municipality of Groningen. This is a mixed team in which both the physical and social domain participate. The team works closely with the GGD and although it may also be related to the contact person concerned, respondent 1, policy officer climate adaptation, is very positive.

> "Yes, I definitely look at it positively! Because I already had good contacts with the GGD. Substantive advice goes well. And I must say that I think we are lucky with the responsible person. We can be very happy with that. She is very fanatic on this theme. That of course also depends on the person. But apart from her, the GGD also has a very enthusiastic and cooperative team" (RP1, Policy officer climate adaptation, personal communication, 23 May 2019).

The purpose is to further spread the theme of climate adaptation within the organization from within this team (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). Besides the formal team, a working group has been established, in which the different domains are also represented. The working group takes place once every six weeks and is non-binding.

> "For that, we always try to create the most attractive agenda possible… This way everyone gets a lot of new things, for example what the challenges are. In this way, we try to inform each other and increase awareness. Not only on the island where people work (RP1, Policy officer climate adaptation, personal communication, 23 May 2019).

In recent years, efforts have also been made in Utrecht to strengthen the connection between the physical and social domain. For example, there are a number of public health people who regularly work in the spatial domain (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019; RS7, Advisor healthy living environment, personal communication, 17 May 2019). In addition, the social domain is part of the area teams. These teams are involved in the full planning procedure of developments in a specific area. In addition to public health, the sectors urban planning and the environment, heritage, land and culture also participate. These teams have created a bridge from the social to the spatial domain and combine knowledge from both domains (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019; RS7, Advisor healthy living environment, personal communication, 17 May 2019).

Connection GGD

This connection between the GGD and the municipality is not so strong in many municipalities. According to respondent 7, until recently Utrecht was the only municipality where public health is at the spatial domain to advise on all kinds of plans. An important reason why the connection within the municipality of Utrecht is so strong is that the GGD is part of the municipality and is not hired by the municipality, as happens in many other municipalities (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RS7, Advisor healthy living environment, personal communication, 17 May 2019). *"Of course it doesn't always have results. But we sit together at the table, know each other and know what we have in common"* (RS7, Advisor healthy living environment, personal communication, 17 May 2019). In Groningen, the GGD is mostly seen as an advisory body. Respondent 3, policy advisor GGD Groningen: *"If the municipality does not ask for advice, then above*

all they do not need information… It is hard to realize the municipality really has to do something with this" (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019).

Stay sharp

Although the relationships may or may not be there, it is not self-evident that the right people are at the table for every assignment or project. As shown in the quote below, it must be checked again and again whether the right people are involved:

> "You have to be sharp every time; Is everyone involved, have we had the right conversations? If we had someone from public health at the table, was that really the right person? Or should we invite someone else?" (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019).

It therefore remains important to be able to find each other, to understand what the other domain is doing and to know what the goals are (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019). The pilot is one of the ways in which the domains got to know each other better and the contact between the different domains has been strengthened (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP10, Advisor climate adaptation, personal communication, 6 June 2019; RPS9, Project leader climate adaptation, personal communication, 6 June 2019; RS8, AIOS society and health (RIVM) and Doctor of society and health (GGD), personal communication, 20 May 2019). Respond 1 and 4 explains why she found it useful to participate in the pilot:

> "... just the list of people sitting at the table, apart from the names, purely by function" (RP1, Policy officer climate adaptation, personal communication, 23 May 2019).

> "And this type of meeting is also very useful because you see other people and domains again. You can always think again but I also had to have you for something else ... especially because you see everyone again and you can also work on other themes and projects" (RS4, Healthy Aging program officer, personal communication, 23 May 2019)

5.3.2 COMMUNICATION

Mutual contact and good communication are mentioned by several respondents as essential for good cooperation (RS3, personal communication, 16 May 2019; RS4, personal communication, 23 May 2019). To really collaborate, employees should constantly doubt whether they see the full picture:

> "Okay, we want to solve something, but for who do we solve it, and where? That we think from a social point of view, what are we doing and what else is going on in that place and what does the environment actually look like? And that do we think from a physical point of view when we develop a location, for whom are we busy?" (RS4, Healthy Aging program officer, personal communication, 23 May 2019).

You could say that there are two ways of thinking, physical and social. The physical domain must understand how the social domain works and thinks. And the social domain must understand how the physical domain works and thinks (RS4, Healthy Aging program officer, personal communication, 23 May 2019). The domains should delve into what is important for the other domain (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019). To understand each other's domain, it is important to be aware of each other's agenda. Although respondent 7 believes that people within the municipality are well aware of each other's agendas, the majority of respondents indicate that not everyone is well informed (RS7, Advisor healthy living environment, personal

communication, 17 May 2019). Respondent 6, program manager healthy living climate, softens it and indicates that it is not possible to answer this question with 100% yes for a large municipality.

> "You can know at the management level, but you can partly know at the project level. But then you will always see that there are projects that do not know about each other" (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019).

Respondent 4, health ageing program officer, answers very firmly "*no*" to the question of whether the domains are aware of each other's agendas. She thinks that many people are aware of this and that you should not want to know everything. But it is important to know and find each other (RS4, Healthy Aging program officer, personal communication, 23 May 2019). Respondent 5, senior policy advisor climate adaptation, also emphasizes that coordination is very important, not only between domains, but also at the program level. In this way, you prevent the municipality, from different programs or teams, from going into the neighbourhood several times. This may involve contact with residents or actually opening a street (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019).

Languages

Sometimes employees need to be helped by policy officers who can make the connection between domains and sectors. Things that are very self-evident for the social domain could be not self-evident for the other domain (RS3, personal communication, 16 May 2019). It is therefore important to transfer information in ready-made building blocks so that the listener can use it directly (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019; RS8, AIOS society and health (RIVM) and Doctor of society and health (GGD), personal communication, 20 May 2019). *"If you say: 'a little more health please'; no one is opposed to that and everyone continues to do the order of the day"* (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019). Respondent 8, resident in society and health and employed by the GGD, emphasizes that employees generally are willing to exchange knowledge, but since they are busy, it should fit within their job description. By connecting to their range of tasks, people can make time for it. It is an innovation process, in which it is important to consider the process and people involved in addition to content (RS8, AIOS society and health (RIVM) and Doctor of society and health (GGD), personal communication, 20 May 2019). Next City in Groningen is an example of a good transfer of information: *"At least you deliver the information in a way that we can actually do something with it"* (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019). Although a lot has been taken into account by Next City, respondent 3 indicates that writing down is one thing, but it is still unclear what role it will play in the implementation.

Some employees actively develop knowledge themselves in areas other than their own field. This helps a lot in the communication between the domains, respondent 6, program manager healthy living climate, says*: "That is learning to speak each other's language and understanding what the other person needs to give your goals a place"* (RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019). Speaking each other's language stimulates mutual cooperation. Respondent 7 is one of those employees that actively develop knowledge:

> "… This is now urgent … And I will do that, but it is not yet properly invested in our department. I do it because it passed ... And because I also think climate adaptation is a very interesting topic, I did that. But I did not ask my supervisor at all whether that is possible or good" (RS7, Advisor healthy living environment, personal communication, 17 May 2019).

Moments of knowledge exchange

In addition to the exchange of knowledge on the work floor and in projects, there are specific moments when space is available for sharing knowledge. In every municipality, these are the stress tests and risk dialogues that connect different domains (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019). Groningen also has a core team and working group in which both domains are represented (further explained in section 5.3.2) (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). A third moment is the monthly college tour. It covers all kinds of topics and everyone from the municipality is invited. These moments offer an opportunity to have a discussion with people from various domains. Although in practice it is disappointing how many different sectors connect (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019).

Also for the aspect of communication, it appears that good communication is highly dependent on the person concerned (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RPS9, Project leader climate adaptation, personal communication, 6 June 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019; RS4, Healthy Aging program officer, personal communication, 23 May 2019; RS8, AIOS society and health (RIVM) and Doctor of society and health (GGD), personal communication, 20 May 2019). Some employees focus on their own topic and do not look further, while others have the skill of thinking out of the box:

> "But I have to say, it also depends on which project leader you have. We have a few project leaders, if it's up to me, then I think oh with climate adaptation it will be fine. But there are still plenty who … only focus on their own assignment" (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019).

5.3.3 CLARITY

When it comes to the division of roles, the respondents unanimously agree: the leading role lies in the physical domain. Within the physical domain, a lot of knowledge has already been gathered about climate adaptation, especially when it comes to themes that link to water. Since heat is also reasoned from the physical living environment and it is about achieving a climate-proof city, the physical domain is also designated as the driving force here (RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019). Respondent 7 emphasizes that when it comes to mitigating measures, the physical domain is the leader (RS7, Advisor healthy living environment, personal communication, 17 May 2019). The social domain is involved and takes an active role (for example in adaptive measures), but they are not the one that is ultimately responsible for making a certain area climate adaptive. Respondent 4 already fulfils this role and indicates that it is important to continue to poke as the social domain. The social domain must continue to feed the physical domain with social aspects that they must not forget (RS4, personal communication, 23 May 2019). This advice from the social domain and the GGD is important, but ultimately it must be anchored in the policy, making it important that the physical domain is leading (RP1, Policy officer climate adaptation, personal communication, 23 May 2019).

The various municipalities are not yet sure what the concrete actions and responsibilities will be within this division of roles. Respondent 1, policy officer climate adaptation, indicates that he has taken on the task of making the connections between the social and physical domain. The GGD sees climate adaptation as one of its tasks (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). Although respondent 3 indicates that the theme of climate adaptation is not yet interwoven

within the GGD Groningen. They now only anticipate developments that they see (RS3, personal communication, 16 May 2019). Respondent 7 is currently working on a proposal from the social domain for a climate adaptation strategy. But indicates that nothing else has yet been established about roles and responsibilities (RS7, personal communication, 17 May 2019).

5.3.4 FORMAL COLLABORATION

In general, the various respondents indicate that little has yet been formally established about collaboration on the theme of heat. It is too early, the process of formalising takes a long time (RS3, personal communication, 16 May 2019, personal communication, 16 May 2019). Respondent 1 indicates that the collaboration that now takes place has been laid down with working agreements, not formal agreements. These working arrangements include tasks and planning. People want to commit to this. However, the need for formalising collaboration and integral working is increasing (RP1, Policy officer climate adaptation, personal communication, 23 May 2019). Organisation-wide integral work is encouraged already for a longer time. But this also includes cultural changes within an organization (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP6, Program manager Healthy Living Climate, personal communication, 27 May 2019).

Respondent 3 indicates that useful structures already exist, such as the structure of the GGD and safety regions as advisory partners to the municipality. The risk profile of the municipality of Groningen, which includes the theme of heat, also offers opportunities. The profile indicates how serious an issue is and what needs to be done at times of crisis. The municipality is currently preparing a new risk profile. This offers opportunities to further develop climate adaptation (RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019). The local heat plan is also offered as an option to record the cooperation between the physical and social domain on the theme of heat (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019).

5.4 THE ROLE OF THE CONTENT

The fourth component of integrated planning discussed in this paper is content. The role of the content will be discussed following different aspects; (1) Results and (2) Monitoring.

5.4.1 RESULTS

Since the process of collaboration between the physical and social domain on the theme of heat is still at the beginning, few results are visible yet. No jointly programs have yet been drawn up or projects implemented and there is hardly any harmonization in objectives and activities. It is therefore also not possible to determine based on results whether people find working together worthwhile. Since respondents have indicated whether or not they think it is worthwhile, it is possible to say something about it. The interviews with respondents show that the collaboration between the two domains is viewed positively and respondents expect a positive result. But besides the positive expectations, several respondents indicated that the practice is more unruly. Thomson et al. argue that when people find it worthwhile to stay active, the collaboration has yielded sufficient results so far (Thomson et al., 2007). If the content (results) is good and it keeps adding value, the satisfaction regarding the collaboration will increase. Actors will continue to invest and make an effort. According to Walt and Gilson, the content is sufficient when the other components are part of it (Walt & Gilson, 1994).

5.4.2 MONITORING

Since the process of collaboration between the physical and social domain on the theme of heat is still at the beginning and there is very few formalised and there are very few results, there is limited information about monitoring and evaluation. The municipalities have plans for monitoring climate adaptation, but these need to be worked out further (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019). Several respondents mention a local heat plan as an option to formalise the collaboration between the two domains (RP1, Policy officer climate adaptation, personal communication, 23 May 2019; RP5, Senior policy advisor climate adaptation, personal communication, 23 May 2019; RS3, Policy advisor GGD Groningen, personal communication, 16 May 2019). The introduction of the local heat plan provides structure for follow-up discussions and sharing experiences. The idea is that the plan follows an annual cycle: in the spring preparations are made for the summer, during the summer the plan is executed, in the autumn the plan is evaluated, then adjustments are made in the winter, so that in the spring the first preparations can be made again (Helmer, personal communication, 10 April 2019). At this moment no more information about monitoring and evaluation is available.

6 CONCLUSION

This research has aimed to gain insight into the extent to which integrated planning between the physical and social domain on the theme of heat is happening within Dutch municipalities and how this cooperation can be improved. As a result of climate change and the increasingly frequent warm periods and heatwaves, it is important that various domains within local governments start working together (Kluck et al., 2017). Nevertheless, the emphasis in recent years is on the physical domain. The social domain seems to be disregarded. At a national level, this focus is changing and the social domain is becoming more involved. However, the local level is lagging behind. Since many municipalities are still drawing up a strategy and implementation agenda, this is an appropriate time to emphasize the added value of the social domain. For this reason, further research has been carried out into integrated planning between the physical and social domain. This research was carried out based on an embedded case study. The selected case is the pilot "Hitte en gezondheid" (Heat and public health), set out by the Ministry of Infrastructure and Environment. The units of analysis in this case are the four participating municipalities. For this research the following central research question has been formulated:

"How can the integrated planning between the physical and social domain of Dutch municipalities be improved to limit the effects of heat stress on health?"

Paragraph 6.1 shows the conceptual framework and provides insight into the structure of the research. Paragraph 6.2 discusses the different components and formulates a conclusion for each component. These conclusions lead to the answer to the central research question, described in paragraph 6.3. Paragraph 6.4 contains a reflection on the research and recommendations for further research.

6.1 COMPONENTS CONCLUSION

6.1.1 STRUCTURE RESEARCH

Scientific literature shows four characteristic components of integrated planning: context, actors, process and content (figure 6.1). Those components are more specified and applied to this research by linking various aspects used by Kickbusch and Buckett (2010), Lowe et al. (2018), Storm et al. (2010) and van der Klauw et al. (2012).

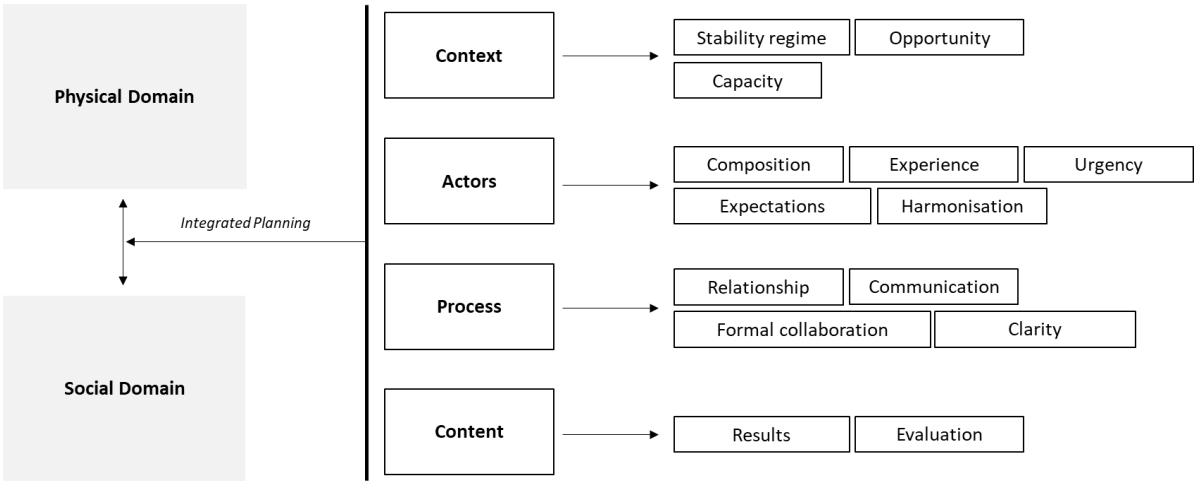

Figure 6.1 Conceptual framework

These components and aspects have been leading and form the structure of the research.

6.1.2 CONTEXT

The component "context" refers to the broader situational and structural factors influencing the integrated planning between the physical and social domain on the theme of heat stress. It is noticeable that the context is developing positively, both with regard to the theme of heat and with regard to integrated planning. Municipalities are paying more and more attention to the theme of heat and understanding and support among employees is increasing. Partly because obligations have been set under the "Delta Program Climate Adaptation" (DPRA). These obligations, the stress tests and risk dialogues, result in more knowledge, better understanding and support, which is essential for successful integrated planning according to Kickbusch & Buckett (2010). The context is also developing positively in relation to integrated planning between the physical and social domain. Municipal employees thus develop a broader vision and look beyond activities within their own domain. The 'National adaptation strategy' (NAS) also contributes to this as they aim to connect all the different actors and municipal domains and to improve an integral and jointly approach (Ministerie van Infrastructuur en Waterstaat, 2016).

In addition, the study shows that municipalities have sufficient knowledge and human capacity to address the theme of heat. However, this research shows that there is one aspect that causes confusion and uncertainty. Respondents unanimously cite financial capacity as the biggest obstacle to integrated planning. The research shows there is still a lot of uncertainty about the financial flows and distribution of costs. While according to Kickbusch and Buckett (2010), it is important to be assured that the cooperation can be guaranteed in the short and long term. The elaboration of the climate adaptation strategy and implementation agenda will have to provide more clarity about finances and distribution of costs.

> In conclusion the component 'context' develops positively and contributes to a successful integrated planning. In general, understanding and support for the theme of heat and integrated planning is increasing. Although financial capacity is unanimously cited as the biggest obstacle.

6.1.3 ACTORS

Actors determine the course of integrated planning by adding their values, interests and roles. This research shows that the 'actors' component has a major influence on the degree to which integrated planning is successful. This research shows that the added value of collaboration is recognized by both the physical and the social domain and that expectations for integrated planning from both domains are positive. It is striking that the social domain seems to be lagging behind. The sense of urgency is lower among employees of the social domain than among employees of the physical domain. Work on the theme of heat is seen as extra work and not so much as added value for their own goals and activities. This is also evident from the attendance figures at kick-offs and work sessions of the pilot, where the social domain was almost always in the minority. However, literature shows that a degree of necessity that is felt by actors to work together is essential for successful collaboration (Kickbusch & Buckett, 2010). Storm et al. (2010) and van der Klauw et al. (2012) also emphasize that a good balance between both domains is important for a balanced conversation. Since the physical domain is in the majority most of the times, they influence the topics that come up and the direction of the discussion. Also, this research shows that even when the two domains are balanced, it is necessary to remain critical, because individuals can also have a major influence on the discussion.

In addition to bringing people together, bringing together goals and actions also contribute to successful integrated planning (Storm et al., 2010; van der Klauw et al., 2012). Respondents agree with

this and indicate that harmonization of goals and actions is essential for good integrated planning. However, practice shows that no joint goals have yet been set and that hardly any work is being done on joint actions. The actions and measures that are now being taken are mainly initiated by the physical domain.

The study showed that municipalities have experience with integrated planning on other themes. However, there is hardly any experience with integrated planning in the field of climate adaptation. The focus here is strongly on the physical domain. Although the literature shows that experience with integrated planning or a shared history between the domains can contribute to a successful collaboration, this did not become clear from this study. It is therefore unclear to what extent previous experiences with integrated planning on other themes contribute positively to integrated planning on the theme of heat (Storm et al., 2010).

In conclusion, the added value of integrated planning is recognized by both domains. But successful integrated planning requires more effort on urgency and harmonization. In addition, the experience with integrated planning on other themes may offer opportunities.

6.1.4 PROCESS

The component process examines how integrated planning is formed and implemented. In the studied case, the integrated planning process has only recently started. This can be seen in the analysis of the component process. The essential relationship between the domains mentioned by Kickbusch and Bucket (2010) is present but to a limited extent. Physical encounters are scarce, there is no clear structure and employees do not know who to approach from the other domain. While respondents describe 'being able to find each other' and ‘dare to ask questions’ as important for successful integrated planning.

In addition to a clear and close relationship, good communication and the exchange of information and knowledge are required for good cooperation (van der Klauw et al., 2012). This research shows that it is not only about the quantity of communication, but also about quality. It is important that the different domains understand each other and know what the other domain is doing. In this way, information can be conveyed in a correct, comprehensible and concrete manner and the added value can be demonstrated for both domains. This tangible and demonstrable added value for the domain concerned is considered essential. At the moment, the transfer of information often goes wrong. Transferred information is not understood or it is seen as additional work with the result the receiver does not take action.

The fact that much is still unclear and very little has been formally laid down about integrated planning does not contribute to this. Kickbusch and Buckett (2010) point out that when plans, actions, roles and responsibilities are clearly established, this contributes to a successful collaboration. Despite the fact that little is recorded in the case studied, there is an anonymous agreement about the division of roles: the physical domain is leading in the integrated planning, the social domain is closely involved and is given an active role. However, the exact division of tasks and concrete actions and measures remain unclear.

In conclusion, in the case studied, the integrated planning process was recently started. Successful integrated planning requires stronger, more structural relationships and an improvement in the quality of communication and knowledge exchange. More clarity in actions, roles and responsibilities will also contribute. Especially when this is formally recorded.

6.1.5 CONTENT

The component content is reflected in programs, projects, activities and objectives. Walt and Gilson (1994) argue that the content should reflect the other three components (context, actors and process). However, hardly any results have been produced in the case studied. No joint programs have yet been drawn up or projects implemented and there is hardly any harmonization in objectives and activities. It is therefore unclear whether all components will be reflected in the content. However, it can be concluded that integrated planning has so far yielded sufficient returns insofar as employees continue to invest and want to make an effort. Since the process of collaboration between the physical and social domain on the theme of heat is still at the beginning and there are very few results, there is also very limited information about monitoring and evaluation.

In conclusion, hardly any content has been produced in the case studied. It is therefore unclear whether the three other components are reflected in the content. Related to this, there is very little information about monitoring and evaluation.

6.2 ANSWERING CENTRAL RESEARCH QUESTION

As explained in the introduction of this chapter the following central research question has been formulated for this research:

"How can the integrated planning between the physical and social domain of Dutch municipalities be improved to limit the effects of heat stress on health?"

The conclusions of the various components show that there is a difference in how far these components have been developed. These differences are shown in figure 6.2.

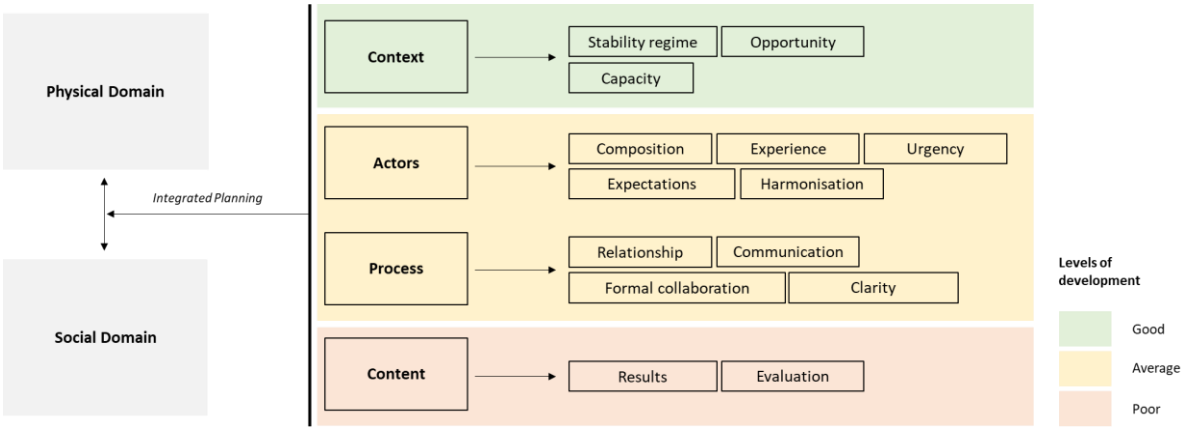

Figure 6.2 Conceptual framework (adapted)

The component context is developing positively, despite the fact that there is still a lot of uncertainty about the financial capacity. It is expected that a stronger sense of urgency, more clarity and certainty will influence the financial capacity positively when the components process and content develop further. The colour orange has been assigned to both the actor component and the component process. The first steps have been taken for both components. However, further, development is still possible and necessary for successful integrated planning. The components actors and process are very closely related and mutually influence. For example, communication and relationship strongly influence the extent to which composition and harmonization develop. And does the degree of harmonization influence the development of the aspects clarity and formal collaboration. The content component has hardly been developed and is therefore marked in red. The influence of the content

component on the other components and the influence of these components on content is therefore unclear.

It can be concluded that the integrated planning between the physical and social domain of Dutch municipalities to limit the effects of heat stress on health can mainly be improved by focusing on the further development of the components actors, process and content.

6.2.1 CONCLUSION IN A BROADER CONTEXT

Although this research shows that the aspect of "content" has hardly been developed, this also offers opportunities. Since no concrete results have yet been produced, further work can be done on the context, actors and process components. Looking at the ambitions of the DPRA program, there is still time for that at the moment. Municipalities are taking the following steps towards a climate-proof and water-resilient design:

1. Identifying potential vulnerabilities by performing stress tests;
2. Conducting risk dialogues;
3. Drawing up a strategy and implementation agenda (Ministerie van Infrastructuur en Waterstaat, 2019).

Most municipalities have achieved the first ambition. By the end of 2019, municipalities were required to have performed stress tests for the four climate themes. Many municipalities are currently working on the second ambition or will start with it soon. This second ambition is the perfect opportunity to involve the social domain in climate adaptation. For example, in the preparation of the dialogue on the theme of heat, work can be done on the urgency of employees. Also, during the dialogues experiences and insights from various domains can be exchanged. The dialogues also offer the opportunity to discuss roles and responsibilities for both domains. These results can then be included in drafting the content, in this case in the form of a strategy and implementation agenda.

6.3 LIMITATIONS AND RECOMMENDATIONS

Framework

A new framework has been developed for this research, in which various components and aspects from the literature have been combined into one framework. The research shows that the framework provides a clear structure to the research and can be used for research into integrated planning. In this research, the framework is applied to horizontal integration between different policy domains within the same level of governance. Within this horizontal integration, follow-up research could vary with sectors or domains. This framework can also be applied to vertical integration between different organisations or different levels of government. Follow-up research can be done on the theme of heat, but the framework could also be applied to other themes, both related to the theme of climate adaptation and beyond.

Due to the development of the framework during this research, the components and aspects were not definitively established at the beginning of the research. Since the selected case, the pilot "Hitte en gezondheid" (heat and public health) was running during this research, there was no time to wait or postpone the observations and interviews. On the one hand, this offered opportunities, since the framework was partly formed by input from observations and interviews. On the other hand, this is a limitation; more clarity and concreteness of the framework may have resulted in more concrete results for all aspects. When applying this framework, in this form, in a new study, more concrete questions could be formulated for the various aspects. However, it would also be interesting to further refine this framework through follow-up research. New components or aspects may be added. For example,

this research shows that "understanding the other domain in integrated planning" is of great importance for successful integrated planning. In this study, this was not included separately as an aspect, but discussed under the aspect of communication. However, it would be interesting to further explore this new aspect and the associated relationships and influences.

Components and relations

In previous chapters, it was regularly mentioned that the process of integrated planning on the theme of heat is still relatively new. The conclusions are therefore based on the first period. The research shows that hardly any content has been created yet, so the emphasis in this research is mainly on the first three components: context, actors and process. As a result, this study mainly examined the process side of integrated planning. Although this research is useful since it can provide guidance during the development process of integrated planning, the framework may be even more applicable for an analytical research. Follow-up research could focus more on results achieved and on evaluation and monitoring.

In addition to research into individual components, research into the integral coherence and relationships between the components is important. However, because this research took place at an early stage in the integrated planning process, it has not been possible to investigate all mutual relationships. In this research, the focus is on the mutual relationships between the components context, actors and process. The influence and influencing of the content component have hardly been investigated, as almost nothing is known about this yet. In follow-up research, when the integrated planning process is more advanced, more attention could be paid to the relationships between all four components. Including the component content. To this end, consideration could be given to the climate adaptation strategies and implementation agendas that will be drawn up by municipalities in the near future.

Data

The selected case for this research was the pilot "Hitte en gezondheid" (heat and public health). Since this research was linked to this running project, the units of analysis were established in advance. This concerned the four participating municipalities. These municipalities have been selected based on, among other things, heat problems, size and the fact that they are frontrunners in the theme of climate adaptation. The representativeness for other Dutch municipalities is therefore doubtful. With regard to the heat problem: it will be comparable for other urban municipalities. But for rural municipalities, it is assumed that the heat problem is less serious. A comparative study between urban and rural municipalities could be drawn up. This is expected to produce different results for the aspect of urgency and possibly for more aspects. The size of the municipalities can also have a major influence on integrated planning. A comparative study could be made of the differences between small, medium and large municipalities. This is expected to produce different results for the aspects of relationship, communication and capacity and possibly for more aspects. Finally, the fact that these municipalities are considered to be leaders can also influence the extent to which integrated planning develops. Front runners may have more knowledge about climate adaptation. In addition, the urgency level among employees may be higher and expectations may be different. Comparative research into front runners and other municipalities will provide more insight into this. The performance of comparative studies, as outlined above, will result in a more nuanced picture of integrated planning within Dutch municipalities on the theme of heat. It will also provide better insight into how integrated planning can be improved within the great diversity of municipalities.

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RP2, Urban planner. (2019, May 21). *Municipality of Groningen, Physical domain (2)* [Personal communication].

RP5, Senior policy advisor climate adaptation. (2019, May 23). *Municipality of Utrecht, Physical domain* [Personal communication].

RP6, Program manager Healthy Living Climate. (2019, May 27). *Municipality of Utrecht, Physical domain (2)* [Personal communication].

RP10, Advisor climate adaptation. (2019, June 6). *Tauw, Physical domain* [Personal communication].

RPS9, Project leader climate adaptation. (2019, June 6). *Klimaatverbond Nederland, Physical and Social domain* [Personal communication].

RS3, Policy advisor GGD Groningen. (2019, May 16). *Municipality of Groningen, Social domain* [Personal communication].

RS4, Healthy Aging program officer. (2019, May 23). *Municipality of Groningen, Social domain (2)* [Personal communication].

RS7, Advisor healthy living environment. (2019, May 17). *Municipality of Utrecht, Social domain* [Personal communication].

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ANNEX

Annex belonging to master thesis

Integrated planning

Research into integrated planning between the physical and social domain on the topic of heat stress in Dutch municipalities

ANNEX 1 INTERVIEW GUIDE 1

Datum	
Gemeente	
Functie	
Domein	

DEEL 1 | INTRODUCTIE

Allereerst dank voor uw tijd en medewerking aan het interview. Ik zal mij allereerst even kort voorstellen. Mijn naam is Marieke van Persie, student aan de Radboud Universiteit in Nijmegen, waar ik de master Spatial Planning volg. Mijn masterthesis schrijf ik bij het Klimaatverbond Nederland, waar ik aansluit bij de Proeftuin Hitte en Gezondheid, georganiseerd door het Klimaatverbond en samenwerking met Tauw.

Het onderzoek dat ik uitvoer ligt in lijn van deze proeftuin en focust zich op de samenwerking tussen de verschillende domeinen die betrokken zijn bij het thema hitte en gezondheid. Ik focus mij daarbij op het fysieke en sociale domein. Dit interview zal gaan over het nut van deze samenwerking, de mate van samenwerking op dit moment en welke factoren een positieve of negatieve invloed hebben op deze samenwerking. Het interview zal eindigen met een korte reflectie op de werksessies binnen de proeftuin.

Voordat we verder gaan zou ik u willen vragen of u het goed vindt dat het interview wordt opgenomen? De data zal gebruikt worden om de interviews betrouwbaar te kunnen analyseren en zal verder niet verspreid worden. Daarnaast de vraag of ik u met naam mag noemen in mijn thesis of dat u liever anoniem vermeld wilt worden?

1. Heeft u nog vragen voordat we beginnen met het interview?
2. Kunt u kort aangeven waar u werkzaam bent en waaruit uw werkzaamheden bestaan in relatie tot het thema van dit interview?
3. Hoe bent u betrokken geraakt bij de Proeftuin Hitte & Gezondheid?
    a. In hoeverre was u gemotiveerd om deel te nemen aan de proeftuin?
    b. In hoeverre denkt u dat de proeftuin relevant is voor uw dagelijkse bezigheden?

DEEL 2 | INTERSECTORALE SAMENWERKING

ALGEMEEN

4. In hoeverre ziet u ‘intersectorale samenwerking’ terug binnen de gemeente?
5. Wat zijn volgens u kenmerken van succesvolle intersectorale samenwerking?
6. Wat zijn volgens u factoren die een succesvolle intersectorale samenwerking belemmeren?

Dit onderzoek richt zich voornamelijk op de samenwerking tussen het fysieke en sociale domein. Binnen deze domeinen zijn verschillende sectoren actief, dit verschilt per gemeente.

SECTOREN

7. Kunt u aangeven welke sectoren binnen het fysieke en sociale domein actief zijn?
8. Als het gaat om het klimaateffect hitte en de gevolgen daarvan, welke sectoren zouden volgens u dan noodzakelijk betrokken moeten worden?

a. Zijn deze sectoren op dit moment betrokken?
b. Zo niet, op welke manier kunnen andere sectoren worden betrokken bij de samenwerking?
c. Als het gaat om samenwerking, waar raken deze sectoren elkaar dan volgens u?

9. Is er een specifiek domein of een specifieke sector die u verantwoordelijk acht voor het thema hitte?

ACTORS

Ervaring en betrokkenheid

10. Heeft u eerder samengewerkt met een andere sector of een ander domein?
    a. Welke sectoren/ domeinen waren dit?
    b. Liep deze samenwerking vaak met dezelfde actoren uit een bepaalde sector?
    c. Hoe heeft u deze samenwerking ervaren?
11. Verwacht u dat de betrokken actoren de juiste kennis en competenties in huis hebben om te werken aan de problematiek rondom het klimaateffect hitte?
    a. In hoeverre is er kennis met betrekking tot hittestress beschikbaar bij actoren binnen uw eigen sector?
    b. Verschillen de deelnemende actoren voldoende om iets te kunnen toevoegen?
    c. Hebben de deelnemende actoren voldoende gemeenschappelijk om aan elkaar bij te dragen?

Urgentie

12. In hoeverre denkt u dat de samenwerking noodzakelijk is om tot een oplossing van het probleem te komen?
    a. Zijn de betrokken actoren naar uw mening zich bewust van deze noodzakelijkheid?

Verwachtingen

13. Hoe kijkt u op dit moment tegen de samenwerkingsprocessen rondom hittestress aan?
14. In hoeverre verwacht u dat de samenwerking een meerwaarde heeft voor uw eigen sector?
15. In hoeverre denkt u dat er een trekkersrol of aanjagersrol ligt voor uw sector?

PROCES

Commitment en harmonisatie

16. In hoeverre denkt uw sector van toegevoegde waarde is?
17. In hoeverre denkt u dat het probleem voor alle actoren duidelijk is?
18. Bestaat er duidelijkheid over de verschillende belangen en intenties van de verschillende betrokken partijen?
19. Is er overeenstemming over een gemeenschappelijk doel?

Formele samenwerking en structuur

20. hoeverre werken sectoren binnen het fysieke of sociale domein op dit moment samen?
21. Zijn er concrete afspraken gemaakt over samenwerking met andere sectoren?
22. In hoeverre zijn er concrete acties omschreven voor deze samenwerking?
    a. Zijn er rollen en verantwoordelijkheden voor de sectoren omschreven?
23. In hoeverre is er sprake van een hiërarchische structuur binnen de samenwerking?

24. In hoeverre is er sprake van interactie tussen de uitvoerende personen van de betrokken sectors?
25. In hoeverre wordt er gereflecteerd op ondernomen acties?

Communicatie

26. In hoeverre zijn andere sectoren gemakkelijk aanspreekbaar?
27. Hoe betrokken zijn het fysieke en sociale domein op elkaar?
    a. In welke mate is er contact tussen de GGD en de gemeente?
28. In hoeverre zijn de verschillende domeinen op de hoogte van elkaars agenda?
29. In hoeverre is er sprake van kennisuitwisseling?

Financiële middelen

30. In hoeverre wordt er samengewerkt in de financiering van de samenwerking?
    a. In hoeverre is het mogelijk financiële middelen uit te wisselen tussen de verschillende sectoren?

CONTEXT

31. In hoeverre spelen recentelijke natuurrampen een rol in het oppakken van dit thema?
    a. In hoeverre vergroot dit het bewustzijn onder collega's?
    b. In hoeverre verhoogt dit het urgentie niveau?
32. In hoeverre denkt u dat er politiek draagvlak is voor de samenwerking?

DEEL 3 | REFLECTIE WERKSESSIES PROEFTUIN

33. Hoe kijkt u terug op de werksessies binnen de proeftuin die tot nu toe gehouden zijn?
34. Hoe zijn de diverse partijen benaderd voor het startgesprek en de werksessie?
35. Verschillende personen waren niet aanwezig, wat was de reden (of redenen) dat ze niet naar de bijeenkomst kwamen?
36. Heeft de proeftuin uw kijk op samenwerking met andere domeinen of sectoren veranderd?
37. Zou u na het deelnemen aan de proeftuin makkelijker op collega's uit een andere sector afstappen?
38. Wat zou u meenemen naar een volgend project waarin samenwerking tussen verschillende sectoren van toegevoegde is?

DEEL 4 | AFSLUITING

Dit was het einde van het interview, heeft u nog vragen met betrekking tot het onderzoek of het interview? Mocht u op een later tijdstip nog vragen hebben, kunt u altijd contact met mij opnemen. Mijn contactgegevens vindt u in de e-mail die ik u voorafgaand aan het interview gestuurd heb.

ANNEX 2 INTERVIEW GUIDE 2

Datum	
Naam respondent	
Bureau / Bedrijf / Organisatie	
Functie	
Fysisch / sociaal domein	

DEEL 1 | INTRODUCTIE

Beste collega, initiatiefnemer van de proeftuin,

Ondanks dat we elkaar kennen, zal ik mij kort even voorstellen. Mijn naam is Marieke van Persie, student aan de Radboud Universiteit in Nijmegen, waar ik de master Spatial Planning volg. Mijn masterthesis schrijf ik bij het Klimaatverbond Nederland, waar ik aansluit bij de Proeftuin Hitte en Gezondheid, georganiseerd door het Klimaatverbond in samenwerking met Tauw.

Het onderzoek dat ik uitvoer ligt in lijn van deze proeftuin en focust zich op de samenwerking tussen de verschillende domeinen die betrokken zijn bij het thema hitte en gezondheid. Ik focus mij daarbij op het fysieke en sociale domein op gemeentelijk niveau. Dit interview is een korte reflectie op de proeftuin en zal gaan over het initiatief, het verloop en de uitkomsten van de proeftuin.

Hieronder vindt u de vragenlijs, welke uit zes onderdelen bestaat. Wanneer u een vraag beantwoord met ja of nee, wil ik u vragen om uw antwoord te motiveren door een korte toelichting te geven. Mocht een antwoord sterk verschillen per proefgemeente, zou ik u willen vragen dit aan te geven. De gegeven antwoorden zullen enkel gebruikt worden voor het onderzoek en zullen niet verder verspreid worden.

Mocht u nog vragen hebben over het onderzoek of het interview kunt u contact met mij opnemen. De contactgegevens vindt u in de e-mail of onder aan de vragenlijst.

1. Mag u met naam genoemd worden in het onderzoek?
2. Kunt u kort aangeven waar u werkzaam bent en waaruit uw werkzaamheden bestaan in relatie tot het thema van dit interview?

DEEL 2 | BETROKKENHEID PROEFTUIN

3. Hoe bent u betrokken geraakt bij de Proeftuin Hitte & Gezondheid?
4. Vanuit welk idee is de proeftuin opgezet?
5. Hoe zou u de kern van de proeftuin samenvatten?
6. Hoe zou u het doel van de proeftuin samenvatten?

DEEL 3 | CONTEXT PROEFTUIN

7. Waarom was dit een geschikt moment om met de proeftuin te starten?
    a. Als het gaat om nationale context?
    b. Als het gaat om gemeentelijke context?
    c. Zijn er andere factoren die volgens u een rol speelden?
8. Welke (nationale) programma's dragen volgens u bij aan of beïnvloeden volgens u de proeftuin?
    - Waarom en op welke manier?

DEEL 4 | VERLOOP PROEFTUIN

Verwachtingen

9. Met welke verwachtingen begon u aan de proeftuin?
    a. Welke van deze verwachtingen zijn uitgekomen?
    b. Welke verwachtingen werden tegengesproken?

Proefgemeenten

10. In hoeverre bent u van mening dat de vier proefgemeenten representatief zijn voor de rest van de Nederlandse gemeenten?
11. Zou u de deelnemers van de vier proefgemeenten omschrijven als gemotiveerd?
    a. Waarom wel of waarom niet?
    b. Waren de deelnemers, naar uw mening, bereid om extra tijd in de proeftuin te steken?
12. In hoeverre denkt u dat sociale en gezondheid thema's een rol speelden binnen het fysieke domein voor de proeftuin?
    a. Als het gaat om visie en beleid?
    b. Als het gaat om uitvoering?
13. In hoeverre denkt u dat fysieke thema's een rol speelden binnen het sociale domein voor de proeftuin?
    a. Als het gaat om visie en beleid?
    b. Als het gaat om uitvoering?
14. In hoeverre denkt u dat de proeftuin hierin een verandering heeft teweeggebracht?

Opkomst

15. Hoe kijkt u terug op de opkomst van het fysieke domein?
16. Hoe kijkt u terug op de opkomst van het sociale domein?
17. Wat of wie zou, naar uw mening, hebben bijgedragen aan een hogere opkomst?

DEEL 5 | UITKOMSTEN PROEFTUIN

Inhoud

18. In hoeverre was de focus op eenzame ouderen naar uw mening een waardevolle toevoeging?
19. Verduidelijkte de kwetsbaarheidskaart het probleem dat geschetst wordt in de proeftuin?
    - Voor medewerkers uit het fysieke domein?
    - Voor medewerkers uit het sociale domein?
20. Droeg de kwetsbaarheidskaart bij aan het bewustzijn van de deelnemers van de proeftuin?

Bewustzijn

21. In hoeverre heeft de proeftuin in het algemeen bijgedragen aan een groter bewustzijn, als het gaat om kansen die samenwerking biedt op het gebied van hittestress?
    a. Welk aspect van de proeftuin heeft naar uw mening hier het sterkst aan bijgedragen?
22. In hoeverre denkt u dat het urgentieniveau van hitteproblematiek is gestegen n.a.v. de proeftuin?
    - Geldt dit voor zowel het fysieke als het sociale domein?

Samenwerking

23. In hoeverre heeft de proeftuin, volgens u, bijgedragen aan een antwoord op het ‘verantwoordelijkheidsvraagstuk’?
24. In hoeverre denkt u dat door de proeftuin de contacten tussen beiden domeinen gestimuleerd of verbeterd zijn?
    a. Welke verandering zou bijdragen aan het (verder) stimuleren of verbeteren van het contact tussen het fysieke en sociale domein?
25. Welke factoren staan volgens u op dit moment nog in de weg voor een goede samenwerking?

Conclusie

26. Wat zou u noemen als meest opvallende waarneming?
27. Zou u naar uw inzicht een samenvattende conclusie van de proeftuin kunnen geven?

DEEL 6 | VERVOLG PROEFTUIN

28. Wat zouden volgens u de beste vervolgstappen zijn van de proeftuin?
    a. Om het contact tussen het sociale en fysieke domein verder op gang te helpen?
    b. Om klimaatadaptatie verder te integreren in het sociale domein?
    c. Om gezondheid en welzijn verder te integreren in het fysieke domein?

DEEL 7 | AFLSUITING

Hartelijk dank voor het invullen van de vragenlijst. Mocht u nog vragen of opmerkingen hebben, neemt u dan gerust contact met mij op.

ANNEX 3 RESPONDENTS

Code	Function	Organisation/ Municipality	Date
RP1	Policy officer climate adaptation	Groningen	29-05-2019
RP2	Urban planner	Groningen	21-05-2019
RS3	Policy advisor GGD Groningen	Groningen	16-05-2019
RS4	Healthy Aging program officer	Groningen	23-05-2019
RP5	Senior policy advisor climate adaptation	Utrecht	23-05-2019
RP6	Program manager Healthy Living Climate	Utrecht	27-05-2019
RS7	Advisor healthy living environment	Utrecht	21-05-2019
RS8	Resident society and health, profile medical environmental science - RIVM Doctor of society and health, profile medical environmental science - GGD Hart voor Brabant	RIVM/ GGD	20-05-2019
RPS9	Project leader climate adaptation	Klimaatverbond Nederland	21-06-2019
RP10	Advisor climate adaptation	Tauw	21-06-2019

ANNEX 4 CODEBOOK NVIVO