CITIZEN PARTICIPATION IN CLIMATE ADAPTATION IN THE NETHERLANDS: GOVERNING BEYOND PUBLIC SPACE

Qualitative research into the different approaches of Dutch municipalities to citizen self-management in the implementation of climate adaptive policies at private residential property

THESIS

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Summary

This master thesis, citizen participation in climate adaptation is studied on a personal, small-scale level: the actions of citizens on their own private residential property. Specifically, the implementation of local adaptation policy by citizens on private residential property, with any form of local government support, has been examined. The concept "citizen self-management", derived from the health sector, was chosen to describe this phenomenon. Citizen self-management is a form of production in which the citizen as an individual can manage and decide on the means to locally adopt the higher-level plans of the government (Bracht and Tsouros, 1990). The aim of this study was to compare and explain the role of Dutch local governments in stimulating citizen self-management in climate adaptive rainwater measures on citizens' private residential property. The research objective was to improve the effectiveness of climate adaptive water projects initiated by local governments, both frontrunners and newly developing ones. First a literature study was conducted, followed by an empirical, qualitative research. Due to COVID-19 limitations, participants were interviewed online. Seven cases were studied, which were diverse in size of the municipal organisation itself, the size of the team working in climate adaptive policy and how far along the local government is in developing and implementing their policy. The participation framework by Mees et al. (2019) was used to analyse the variety of material-incentives used by local governments to stimulate self-management. Most of the examined cases are still pioneers in the local adaptation policies. Both policy creation and implementation are done experimentally through a variety of different projects and pilot-based solutions. Further research is therefore required. This study has resulted in five practical policy recommendations, which are going to be shared with both the participants of this research as well as any other interested Dutch policy officials. They consist of new insights of the researcher through conducting this research as well as some of the best practices of the examined cases. In short, the recommendations are to 1. Learn from others 2. Lower the threshold to participate 3. Make use of external partners 4. Set a good example 5. Rethink design.

Preface

Dear reader,

This master thesis does not only mark the end of my academic career, it is also an assemblage of the issues that have interested me in the past four years of studying. In my bachelor Interdisciplinary Social Sciences, I learned about metropolitan issues from a social perspective. Along the way, I developed a special interest for climate change; the biggest governance challenge of the 21st century. I started this master Urban Governance to learn the skills to tackle complex governance issues and to develop sustainable governance policies. This all comes together in this master thesis, in which I challenged myself to research local government's climate action via citizen participation.

Despite the many challenges imposed by COVID-19, the last six months have been interesting, and I developed as an academic, a professional and as a person. I am grateful to Joram Grünfeld for providing me the opportunity of experiencing the practice of policy making through my internship at the city of Hilversum. It was a great learning experience and the combination of theory and practice has prepared me well to further realizing my ambitions in the field of public climate policy.

I want to thank my thesis supervisor for his academic guidance and support throughout the thesis writing process. The valuable feedback from both my supervisor as well as the second reader helped taking this thesis to the next level. I would also like to express my gratitude towards all the participants for their willingness, openness, and honesty in answering my questions and their passion towards climate adaptation. They have been of great help to gain in-depth insights in the context of the specific cases. In particular Jean Eigeman, thanks to whom I got off on a good start with my research. Finally, I would like to thank my family, friends, and boyfriend wholeheartedly for their motivating words, constructive feedback and keeping me grounded during stressful times. On to new challenges!

Nanine Koolstra

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1. Introduction

1.1 Climate adaptation in the Netherlands

Since the mid-20th century there have been significant changes to the earth. Climate change can be defined as a long-term change in the average weather patterns which define the global, regional, and local climate of the earth (NASA, 2020). It has become an established fact among scientists that there are many dangers of the current climate change. The danger of climate changes resulted in the Dutch government establishing the Dutch National climate adaptation strategy (NAS) in 2016. It shows how people will experience more heat stress, due to extreme weather conditions. These extreme weather conditions will put more stress on vital and vulnerable functions in our society such as infrastructure, energy, and agriculture. Specific challenges that cities will face are, for example, periods of water flooding and periods of drought (State secretary of Infrastructure and Environment, 2016). The NAS was the Dutch response to the European Commission, urging its members to come up with a climate adaptation strategy before 2017 (State secretary of Infrastructure and Environment, 2016). The report was written not only by the State Secretary for Infrastructure and Environment, but on account of several other ministries as well. The involvement of so many political departments of the Dutch central governments shows both the importance of climate adaptation and the complexity of it. Adapting to the impact of climate change is a multilevel challenge, requiring action on both a global and local level. The local government and the private residential property of citizens is the scope of this thesis. Climate change effects are often experienced locally, and adaptation solutions require changes in the physical environment, in combination with place-based approaches (Maesham et al., 2011; Mees et al., 2013). In the Netherlands this is, in most cases, the responsibility of the local and regional government.

1.2 Participation citizens at climate adaptation

The central government of the Netherlands has adopted a new environmental law, the *Omgevingswet* (Environmental law), which will come into force by January 2022. The current environmental law will be adjusted, since it consisted of many different laws with their own regulations which made it complicated to work with. The new environmental law has been created to solve most of these problems by simplifying the decision-making process and reduce all current environmental laws to one new law. A specific aspect of the new environmental law, which is interesting for local governments promoting citizen participation in climate adaptation, is the decentralization of the living environment. Decisions are made with and can be executed by those who are impacted by the plans. Rather than the imposition of rules and laws, the aim of the new law is to maintain control of the processes. Sustainable projects are promoted, and the environmental policies should be more adapted to the local needs and goals (Rijksoverheid, n.d.). The *omgevingswet* enables the (local) government to cope with climate change.

Moreover, it allows citizens to participate in this challenge.

The promotion and facilitation of citizen participation in the environmental law (Omgevingswet) can be connected to the Dutch political phenomenon 'participation society'. Since the beginning of the 21st century, there has been a growing political belief in the Netherlands that citizens must take responsibility for both their own well-being and that of their fellow citizens (Spierts, 2014; Tonkens, 2014). This is accompanied by decentralization of decision-making from the central government to the municipalities. The participation society is ideologically supported by concepts such as putting citizens in their own strength, citizens' initiative, and active citizen participation (Spierts, 2014). This was a political shift from the Netherlands as a welfare state to being more of a participation society. As a welfare state, the government is taking care of its citizens. However, it was noted that the welfare state was not using the full potential of citizens, crowding out citizen initiatives (Movisie, 2015).

In the participation society, citizen participation is valued deeply. Therefore, it is important to define citizen participation. Citizen participation refers to "the social process of voluntarily taking part in either formal or informal activities, programs and/or discussions to bring about a planned change or improvement in community life, services and/or resources." (Bracht & Tsouros, 1990, p. 201). In this thesis, citizen participation is studied on a personal, small-scale level: the actions of citizens on their own private residential property. Specifically, the implementation of local adaptation policy by citizens on private residential property, with any form of local government support, is examined. The concept "citizen self-management", derived from the health sector, was chosen to describe this phenomenon. Citizen self-management is a form of production in which the citizen as an individual can manage and decide on the means to locally adopt the higher-level plans of the government (Bracht and Tsouros, 1990).

1.3 Problem statement

In order to adapt to climate change, place-based solutions and activities appropriate to the situation are needed. The resilience of local communities needs to be increased to cope with the impacts of climate change. It is therefore argued that the public authorities need to involve local stakeholders, such as housing associations, private developers, and citizens (Mees & Driessen, 2019). There is growing attention to the role communities can play in complex problems such as climate adaptation (van Buuren, van Meerkerk & Tortajada, 2019). However, it is often unclear for public officials to what extent public services can be improved by incorporating citizens and how co-creation could create financial benefits (Duijn et al., 2019). Additionally, studies on citizen participation in climate adaptation are often conducted in frontrunner cities, which does not represent a wider variety of cities, or represent cities with less-pronounced adaptation activities (Klein, Araos, Karimo, Keikkinen, Ylä-Anttila and Juhola, 2018).

1.3.1 Climate change, citizen participation and water management

As mentioned above, water management is challenged by climate change effects. Climate change effects regarding urban water management, as predicted by KNMI (Dutch meteorological institute) show that the precipitation climate will change, resulting in an increase of rainfall. Effects on the sewage system will be as follows: Firstly, the degradation process in the collection and transport systems will run faster, decreasing the technical life span. Secondly, there is an increased risk of hydraulic overloading of the current rainwater collection systems. Thirdly, due to longer droughts, the use of the effluent from the treatment plants as raw material for fresh water is becoming increasingly important (GRP Hilversum, 2015-2020).

In the Netherlands, the municipalities have the duty of collecting and removing the urban wastewater, the rainwater, and the ground water to a qualified discharge point. The national law environmental management (Directoriaat Generaal Milieu, 2004) states that the municipalities are obligated to take responsibility for complaints and notifications. In addition, municipalities must write a general sewage plan (*gemeentelijk rioleringsplan)* every five years in which they state their proceedings regarding these three types of water management. In return, the municipalities have the right to charge all users of the water system sewage taxes to pay for these duties of care (Directoriaat Generaal Milieu, 2004). Also, the water can be re-used by individuals or, depending on the type of soil, it can be infiltrated into the soil (Rainproof, 2020). Both actions tackle the negative effects of climate change and release the pressure on the sewage system, as mentioned above. However, both also require the involvement of citizens, since the implementation of climate adaptative policies requires adaption to private residential properties (Hegger et al., 2017; Mees & Driessen, 2019).

1.4 Research question

1.4.1 Research objective

The Delta Plan of Spatial Adaptation (Deltaprogramma, 2018) is a joint plan of municipalities, water boards, provinces, and central government. Its intention is to accelerate and intensify spatial adaptation. The plan highlights the importance of spatial adaptation to climate change effects, estimating the costs of the damage in the cities to reach as much as €70 billion in the period up to 2050, if no changes are made. However, the issues of climate change need to be tackled on both public and private property. Therefore, the aim is to stimulate the participation of non-governmental organisations and citizens. This research focuses specifically on the participation of citizens in climate adaptation on their own premises.

All municipalities encounter the issues of climate change, even though for some the effects might be more severe than for others. However, the available resources and expertise on citizen participation and climate adaptation however differ greatly within the Netherlands. Some municipalities are yet at the start of the policy development which stimulates citizen self-management in climate adaptive rainwater measures on citizens' premises, whereas other municipalities are already working on improving and expanding their policies for quite some time. This research aims to review the policy choices Dutch local governments make in guiding citizen self-management in climate adaptive rainwater measures, executed on citizens' own premises. In order to learn from the process of policymaking in this emerging issue across a variety of municipalities, there is great variation in the cases that are investigated in this study. The selection of the cases in this study will be described in more detail later. The goal of this study is to improve the effectiveness of climate adaptive water projects initiated by local governments, both frontrunners and newly developing ones.

1.4.2 Research question

The main research question of this study is:

How do local governments stimulate and facilitate citizens to participate in the implementation of climate adaptation rainwater measures on private residential property and how effective is the local adaptation policy?

This question is further broken down into the following sub-questions:

- What motivates the local government to engage citizens in the implementation of climate adaptive policies?
- What local adaptation policy and which policy tools are being deployed by local governments to guide citizen self-management on private residential property?
- How effective is the local adaptation policy in stimulating and facilitating citizens to participate in the implementation of climate adaptive rainwater measures on private residential property?

1.5 Relevance

1.5.1 Societal relevance

Climate change is a complex societal problem, which requires everyone's involvement. The effects of climate change are experienced locally, whereas the causes originate from a higher, global level. It is necessary to combine efforts, and solutions require collaboration on the local, regional, and national level (Klijn & Koppenjan, 2015). Climate adaptation therefore requires a system-wide change. Complexity science shows how attitude change can be facilitated by bottom-up knowledge dissemination. Through local communication, actors can influence others and other environments. This

knowledge will result in self-organizing practices. It has been shown that once actors feel ownership over the incremental changes, rather than having change imposed on them, a system wide transformation is possible (Braithwaite, Churruca, Long, Ellis & Herkes, 2018). This is also supported by Lorenz (2000; Heylighen, 2008), stating that when the initial conditions are right and small changes are made, a large impact can be expected.

In addition, the effects of climate adaptive rainwater measures implemented by citizens go beyond the challenges of rainwater. A climate adaptive garden will decrease heat stress, limit the effects of drought, and improve the circularity of the soil and the rainwater itself when it is being reused. Most importantly, the citizens themselves will benefit from an increase in liveability (Kluck, Klok, Solcerová, Kleerekoper, Wilschut, Jacobs & Dankers, 2017).

1.5.2 Policy relevance

Considering this research, "small changes big impact" gets a more practical meaning. According to the Delta Plan on Spatial Adaptation, the whole of the Netherlands should be water-robust and climate-proof by 2050 (Deltaprogramma, 2018). Heggers et al. (2017) state that climate adaptive measures taken on by residents on their own premises is necessary to share responsibilities, to exploit resources and to fill up institutional voids. It has the potential of battling a lack of awareness, communication, motivation, and willingness to act.

The implications of this research can aid the municipalities to adapt their adaptation policies based on the knowledge derived from the experiences of other municipalities, as well as from a thorough literature review. This research can inspire the environmental vision of municipalities, as well as to give insight in the effectiveness of their current practices and to provide more concrete guidelines on how to improve their policies. Moreover, this study can inspire municipalities that are still developing climate adaptation policies.

1.5.3 Scientific relevance

There are many studies on citizen participation in the decision-making and vulnerability assessment in climate adaptation literature. Citizens can, however, play a bigger role in climate adaptation, by being involved in the implementation on private residential property, because there is the requirement of residents' initiative or their consent in making climate adaptive changes (Hegger et al., 2017). There are some empirical studies which assess the interactions between citizens and municipalities in climate risk management and adaptation (Brink and Wamsler, 2018). However, existing studies focus mostly on frontrunner cities, which does not represent a wider variety of cities, or represent cities with less-pronounced adaptation activities (Klein et al., 2018). This research examines a niche within citizen participation in climate adaptation, focusing specifically on the execution of public policy by citizens themselves on private residential property in a variety of Dutch municipalities.

1.6 Roadmap

This thesis will consist of a theoretical and empirical part. The second chapter will provide an overview of the existing literature on citizen participation and climate adaptation. The third chapter will discuss the chosen design, as well as the conceptual framework, which is conducted by the input of the literature study. In the fourth chapter, the results of the empirical research are discussed, followed by a qualitative analysis. In the fifth and final chapter the research question and sub questions are answered, the limitations of the study are discussed, and recommendations are given.

2. Theoretical framework

This chapter will address the existing literature, theories, and concepts to create the theoretical foundation for the empirical research. The implementation of local adaptation policy by citizens on private residential property, with any form of local government support, will be empirically studied. This chapter starts with the institutional context of climate adaptation, followed by the drivers of the local governments' climate adaptive policy and the potential benefits of including citizens. Additionally, the opportunity and willingness of citizens to self-manage in the implementation of adaptation policies of the local government is discussed briefly. Subsequently, an overview of policy choices and tools to guide citizen participation in climate adaptive policies is provided. Finally, the conceptual model to guide the empirical study is presented.

2.1 Institutional context of climate adaptation

Climate change effects are experienced locally and governed by the local government, furthermore the local government is the level of government most accessible by civil society (Maesham et al., 2011). Related to environmental policy, municipalities oversee urban development and land-use policy, public health, and water management (OECD, 2016). They have a 'duty-of-care' to ensure there is no significant and unmanaged exposure to hazards (Maesham et al., 2011).

However, active policy to counter the challenges of climate change is a new policy field for national, regional, and local governments. There are many factors which influence the transformation process of local governments towards climate adaptiveness (Amundsen, Hovelsrud, Aall, Karlsson & Westskog, 2018). An exogenous factor is the shared values and priorities between national and local levels. A fitting concept to this factor could be the 'political driver'. The political driver of local governments introducing climate adaptive policies can be the regional, national, or even global political ambitions. In the Netherlands, the adaptation of water management to climate change became a policy issue in the 1990s, with the publication of the Fourth National Policy Document on Water Management (Kwadijk et al., 2010). It states that there are some preliminary conclusions that climate change is caused by the greenhouse effect. Although there were many uncertainties at the time, it was noted that climate

change places a burden on the water management system (Ministry of Transport, Public Works, and Water Management, 1998). A large political goal was set with the Paris Climate Agreement in 2015. The global ambition was to limit global warming to less than two degrees Celsius relative to the pre-industrial era. The aim of this political goal was to contain the global average temperature to 1.5 degrees Celsius (Klimaatakkoord, 2018; Amundsen et al., 2018). This requires significant systematic and transformative changes. Local governments are 'active agents of change' (Amundsen et al., 2018, p. 25). Local governments have dual roles in this transformation, both to transform within their own organization and to guide the local transformation. The local transformation relates both to building resilient communities and to mitigation to a low-emission society. Local governments can implement the response to climate change at a local scale, and it has the potential of influencing individual behaviour directly. The responsibility of the local government to maintain safe and sustainable circumstances for their residents allows them to expand this role and to start the transformation process. Specifically, locally governed land-use planning provides opportunity to take major steps in the transformation towards climate adaptiveness (Amundsen et al., 2018).

2.1.1 Challenges faced by the local government in creating climate adaptive policies

There are several challenges which local governments face when creating climate adaptive policies. Climate change is an issue which can appear to be distant and cloudy in comparison to other more concrete issues on the crowded agenda of local governments. Therefore, it is difficult to prioritize climate adaptive policy. Additionally, when managing the issues of climate change there is a lack of either legislative directive or community best practice (Maesham et al., 2011). How local governments pursue their responsibilities for adaptation depends on size, geography, assets, and the priority placed on climate change by the local council (Schmidt, 1996; Maesham et al., 2011). When aiming for climate adaptation, the local governments tend to struggle with inadequate information, institutional limitations, and lack of resources (Maesham et al., 2011). The execution of the Delta plan (Deltaprogramma, 2018), which entails having every municipality perform stress tests to gain knowledge on the current and potential local climate change effects, is partly resolving the issue of lack of information. However, institutional limitations and a lack of resources are an ongoing issue for municipalities, since they have limited financial capacity and they are dependent on national policy and budgets (Maesham et al., 2011). Another institutional limitation which could also explain the lack of resources is the local governments' tendency to plan, discuss and tackle climate adaptation in the environmental and water section only. The challenge for local governments is to recognise climate adaptation as a cross-sectoral issue, both for the council and the public servants (Critchley & Scott, 2005).

2.1.2 Citizen engagement in climate adaptive policies

Although the contribution of the private sector in climate action should not be underestimated, current adaptation policymaking and action is largely dominated by the public sector. The aim of local governments to become climate adaptive is, however, a public issue that requires the involvement of society (Hegger et al., 2017; Klein et al., 2017). In the context of Dutch municipalities, the arrival of the new environmental law even makes it mandatory to involve citizens in developing and implementing spatial policies (Rijksoverheid, n.d.). Obligatory citizen engagement may seem surprising, but it is highly effective in climate adaptive policies (Mees & Driessen, 2019).

Citizens are important stakeholders to solve adaptation issues. Not only does the inclusion of citizens result in achieving accountability, it also improves the effectiveness of urban and environmental policy. Few, Brown and Tompkins (2007) argue that it is important for public participation initiatives to go beyond the provision of technical or scientific information on climate change impact in order to determine and promote the shared responsibility of public and private stakeholders in addressing the issue of climate change. Citizens can provide information on the local impact and vulnerabilities. Their knowledge of the local situation of specific neighbourhoods allows adaptive policies to specifically target local challenges. Heggers et al. (2017) state that climate adaptive measures taken on by residents on their own premises is necessary to share responsibilities, to exploit resources and to fill up institutional voids. It has the potential of battling a lack of awareness, communication, motivation, and willingness to act.

2.2 Citizen involvement in Dutch local adaptation policy

Several empirical and academic studies emphasize the importance of the perceived and achieved level of ownership experienced by citizens in citizen participation (Voorberg et al., 2015; Kalkbrenner & Roosen, 2016; Braithwaite, 2018). When it comes to policy on citizen participation in climate adaption, it is important to distinguish the different positions from which residents act and which responsibilities come with them. On the one hand residents carry the role of citizens of a country, falling under the jurisdiction of various government levels. On the other hand, residents can be considered as consumers (Hegger et al., 2017). Firstly, general insights are discussed on the modes of governance in climate adaptation. Secondly, an overview of the different roles and responsibilities of citizens in relation to the water management in the Netherlands is provided. Lastly, the responsibilisation of citizens in climate adaptive policies is discussed.

2.2.1 Bottom-up versus top-down climate adaptation

Depending on the policy instrument, which is chosen by the local government, responsibilities can be mandated by law, delegated by public authority or self-initiated (Mees et al., 2014). Top-down policies and legal regulations are policy instruments in which the public authority assigns responsibilities to its citizens. This policy instrument can be described as governing by regulation, with potential sanctions. An example of this policy regarding to local climate adaptation could be the sewage taxes, imposed by municipalities. Bottom-up, participatory policies provide more opportunities for citizens to engage in adaptation, it allows problem ownership to be shared and the responsibilities are distributed.

There are different policy instruments, either governing by provision or governing through enabling which can be related to bottom-up policies. Governing by provision relates to softer policy instruments such as creating (financial) incentives for citizens to participate or by providing services The implementation of climate adaptive measures would mean that the local government provides subsidy or services. The citizens then implement the adaptation. Governing through enabling is more focused on the provision of information and knowledge, in which partnerships between citizens and the local government are facilitated to promote citizen participation (Klein, Juhola and Landauer, 2017). Klein et al. (2017) argue for the benefits of governing through enabling since this is a policy tool which does not only assign responsibility to citizens, but the local government also shares the problem ownership with its citizens, which provides incentives to perform adaptation measures as well. In doing so, the public officials need to be clear on the potential consequences of policies and measures on citizens' motivation and capacities to adapt. Another possibility provided by Klein et al. (2018) is governing through participation and partnership. This mode of governance supports actions led by other actors, either the private sector or citizens. This study will focus on partnership with citizens. Governance through participation and partnership requires a shift in responsibilities to a non-state partner. This comes with several risks, such as an increase of inequality and vulnerabilities.

2.2.2 Participation framework

Combining the abovementioned different governing forms of Klein et al. (2018), and the participation ladder of Arnstein (1969), Mees et al. (2019) created a framework to assess the role of local governments in Dutch climate adaptive initiatives. It is a scale of five steps in which the local government's participation is ranging from no participation, to actively regulating. Although in practice the boundaries between the levels are not as clear-cut and the roles can overlap, it is a useful framework to assess the role of local governments and citizen self-management in climate adaptation policies. The fifth step in the scale involves the highest level of government participation: regulation. The regulating role of the local government expresses itself by regulating the actions by citizens, by initiating,

coordinating, and making decisions for citizens. It is a hierarchal government in which regulations are enforced and sanctioning might be used in case of non-compliance. The fourth step in the scale is a network steering role for the local government, in which the government (co-)initiates a network of public and private stakeholders who make decisions jointly. The local government coordinates the process, sets the rules, but also contributes to trust building among the stakeholders. The third step is a stimulating role for the local government, which consists of structural (financial) support for initiatives during a longer period, in which the initiatives coordinate and decide independently. The second step in the scale is a facilitating or enabling role for the local government. Again, the initiatives coordinate and decide independently, but the government is only involved because they have an interest in the success of the initiative. The local government facilitates the initiative in making the best use of the institutional environment. However, the resources and other capacity development are limitedly provided by the local government**.** The first step, highest on Arnsteins' participation ladder (1969) and the desired part of the scale by the local government is 'letting go'. The initiatives are initiated, coordinated and government independently from the government. The local government might be indirectly involved by becoming an ambassador of the initiative, however, no help is provided (Mees et al., 2019).

All-in all, while the literature is not clear on the desired form for governments to execute, two important aspects are agreed upon. First is the importance of information. The provision of information, either via governing through enabling or governing through participation, is the most successful in stimulating citizens to participate in climate adaptation. After informing, citizens are expected to implement individual adaptive measures. Empirical studies have shown that this is effective, although it appears to be a top-down, one-way process (Klein et al., 2018; Mees et al., 2012). On the other hand, the participation framework of Mees et al. (2019) shows the desired form for governments is 'letting go', in which they are only very limitedly involved. However, the authors also state that this is not realistic yet.

2.2.3 Roles for residents in water management

Ever since the beginning of the 21st century, the Dutch national policy has been aiming to decouple rainwater from the sewer system. If possible, rainwater should be infiltrated in the soil or included in surface water. To prevent flooding, rainwater should be retained and stored before abduction (Dictoriaat Algemeen Milieu, 2004). Most municipalities implemented the national policy by initiating subsidy programs and providing advice to residents regarding the installation of retention measures on their premises (Hegger et al., 2017).

The role played by residents as either a citizen or a consumer can be divided into a mainstream role and an additional role. When it comes to rainwater management, the mainstream role for citizens

is that they are being addressed as potential action takers regarding the retaining of rainwater on their own premises. An additional role for citizens is to take action. Examples could be replanting green, green roofs, green facades, harvesting on own premises: all resulting in disconnection of rainwater from the sewer system. These measures have collective benefits: not only will it prevent flood, but it improves the quality of urban space and biodiversity as well. There are several municipalities offering subsidies for these green projects. However, the subsidies appear to be sensitive to politics: due to available budgets they change from year to year (Mees et al., 2013).

In rainwater management, the mainstream role for consumers is to be the customer of green roofs, green facades, or water infiltration crates. When it comes to the provision of these goods, not only the functionality, but also the economic benefits of water retention are emphasized. In addition, the market plays a role in informing the consumers on potential governmental subsidies (Hegger et al., 2017). The additional role of consumers is to purchase green roofs with other motives than functionality. Motives for purchasing green roofs can also be aesthetic value or green roofs as a symbol for status or sustainable behaviour (Mees et al., 2013).

2.2.4 Responsibilisation of citizens

Interestingly, two things are happening at the same time. On the one hand, the challenge remains for governmental actors to delegate their responsibilities to citizens. The most evident challenges faced in the Netherlands are uncertainty of the scope of action of residents and the lack of risk awareness. However, in the study of Mees et al. (2013), additional roles are created by the local government, showing positive results in sustaining active roles of residents. Barriers against increased involvement of residents are not impossible to overcome, yet active policy to do so is required. On the other hand, a trend of responsibilisation of citizens is occurring. The initiatives of citizens for climate action are supported and facilitated by both local and national government, aiming to enhance the resilience of communities to climate change. This impacts the governing of the local government, since the government roles need to shift from a regulating and steering role to a collaborative, responsive role (Mees & Driessen, 2019). This is a phenomenon called ‘government participation’ as a counterpart to ‘public participation’ (Edelenbos, Van Buuren, Roth & Winnubst, 2017). In line with the rise of the ‘participation society’ in the Netherlands, this term was introduced to change the public opinion on public participation. The government would participate in community initiatives predominantly led by citizens, who develop own projects with solutions for a policy problem (Edelenbos et al., 2017). However, are citizens ready to take on the responsibility of countering the challenges of climate change? Or does the local government still need to do more than enabling and facilitating?

2.3 Motivate citizens to self-manage

When aiming for citizen self-management in the implementation of adaptation policy, it is important to review the willingness and opportunity of citizens to participate. This chapter describes the aspects which the local governments need to be aware of and on which they need to act, to effectively implement adaptation policy with citizen self-management.

2.3.1 Opportunity

As mentioned above, it is important for local governments to provide information to stimulate citizen self-management. However, Ramanadhan and Viswanath (2008) state that there is inequality in communication due to the degree of receptiveness of residents to information. Structural determinants such as socio-economic status and mediating mechanisms such as gender, age and social networks lead to differential communication outcomes. This is shown by access to and use of information channels, attention to (media) content, recall of information, knowledge and comprehension of information and a capacity to act on relevant information by individuals. Without information disclosure, it can be stated that inclusion and meaningful participation is not possible (Tanner et al., 2009; OECD, 2001; Behrman et al., 2014). However, the means by which information is spread, are often limited to certain forms. This is one of the reasons which can explain the underrepresented group of vulnerable or economically marginalized groups in the processes in which cities consult citizens or organize public hearings. There is a positive correlation between socio-economic class and representation, marginalizing citizens with a low socio-economic status. A lack of access as mentioned above can be an explanation. Additionally, disinterest and low levels of education and low income are significant factors for (non)participation (Tanner et al., 2009). Moreover, it can be stated that for citizens to have the opportunity to participate, they need access to assets and social capital. Social capital can be defined as the ability to work together as a community and the ability to access information and resources from high-level institutions (Behrman, 2014).

2.3.2 Incentives

Alford (2002) investigates the willingness of public-sector clients to coproduce with the (local) government. He distinguishes material and nonmaterial incentives. Material incentives are quantifiable benefits, which could be services, money, or goods. Material rewards are only effective when it comes to individual action and simple tasks. Non-material incentives can take a variety of forms. Something which they have in common are intrinsic rewards, through which citizens retrieve a self-administrated ‘kick’ out of doing something (Schneider & Bowen, 1995). It increases self-esteem because citizens have more control (Lengnick-Hall, 1996). Solidarity incentives are formed by social cohesion and group pressure, and they denote the rewards of associating with others, as well as the sense of group

membership and group identification. Expressive incentives are similar to what Voorberg et al. (2015) describe as intrinsic values: the rewards of the sense of satisfaction when contributing to a worthwhile cause. A final incentive for citizens to coproduce are sanctions, often in the shape of legal obligations such as the tax authority of the local and national government (Alford, 2002).

2.3.3 Personal characteristics

In addition to the abovementioned incentives, there are different personal characteristics impacting the willingness of citizens to participate or cocreate with public organizations. This is relevant to this research since, when aiming for all citizens to be engaged in the adaptation policy, it is important to understand which groups of citizens will engage naturally, and which groups might require more stimulation.

Kalkbrenner and Roosen (2016) investigated the willingness of citizens to participate in local renewable energy projects. As stated in the introduction of this research, there is limited research available on citizen self-organization in climate adaptation. Both renewable energy and the reuse of rainwater are sustainable actions which depend on citizens taking own initiative on their own premises. Therefore, the research of Kalkbrenner and Roosen (2016) is used to examine the willingness of citizens to participate in climate adaptive measures by looking into the citizens' personal characteristics, which will be validated during the empirical part of this research.

In the first place, citizens are more willing to put in voluntary efforts in community energy projects than to contribute financially. Social norms are found to have the highest impact on the willingness to participate, followed by environmental concern and perceived ownership in the project. By reviewing the demographics of the participating citizens, it becomes clear that male citizens with a higher income are more willing to participate. Interestingly, when it comes to educational level, different studies argue different impacts of educational level on citizen participation. Some studies argue that educational level impacts the willingness to participate (Voorberg et al., 2015). It can be argued that education and income are correlated (Glick & Miller, 1956), which supports this argument. Carreira, Machado and Vasconcelos (2016) argued by empirical study on public participation in environmental and spatial planning that educational level does influence citizen participation. Interestingly, they distinguish the actual participation of citizens from how citizens perceive and carry out their involvement in public policies. Although citizens with a higher educational level perceive and carry out their involvement in public policies differently, it does not have an impact on their actual active participation as described by citizen self-management (Carreira et al., 2016).

It could be argued that self-efficacy is an effective way to examine whether citizens perceive ownership in the process of participation and to stimulate self-engagement. Self-efficacy is the 'sense acquired by an individual that they can carry out actions which entail some expected results' (Boviard,

van Ryzin, Loeffler and Parrado, 2015, p. 17). Self-efficacy is strongly correlated to coproduction, as it shows whether citizens perceive to have the ability to make a difference. There is great power in peer support, since citizens' self-efficacy can be increased by fellow citizens who already have a high sense of self-efficacy (Boviard et al., 2015).

2.4 Policy tools to stimulate citizen self-management in climate adaptation

The quality of citizen participation has been discussed so far by reviewing the policy choices of the local government in guiding citizen participation and studying the impact of citizens' opportunity and willingness to participate on citizen self-management in climate adaptive rainwater measures. Besides, it is interesting to research policy tools which could promote citizen self-management in climate adaptive measures. This section provides an overview of policy tools which can be used to promote citizen self-management in taking on climate adaptive measures, as proposed by both academic literature and empirical studies.

2.4.1. Raising awareness

The climate adaptivity of citizens and communities is strongly related to capacity building and the realization of the local potential (Allen, 2006). First of all, it is important to raise awareness of local risks and the causes of vulnerability. Case studies show how vulnerability and capacity assessments in which local people participated have the potential of communities to address their own vulnerabilities (Davis, 2013). People who perceive their lives to be more vulnerable to hazards are more likely to cooperate in climate adaptive measures than those who do not (Paton, 2001). This is educative, it raises awareness and it stimulates participation in practical adaptive measures. Once people are aware of the opportunities and strategies of climate adaptive measures, it has the potential of spreading through the community and reaching even those who have not actively participated in project activities (Allen, 2004). The vulnerability and capacity assessments in collaboration with citizens also have a positive impact on the capacity of public officials. They gain access to local knowledge and ideas, build on local coping or adaptive strategies, and mobilize local resources (Allen, 2006).

2.4.2 Motivate and mobilize

The next step after raising awareness is to mobilize and motivate the local community (Allen, 2006). A specific project and expected output to aim for helps to unite participants around a shared goal. Pre-existing projects should be taken into consideration, rather than simply starting new initiatives. The focus of the project needs to be concrete yet also focused on long-term climate adaptation. A common flaw is the focus on coping with an issue rather than adapting the situation to future challenges. Project outputs contribute to empowerment due to their symbolic value. They illustrate the achievements of the participators. Public recognition of local issues and the vulnerability of communities empower the

community. It is important that the public officials specifically consider the community members who are ordinarily not involved in public discussions or in a decision-making process. Otherwise, the public officials will not gain insight in the local concerns, priorities, and possible solutions to local problems. A final tool to mobilize and motivate the local community is providing training to a selected group of interested participants, in which information is provided about the specific project. This has the potential of individual empowerment, increases confidence, and it results in people realizing they can make a change (Allen, 2004; Alford, 2002).

Empowerment by providing information, advice or training have been put forward as tools to ensure capacity building (Alford, 2002; Allen, 2004). However, there is also the possibility of simplifying tasks. Empirical studies have shown that the use of technology, mostly through information systems and communications, facilitates citizen participation (Alford, 2002).

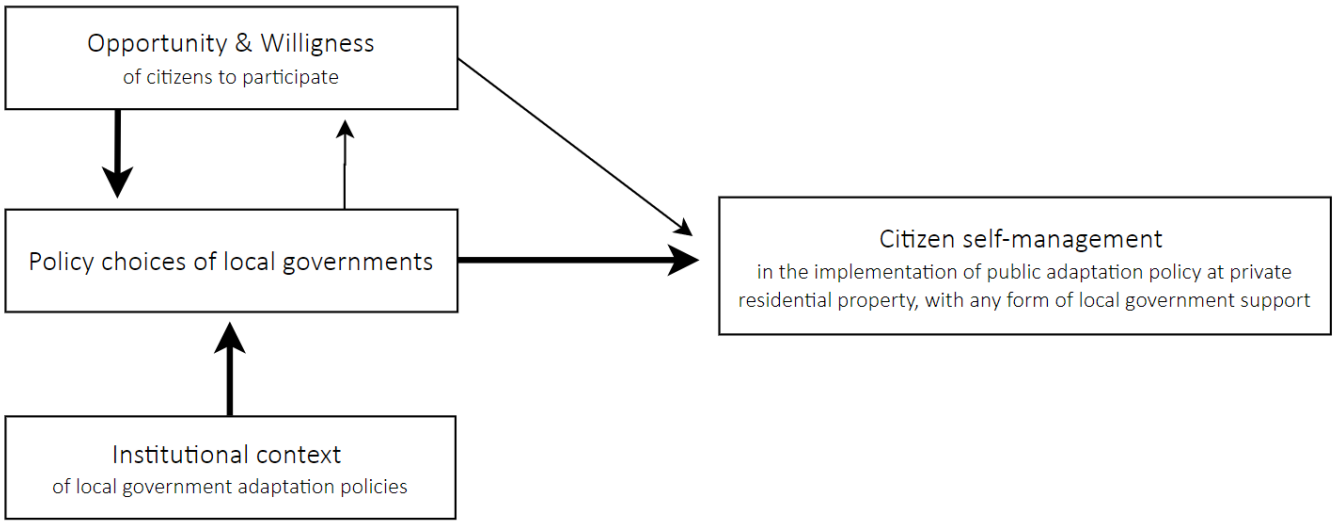

Figure 1. Conceptual model

2.5 Conceptual model

Based on the findings in the theoretical framework, it can be stated that citizen self-management in climate adaptive rainwater measures on own premises is a multidimensional process which is impacted by different factors concerning both policy and citizen side. In figure 1, a conceptual model is displayed to prepare for the empirical study. Relevant factors concerning citizens are opportunity and willingness: are the local governments aware of or actively acting on the aspects of their adaptation policy which influence the willingness and ability of citizens to self-manage the implementation of adaptation policy? Opportunity relates to citizens' access to resources and information. This can have an impact on both citizen self-management itself and it could determine the policy choices of the local government as well. The latter is studied in this empirical study. The policy choices relate to the incentives, support, information, responsibilities, and problem ownership provided by the local government to guide citizen

participation. This in return has an impact on opportunity, depending on the chosen policy. Moreover, it can have an impact on the willingness of citizens to participate. In this study, only the material rewards as incentives will be examined. Depending on the chosen policies, the local government can make use of rewards to stimulate citizen self-management. On the other hand, willingness is also determined by personal characteristics of citizens. The social economic status of citizens can impact both the opportunity and willingness of citizens to self-manage adaptation policy. In this research, level of education and socio-economic status were examined. Concerning policy, the concept of policy choices is chosen to cover both the policy drivers, policy decisions and policy tools in climate adaptation policies. This research only citizen self-management concerning policy. Therefore, in figure 1, a distinction has been made in the thickness of arrows. The thin arrows are relevant in examining citizen self-management in the implementation of climate adaptive policy. However, they also require a study involving citizens as participants. This study only examines local government officials as participants, displayed by the thick arrows, due to the limitations of COVID-19.

3. Methodology

In this chapter the methods of this research will be discussed. Firstly, the research design is discussed, and the selection of cases is described. Secondly, the data collection and data analysis are presented. To operationalize the empirical research, the literature study is summarized and operationalized in the conceptual model. Finally, the reliability and validity of this research will be discussed, and a brief note on ethics is provided.

3.1 Research design

To compare and explain the role of Dutch local governments in stimulating citizen self-management in climate adaptive rainwater measures on citizens' private residential property, qualitative research was found to be the most suitable. It is a research method which focuses on understanding underlying reasons, relations, and motivations instead of quantifying the problem (Bryman, 2016). This empirical research reviews policies, focused on stimulating citizens to apply climate adaptive rainwater measures to their own premises. The drivers of climate adaptive policy choices, the local government policy choices, the incentives created by the local governments for citizens to participate and the facilitation of citizen participation by the local government are best to be examined qualitatively. By studying a variety of Dutch local governments, the researcher gained insight into the effects of governance on citizen participation in climate adaptation in different cities. Policies are reviewed up close, by studying policy documents and municipal websites in combination with a comparative study on the diverse government approaches.

3.1.1 Case selection

For the selection of the cases, the aim was to have a diverse collection of cases, such as diversity in size of the municipal organisation itself, the size of the team working in climate adaptive policy and how far along the local government is in developing and implementing their policy.The researcher only had direct connections with the participants employed at the city of Hilversum. All other participants were approached via the snowball method using the connections of the policy makers from the city of Hilversum or via LinkedIn. The case selection was dependent on responsiveness of the civil servants of the municipalities, which was a limitation in creating a diverse sample. Nonetheless, effort was made to create a sample as diverse as possible. In addition, two external advisors which are member of the union of local governments for sustainable development (*Gemeenten voor Duurzame Ontwikkeling, GDO)* were interviewed. They both have experience on several administrative layers within local governments as well as advisor experience in climate adaptation initiatives in the public domain.

Table 1. Case descriptions

Municipality	Size and residents	Team size[1]	Implementation[2]	Evaluation[3]
Zwijndrecht	Small 44.000	4	Experimenting projects.	First project was evaluated as a success, implementation of additional projects is currently being developed.
Veenendaal	Medium 66.000	1[4]	Performed pilot and several experimental projects.	Evaluated pilot, have not decided yet on final policy to be implemented.
Hilversum	Medium 90.000	1[5]	Single pilot in one neighbourhood is implemented, which is still running.	Not evaluated. However, plans are currently being developed to scale up pilot to be municipal-wide.
Deventer	Medium 100.000	1[6]	Started with pilot performed by citizens in one eco-neighbourhood, which has been the inspiration for other municipal-wide initiatives.	Successful partners and good use of subsidies and strong network of ambassadors will be rethinking the subsidy structure in the future.
Amersfoort	Large 156.000	7	Structural project-based.	Scaling up successful initiatives.

[1] For more detail, see chapter 4
[2] For more detail, see chapter 4
[3] For more detail, see chapter 4
[4] With some assistance from a communication officer
[5] Collaborating in an unofficial working group on climate adaptation with two other policy makers
[6] Collaborating in an official working group on climate adaptation

Utrecht	Large 358.000	3	Structural project-based.	Projects are being expanded to other neighbourhoods.
Rotterdam	Large 650.000	18	Structural project-based Recently initiated a new pilot.	Continuous evaluation, adjusting policy and expanding projects to more neighbourhoods.

3.2 Data collection

To conduct the empirical research, data was collected in two ways. In this research method, triangulation was chosen to increase the internal validity (Verschuren, 2007). Primarily, the data was retrieved from in-depth interviews with public officials of several Dutch municipalities, who are involved with citizen participation in climate adaptive rainwater projects. The policy decisions and tools used in their rainwater projects was discussed in in-depth interviews. The topic list guiding the interviews can be found in annex 1. The public officials who were interviewed represent local governments which differ in size, available resources, type of residents and years of experience with policy on citizen participation in climate adaptation. Interviewing policy makers and other concerned officials in the rainwater projects from the different local governments was therefore expected to result in a rich and complete collection of data. Additionally, an analysis of primary and secondary sources was triangulated to support the observations from the interviews (Bryman, 2016). Policy documents, municipal websites and other related documents concerning the public policy on citizen self-management in climate adaptive rainwater measures on citizens' premises were briefly reviewed as well, in order to prepare for the interviews and to support the information provided by the participants. The list of the participants in this research can be found in table 2. In the current context face-to-face contact was limited due to the spread of COVID-19, therefore the interviews were conducted over Zoom, Microsoft Team or phone calls.

Table 2. Overview participants interviews

Municipality	Position
Zwijndrecht	Alderman[7]
Veenendaal	Policy maker – climate and sewage
Veenendaal	Rainwater coach (external advisor)
Hilversum	Policy maker – sewage and water
Hilversum	Policy maker – biodiversity
Hilversum	Policy maker – sustainability
Hilversum	Alderman

[7] In the Netherlands, an alderman is a member of the municipal council, a governor with a responsibility for certain policy areas

Deventer	Project leader at Ulebelt, centre for nature- and environmental education
Deventer	Policy maker
Amersfoort	Project leader SamenDuurzaam at Amersfoort municipality
Utrecht	Policy maker – urban water management
Rotterdam	Policy maker – water, participation, and climate adaptation
Gemeenten voor Duurzame Ontwikkeling (GDO)	External advisor
Gemeenten voor Duurzame Ontwikkeling (GDO)	External advisor

3.3 Data analysis

The collected data consists of policy documents and transcribed interviews. The qualitative analysis is theory driven and therefore the literature study provided several core concepts, which were used to form a topic-list. The topic list can be found in annex 1. All interviews were conducted based on the same topic list. This topic list was also used to manually code the transcripts. Additional interviews were conducted to fill in gaps in the information. The results and analyses of the semi-structured interviews can be found in chapter 4.

3.3.1 Operationalization

The operationalization of the main concepts is based on the theoretical framework, as visualized in the conceptual model. To be able to measure the chosen concepts empirically, they need to be converted into measurable indicators. All the concepts mentioned in the following tables have been derived from the theoretical framework. An overview of the concepts is displayed in tables 3 to 7. The final questionnaire based on these concepts can be found in annex 1. The concepts highlighted in green support the conceptual model and will be examined in the empirical research. The original aim of this research was to study all concepts displayed in the following five tables. Due to limited time and resources, as well as to the unusual circumstances of COVID-19, it was decided not to select all concepts of the literature study for the empirical research. The full operationalisation tables can be found in annex 2, in which the additional concepts are highlighted in blue.

Table 3. Institutional context of local governments' climate adaptive policies

Key concept	Dimension	Indicator
Institutional context Maesham et al., 2011	Demographics local government	Size Geography Maesham et al., 2011
	Institutional challenges	Institutional limitations Lack of information Lack of resources Maesham et al., 2011

Table 4. Drivers of local governments' climate adaptive policies

Key concept	Dimension	Indicator
Drivers of climate adaptive policy choices Amundsen et al., 2018	Political driver / Leadership Amundsen et al., 2018 Maesham et al., 2011	Local goal / political ambitions Regional goal / political ambitions National goal / political ambitions Amundsen et al., 2018
	Benefits citizen participation in climate adaptation policies Hegger et al., 2017; Mees & Driessen, 2019	Citizens providing tacit knowledge Locally oriented solutions Exploit resources Shared responsibilities Hegger et al., 2017;

Table 5. Operationalization concept 'participation framework local government'

Participation framework local government		Indicators
Regulating Mees et al., 2019	Provision of incentives Klein et al., 2017 Klein et al., 2018 Alford, 2002	Regulating the storage of rainwater on private property in existing construction via - Municipal tax benefits - Sanctions: municipal tax increase - Obligations for climate adaptive measures, enforced by law
Network steering Mees et al., 2019	Support for actions led by citizens, providing information Klein et al., 2018	Bring citizens together, spread information, program coordination
Stimulating Mees et al., 2019	Provision of incentives Klein et al., 2017 Klein et al., 2018 Alford, 2002	Money (Subsidies) Goods (Resources)
	Provision of services Klein et al., 2018 Rainproof, 2020	Government aid in making garden climate adaptive
Facilitating / enabling Mees et al., 2019	Shift of responsibilities to citizens Klein et al., 2017	Responsibility to execute policy: citizen or government
	Provision of information Klein et al., 2018	Information brochures Website Social Media
	Sharing problem ownership with citizens Klein et al., 2017	Responsibility to deal with water flooding: citizen or government

Table 6. Operationalization concept 'willingness'

Key concept	Dimension	Subdimension	Indicator
Willingness of citizens to participate Alford, 2002	Material incentives Alford, 2002	Services Alford, 2002	Provision of services Klein et al., 2018
			Voluntary efforts by citizens Kalkbrenner and Roosen, 2016
		Money Alford, 2002	Subsidy Mees et al., 2013
			Financial contributions by citizens Kalkbrenner and Roosen, 2016
		Goods Alford, 2002	Provision of resources Klein et al., 2018
		Sanctions Alford, 2002	Legal obligations; municipal taxes Klein et al., 2017 Alford, 2002
	Personal characteristics	Socio-economic status Ramanadhan and Viswanath, 2008; Kalkbrenner and Roosen, 2016	Income Kalkbrenner and Roosen, 2016

Table 7. Operationalization concept 'opportunity'

Key concept	Dimension	Sub-dimension	Indicator
Opportunity	Access to resources & Access to information Behrman, 2014; OECD, 2001; Ramanadhan and Viswanath, 2008; Tanner et al., 2009	Socio-economic status Tanner et al., 2009; Behrman, 2014	Income Level of education Ramanadhan and Viswanath, 2008; Voorberg et al., 2015; Carreira et al., 2016
	Access to resources Tanner et al., 2009; Behrman, 2014 Ramanadhan and Viswanath, 2008;	Capacity to act on relevant information Ramanadhan and Viswanath, 2008	Education Ramanadhan and Viswanath, 2008 Access to internet Digital capacity
	Access to information Behrman, 2014; Tanner et al., 2009; Ramanadhan and Viswanath, 2008; OECD, 2001	Information disclosure by local government Behrman, 2014; OECD, 2001; Ramanadhan and Viswanath, 2008; Tanner et al., 2009	Information brochures Website Social Media

3.4 Validity and reliability

The validity of this research is determined by internal and external validity (van Thiel, 2014). Internal validity refers to the instruments' quality. To ensure that these measure the intended phenomenon, the key concepts have been derived from a wide variety of academic studies and empirical research and have been operationalized into indicators. External validity refers to the generalization of the study's results. Particularly case studies, such as this research, are hard to generalize (Bryman, 2016). Climate adaptation is a quickly developing field, and the environmental law is also expected to result in great

changes regarding citizen participation and climate adaptivity of the examined cases. The respondents of the interviews are both policy makers and other concerned public officials. This results in a one-sided perspective on citizen participation since citizens themselves will not be participating in the research. This is a limitation of the research which is imposed by the circumstances of COVID-19, not by choice of the researcher.

The reliability of the research depends on the repeatability of observations or the undependability on the researcher, which are great challenges in qualitative research (Bryman, 2016). Through transparency of the procedures, the uncertainties, and the limitations of the research, the researcher tried to be as objective as possible. To ensure a valid and diverse sample, a variety of municipalities and public officials were approached to participate in the research.

This research considers ethical guidelines. The participants could decide at any moment to stop participating in the research. Participants received an information letter and an informed consent was used, added in annex 3.

4. Research findings

In this chapter the seven selected cases are introduced, and the results of the empirical research will be presented. Firstly, an overview of the cases is provided, followed by the institutional challenges of creating adaptation policy. Secondly, the different policy tools used by the local government to stimulate citizen self-management in climate adaptation are discussed. The willingness and the opportunity of citizens to self-manage are discussed in relation to the different policy tools Thirdly, the methods for effective implementation of adaptation are briefly discussed. Finally, the results of the adaptation policy are given and the set goals are discussed.

4.1 Overview of the cases

In this section, a brief overview of the seven cases is provided. The order of the description of the cases is determined by the size of the municipality, which, as stated by Schmidt (1996; Maesham et al., 2011) is one of the main indicators on how local governments pursue their responsibilities for adaptation.

Zwijndrecht is a small-sized municipality, in the province South-Holland, the Netherlands. It has around 44.000 residents (AlleCijfers, 2020). In October 2018, the municipality published its new green policy 'green is alive' (Groen Leeft, 2018*)*. It shows a new approach to green in Zwijndrecht. The council of Zwijndrecht was determined to achieve an integrated green vision, which "contributes to the health and well-being of the inhabitants, the character of Zwijndrecht and a good business climate for businesses and employees" (Council proposition, 2018). There is a team of four civil servants working in a so-called 'green coalition', consisting of a policy maker focused on sustainability, with a background in urban planning, a trainee focused on sustainability and green living environment, an employee of the registry

(for a few hours per week) and a team leader. In addition, green managers and climate directors are actively involved. Actions to increase awareness and a first experimental project have been initiated already. Budgets are prepared for the execution of the policy in 2020-2023. Therefore most of the implementation has yet to be carried out.

Veenendaal is a medium-sized municipality with over 66.000 residents, located in the province Utrecht, the Netherlands (WSJG, 2019). In 2016, the first sessions were held internally to raise awareness of climate change and its local effects, both for the civil servants and the council. In 2019 several experimental projects were initiated. Furthermore, a formal pilot was launched in one neighbourhood to study the willingness of citizens to disconnect the rainwater and to connect it to the public separated sewage system. Although the pilot has ended, no formal policy has been formed or implemented on larger scale yet. Currently the policy maker focused on climate and sewage is the only civil servant working on realizing climate adaptivity. A communication advisor provides support when necessary and the team of public space is working closely with him. However, he stated explicitly that there was no team for climate adaptivity, which is necessary in order to tackle the issues of climate change. His specialism is only in sewage, whereas climate adaptivity goes beyond the sewage system.

Hilversum is a compact, medium-sized municipality with over 90.000 residents, located in the province Noord-Holland, the Netherlands (Hilversum In Cijfers, 2020). In the GRP for Hilversum 2015-2020, the participation of citizens and climate adaptiveness were first mentioned. After a motion by the municipal council to become a member of the national organization Steenbreek and to make more efforts in becoming climate adaptive, the pilot of the water infiltration crates was initiated in March 2018. The team supporting the climate adaptive policy consists of three policy makers, specialised in sustainability, ecology, and water. However, the pilot focused on stimulating citizens to disconnect the rainwater from the sewage system on their own premises by installing water infiltration crates is carried out by the policy maker water solely. This results in limited capacity to evaluate or adjust the policy. While the three policy makers are working together, no official team on climate adaptivity has been installed yet. Climate adaptation has not been given a place in the organisational structure yet.

Deventer is a medium-sized municipality with a little over 100.000 residents, located in the province Overijssel, the Netherlands (Kennisportaal Deventer, 2020). Around 2016 the municipality of Deventer started its policy to stimulate citizens to disconnect the rainwater and to infiltrate the water in their own garden. They did so by implementing a subsidy arrangement by making use of the so-called ‘rainwater ambassadors’: people who voluntarily are being trained by the municipality of Deventer to create an active network of ambassadors who stimulate and inform others on taking climate adaptive measures. The team tackling climate issues in Deventer is a multidisciplinary team operating in a

‘working group climate’. Civil servants across the municipality are involved to discuss and create integrated approaches for tackling climate challenges in Deventer. As for the execution of the climate adaptive policies, the rainwater ambassadors and the nature and education center ‘Ulebelt’ are important partners.

Amersfoort is a large municipality with over 156.000 residents, located in the province Utrecht, the Netherlands (Amersfoort in Cijfers, 2019). Amersfoort joined the Steenbreek foundation already at its start in 2015. Joining Rainproof allowed the municipality of Amersfoort to have their own website accessible for citizens. The team supporting this program consists of seven civil servants. They vary in specialism, ranging form policy makers, project leaders, designers, and rainwater coaches. Amersfoort municipality has been working on guiding citizen self-management in citizens taking climate adaptive rainwater measures in their own garden for several years now and it has established a project-based policy that is successfully implemented. However, there is still much to learn, and they keep evaluating and improving their policies.

Utrecht is one of the four biggest municipalities in the Netherlands, with an estimate of 358.000 residents (Utrecht in Cijfers, 2019). It is located in the center of the Netherlands, in the province Utrecht. The policy related to citizen self-management in making gardens climate adaptive, specifically related to water of citizens’ premises, is initiated by Utrecht municipality in 2017, called Waterproof 030. The urgency for climate adaptive rainwater measures in two specific neighbourhoods was the start of Waterproof 030, and since then the team has been creating new initiatives and scaling up its work throughout the city of Utrecht. The team of Waterproof 030 consists of a project manager, a project assistant, and a communication advisor. All are working part-time on the project.

Rotterdam is the second largest municipality in the Netherlands, with an estimate of 650.000 residents (AlleCijfers, 2020). Rotterdam is located in the province South-Holland. It has a low-level location in a delta. Therefore, it is exposed to sea level rise and changing wind patterns, which stresses the need to become climate adaptive. Rotterdam started 'Rotterdam's rebuttal' (*RotterdamsWeerwoord)* in 2018, containing the ambitions and goals of Rotterdam to keep the city climate proof. The municipality supervises this process. The team supporting this program consists of 18 civil servants. They vary in specialism, ranging from policy makers, program managers and communication advisors to landscape architects and designers. The first policy related to climate adaptiveness of the city, focused on for example water, was already initiated in 2009 in the name of ‘Rotterdam Climate Proof’, followed by the Rotterdam adaptation strategy, formulated in 2013.

4.2 Institutional challenges

In the literature study several institutional challenges are mentioned, which local governments can face when creating adaptation policies. These are challenges that are experienced within the organisation itself. This section is composed of the three main challenges from the literature study, starting with institutional limitations, followed by the lack of resources, and finishing with the lack of information.

4.2.1 Institutional limitations

One of the main challenges found in the literature study was to recognise climate adaptation as a cross-sectoral issue for both the council and the public servants. The effects of climate change have become urgent in the experience of the council, the public servants, and the residents of municipalities due to the water flooding in extreme rain downfall, and periods of extreme drought. In most of the researched cases, the responsibility for taking care of the water-related challenges of climate change or even the issue of climate change in general is given to the section of the water management, within the municipal organisation. Something which all policy makers interviewed in this research had in common, was their function as a water manager in the sewage system team of the local governments. They have the best knowledge on the action on climate adaptation in private residential property, mostly due to their technical background and knowledge of the water systems in the municipality. Also, they are the ones responsible for making sure the public space is climate adaptive, based on the water-related challenges imposed by climate change. However, recently the involvement of citizens has been added to their job. Not only is it required of them to know how to make the city climate proof, they also need to motivate and support other private stakeholders (citizens, companies, housing corporations) to be climate adaptive. The overview of cases as provided in section 4.1 shows that some of the municipalities are aiming to take on a more multidisciplinary approach. There are quite some differences between the examined cases, in team size and composition of the public officials creating the adaptation policies. Participants named benefits of having for example landscape architects involved to help with advising citizens on climate adaptive rainwater measures in their gardens, or communication officers to deliver the right message to all involved stakeholders. In addition, several participants stated the need for an official climate adaptation team, preferably with a climate director, who is experienced in project management.

Other than that, there is more to it than just the sewage system struggling with extreme rain downfall. Interviews with the external advisors from GDO (Municipalities for sustainable development), the policy maker from Rotterdam municipality and the Alderman of Zwijndrecht all highlighted the importance of how the climate adaptation policy, and the climate challenge in general, is framed. Solutions to climate change effects can also counter other social issues. It takes a variety of civil servants with different views on city planning and urban design to make the best use of climate change solutions.

An example provided by one of the participants is the use of an inspiration garden to inform citizens about the opportunities of making their own garden more climate adaptive, which was also a meeting point in a neighbourhood struggling with social issues such as loneliness.

4.2.2 Lack of resources and information

Once climate change is recognised to be a cross-sectoral issue, this can have a positive influence both on the knowledge on how to address the challenges, as well as on the budgets which could be allocated to make a city climate adaptive.

Resources

The budgets allocated to climate adaptation can differ greatly between municipalities. This can be explained through the different sizes of the municipalities. Firstly, most climate adaptation projects are currently paid by the sewage taxes of the residents. The more residents, the bigger the budget. Secondly, the level of urgency derived from the geography of a municipality can play a role. Rotterdam for example is the most vulnerable, of all examined cases, to climate change effects due to its low-level location near the North Sea. Structural changes to the urban design of the city are needed, to prevent major water damage. This has been an established fact for quite some time; therefore, climate action was initiated in Rotterdam even before the climate agreement (Rijksoverheid, 2018) or the Delta plan (Deltaprogramma, 2018). Other local governments only recently have been experiencing the negative effects of climate change in their municipality, and the water damage to private residential property was mentioned in many interviews as the main reason to initiate climate adaptive policy.

Thirdly, once climate adaptation policies are formed by several sectors within the organisation, a broader variety of budgets also seem to become available. Both Zwijndrecht and Rotterdam emphasize the importance of viewing climate change challenges along with other social and physical challenges in the city. For example, both underline the social function of green and the reduction of heat stress increases liveability. This results not only in more organisational support but also in support of citizens, which be discussed later.

Information

To gain knowledge about the effects of climate change, many municipalities have been doing stress-tests for the four climate themes of heat, drought, water damage and flooding. To facilitate these tests, standardised tests have been developed by the national government (Deltaprogramma, 2018). Several participants mentioned the benefits of these tests in gaining insight in which areas to focus on primarily, for example when executing pilots of the new adaptation policies.

However, participants did stress the need for more information, or perhaps better said, there is a need for insight in best practices. Some of the examined cases are already working on improvements

of well-functioning adaptation policies, whereas others are still experimenting and developing its first pilots of adaptation policy. Surprisingly, participants stated they were hardly in contact with other municipalities on the topic of climate change. One would expect them to work together and learn from each other. This was also supported by the advisors of GDO. They stated that municipalities have the tendency to try to 'invent the wheel' all by themselves, starting from scratch, while they could learn from the mistakes made by others and benefit from their learning experiences.

Something that also stood out, was that many of the examined cases only have had limited to none contact with their residents on the implementation of the adaptation policies. Currently, policy makers seem to be basing their policies on assumptions of the need of their residents, or perhaps on a few informal conversations.

4.3 Participation framework

The following table describes the different roles of local governments in the examined cases. The table is based on the study of Mees et al. (2019), with study-specific cases and some adjustments to the description of the common practices, fitting to the cases in this study. Something which stood out in the empirical research but was not found in the literature study was the role of an 'inspiring' government. In the third level, the stimulating role of the local government, the role of inspiring citizens is added to the table. In many interviews, policy makers emphasized the importance of leading by example and about initiating example/inspiration gardens and projects in public space to inspire citizens to make changes in their private space.

Table 8 shows how the municipalities are still exploring what role they should take on in the climate adaptive policies. In Rotterdam municipality it becomes most clear that they are currently governing by facilitating a network, with aiming of being able to let go in the future. They are actively connecting neighbourhood organizations and partners in the neighbourhood, such as Rotterdam City Management, Urban Development and Social Development, the housing associations, the water boards, active neighbourhood and residents' organizations, neighbourhood initiatives and of course the individual residents (Rotterdams Weerwoord, 2019). Their aim for 2022 is to have an inclusive, autonomous network of ambassadors and involved citizens in the neighbourhood. And to have a structural team of civil servants and 'external actors' who can control and maintain all involved organisations.

Table 8. Government participation framework and corresponding roles (based on Mees et al., 2019)

	Role local government	Adaptation initiatives involving public engagement in this research	Common practices of local government roles
5	Regulating	All cases, some more strict than others.	Regulating the storage of rainwater on private property in new construction
		Non-existent	Regulating the storage of rainwater on private property in existing construction
4	Network steering	Amersfoort Rainproof	Bring citizens together, spread information, program coordination
		Rotterdams Weerwoord	Bring stakeholders including citizens together, program coordination, resolve conflicts and build trust
3.1	Stimulating	Stone Break (national program): Amersfoort, Rotterdam, Veenendaal, Utrecht	Provision of free plants and free removal of tiles and pavements
		Zwijndrecht, Veenendaal, Deventer, Amersfoort, Utrecht, Rotterdam	Provision of fee per square meter for the installation of the roof
		Veenendaal, Deventer, Rotterdam	Provision of fee per cubic litre for collecting water on private property and/or offering free advice
		Veenendaal	Professionals advising citizens how to store rainwater on their properties
		Veenendaal, Deventer	Hiring an agency to help citizens design a climate adaptive garden
3.2	Inspiring	Inspiration garden Utrecht, Deventer, Veenendaal	Public space examples of climate adaptive measures
2	Facilitating	Amersfoort, Veenendaal	Going door to door to advise citizens
		Deventer, Amersfoort	Training citizens to advise other citizens how to store rainwater on their properties
		Deventer	Hiring an agency to help citizens collectively build green roofs
1	Letting go	Non-existent	No role for the local government

4.4 Local governments stimulating citizen self-management

Based on chapter two, five material incentives used by local government to stimulate citizen self-management ways are selected to be analysed: information, services, resources, subsidies, and regulation.

4.4.1 Information

The aim of this paragraph is to review the different platforms and means used to disseminate information about climate adaptive rainwater measures. When reviewing the provision of information, two distinctions can be made. A first distinction is between online and offline information provision. The second distinction is between governmental and non-governmental information providers.

In the Netherlands, there are many online platforms and websites aiming to inform citizens on climate adaptive measures. The online websites range from small-scale municipal websites to national websites. Stone Break (*Steenbreek)* is a national foundation, joined by over 75 municipalities, including four of the cases examined in this research. It is a program known for stimulating citizens to remove pavements in their gardens by providing plants for free in return for collecting the tiles (in Dutch: "tegel eruit, plant erin") (Steenbreek, 2020).

Table 9. Overview of information platforms

Scale	Case	Website	Provider
Municipal *on municipal website*	Utrecht	https://www.utrecht.nl/wonen-en-leven/duurzame-stad/wateroverlast-voorkomen/	Governmental
Municipal *external to municipal website*	Amersfoort	https://www.amersfoortrainproof.nl/	Governmental
	Rotterdam	https://rotterdamsweerwoord.nl/	Governmental
	Dordrecht	https://www.ulebelt.nl/	Non-governmental
	Veenendaal	https://www.duurzaamveenendaal.nl/regenwater/default.aspx	Governmental
Regional	Utrecht	https://klimaatklaar.nl/	Governmental
National	Veenendaal Amersfoort Utrecht Rotterdam	https://steenbreek.nl/	Non-governmental

Both Hilversum and Zwijndrecht are not providing any online information specifically aimed at educating citizens on how to make their property more climate adaptive. In Hilversum, citizens are informed about the water infiltration crates pilot via an article in the local news paper and during reconstruction work on the sewage system, the policy maker water management presents a variety of climate adaptive rainwater measures which citizens can self-manage on their own property. In Zwijndrecht the focus is more on creating awareness rather than educating its residents. The annual sustainability day is one of

the offline events which Zwijndrecht uses to reach that goal.

Offline dissemination of information is also done rather uniquely by Utrecht municipality. They are very explicit in leading by example. Not only do they hope to inspire their residents to take on climate adaptive measures themselves, but they also aim to educate and inform citizens by the provision of examples. An example is the green sedum roofs on the bus stop cabins. After the installation of the green roofs, surrounding houses receive a flyer with information on the subsidy for building a green roof. A similar approach is used when greening schoolyards and playgrounds. The latter is a technique also used by Deventer. The participants of both cases expressed the success of leading by example, in which the biggest success mentioned was the participation of citizens who normally are not involved in government projects. Due to inspiring and interesting changes in their proximate living environment, citizens got interested and applied for a subsidy to create something similar on their own property.

Deventer is the only examined case which makes use of an external partner to provide information to its residents on climate adaptive measures. By means of a mix of recreation and education, nature- and education center Ulebelt wants to stimulate the residents of its working area to make their own contribution to a more sustainable society (Ulebelt, 2020).

4.4.2 Subsidies

A commonly used material incentives to stimulate citizens to self-manage in line with (local) governmental policy is through the provision of subsidies. In table 10 an overview of the subsidy arrangements in the seven examined cases, can be found. All researched local governments make use of subsidies to promote climate adaptive measures on private residential property. The most common subsidy provided to citizens is for building a green roof. Participants state that subsidies do contribute to citizens disconnecting rainwater and making their property more climate adaptive. However, it requires good communication and an understandable, user-friendly overview of the subsidy arrangement. The rainwater coach shared that she spoke to many citizens who considered the information page of the municipalities to be so complicated and the arrangement to be so demanding they already quit before even trying.

Several participants contested the effect of subsidies as a motivation for citizens to self-manage climate adaptive rainwater measures. There are many cases in which the municipality ran out of budget for the subsidy before the ending of the year. Once the subsidy is no longer available, citizens stop taking the initiative to make their property climate adaptive. This is one of the main reasons the project leader of Amersfoort is rather vocal against using subsidies to stimulate citizens to self-manage climate adaptive measures. She is an advocate of the mentality of development aid: show why change is important, provide the knowledge and tools, after which she believes the residents will start to self-manage. To the project leader of Amersfoort, the choice of local governments to subsidize building

green roofs is however to be understood, due to the appealing innovative nature which can be threatened by the high costs and technicalities.

Table 10. Overview of subsidy arrangements in the examined cases

Municipality	Subsidies
Zwijndrecht	Subsidy for building a green roof
Veenendaal	Subsidy for green roof, green garden, and/or disconnecting rainwater
Hilversum	No subsidies related to climate adaptiveness, only for sustainable energy measures.
Deventer	Subsidy for disconnecting rainwater Subsidy for building collective green roofs
Amersfoort	Subsidy for building a green roof
Utrecht	Subsidy for building a green roof
Rotterdam	Subsidy for building a green roof General subsidy climate adaptation

4.4.3 Services and resources

To research the support of local governments for citizen self-management in taking on climate adaptive measures on citizens' premises, the provision of services and the provision of resources are analysed together. Preliminary analysis has shown that these different forms of government aid are often interconnected and therefore better to be discussed together. An overview of the services and resources provided by the local governments can be found in table 11.

Table 11. Overview of the services and resources provided by the local governments

Municipality	Services and resources
Zwijndrecht	- Day of sustainability: annual action handing out free plants, ludic action to win rain barrel. - Project day: aid by municipal garden service, tools for loan and free green. - Ludic actions: aldermen come bringing a tree to new construction residents
Veenendaal	- 'Rainwater coaches', visiting residents to talk about ways to disconnect rainwater from sewage system and to inform about subsidies from municipality. - Pilot of disconnecting rainwater from sewage system for citizens, executed and paid for by municipality: only permission of owners' property needed. - Ludic action in line with *Stone break*: tile out, plant in: free plants handed out - Example garden with sedum-roof, rain barrel, kitchen garden for edible green - Free garden design for residents of new construction - Rain barrel action: When buying a rain barrel in a local hardware store, the municipality offers an automatic filler for free. - Public inspiration garden
Hilversum	- Free water infiltration crates delivered at front door. Installation own responsibility of citizens.
Deventer	- Network of rainwater ambassadors: inspiring, informing and supporting others to make their garden climate proof, focused on rainwater.

	- Collaboration with nature and education centre to facilitate the applications for collective climate adaptive projects such as green roofs. - Public inspiration garden
Amersfoort	- Pilot of 100 people who can get free advice how to make their garden rainproof, in return need to open their garden to be an example to others. - Training offered to citizens to become 'rainwater coach', to be informed and to inform others - Workshop on street level: minimum of five houses in the street to sign up. Information provided on how to make garden rainproof and visiting different gardens to look at opportunities and alternatives. - Social gardening: volunteers from well-off neighbourhoods, donating plants left over from plant workshops, handing them out in community homes and helping others to plant them.
Utrecht	- Free façade garden, collecting tiles, handing out free seed sachets of local flora. - Public inspiration garden
Rotterdam	- Neighbourhood-scan of two pilot neighbourhoods to do an inventory of the physical and social challenges in the area, involving residents and local organisations. Followed by creating an action plan with the climate action team, a group of local stakeholders (for example: resident, local entrepreneur, neighbourhood manager and a representative of the social housing corporation). - Ludic actions in line with *Stone break*: tile out, plant in. Free plants and rain barrels handed out

As mentioned in the previous chapters, some of the services provided by the local governments do not only serve the purpose of making the city more climate adaptive, but also contribute to battling social and economic challenges. Many projects benefit the social cohesion in a neighbourhood and offer residents a more personal relationship with the municipality. The Alderman of Zwijndrecht stated that "The stereotype of an administrative impersonal organization is slowly being replaced by the image of actual human beings, who are more than willing to help the residents of their city".

Other than that, it is important to mention that there are several actors executing the above-mentioned services or offering the above-mentioned resources. The local government carries the responsibility and finances the services and resources. However, the nature- and education centers, local garden centers and hardware stores, non-governmental social initiatives and governmental social initiatives do also play a big role in the provisioning of services and resources. Each are important in stimulating citizens to self-manage climate adaptive rainwater measures. For example, some citizens might be more inclined to listen to the information on climate change effects provided by an external organization rather than the government itself. Neither should the importance of involving local hardware stores and garden centers be underestimated. If the local government spreads information and activates citizens to self-manage climate adaptive measures, the materials to do so need to be available locally.

The effect of some of the offered resources such as rain barrels are limited. Yet some participants stated that the increased awareness of the (re)use of rainwater is already a positive effect on itself. In Veenendaal a form was provided to citizens who bought a rain barrel and made use of the

free automatic filler of the municipality. On this form people could leave their information for the rainwater coaches to approach them for more information; the coaches could come over and assess with the residents what other climate adaptive measures (with or without government financial support) can be developed by the residents. The rain barrel can be considered as a way to interest people in other climate adaptive measures.

Finally, the provision of services and resources specifically directed towards residents of new construction was an unexpected finding. This has many potential, since in new construction there is a 'blank canvas', therefore the new residents have the opportunity to do it "right" from the very beginning.

4.4.4 Regulations

Moving on to briefly reviewing the regulations imposed by the cases in this study, new construction is again of great importance. Currently the municipalities have hardly any to no regulations regarding the collection of rainwater, nor are there any rules on the percentage of water absorbent surface in existing construction. This is explained by the participants through the political hesitance to obligate people to make changes on their private property. However, in new construction all cases have, some more strict than others, regulations to ensure project developers create climate adaptive new constructions.

Other than the political sensitivity of regulating the collection of rainwater on private residential property, there are some practical challenges to it. For the local governments it is difficult to uphold regulations due to the time-consuming and therefore expensive nature of controlling. Some suggested the use of air photos, which do portray the percentage of green, but they have limitations in displaying the infiltration possibilities of hardened surface.

4.5 Willingness and opportunity of citizens to self-manage

This chapter focuses on how the policies are formed by the opportunity and willingness of citizens to participate. To do so, the experiences of policy makers in citizen participation are examined. It is relevant to examine what thresholds policy makers perceive for its residents to self-manage and if/how they are lowering that threshold? Also, do the policy makers experience willingness of residents to participate, and are there any adjustments to increase the willingness in a broad group of residents?

4.5.1 Problem ownership and responsibilities

Before reviewing the opportunity of citizens to participate, it is relevant to examine what responsibilities local governments assign to their residents. To what extent does the local government share problem ownership with its residents, related to the challenges of climate change?

On the one hand, it seems that the municipalities are currently taking most of the responsibility and take full problem ownership. The main reason given to support this decision was the fact that the policy makers considered it to be important to 'unburden' the citizens in making climate adaptive changes to their property. One could even state they consider citizens to be uncapable to self-manage climate adaptive policies. However, some policy makers did state that there is room in the legal regulations for municipalities to take a step back when it comes to taking care of rainwater on private property, something that is already happening in the regulations of new construction. The difference as explained by participants is about the one responsible: the project developer of new construction or the private owner of existing construction? The project developer is, in contrast to the citizens, expected to be able to follow strict regulations when creating climate adaptive properties. On the other hand, citizens are also taking own initiative in coming up with climate adaptive solutions and are policy makers feeling like the citizens are challenging the municipality to keep up.

4.5.2 Opportunity created by the provision of material incentives

The municipalities provide a broad variety of material incentives, although one might question their effect. Do they ensure the opportunity for citizens to self-manage the implementation of adaptation policies? Some general comments can be made, however further research is recommended.

The provision of information by local governments is done via a variety of information channels. In local newspapers specific projects are announced, information on the projects and general information on the climate adaptive measures which can be taken by residents can be found on (municipal) webpages. Information is mostly shared online and only to be found for those who are interested and therefore actively looking for it. Several participants did state that they are aware of more elaborate communication strategies which could result in the information being disseminated to a wider range of residents. However, such strategies have hardly been implemented.

As mentioned in the previous chapter, the effectiveness of subsidies is contested, even more so when reviewing subsidies from an equality principle. The subsidy applications are often hard to understand and hard to find. Participants admitted that subsidies were known to be used the most by citizens who know their way around the governmental system. Also, the application often requires technical skills and an amount of paperwork that might not be accessible to for all educational levels. Deventer policy makers specifically contested the design of their subsidy arrangement. Currently the amount of subsidy provided to citizens is dependent on the number of square meters of their garden or roof surface. So, residents of big houses with big gardens, who are therefore expected to have a good income, can receive a large amount of money, whereas residents of small houses with small gardens, with possibly a more limited income, only receive a limited amount of money. Climate adaptive rainwater measures are however easier and cheaper to realize in a big garden, since small gardens often

require more technical and expensive solutions.

The opportunity of citizens to self-manage was also briefly discussed in the previous chapter, when statements were made about the ability of citizens to self-manage. Since local governments seem to expect citizens to be unable to self-manage, most of the services provided to the citizens are designed to 'unburden' them. Policy makers perceive a high threshold for people to participate due to them lacking knowledge, capacity, and resources. An example is Veenendaal, whose primary implementation of adaptation policy was to initiate, finance and execute the disconnection of rainwater from the public sewage system on private property, in which citizens only needed to give their consent. Amersfoort, Zwijndrecht and Utrecht approach the issue of 'uncapable' citizens quite differently, they make use of social organisations. These social organisations can be voluntary (Utrecht and Amersfoort) or organised by the municipality (Zwijndrecht), and they are helping to green gardens of citizens who cannot do so themselves. Interestingly, one of the advisors of GDO, educated as landscape architect with many experiences of citizen-involvement in adaptation policies, stated that the threshold for citizens to execute climate adaptive rainwater measures is not really that high. If citizens are informed well and all needed resources are available locally, many adaptive measures can be done rather easily. This was supported by the rainwater coach as well.

Regulations are not yet something citizens need to manage, only project developers do. As predicted by the literature study, municipalities are still pioneering of climate adaptive policies, therefore regulations are not yet in place. Although it is a politically sensitive topic, it will be an important topic to debate (and research) in the near future.

4.5.3 Willingness of citizens to self-manage

In previous chapters the framing of adaptation policy was mentioned to be of great importance to receive organizational support. Empirical research also shows that framing climate adaptation policies beyond the 'regular climate message' also results in greater willingness of citizens to self-manage. One of the advisors of GDO states that a broader variety of citizens willing to self-manage when a message is shared about liveability (heat stress in summer when there is limited green) and green as a facilitator of meeting others and exercising. A strategy successfully used by several housing corporations who make their social housing more climate proof required the assistance of its tenants to accomplish this goal. In addition, the policy makers also noted the increase in willingness of citizens to self-manage when they experienced the urgent issues of flooding on their premises. Finally, unique to the self-management of climate adaptation is the fact that having a green, climate adaptive, residential property attracts residents with a passion for nature and/or the environment. Without any government involvement they will already be aware of the many sustainable possibilities to be executed on their premises. Also, climate change is an issue that people can become passionate about. Participants stated

they have many experiences with residents actively informing and activating others to execute climate adaptive rainwater measures. One must be aware that this could also have a negative impact on the willingness of others, since some might have the best intentions, yet are too activist or too critical on others. Participants stated that it is most important to be able to have an open conversation, in which every positive change is desirable, in stead of only aiming for the 'highest goal'.

4.6 Effective policy implementation

There are several implications for effective policy implementation based on the findings of the empirical research. The main implications are framing, scale, external partners, and examples. In addition, when examining effective methods to implement policies, it is also important to review the results of the adaptation policy. Relevant to this research is to examine what goals are set and how the achievement of these goals is formulated.

4.6.1 Scale and external partners

The scale and external partners are interconnected in this empirical research. In the implementation of the adaptation policies, the local governments show quite some variation in scale. Some policies are targeting residents individually as a member of the municipality, whereas others target a specific street or neighbourhood or only provide support for collective projects. On the one hand, participants state that personal contact is a vital part of effective policy implementation, while on the other hand there are clear benefits of street-level / neighbourhood scaled projects due to the higher participation when residents involve their neighbours and social capital is enforced. Participants are not able to conclude on which scale is most effective. They did state that if the right partners are involved, any scale can be a success.

During the interviews, six types of external partners were mentioned to be of great value for local governments to effectively implement their adaptation policies. First are citizens in the role of ambassadors, informing and activating others to make climate adaptive changes to their property. The rainwater ambassadors can be key figures in the neighbourhood or representatives of the communities. In both Zwijndrecht and Amersfoort, residents who made use of the subsidy provided by the local government need to be ambassadors in return. Informing, advising, and activating residents to self-manage climate adaptive measures can also be done professionally, as done by the rainwater coaches employed externally by Veenendaal. Deventer is making use of its local nature- and education center to inform and inspire residents, but also facilitates through supporting the applications for collective subsidies, paid by both the municipality and the waterboard. The waterboard on itself is also a great partner for municipalities since the water board has (technical) knowledge and funding to be used for climate adaptive challenges. Garden centers and hardware stores can also play a role in informing citizens on the climate adaptive opportunities, as well as offering the tools to do so. Finally, housing

corporations must not be forgotten. In the Netherlands around a third of the residential property is owned by housing corporations (CBS, 2020). If housing corporations collaborate with local governments, many residents of a municipality are reached quickly.

4.6.2 Provision of example and inspiration

Many of the participants mentioned the importance of providing examples or to give citizens inspiration. As mentioned in chapter 4.1.1, municipalities can lead by example. When climate adaptive changes are made to public spaces or public properties, this can inspire citizens to look at possibilities on their own property. Citizens themselves setting an example can also persuade others to join. If one household in the street creates an attractive climate adaptive garden, neighbours are likely to notice and might get interested to make changes as well. Several of the examined cases have created 'inspiration gardens', which are both educative and pleasant to reside. Example gardens or displaying materials and rainwater measures is already been implemented by nature- and education center Ulebelt in Deventer. They aim to create a space in which citizens can show and test materials, combining information with hands-on examples. Another example of putting information into practice is by giving workshops, either by the local government or by hiring an external partner. Once citizens experience for themselves how easy several measures can be taken, this will lower the threshold to make changes on their own property.

4.6.3 Policy results

In the previous chapters it has become clear that the cases have rather different approaches to citizen self-management in the implementation of their adaptation policies. This has also seemed to have resulted in different approaches to setting goals to determine the success of their policies. The main distinction in the goals of the local governments is the distinction between qualitative and quantitative goals. What do they aim to accomplish and how to they plan on achieving this goal?

An interesting qualitative goal set by Zwijndrecht and Rotterdam is to increase social cohesion in a neighbourhood. For them, green projects are a means to gain insight in what is going on in a neighbourhood. For the local government it is a way in, allowing them to keep track of people, to offer help and to "put a face on the big municipal organization". Green and climate adaptive projects are not only a goal in itself but also a means to a different (social) end.

The qualitative goal mentioned the most by the participants is 'to create awareness'. It relates to a rather drastic change in citizens' thinking. It is important for local governments to help residents understand the impact of climate change and encourages changes in their attitudes and behaviour, helping them to adapt to climate change related trends, as well as making citizens realise adaptation to climate change is something that also requires for them to make changes, instead of the issues fixing themselves or the local government fixing it for them. Surprisingly, none of the participants was measuring to what extent their policies have changed the awareness of citizens, and therefore what the

effect of their policies is.

One would expect the cases with clear quantitative goals to have good insight in the effectiveness of their policies. For example, one of the quantitative goals mentioned often is to reduce pressure on the sewage system and to decrease the risk of flooding. However, in the interviews policy makers expressed their challenges with developing the right way to test their goals, especially since the final, most effective approach to implementing their policies has not been found yet. Many municipalities are still experimenting and are working with pilots or project-based policies. Therefore, even though the goal has been set (many of the examined cases write in their policy documents to strive to be a climate adaptive city by 2050), how to accomplish that goal was not yet clear to the policy maker nor was it described specifically in any policy documents. Moreover, the concept 'climate adaptive city' has not been operationalised yet.

Effectivity in general seems to be hardly researched by municipalities, perhaps due to the experimental phase and pilot-based of many adaptation projects. Many of the cases do not follow up on the subsidies or resources provided to their citizens. User-experience research do not seem to be conducted. The technical, climate effects of the policy are according to the participants truly relevant yet most difficult to measure. Although some are optimistic about the use of repeated stress-tests. One could state that the national government can take the lead in providing guidelines in setting goals for municipalities to aim for. The challenge is however that a standardised guideline will not work, due to the different geographical qualities of each municipality. The variety of soils and groundwater levels, in combination with the available surface water, requires every municipality to discover their best way to take care of rainwater in the most climate adaptive way.

5. Conclusion

To conclude, the research question "How do local governments stimulate and facilitate citizens to participate in the implementation of climate adaptation rainwater measures on private residential property and how effective is the local adaptation policy?" will be answered. This will be followed by a discussion of the limitations, after which recommendations will be given for future research, finishing this thesis with several practical recommendations.

5.1 Conclusion

The aim of this research was to review the policy choices Dutch local governments take in stimulating and facilitating citizen self-management in climate adaptive rainwater measures, executed on citizens' own premises, as well as the effectiveness of the local adaptation policies.

Before answering the research question, it is important to mention that most of the examined cases are still pioneers in the local adaptation policies. Both policy creation and implementation are

done experimentally through a variety of different projects and pilot-based solutions. All participants in this research care deeply about creating a climate-proof future for their municipality and its residents, nonetheless they experience institutional limitations while doing so. Several participants stated that they experienced a lack of time, knowledge as well as a lack of organisational and political support.

In line with this, it can be concluded that institutional challenges seem to limit the local governments in developing cross-sectional integrated adaptation policies. Political goals are currently more of a motivation to involve citizens (Amundsen et al., 2018), rather than potential benefits such as the tacit knowledge, locally oriented solutions or shared responsibilities (Hegger et al., 2017; Mees & Driessen, 2019), which also limits the financial benefits (Duijn et al., 2019) as well as a lack of information and resources (Maesham et al., 2011) in tackling the climate change challenges. An observation by the researcher is however that neither the size of the municipality nor the years of the adaptation policy are implemented seems to impact the effectiveness of the adaptation policy.

To promote citizen self-management most of the local governments take on a facilitating / stimulating role (Mees et al., 2019; Klein et al., 2017), motivating citizens through the provision of material incentives (Alford, 2002) such as subsidies, services and resources, and providing information to its residents. The local government remains the one responsible for local climate change effects such as water damage and flooding. Both regulating climate adaptive measures as well as 'letting go' are non-existent roles for the local governments in this study, except for regulations for project developers in developing new construction.

Many of the examined cases are not yet focused on attracting a diverse group of residents to participate in the implementation of their adaptation policy. Only few participants had insight into the users of the arrangements the local governments provide. There is no differentiation based on income, nor do the policies seem to focus on making the topic and policy arrangement understandable for all educational levels (Ramanadhan and Viswanath, 2008; Voorberg et al., 2015; Tanner et al., 2009). Several participants did state that they were interested to investigate the possibilities to differentiate in their policies more. In addition, one participant even pointed out the inequality of their current subsidy arrangement. The examined cases were aware of a potential threshold for citizens to self-manage climate adaptive measures. Surprisingly, a common response was to think on behalf of residents, rather than starting the conversation with them to research what they would need, to lower the threshold. This could also result in better insight on the notes given by the rainwater coach as well as the external advisor, that the perceived threshold might be higher than the actual threshold for citizens to self-manage climate adaptive measures.

The effectiveness of local adaptation policies seems to be hardly researched by local governments so far. Who participates and why do they participate were questions most participants could not answer. The set goals varied between qualitative and quantitative goals, however the testability of both of those goals was low. Concepts such as 'climate adaptive city' were not

operationalised into concrete indicators. Some best practices in this empirical research can however be concluded to be indicators for effective local adaptation policy, to be found in chapter 5.3.2.

5.2 Limitations of study

Although this research yields interesting results, they should be considered along with several potential limitations. Yet, these limitations imply interesting future research directions, which will be discussed in chapter 5.3.1.

The main limitation of this research is the lack of contact with citizens who self-manage the implementation of local adaptation policies. Due to COVID-19 it was not an option to approach citizens to participate in this research. To make up for this limitation, this research has aimed to research a broad range of municipalities. The participants are connected to the adaptation policy in different ways: a hired professional rainwater coach, a project leader, two external advisors, many policy makers as well as two aldermen. Nonetheless, due to the limited scope of this study, the restricted size of the sample needs to be considered. Moreover, the respondents were approached via the connections of the researchers' internship at the city of Hilversum and via LinkedIn. Online responsiveness and willingness were the main dependent variables whether a municipality would be represented in this study. This led to a smaller, more 'random' network of respondents, as well as a somewhat more superficial examination of the cases.

Also, the literature study resulted in many relevant concepts, but with the available time and resources, choices had to made in the selection of researched concepts. It resulted in participants stating experiences which were in line with the literature study but could not be fully researched within this research.

5.3 Recommendations

This chapter is divided in recommendations for further research and practical recommendations.

5.3.1 Further research

The biggest limitation of this research is also the main recommendation for further research: citizens experiences with and perspective on Dutch climate adaptive policies guiding citizen self-management. It will be relevant to research if residents are expecting the local government to take responsibility on climate change effects. Possibly many are already willing to make changes to their living environment themselves. What do residents need from the local government to facilitate them?

This research has been focusing on material incentives provided by the local government to stimulate citizen self-management. The literature study however has also emphasized the importance of non-material incentives, social capital, and capacity building. Although not specifically researched here, it was mentioned often by several participants.

Initially this research was only focused on the interaction between the local government and citizens. In the Netherlands, a third of the housing is owned by housing corporations (CBS, 2020).

Therefore, it would be relevant to research the role housing corporations can play in the implementation of local adaptation policies. Housing corporations are not the only external partner that can play a role. Citizen self-management in climate adaptive gardens goes beyond the local government. To achieve the goal of residents initiating climate adaptive change in their gardens, the support of other external partners is needed and is in need to be researched more (for example; nature- and education centers, local garden centers and hardware stores, and the water board) .

A final recommendation for further research is climate adaptation as both a goal and a mean. It will be interesting to research not only the effectiveness of local adaptation policies on climate change effects, but also what potential positive social effects it could have.

5.3.2 Public policy in practice

Following the conclusion, several practical conclusions can be provided to the participants of this research and to Dutch local governments in general[8]. The research objective was to improve the effectiveness of climate adaptive water projects initiated by local governments, both frontrunners and newly developing ones. The recommendations consist of new insights of the researcher through conducting this research as well as some of the best practices of the examined cases.

Learn from others

Best practices are shared on a variety of online platforms[9], each municipality must not start from scratch. Local governments would benefit greatly from sharing their knowledge with each other. There are many existing governmental and non-governmental initiatives trying to support mutual learning, for example by sharing best practices. In line with this, the observation was made by participants that local governments did not seem to realize that there are already many elaborate, informative, and inspiring (and expensive) knowledge platforms. Rather than every municipality or region creating their own website, they should refer to the existing platforms. In addition, policy makers can learn from their colleagues within the municipal organisation, in other sectors. Integrated approaches allow policy makers to look at both neighbourhood opportunities as well as climate opportunities. Even more so when the residents are involved in creating policy as well. Although there are many benefits in involving citizens, in this case the local governments will benefit most from its residents' tacit knowledge on local challenges and needs.

Lower threshold to participate

In order to lower the threshold for residents to participate in the government-induced projects, several aspects are of importance. The information shared needs to be easy-to-read, understandable, and

[8] To share the knowledge that has been gathered by conducting this research, in annex 4 a public, easy to read, summary of the practical recommendations is written to share with the participants as well as any interested Dutch policy officials

[9] See table 9 for an overview of the information platforms used by the examined cases in this research

disseminated via a variety of platforms. External partners such as local nature- and education centers and petting zoos can help in sharing information as well. This also avoids the stigma on 'the government wants something', some citizens will be more open to the message about climate adaptive action when someone beside the government shares it with them. Personal contact is also a great way to lower the threshold. This is also the main benefit of small-scale adaptation projects. Small-scale projects can be adapted to local needs as well as social pressure a higher participation rate. Neighbours can have a positive influence on each other, resulting in a wider range of people being inclined to participate.

Make use of external partners

Although briefly mentioned in the previous recommendations, it is important to pay attention specifically to the benefits of involving external partners, to achieve climate adaptive goals: either to aid in informing citizens (schools, nature- and environmental education centers) or to supply the resources which citizens need to put their knowledge into practices (garden centers, hardware stores). And, to support municipalities in funding and knowledge, the water boards are an important partner as well.

Set a good example

Another way to reach out to residents with different interests, economic status and educational levels is by providing examples of climate adaptive measures in public space. Climate adaptivity can be visually attractive and should make public places more comfortable to reside. There are great advantages in installing an inspiration garden in an area where limited residents are aware of climate change effects and who normally would not participate in government-induced projects. In general, central places in public space such as schoolyards, playgrounds or churches that make climate adaptive changes, can already increase awareness, and could possibly inspire many different people to make changes on their private property as well. Communities connected to churches and schools can also inspire a collective of citizens to support each other and making change on a larger scale. Nevertheless, municipalities should not only show examples of green, climate adaptive initiatives on public ground, but also self-govern towards being a climate adaptive organization.

Rethink design

Moving on to the final recommendation of this thesis, which is to rethink design. When building new construction, creating new public space, or reconstructing the current living environment, climate change effects should always be taken into consideration. Furthermore, current design trends should be reconsidered. Many local governments are dedicating a significant part of their local adaptation policy to destoning front yards. Perhaps there is more benefit in designing a low-maintenance public green stroke, rather than front yards. Ownership over the maintenance of the public green strokes could be discussed with the adjoint living residents.

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Annex 1. Topic-list on local climate adaptation water policies and citizen participation

- Introduction
    - Job function
    - Projects involved with
- Policy drivers
    - When and how policy/project started
    - Why climate adaptive policy and citizen participation
    - Team composition
- Policy choices
    - Problem ownership
    - Responsibilities
    - Support
- Opportunity & Willingness
    - Active policy targeting income / education
- Opportunity
    - Information disclosure
- Willingness
    - Material incentives
        - Services
        - Money
        - Goods
        - Sanctions
    - Participation
        - Who participates?
        - Challenges
- Results
    - Goals
    - Testability

Annex 2. Full operationalisation tables

Table 2. Institutional context of local governments' climate adaptive policies

Key concept	Dimension	Indicator
Institutional context Maesham et al., 2011	Demographics local government	Size Geography Maesham et al., 2011
	Institutional challenges	Institutional limitations Lack of information Lack of resources Maesham et al., 2011

Table 3. Drivers of local government's climate adaptive policies

Key concept	Dimension	Indicator
Drivers of climate adaptive policy choices Amundsen et al., 2018	Political driver / Leadership Amundsen et al., 2018 Maesham et al., 2011	Local goal / political ambitions Regional goal / political ambitions National goal / political ambitions Amundsen et al., 2018
	Benefits citizen participation in climate adaptation policies Hegger et al., 2017; Mees & Driessen, 2019	Citizens providing tacit knowledge Locally oriented solutions Exploit resources Shared responsibilities Hegger et al., 2017;

Table 4. Operationalization concept 'Participation framework local government'

Participation framework local government			Indicators
5	Regulating Mees et al., 2019	Provision of incentives Klein et al., 2017 Klein et al., 2018 Alford, 2002	Regulating the storage of rainwater on private property in existing construction via - Municipal tax benefits - Sanctions: municipal tax increase - Obligations for climate adaptive measures, enforced by law
4	Network steering Mees et al., 2019	Support for actions led by citizens, providing information Klein et al., 2018	Bring citizens together, spread information, program coordination
3	Stimulating Mees et al., 2019	Provision of incentives Klein et al., 2017 Klein et al., 2018 Alford, 2002	Money (Subsidies) Goods (Resources)
		Provision of services Klein et al., 2018 Rainproof, 2020	Government aid in making garden climate adaptive

2	Facilitating / enabling Mees et al., 2019	Shift of responsibilities to citizens Klein et al., 2017	Responsibility to execute policy: citizen or government
		Provision of information Klein et al., 2018	Information brochures Website Social Media
		Sharing problem ownership with citizens Klein et al., 2017	Responsibility to deal with water flooding: citizen or government
1	Letting go Mees et al., 2019		No role for the local government, not relevant to this study

Table 5. Operationalisation concept 'policy tools'.

General	Key concept	Dimension	Indicator
Local government policy tools	Capacity building Allen, 2006	Raising awareness Allen, 2004; Allen, 2006	Provide education Allen, 2004; Paton, 2001 Vulnerability and capacity assessment Allen, 2004; Davis, 2013
		Empowerment Allen, 2004; Alford, 2002	Realizing local potential Provision of information Provision of training Allen, 2006

Table 6. Operationalization concept 'opportunity'

Key concept	Dimension	Sub-dimension	Indicator
Opportunity	Access to resources & Access to information Behrman, 2014; OECD, 2001; Ramanadhan and Viswanath, 2008; Tanner et al., 2009	Socio-economic status Tanner et al., 2009; Behrman, 2014	Income Level of education Ramanadhan and Viswanath, 2008; Voorberg et al., 2015; Carreira et al., 2016
	Access to resources Tanner et al., 2009; Behrman, 2014 Ramanadhan and Viswanath, 2008;	Capacity to act on relevant information Ramanadhan and Viswanath, 2008	Education Ramanadhan and Viswanath, 2008 Access to internet Digital capacity
	Access to information Behrman, 2014; Tanner et al., 2009; Ramanadhan and Viswanath, 2008; OECD, 2001	Information disclosure by local government Behrman, 2014; OECD, 2001; Ramanadhan and Viswanath, 2008; Tanner et al., 2009	Information brochures Website Social Media

	Social capital Behrman, 2014		

Table 7. Operationalization concept 'willingness'

Key concept	Dimension	Subdimension	Indicator
Willingness of citizens to participate Alford, 2002	Personal characteristics	Socio-economic status Ramanadhan and Viswanath, 2008; Kalkbrenner and Roosen, 2016	Income Kalkbrenner and Roosen, 2016
		Gender Ramanadhan and Viswanath, 2008; Kalkbrenner and Roosen, 2016	
		Age Ramanadhan and Viswanath, 2008	
		Environmental concern	
		Social norms Kalkbrenner and Roosen, 2016	
		Interest Tanner et al., 2009	
	Material incentives Alford, 2002	Services Alford, 2002	Provision of services Klein et al., 2018
			Voluntary efforts by citizens Kalkbrenner and Roosen, 2016
		Money Alford, 2002	Subsidy Mees et al., 2013
			Financial contributions by citizens Kalkbrenner and Roosen, 2016
		Goods Alford, 2002	Provision of resources Klein et al., 2018
		Sanctions Alford, 2002	Legal obligations; municipal taxes Klein et al., 2017 Alford, 2002
	Non-material incentives Alford, 2002; Lengink-Hall, 1996; Schneider & Bowen, 1995	Intrinsic rewards Alford, 2002; Voorberg et al., 2015	Increased self-esteem of citizens, value in participation itself Schneider & Bowen, 1995
			Citizens taking control Lengnick-Hall, 1996
			Social cohesion
			Sense of group membership Voorberg et al., 2015
		Expressive rewards Alford, 2002;	Sense of satisfaction, contributing to a worthwhile cause Alford, 2002

Annex 3. Informed consent

Onder begeleiding van Paul Rabé (Erasmus Universiteit) en Joram Grünfeld (Gemeente Hilversum) onderzoekt Nanine Koolstra de invloed van gemeentelijk beleid op burgerparticipatie bij klimaatadaptatie. Met de verzamelde data wordt gekeken naar de beleidskeuzes van Nederlandse gemeenten in het begeleiden van de burgerparticipatie in klimaat adaptieve regenwater maatregelen, uitgevoerd op het terrein van de burger. Met behulp van uw deelname kan dit onderzoek worden gerealiseerd. Hartelijk dank daarvoor. Het invullen van dit toestemmingsformulier is noodzakelijk voor het interview.

Informatieblad

Waarom dit onderzoek?
Het doel van dit onderzoek is om inzicht te verkrijgen in de rol die Nederlandse gemeenten kunnen spelen in het stimuleren van burgerparticipatie bij klimaatadaptatie, specifiek gericht op burgers die klimaat adaptieve regenwater maatregelen uitvoeren op hun eigen terrein. Het onderzoek richt zich daarbij vooral op de aspecten 'mogelijkheid' en 'motivatie' binnen gemeentelijk beleid. Dit onderzoek wordt uitgevoerd voor een masterthesis, geschreven vanuit de Erasmus Universiteit Rotterdam.

Verloop
U neemt deel aan een onderzoek waarbij informatie vergaard wordt door u te interviewen en uw antwoorden op te nemen via audio-opname. Er wordt een transcript uitgewerkt van het interview dat geanalyseerd wordt met het programma NVivo 11.

Vertrouwelijkheid
Wij doen er alles aan uw privacy zo goed mogelijk te beschermen. Naast de student zal alleen de scriptiebegeleider en de tweede lezer van de student toegang krijgen tot alle door u verstrekte gegevens. Er wordt op geen enkele wijze vertrouwelijke informatie of persoonsgegevens van of over u naar buiten gebracht, waardoor iemand u zal kunnen herkennen. In het onderzoek wordt u aangeduid met een verzonnen naam (pseudoniem), tenzij u expliciet toestemming verleend om uw naam te gebruiken.

Vrijwilligheid
Uw deelname is vrijwillig en het is mogelijk om op ieder moment te stoppen. Tijdens uw deelname aan het onderzoek heeft u het recht om meer informatie over de dataverzameling en analyse te vragen. Daarnaast heeft u het recht om uw toestemming in te trekken en te vragen naar verwijdering van uw data voordat de dataset is geanonimiseerd of het manuscript is ingeleverd om gepubliceerd te worden. U kunt dit bewerkstelligen door contact op te nemen met Nanine Koolstra via n.koolstra@hilversum.nl of via 06-37023287.

Dataopslag
In de thesis zullen anonieme gegevens of pseudoniemen worden gebruikt, tenzij u expliciet toestemming verleend om uw naam te gebruiken. De audio-opnamen, formulieren en/of andere documenten die in het kader van deze scriptie worden gemaakt of verzameld, worden beveiligd opgeslagen. De onderzoeksgegevens worden bewaard voor een periode van twee jaar. Uiterlijk na het verstrijken van deze termijn zullen de gegevens worden verwijderd of worden geanonimiseerd zodat ze niet meer te herleiden zijn tot een persoon.

Indienen van een vraag of klacht
Indien u specifieke vragen heeft over hoe er met uw persoonsgegevens wordt omgegaan, kunt u deze stellen aan Nanine Koolstra via n.koolstra@hilversum.nl of via 06-37023287. U kunt daarnaast een

klacht indienen bij de Autoriteit Persoonsgegevens indien u vermoedt dat uw gegevens verkeerd zijn verwerkt.

Toestemming

1. Ik ben voldoende geïnformeerd over het onderzoek. Ik heb het informatieblad gelezen en heb daarna de mogelijkheid gehad vragen te kunnen stellen. Deze vragen zijn voldoende beantwoord en ik heb voldoende tijd gehad om over mijn deelname te beslissen.
2. Ik neem vrijwillig deel aan dit onderzoek. Het is mij duidelijk dat ik deelname aan het onderzoek op elk moment, zonder opgaaf van reden, kan beëindigen. Ik hoef een vraag niet te beantwoorden als ik dat niet wil.
3. Ik geef toestemming om de gegevens die tijdens dit onderzoek over mij worden verzameld te verwerken zoals is uitgelegd in het bijgevoegde informatieblad.
4. Ik geef toestemming om tijdens het gesprek geluid- en/of video-opnames te maken en mijn antwoorden uit te werken in een transcript om vervolgens te analyseren voor de doeleinden van dit onderzoek.
5. Ik geef toestemming om mijn antwoorden te gebruiken voor quotes in de scriptie van de student.
6. Ik geef toestemming om de bij mij verzamelde gegevens te bewaren en in gepseudonimiseerde vorm te gebruiken voor al het verdere onderzoek dat er later mee gedaan kan worden.

Ondertekening

Als u op de 'verzenden'-knop drukt, ondertekent u dit online formulier.

Annex 4. Infographic on practical policy recommendations

CITIZEN PARTICIPATION IN CLIMATE ADAPTATION: GOVERNING BEYOND PUBLIC SPACE

Practical policy recommendations of master thesis written by Msc Urban Governance Nanine Koolstra

LEARN FROM OTHERS

Make use of existing platforms which are aimed at informing citizens how to take on climate adaptive rainwater measures.

Collaborate in a multidisciplinary team for integrated solutions.

Involve residents to benefit from their tacit knowledge on local challenges and needs.

LOWER THRESHOLD TO PARTICIPATE

Easy-to-read, understandable information, and disseminated via a variety of platforms.

Other organisations share information, avoiding the stigma on 'the government wants something'.

Personal contact either via small-scale projects, in which neighbours can positively influence each other to participate or via professional or voluntary rainwater ambassadors.

MAKE USE OF EXTERNAL PARTNERS

Nature- and environmental education centers, petting zoos and schools to inform citizens.

Local garden centers and hardware stores proving the resources needed by citizens to put their knowledge into pracice.

Regional water board for support in knowledge and funding.

SET A GOOD EXAMPLE

Providing examples of climate adaptive measures in public spaces.

Inspiration garden is visually attractive and comfortable to reside. Best to be located in a neighbourhood with limited participation, where awareness needs to be raised.

Municipal self-governance, leading by example.

RETHINK DESIGN

Take climate adaptivity in consideration when building new construction.

Reconsider current design trends which result in non-climate adaptive behaviour.

ANY QUESTIONS OR INTERESTED IN READING THE ENTIRE MASTER THESIS?
CONTACT ME VIA NANINEKOOLSTRA@GMAIL.COM