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Adaptive Capacity of the Overdiepse Polder

Bachelor thesis
Geografie, planologie en milieu (GPM)
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Preface

This bachelor thesis is written as the final part of my pre-master Spatial Planning. It was an interesting experience and connected my previous education perfectly to the master program I intend to do. During my previous study programme, I developed my interest for water management. The necessity of innovative water management is globally increasing. Also in the Netherlands, the subject stays on topic because of extreme precipitation and floods last spring. For this reason, I choose to follow the master program Spatial Planning with the specialisation Cities, Water and Climate Change. The making of this bachelor thesis fitted right in my field of interest and linked my previous education and the master program very well.

I would like to thank several people for their contribution to this bachelor thesis. First, I want to thank Maria Kaufmann for her effort in supervising my thesis. She helped me focussing on the essence of the theory and her regular feedback assisted me to achieve this result. I am also grateful to Sander Meijerink and Margo van den Brink for their comments and conversations about my thesis. At last, I would like to thank all interviewees who spoke to me about the Overdiepse Polder, providing me with a lot of information about this interesting case.

Milan Storms, June 23 2016

Table of contents

Summary

The flood risk of rivers is predicted to increase as a result of climate change. Changes in precipitation levels can result in the increase of the severity and frequency of extreme discharges in Dutch rivers. In addition to climate change, several human factors influence flood risk, for instance the increase of human activity in flood prone areas. Therefore, measures have to be taken to reduce the flood risk. Broad agreement about the approach of integrated water resource management (IWRM) means flood risk management is combined with spatial planning. By implementing innovative solutions of IWRM, the effect of climate change can be reduced. In the Netherlands, IWRM is expressed in projects to give more room to rivers, instead of separating water from land. In the government program Room for the River 34 projects are implemented along different Dutch rivers to increase water safety. The Overdiepse Polder is one of these projects.

The integration of flood risk management and spatial planning is new and complex. Applying this new approach (IWRM) creates problems for existing institutional structures, which are set to times when climate change was not on the agenda. For this reason, institutions now have to adapt to the approach of IWRM. IWRM is a way to cope with climate change. The adaptive capacity of institutions determines the ability to deal with IWRM, and therefore also with climate change. When the adaptive capacity of a system is high, the impact of climate change can be reduced. Characteristics of institutions, like formal and informal rules, norms and believes, influence the ability of society to cope with climate change (Gupta et al., 2010). This means institutions enable and constrain actors to adapt to climate change.

The goal of this research is to obtain more insight in the adaptive capacity of the institutions involved in the Overdiepse Polder project. The Adaptive Capacity Wheel is used as a method to analyse this. The Adaptive Capacity Wheel is a comprehensive structuring tool and divides adaptive capacity in six dimensions and 22 criteria, clarifying positive and negative aspects. However, in this research only two of these six dimensions are assessed: learning and leadership. Several reasons are given why investigating learning and leadership is interesting. This research is socially relevant because it contributes to the understanding of adaptive capacity of institutions. Difficulties of achieving adaptation are revealed by appointing examples from this case study. In this way, future policy makers can improve adaptive capacity of large area developments. This research is scientifically relevant because it contributes to the literature on Room for the River and to the subject of institutional dynamics in water management. By elaborating on adaptive capacity in a case study, this thesis provides extra information on and insights in of institutional dynamics.

Learning means institutions can adapt to a situation by reflecting on past experiences (Gunderson, 2001). The dimension learning is divided into five criteria: trust, single loop learning, double loop learning, discussion of doubts and institutional memory. Leadership is a driver for change, showing a direction and motivation for others to follow (Gupta et al., 2010). The dimension leadership consists of the criteria visionary, entrepreneurial and collaborative leadership. By assessing these criteria, strengths and weaknesses of the adaptive capacity of the Overdiepse Polder are identified.

The Overdiepse Polder is a 550 hectare polder along the river Bergse Maas in the Netherlands, consisting of primarily agricultural land. In the year 2000 the polder was announced to be a search

area for inundation to give the river more space. The local inhabitants responded by developing their own plan combining temporarily water storage and modern farming: the 'terps plan'. By building farms on mounds, the polder could remain inhabited. When the discharge of the river is too high, the polder will flood automatically to reduce the water level of the river. The Overdiepse Polder is expected to flood once every 25 years. After some initial opposition, the 'terps plan' was eventually approved and financed by the national government. The province was responsible for the development phase between 2005 and 2010. The regional water authority was in charge of the implementation of the plan between 2010 and 2015. The inhabitants, represented by an interest group, were actively involved in the planning process.

The data about learning and leadership are obtained from two sources: eight in-depth and semi-structured interviews with key stakeholders in the planning process and several secondary documents. The analysis is made on these two data sources separately, in order to have a clear data extraction thereby obtaining all relevant information. The criteria are eventually scored between -2 and +2, to give an overview of the results. The results are discussed in an expert interview to improve the reliability of the analysis.

The main results of this thesis are as follows. The dimension learning contributes in general slightly positive to adaptive capacity of institutions at the Overdiepse Polder. This is the aggregated result of the five criteria of learning. First, the criterion trust was a weak point of learning because of distrust between some organisations. This means that these participants did not act together effectively to pursue shared objectives (Putnam, 1995), which hampered adaptive capacity. The second criterion, single loop learning, was slightly positive because institutions learned from past experiences and improved their routines, which is important to adapt to new situations. However, there also still was stiffness of governmental regulations and inability to improve existing routines. This also affected the double loop learning, the third criterion because governmental authorities stuck to old mindsets. On the other hand, two major aspects of new institutional patterns were seen in this project: intensive citizens participation and decentralisation of responsibilities by governmental authorities. As a result, the criterion double loop learning also scored slightly positive. Fourth, the effect of the discussion of doubts on the adaptive capacity at the Overdiepse Polder was neutral because of several positive and negative aspects. Exclusion of the inhabitants in the making of the first plan and the continuing uncertainty of the farmers are bad aspects for adaptive capacity. However, the national government involved the regional governments in the making of the Room for the River program, and Rijkswaterstaat examined alternative options for the Overdiepse Polder. This improved the adaptation. The last criterion of learning, institutional memory, scored positive as a result of the extensive documentation of the process. This improves the adaptive capacity of institutions because future policies can be linked to the experiences of this case (Folke, Hahn, Olsson, & Norberg, 2005). The results of the dimension leadership was in general also slightly positive. First, visionary leadership had a positive effect on adaptive capacity because of the efforts of Jan Boelhouwer (former provincial executive) and Peter van Rooy (innovator and intermediate). The effect of the second criterion of leadership, entrepreneurial leadership, was neutral. The province clearly took the lead and the interest group of the inhabitants stimulated actions and undertakings. However, several governmental authorities opposed the process in the beginning. This hampered the progress of the project and was therefore negative for adaptive capacity. Third, collaborative leadership in this case was slightly positive for adaptive capacity. The interest group of the inhabitants and Peter van Rooy

improved the collaboration between the inhabitants and government authorities, thus improving adaptation (Folke et al., 2005). On the other hand, the collaborative link between the province and Rijkswaterstaat was weak during the Overdiepse Polder process, which hindered the adaptive capacity.
Several recommendations for further research are made. First, the Adaptive Capacity Wheel was a good method to analyse the Overdiepse Polder and it also is an appropriate tool for application in a bachelor thesis. This is because it is a clear method that allows adjustments. However, proper understanding of the criteria is necessary to link the criteria to practice. Good preparation of interviews and asking for practical examples is crucial to apply the Adaptive Capacity Wheel. Secondly, the separation between the analysis of interviews and the secondary documentation turned out to be not strictly necessary, as long as different sources of data are used. Thirdly, it is recommended for future research to expand the assessment of the Overdiepse Polder by the remaining dimensions. It is also recommended to compare this case to other case studies, in order to identify similarities and differences.

In the end, recommendations to the practice of water management are given. Firstly, in large area developments, like the Overdiepse Polder, it is important to take advantage of available opportunities. These opportunities can be various, like the presence of persons, organisations or physical aspects. By seizing opportunities new and innovative solutions can be found. Institutions must provide room to accommodate these opportunities. Secondly, important aspects for the practice of water management are several criteria used to analyse this case study. Trust is important for a productive relationship between individuals and organisations. Investing in a good relationship is therefore recommended. Room for single and double loop learning is important for institutions to be able to adjust to new circumstances. The discussion of possibilities, doubts and uncertainties is also necessary. Institutions must also allow different forms of leadership. Leadership drives institutional change because leading people propel new ideas in various ways. Visionary, entrepreneurial and collaborative leadership are all important for adaptation to occur. For this reason, institutions must move along with leading people. These aspects all contribute to the adaptive capacity of institutions to adjust to climate change.

1. Introduction

This first chapter contains the introduction to this thesis. It successively consists of a project framework, the research goal, the research model and it ends with the research questions.

1.1 Project framework

I start by giving an overview of the most important aspects underlying my research goal. This framework addresses the primary literature for this research on flood risk, flood risk management, adaptive capacity and institutions.

Flood risk

Climate change is foreseen to influence flood risk, according to the literature (Booij, 2005; Kundzewicz et al., 2010; Milly, Wetherald, Dunne, & Delworth, 2002; Palmer et al., 2008; Samuels, Klijn, & Dijkman, 2006; Stokkom, Smits, & Leuven, 2005; Wheater & Evans, 2009; Wilby, Beven, & Reynard, 2008). Changes in climate can influence the discharge of rivers, leading to higher water levels and an increase in flood risk. Climate change however, is a very complex concept. Besides atmospheric factors, the phase of precipitation (rain or snow) and its intensity and location have a major effect on the discharge (Kundzewicz, 2015). For instance, heavy rainfall in the river basin of a river can cause water levels to rise extremely. The sequence of temperature (determining if snow on the ground will thaw and the freeze up or melting of glaciers) and large-scale circulation patterns are also principal climatic factors in determining the flood hazard (Kundzewicz, 2015). According to Booij (2005) the general trend, as a consequence of climate change, is a small decrease of the river's average discharge and a small increase of the standard deviation of the discharge variability and extreme discharges. This means that the average amount of water in rivers decreases, but there are more fluctuations and more often extreme high water levels. However, there is no conclusive evidence of the link between climate change and flood risk. Milly et al. (2002) find that the frequency of great floods increased substantially during the twentieth century. The statistically significant positive trend in risk of great floods is consistent with results from their climate model and according to the model, the trend will continue (Milly et al., 2002). This would mean that the occurrence of great floods increases. Kundzewicz (2015), on the other hand, says that there is no gauge-based evidence found for a widespread change in the magnitude or frequency of floods during the last decades as a result of climate-change. However, future changes in climate could influence precipitation levels in the river basin of Dutch rivers to such a degree that it can result in extreme discharges in the Rhine and Meuse (Stokkom et al., 2005).

Besides the increased flood risk as a result of climate change, far-reaching regulation of the fluvial hydrosystem and an increased sealed ground surface in the past century have reduced the hydromorphological resilience of the Rhine and Meuse river basins (Stokkom et al., 2005). Dramatic changes in the flow of rivers, like the straightening of meanders, have reduced the natural ability to adjust to and absorb disturbances which can lead to increased flood risk (Palmer et al., 2008). For instance, the length of the river Meuse downstream of Grave, near Nijmegen in the Netherlands, has decreased by nearly 30 percent due to meander cut-offs (Middelkoop & Van Haselen, 1999). Also social, demographic and economic developments enlarge the risk of flooding (Samuels et al., 2006; Stokkom et al., 2005; Wheater & Evans, 2009). Growing human activity in flood prone areas increases the damage in case of flooding, and thus the risk. For centuries, the Dutch have strengthened their

dikes to improve the safety, leading to a more intensive land use. However, this again leads to more damage from flooding, which increases the feeling of the need to strengthen the dikes again. This phenomenon is called by Remmelzwaal and Vroon (2000) the 'control paradox' (see Figure 1).

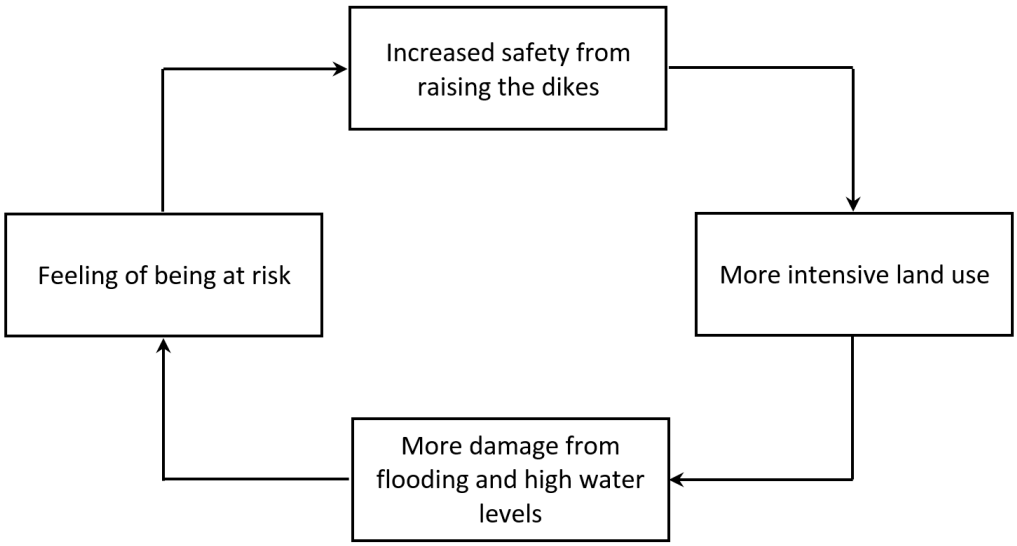

Figure 1 The control paradox, based on Remmelzwaal and Vroon (Wiering & Immink, 2006)

Flood risk management

The protection of low-lying, flood-prone deltas to predicted impacts of climate change and other aspects on flood risk, is generally acknowledged to be of great importance (Brink, Meijerink, Termeer, & Gupta, 2014). Many agree that the approach of integrated water resource management (IWRM) is desirable for environmental management (Mitchell, 2005). This means that flood risk management needs to be accessed from an 'intergraded' or 'holistic' approach. IWRM emphasizes that water problems cannot be treated in isolation and should be included in spatial planning (Mitchell, 2005). In the Netherlands, IWRM is expressed in projects to give rivers more space in order to reduce flood risk.

Nowadays, technical solutions of separating water from land are not the only way of keeping Dutch people safe from flooding. A shift can be seen in the Dutch 'battle against water' towards 'accommodating water', where water is given more space to reduce the flood risk (Wiering & Immink, 2006). This view on water management, which is part of IWRM, is used in more countries than just the Netherlands (Samuels et al., 2006). After the near flooding in the years 1993 and 1995 the Dutch government decided to move the focus from dike improvement to river widening by implementing measures outside as well as inside the dikes (Planologische Kernbeslissing Ruimte voor de Rivier, 2006). This way of protecting the hinterland from flooding is called Room for the River and can be seen as the opposite of channelling. Room for the River is a so called 'core decision' of the Dutch government to have the protection against flooding in 2015 at the legally required level (Planologische Kernbeslissing Ruimte voor de Rivier, 2006).The goal of the Room for the River project is to decrease the flood risk by lowering the water level of the major rivers in order to cope with temporary high river discharges. Besides decreasing the flood risk, the Room for the Rivers project also has the aim to improve the spatial quality of the river area (Rijkswaterstaat, n.d.). These objectives are implemented at 34 places in the Netherlands (see Figure 2). Some of the techniques used are, for instance, the digging of secondary channels or the expanding or lowering of floodplains. The implementation is executed by multiple organisations; the Ministry of Infrastructure and

Environment is responsible (Rijkswaterstaat, n.d.). The Overdiepse Polder was one of the projects to give more space to water. This polder, located at the river Bergsche Maas, is used as a case study in this research. One particular aspect of the Overdiepse Polder is that the local inhabitants played a major role in the planning process (Rooy, 2015). More information about the Overdiepse Polder will be given later.

Figure 2 The Room for the River projects in the Netherlands

Adaptive Capacity

The Netherlands have to modify their practice of flood management to deal with climate change and increased flood risk. 'Climate-proof planning' is a term that matches IWRM and includes the Room for the River projects (Pater, 2011). 'Climate-proof planning' is a new and complex issue and therefore poses problems for current institutional structures which are developed in times when climate change was not high on the agenda (Betsill & Bulkeley, 2007; Gupta et al., 2010, Brink et al., 2014). The adaptive capacity of a society or institution determines the ability to cope with climate change. The Intergovernmental Panel on Climate Change (IPCC) defines adaptive capacity as: "the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences" (Parry, 2007). When the adaptive capacity of a system is high, negative consequences of climate change for society can be reduced. It is therefore important to assess the adaptive capacity in the Netherlands in order to improve flood risk management. In the case of the Overdiepse Polder climate change is projected to result in high river discharges of the Meuse river. Adaptive capacity is context-specific and varies from case to case and also over time (Smit & Wandel, 2006). Thus, the adaptive capacity of the Overdiepse Polder is unique. However, by assessing the adaptive capacity of this case lessons can be learned for other cases.

Institutions

Adaptive capacity is an aspect or characteristic of institutions. According to Young et al. (1999) ''at the most general level, institutions are constellations of rules, decision-making procedures and programs that define social practices, assign roles to the participants in such practices and govern the interactions among the occupants of those roles''. A distinction can be made between formal and informal institutions, referring to the nature of processes of development or communication (Pahl-Wostl, 2009). Formal institutions are the official governmental bureaucracies; informal institutions refer to socially shared rules, like social and norms and values (Pahl-Wostl, 2009).

Characteristics of institutions, like formal and informal rules, norms and believes, enable society to cope with climate change (Gupta et al., 2010). In other words, institutions enable but also constrain actors in making the Netherlands climate-proof. Institutions determine to which extent actors are able to adjust to climate change. In this way, institutions define the adaptive capacity by giving the possibility to adjust to climate change. For instance by widening rivers, like the Room for the River projects. This project is executed by actors, however, these actors are constrained by the institutions that were created in times of different climate circumstances (Brink et al., 2014). The adaptive capacity determines whether these actors are given the possibility by institutions to adjust to climate change. Actors do not only execute these Room for the River projects, they also change the institutions. The degree to which institutions allow and encourage actors to change these institutions is an aspect of adaptive capacity (Gupta et al., 2010). This research focusses on water management and planning institutions involved in the Overdiepse Polder process.

1.2 Research goal

Now the framework of this research is clear, I introduce the research goal. The research goal gives the main issue of this research. I explain also why I have chosen for this research goal.

To assess the adaptive capacity of the Overdiepse Polder, the Adaptive Capacity Wheel is used. The Adaptive Capacity Wheel is an analytical structuring tool to understand and evaluate the adaptability of institutions, and clarifies in a direct way positive or negative aspects (Brink et al., 2014). The Adaptive Capacity Wheel consists of six dimensions to assess the adaptability. Learning and leadership are two of these six dimensions. That is why learning and leadership can partially determine the adaptive capacity of a system. The research goal therefore is as follows:

The goal for this research is to analyse the adaptive capacity of the flood risk management of the Overdiepse Polder case by assessing learning and leadership of the institutions involved. By doing this, more insight in adaptive capacity is obtained, which will help institutions to adapt to the uncertain future of climate change.

This research goal is designed for several reasons. First, because of climate change, adaptive capacity of society is important to be able to adjust to this change (Parry, 2007). This research will develop more insight on how learning and leadership contribute to or hamper the adaptive capacity in the Overdiepse Polder. Research of learning and leadership can give a better understanding of the process and cooperation in large planning projects. By assessing learning and leadership, this research can help to understand adaptive capacity of systems for future projects in the Netherlands and abroad. As Gupta et al. (2010, p. 460) put it: ''it becomes critical to study the conditions under

which institutions can stimulate the adaptive capacity of society to deal with the potentially serious and irreversible impacts of environmental change''. It is likely that the strategy of giving more space to water, or the extensive involvement of non-governmental actors, like this is done in the Overdiepse Polder, will be applied more often. By studying the case of the Overdiepse Polder, the conditions to make large planning projects successful can be revealed. For this reason, this research is relevant for society.

A second reason why this research goal is designed is because in-depth studies of processes of flood risk management remain relatively scarce, therefore detailed scientific case studies of Room for the River projects can improve the insights of planning and implementation of these projects (Roth & Winnubst, 2014). Therefore, the knowledge gap of detailed scientific case studies of the Room for the River program is made smaller by this research. This research also contributes to understanding of institutional dynamics in flood risk management because the adaptive capacity of institutions is assessed. For these reasons, this thesis is scientifically relevant.

Besides learning and leadership, the Adaptive Capacity Wheel consist of four more categories: variety, room for autonomous change, resources and fair governance. However, in this research only learning and leadership are investigated. The first reason for this is that a key aspect of the Overdiepse Polder is the major involvement of the local inhabitants in the planning process, which makes it interesting to look at the cooperation between several actors. Learning and leadership are most relevant for the goal of analysing the collaboration in this planning process. Learning, for instance, examines the level of trust between actors and whether institutions allow for changes in underlying institutional patterns (double loop learning), like citizens participation. Besides that, leadership looks for example at collaborative leadership, which is important to bridge gaps, span boundaries and build coalitions (Huxham & Vangen, 2005). Secondly, giving more space to water was a rather new aspect within IWRM because when the Overdiepse Polder process was initiated the approach was relatively new. This means that it is important to explore learning and the institutional capacity that enables learning, in order to improve this approach. Thirdly, exploratory reading of the Overdiepse Polder made clear that there were several people important for the success of the project. This makes it also interesting to research leadership. The last reason for the choice to research only learning and leadership is the feasibility of a bachelor thesis. Because of limited time, I chose to thoroughly examine only two dimensions instead of sketchy examining six. Gupta et al. (2010) explain that their method of six dimensions is rather comprehensive and there is room to alter the method by new ideas. That is why I assume, by only assessing learning and leadership, this research is still a proper way of applying the Adaptive Capacity Wheel. I examine all criteria of the two dimensions and look into all aspects relevant for these criteria.

1.3 Research model

Following the project framework and research goal, the research model will give an overview of how the objective will be achieved. The research model (see Figure 3) describes the major steps that are taken in this research.

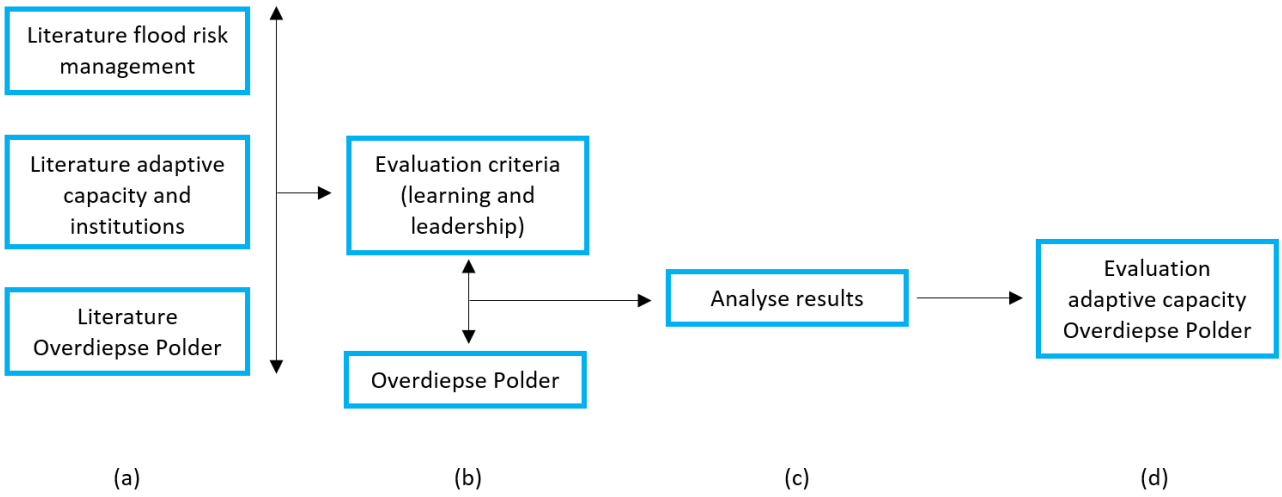

Figure 3 Research model

The first step (a) in this research was to thoroughly look into the relevant literature. Three main subjects in the literature were relevant: flood risk management, adaptive capacity and institutions, and the Overdiepse polder. The second step (b) was to develop a research perspective and research object. The research perspective are the evaluation criteria used to analyse the research object, which is the Overdiepse Polder. For evaluation criteria, the Adaptive Capacity Wheel of Gupta et al. (2010) is used. Learning and leadership are two dimensions of adaptive capacity that are investigated. Two sources were used to analyse the adaptive capacity of the Overdiepse Polder: various types of documents and in-depth interviews. The next step (c) was to analyse the results of the documents and interviews on the evaluation criteria. This is done by scoring the criteria of learning and leadership. The final step of this research (d) was the evaluation of adaptive capacity of the Overdiepse Polder. Here, I assessed which aspects of learning and leadership hamper or contribute to the adaptive capacity of the Overdiepse Polder. After this step, the research objective was achieved. Research is, however, an iterative process, meaning that I did not go through these steps in this specific order, but I had to go back and forth between the different steps.

1.4 Research questions

To ensure the research goal was achieved, I had a main question and several sub-questions. By answering these questions, useful and necessary information for the research objective was obtained. The main question to reach the research goal was as follows: *How do learning and leadership contribute to the adaptive capacity of institutions involved in the Overdiepse Polder?*

To answer this main question, several sub-questions were made:

- What are the main organisations and actors involved in the Overdiepse Polder project?
    - What are the goals and activities of these organisations and actors?
    - What are connections between the different organisations and actors?
- How do the institutions score on the aspect of learning?
    - What is learning and how can it be operationalized?
    - How does this aspect hinder or contribute to adaptive capacity in the Overdiepse Polder?
- How do institutions score on the aspect of leadership?
    - What is leadership and how can it be operationalized?

- How does this aspect hinder or contribute to adaptive capacity in the Overdiepse Polder?

2. Theory

In this chapter I explain the theoretical framework of this research. After that, I exemplify in the operationalization the evaluation criteria learning and leadership. At last, I give the conceptual model, which visualizes the theoretical framework.

2.1 Theoretical framework

In the theoretical framework, I explain which theories and approaches are relevant for this research. These are adaptive capacity and the structuration theory of Giddens.

Adaptive capacity

In this research the adaptive capacity of the Overdiepse Polder project is assessed in order to see whether the two aspects, learning and leadership, contribute to the ability of this case to adapt to climate change. Adaptive capacity is an important concept to determine if a society can do this. In the project framework I have already given a short explanation of adaptive capacity. Gupta et al. (2010, p. 461) define adaptive capacity as ''the inherent characteristics of institutions that empower social actors to respond to short and long-term impacts either through planned measures or through allowing and encouraging creative responses from society both ex ante and ex post''. This means that adaptive capacity determines the ability of society to cope with climate change. The Adaptive Capacity Wheel uses six dimensions to analyse the adaptive capacity of a system. An example of the application of this method is the assessment of the historically grown Dutch planning institutions to promote climate proof planning for flood prone areas by Brink et al. (2014). Despite that they give a rather brief explanation of their findings and scores, they give a good image of the application of this method. They found that the Adaptive Capacity Wheel was a useful method to research the strengths and weaknesses of these institutions. For this research, as explained before, only learning and leadership are investigated. In the operationalization, I will exemplify these dimensions further.

Structuration theory

Giddens structuration theory and the idea of structures, practices and the duality of structure are strongly related to adaptive capacity of institutions. He explains that the rules and resources (structures) drawn upon in the production and reproduction of social action (practice) are at the same time the means of system reproduction (Giddens, 1984). This means that the same agency that sustains the reproduction of structures also makes their transformation possible (Gupta et al., 2010). Institutions are inherently conservative (Gupta et al., 2010) but the adaptive capacity is the property of institutions enabling them to change. This is what Giddens (1984) means with his structuration theory: structure and agency together form society. Structure has influence on agency and agency has influence on structure. Adaptive capacity determines the degree to which these institutions allow agency to change the institutions. Institutions are structures that enable existing structures to remain, like the safety standards of dikes, but they also enable the practices of flood risk management to change, like the shift towards accommodating water. In other words, institutions change and can be changed, but it is difficult to do so, according to Gupta et al. (2010). By assessing aspects of adaptive capacity, we can determine to which extent institutions in the Overdiepse Polder are able to change.

2.2 Operationalization

I will now explain the two dimensions, learning and leadership, and give the criteria that influence these dimensions. This is the operationalization of these two indicators of adaptive capacity. The operationalization is important for the analysis later on in the research because it explains how learning and leadership can be determined.

Learning

One aspect of adaptive capacity investigated in this research is learning. Learning means that institutions base modifications on experiences form the past and in this way adapt to a situation (Gunderson, 2001). Adaptive institutions encourage actors to learn, by allowing society to question socially embedded frames, assumptions, roles, and procedures that dominate problem solving (Gupta et al., 2010). Learning is one of the six dimensions given in the Adaptive Capacity Wheel. Learning is made up of five criteria: trust, single-loop learning, double-loop learning, discuss doubts and institutional memory (Gupta et al., 2010). These five criteria, if present, all contribute to the adaptive capacity of the Overdiepse Polder. I will shortly explain what these criteria mean and how these can be observed contributing to adaptive capacity.

Trust is a feature of social life that enables participants to act together more effectively to pursue shared objectives (Putnam, 1995). Therefore, when actors trust each other, it has a positive effect on adaptive capacity. Some people, according to Giddens (1990), are recognised as trustworthy because of their role in society. This is the case with governmental organisations. This form of trust is built on formal credential and reputation, and individuals often have no encounter with the actor or group they trust (Giddens, 1990). The criterion trust for adaptive capacity can be seen as the presence of institutional patterns that promote trust (Gupta et al., 2010). Trust is empirically difficult to observe (Pelling & High, 2005), although actions of institutions like providing information and protecting local citizens contribute to trust (Levi, 1998). I will not make a distinction between trust among individuals or trust among organisations because both are relevant to change understandings.

For single-loop and double-loop learning I use the explanation of Argyris (2002, p. 206):

> Learning can be defined as the detection and correction of error. Single-loop learning occurs when errors are corrected without altering the underlying governing values. For example, a thermostat is programmed to turn on if the temperature in the room is cold, or turn off the heat if the room becomes too hot. Double-loop learning occurs when errors are corrected by changing the governing values and then the actions. A thermostat is double-loop learning if it questions why it is programmed to measure temperature, and then adjusts the temperature itself.

Single-loop learning is the ability of institutional patterns to learn from past experiences and improve their routines (Gupta et al., 2010). Single-loop learning can, for instance, be seen when workshops or brainstorm sessions are organized in the planning project. Also, good communication can stimulate learning. Double-loop learning occurs when assumptions in underlying institutional patterns are changed (Gupta et al., 2010). With double-loop learning institutions have to rethink their routines and do things rather differently. Processes of double-loop learning are more important than single-loop learning for the adaptive capacity of the Overdiepse Polder (Pahl-Wostl, 2009).

The discussion of doubts is reflected in the institutional openness towards uncertainties (Gupta et al., 2010). It is important to raise and discuss doubts in complicated dynamic events (Weick & Sutcliffe, 2011). Openness towards uncertainties contributes to adaptive capacity. Discussion of doubts, for instance by debating different solutions, can be done in brainstorm sessions (Brink et al., 2014).

Institutional memory is the monitoring, evaluation and documentation of policy experiences (Gupta et al., 2010). Institutional memory enables one to link past experiences with present and future policies (Folke, Hahn, Olsson, & Norberg, 2005). In this way, institutional memory can contribute to the adaptive capacity of the Overdiepse Polder. There are different forms of institutional memory available, like reports, books or policy documents (Brink et al., 2014).

Leadership

The other aspect of the Adaptive Capacity Wheel assessed in this research is leadership. Leadership is important for change, showing a direction and motivation for others to follow and without this leadership a society is often unable to respond to long-term, large-scale challenges (Gupta et al., 2010). Leadership is the ability of an individual to influence a development in such a way progress is achieved (Andersson & Mol, 2002). For this reason leadership is important for adaptive capacity. The Adaptive Capacity Wheel distinguishes three types of leadership: visionary, entrepreneurial and collaborative. I shortly explain what these criteria mean.

Visionary leadership means that there is room for long-term visions and there are reformist leaders (Gupta et al., 2010). Visionary leadership is important to link different time scales and to convince other actors to anticipate potential future events (Young, 1991). Reformist leaders have several important strategies: they foster a sense of urgency, communicate a personal commitment in making large changes to the status quo and enter coalitions with other reformist leaders (Goldfinch & Hart, 2003). When visionary leadership is present, the adaptive capacity of the Overdiepse Polder will increase.

Secondly, entrepreneurial leadership is the room for leaders that stimulate actions and undertakings (Gupta et al., 2010). This type of leadership is important to 'get things done', for instance by obtaining the necessary resources and to organise a process architecture to lead actors involved in the process (Brink et al., 2014). For this reason, entrepreneurial leadership contributes to adaptive capacity.

Finally, collaborative leadership stands for leaders who encourage collaboration between different actors (Gupta et al., 2010). This collaboration takes place between a diverse set of stakeholders, operating at different levels, like local inhabitants and the province (Folke et al., 2005). Collaborative leadership involves building coalitions and the linking of networks. Also this kind of leadership contributes to adaptive capacity.

2.3 Conceptual model

The conceptual model represents the theoretical framework of this research (see Figure 4). Two of the six aspects of the Adaptive Capacity Wheel are used to investigate the adaptive capacity of institutions at the Overdiepse Polder: learning and leadership. These dimensions consist of several

criteria, which are explained in the operationalization. As a result of this assessment, indications of the strengths and weaknesses in adaptive capacity of the institutions are identified.

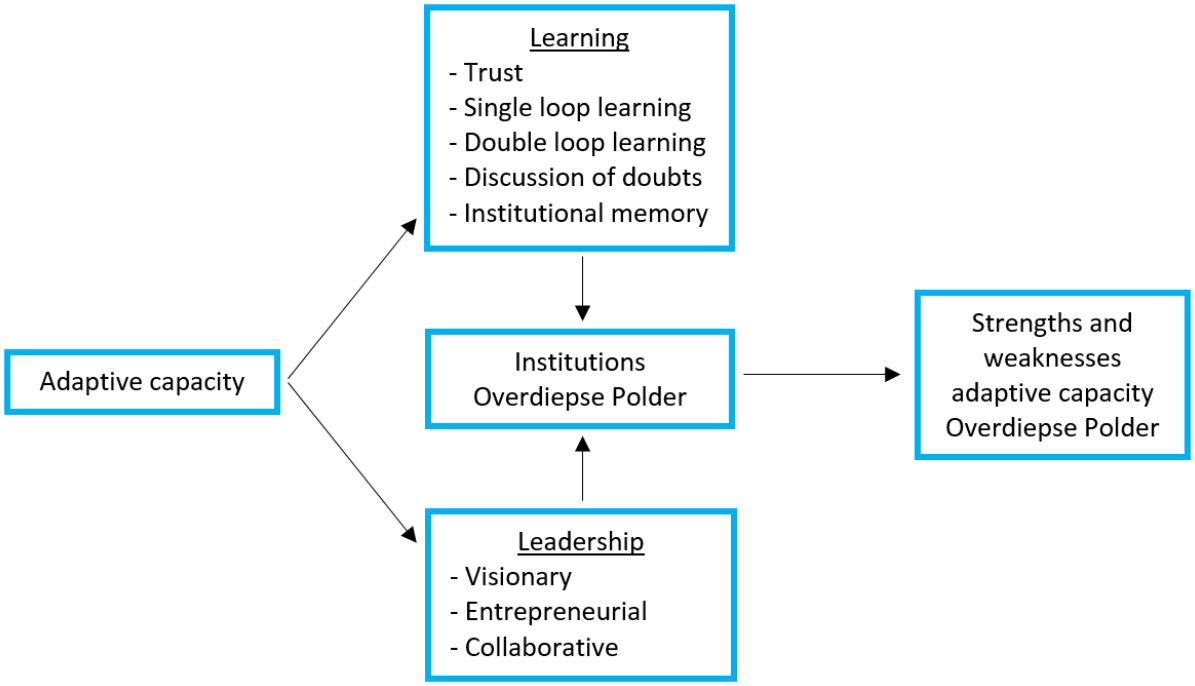

Figure 4 Conceptual model

3. Methodology

3.1 Case study Overdiepse Polder

This research examines the case study of the Overdiepse Polder. Therefore, I exemplify why the Overdiepse Polder is investigated and explain some more about the case, the process of the area development and the organisations involved.

The choice for the Overdiepse Polder case

Learning and leadership of institutions at the Overdiepse Polder are investigated in order to give a better understanding of future processes. First, the Overdiepse Polder is part of the program Room for the River. This program is a large 'core project' of the flood risk management in the Netherlands. For this reason, assessing the Overdiepse Polder is relevant for researching adaptive capacity of institutions of water management in the Netherlands. Also internationally the Overdiepse Polder has received much attention, for instance from the New York Times (Kimmelman, 2013) and the BBC (2014). This is because the Overdiepse Polder is an innovative project and a nice example of the approach of IWRM. The way this project copes with climate change makes it an interesting case to study.

Besides that was, for instance, the extensive involvement of the inhabitants at the Overdiepse Polder process a new approach. This makes it interesting to investigate how aspects of learning are dealt with, in order to see how institutions allowed the involvement of citizens.

Thirdly, because the project is recently finished, I had the possibility to investigate the project from start to completion. This means an overall view was possible and there would be no uncertainties about possible future developments affecting the process.

The case and process

The Overdiepse Polder is located in the South of the Netherlands, in the province of Noord-Brabant. The polder lays between the Bergsche Maas and the Oude Maasje (see Figure 5). Together with other measures, the Overdiepse Polder contributes to the safety of the entire region along the Meuse up to 's Hertogenbosch (Rooy, 2015). At the start of the Room for the River project, the polder contained 550 hectares with an agricultural function inside the dikes and 180 hectares of river foreland outside the dikes (Roth & Winnubst, 2014).

After the (near) floods of '93 and '95 there was broad agreement that the water safety measures were not sufficient anymore. Until then, the general way of protecting the hinterland of rivers was by separating the land from the water. A new strategy emerged in which the riverbed would be adjusted and extended, and where land would occasionally flood (Wiering & Driessen, 2001). The national government therefore examined over 600 areas in the Netherlands for the possibility of river widening by looking at water level reduction, costs and environmental and social effects (Hans Brouwer (Rijkswaterstaat), personal communication, 2016). Eventually, 34 projects are implemented, one of which is the Overdiepse Polder.

The total development of the Overdiepse Polder has taken about 15 years. These 15 years can be divided into three phases (Jaap Sonnevijlle (Province of Noord-Brabant), personal communication,

2016). The first phase is the initiative phase, in which the first ideas are invented and investigated. For the case of the Overdiepse Polder, the initiative phase started in 2000 because in this year the inhabitants were for the first time informed about the plans to use the polder for temporary water storage. After the inhabitants heard about these plans they decided not to oppose to the government authorities, but to collaborate with them in order to have a voice in the development of the polder. They established the Overdiepse Polder Interest Group (OPIG) to represent the inhabitants and came up with their own plan to build farms on mounds: the 'terps plan'. This plan was developed in cooperation with the farmer's organisation ZLTO. The core of this idea is to combine modern farming with occasional water storage, by lowering the previous primary dike on the north side of the polder and by making a new primary dike on the south side to which the mounds for the farms are attached. The mounds rise six metres above the polder floor. In this way, the polder will flood approximately once every 25 years and the entrepreneurs can continue their farming businesses in the polder. However, of the 17 families originally living in the polder, only eight could stay in the new polder.

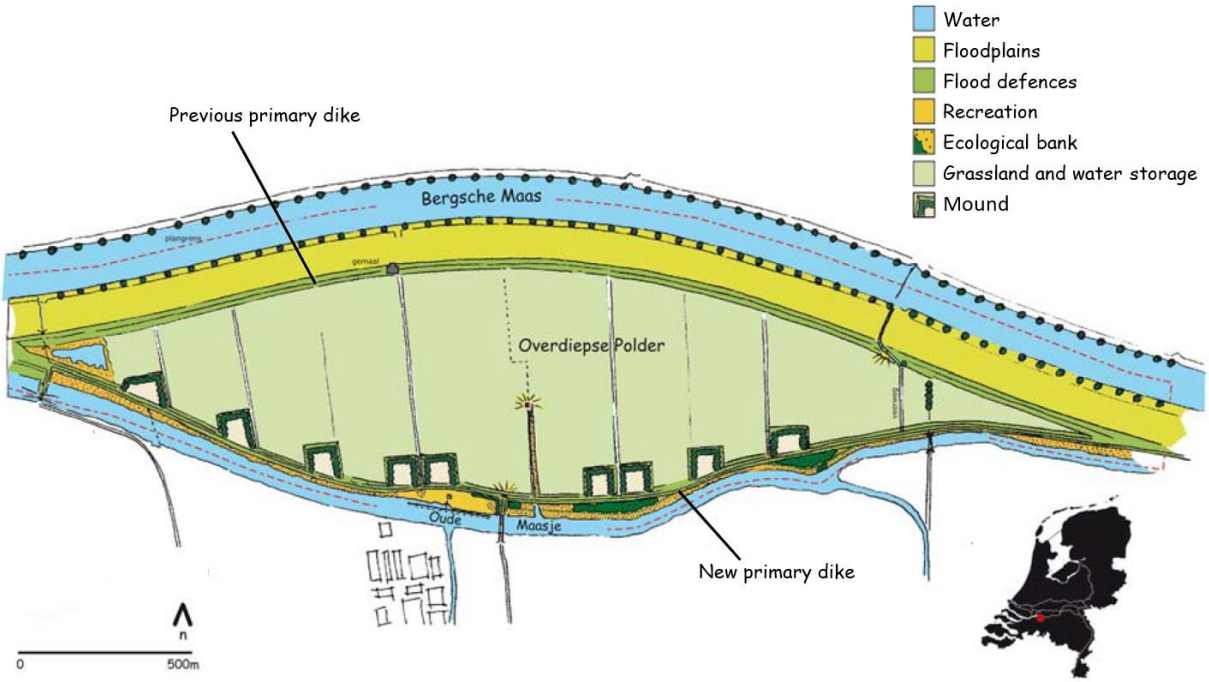

Figure 5 Map of the Overdiepse Polder (Noord-Brabant, 2009)

The second phase is the development phase, which started in 2005 when the province signed a contract with the minister to elaborate the plan fully. In this phase a detailed plan was developed, all official procedures were performed and the contracts with inhabitants about their farms were made. Because the Overdiepse Polder was the first Room for the River project to start, it was called a 'forerunner project'. A lot of aspects of the development had therefore not been done before, meaning that this had to be sorted out for the first time, like the compensation arrangements with the farmers. In the following analyses, the initiative phase and the development phase are combined into the development phase because often no clear distinction was made in the interviews.

The third phase is the implementation phase which started in 2010. Waterboard Brabantse Delta directed this phase. They worked together with a contractor who executed the 'terps plan'. This was a logistical challenge because a lot of ground had to be moved, but the farmers had to be able to

continue their businesses. Eventually, in 2015, the project was completed within the timeframe and budget (Hans Brouwer (Rijkswaterstaat), personal communication, 2016).

Two important official institutions in the Overdiepse Polder process were the official counselling group (Ambtelijke Begeleidingsgroep) and the directing council (Stuurgroep). The operation of the process was in the hands of the official counselling group, that came together about once every six weeks and consisted of representatives from the province Noord-Brabant, municipalities of Waalwijk and Geertruidenberg, Waterboard Brabantse Delta, Rijkswaterstaat, Water Vision Group, Habiforum and the OPIG. Decision making was the responsibility of the directing council. All involved authorities and Habiforum, as representative for the inhabitants, had a place in this council. They had a meeting about four times per year.

Involved organisations

Within the 15 years the project took, several organisations were involved in the development of the Overdiepse Polder. I will give a short explanation about the most influential organisations in the planning and implementation process:

Rijkswaterstaat: Rijkswaterstaat is the executive agency of the Ministry of Infrastructure and Environment. This organisation constructs and manages all national highways and main water systems commissioned by the Ministry. The program direction Room for the River is part of Rijkswaterstaat and was the umbrella for all 34 projects. However, the national government directed the Overdiepse Polder project to the province, meaning that Rijkswaterstaat itself did not execute the project. Rijkswaterstaat was instead the instructor of the Overdiepse Polder project towards the province and monitored the execution. Rijkswaterstaat was member of the directing council, supervising the project to keep it within the framework in terms of budget, goals and time.

Province of Noord-Brabant: The province played a major role in the Overdiepse Polder project. Managing large area developments like this one was unusual for a provincial authority. Nevertheless, at the Overdiepse Polder the province took a leading role. Already in the initiation phase they were actively involved, for instance by supporting the local inhabitants and their ‘terps plan’. Later, the province officially led the development phase.

Waterboard Brabantse Delta: The waterboard as the regional water authority is responsible for water safety. The main goal of the waterboard is to make sure there is no nuisance in terms of too little or too much water. They are also responsible for the water quality in regional waters. The waterboard had a leading role in the implementation phase.

Municipalities of Waalwijk and Geertruidenberg: The polder is divided over two municipalities of which Waalwijk covers the largest part of the polder. The municipality of Geertruidenberg covers a little area in the western part of the polder. The municipalities were involved in the development and implementation phase. They are eventually responsible for the maintenance of the public space after realisation.

Habiforum: Habiforum (nowadays: NederLandBovenWater) is a non-governmental cooperation for innovation in area development. Peter van Rooy was on behalf of Habiforum actively involved in the

Overdiepse Polder planning process from the beginning. Habiforum had a place in the official counselling group. Besides that Peter van Rooy represented the inhabitants in the directing council, meaning Habiforum was also closely involved in the decision making process. The major task of Habiforum was to support and push the process. Peter van Rooy did this, for instance, by contacting the minister directly or by involving the media (Peter van Rooy (Habiforum), personal communication, 2016). Peter van Rooy also mediated between the inhabitants of the polder and the governmental authorities. He therefore had a close relation with the OPIG. Habiforum was funded by the province of Noord-Brabant (Hans Brouwer (Rijkswaterstaat), personal communication, 2016).

Overdiepse Polder Interest Group (OPIG): The OPIG represented the interests of inhabitants and entrepreneurs of the polder, for instance by preparing the negotiations with the governmental authorities about ground and farms. Sjaak Broekmans and Nol Hooijmaijers were the frontmen of the OPIG during the 15 years. The 'terps plan' was the brainchild of the OPIG. The frontmen of the OPIG were actively involved in the planning process as members of the official counselling group. Also, Peter van Rooy of Habiforum represented the OPIG in the directing council.

Water Vision Group: the Water Vision Group was an informal commission looking at potential future water safety risks. This government-instated group was looking for projects that could put new policy into practice because around the year 2000 water management was open to new approaches (Winnubst, 2011). By using her political status Neelie Kroes, chairwoman of the Water Vision Group, was several times important for the proceeding of the process.

3.2 Research strategy

Now that the case for this research is explained, I exemplify the research strategy. In the next section I elaborate on the approach of this research and why choices were made.

Adaptive Capacity Wheel

In order to investigate learning and leadership of the institutions involved in the Overdiepse Polder the Adaptive Capacity Wheel is used. As mentioned before, the Adaptive Capacity Wheel is an analytical structuring tool to understand and assess the adaptability of institutions, and also to reveal positive or negative aspects of institutions regarding adaptive capacity (Brink et al., 2014). According to Gupta et al. (2010) the Adaptive Capacity Wheel has multiple advantages. For instance, this method gives a good representation of the end results. The end results are very communicative, especially when traffic colours are used. Also, the Adaptive Capacity Wheel can be used to generate quantitative results in order to compare different institutions. This is useful to investigate what the strong and weak points in learning and leadership of institutions are. The data however will be obtained in a qualitative way, but this will be explained later. This research only investigates learning and leadership. In the operationalization the criteria for learning and leadership are explained.

Five steps approach

Gupta et al. (2010) describe five steps in a protocol for applying the Adaptive Capacity Wheel. These steps are applied for this research as well because they structure the research process:

1. Preparing for research
2. Collecting the data
3. Analysing the data
4. Interpreting the data
5. Presenting the data

Step one, the preparation of the research is done extensively by collecting relevant information, as given in the introduction and theory chapter. Also the build-up of the research, as can be read in this methodology chapter, is part of step one. The proper preparation is the foundation for this research and ensured a good continuation.

Step two, collecting the data is an important part of the research. As mentioned earlier, the data about learning and leadership of the institutions and individuals are obtained by the following two sources: several in-depth and semi-structured interviews with key stakeholders in the planning process of the Overdiepse Polder and various types of documents (secondary documents). More information about the research data is given in the next paragraph.

The third step of the research is analysing the data, which is described in chapter 4: Analysis. Two separate analyses are performed with the aim to obtain all relevant information: one for the interviews and one for the secondary documents. First the interviews, which are all recorded with the approval of the interviewee. After the interviews all conversations are transcribed via Atlas.ti. Codes are given to the data in order to analyse what is said in the interviews. Most codes are assigned to relevant aspects for learning or leadership. Just over 300 codes are given for the eight interviews conducted. Most of the codes are grouped on the basis of the criteria of learning and leadership. Thus, 8 families were created in Atlas.ti. By doing this, all relative data for each criterion out of the different interviews are together in a family. Subsequently, every criterion is analysed separately. This is done by exemplifying all positive and negative aspects of the criteria that came forward in the interviews. On the basis of this, a score is given to every criterion.

For the analysis of the secondary documents also the relevant aspects for learning and leadership are listed. In total therefore two analyses are executed, as a form of data-triangulation. This is done to ensure all relevant information about the criteria is collected, which improves the reliability. As a result, several aspects are analysed twice, but there were also issues only mentioned in one of the two analyses. For the secondary documents also applies that all positive and negative aspects of the eight criteria of learning and leadership are explained. Again, a score is given to the criteria.

Every score is associated with a color, improving the communication of the results (Gupta et al., 2010). The different scores are explained in Table 1. The score of learning and leadership is the average of all criteria. The same applies to adaptive capacity, which is the average of scores of learning and leadership.

Table 1 Meaning of different colours given to the criteria (Gupta et al., 2010b)

Green	Lime	Light yellow	Orange	Red
Institutional structure enhanced adaptive capacity for adaptation	The structure existed, and could be applied, but was not (yet fully) applied to adaptation	Neutral score (positive nor negative effect)	Gap that needed to be filled to counteract negative effect on adaptive capacity	Institutional structure obstructed adaptive capacity for adaptation
Score 2	Score 1	Score 0	Score -1	Score -2

The fourth step is to interpret the data, which is done in chapter 5: Conclusion and discussion. The main question here is: what do the scores given to the criteria mean? Differences in scores are also explained in this stage. I look at the main strengths and weaknesses in the adaptive capacity of the Overdiepse Polder. By giving the strengths and weaknesses of the Overdiepse Polder, I can give recommendations for future planning processes.

The last step, presenting the data, is closely related to the previous two steps. This is because, aggregated scores for the two separate analyses are displayed in a wheel, and also for the summarized result a wheel is given to present the data. The outcome of the interviews is presented in colours. Grey tones are non-judgemental and provide a neutral evaluation of the criteria (Gupta et al., 2010). However, traffic light colours are used because these are easier to interpret. Important to bear in mind is that the scores and colours given to the criteria may give the impression of quantitative results but this research is explicitly qualitative. For this reason, an extensive explanation for all positive and negative aspects of criteria is given. The score and corresponding colour is a complement to the description, with the goal to make the main results transparent.

Expert interview

To improve the reliability of the analysis an expert interview was conducted with dr. M. A. van den Brink. She has experience with the development and application of the Adaptive Capacity Wheel (Gupta et al, 2010b; Brink et al, 2014). This is done instead of the independently scoring of criteria by different researchers as is considered necessary by Gupta et al. (2010). The way Gupta prescribes the conduction of the process was not feasible within the framework of this bachelor thesis. Hence, the research design and results of the analyses are discussed with dr. M. A. van den Brink. By debating different opinions, the robustness of the results is improved.

3.3 Research material and interviewees

Two types of research material are used to perform the analysis: semi-structured interviews and secondary documents. This is also done in an assessment of the adaptive capacity of planning institutions in the Zuidplas Polder and the Westergouwe project (Brink et al., 2014). However, this research analyses the two types separately, which Brink et al. (2014) did not. The separation is done to make the overview of the selected data more clear. It also allows to distinguish contradictions between the two sources. By using multiple sources of data, the reliability of the research is improved (data-triangulation). I describe both sources of data hereafter.

Interviews

The interviews were so-called in-depth and semi-structured. This means profound information about learning and leadership was obtained and the interviews were only partly structured by predesigned questions in order to get a closer look on explained issues by asking follow-up questions (Creswell, 2012). In the appendix the interview guide is included. The interview guide contains the preparation for the interviews, like the interview questions. It also explains issues that needed attention during the interviews, for instance the importance of asking follow up questions. A total of eight interviews were conducted. Every organisation that played a major role in the Overdiepse Polder process was interviewed. These were the following:

Table 2 List of interviewees, including organisation and role in the process

Organisation	Person	Role in process	Information interview
Waterboard Brabantse Delta	Simon Hofstra	Project leader (2012-2015)	Place: head office waterboard, Breda Date: 14-4 Duration: 64 min.
Municipality of Geetruidenberg	Henk Kools	Representative for Geertruidenberg and responsible for eventual maintenance public space (2006-2015)	Place: town hall, Raamdonksveer Date: 15-4 Duration: 52 min.
Municipality of Waalwijk	Paul Broers	Representative for Waalwijk and responsible for eventual maintenance public space (2008-2015)	Place: town hall, Waalwijk Date: 18-4 Duration: 67 min.
OPIG	Nol Hooijmaijers	Frontman OPIG (2000-2015)	Place: Home family Hooijmaijers, Overdiepse Polder Date: 19-4 Duration: 109 min.
Habiforum	Peter van Rooy	Intermediate and driver of process (2000-2015)	Telephone conversation Date: 19-4 Duration: 34 min.
Province of Noord-Brabant	Jaap Sonnevijle René Peusens	Project secretary (2002-2015) Project leader (2006-2010)	Place: head office province, ‘s Hertogenbosch Date: J. Sonnevijlle 25-4 R. Peusens 13-5 Duration: J. Sonnevijlle 58 min. R. Peusens 45 min.
Rijkswaterstaat	Hans Brouwer	Representative Rijkswaterstaat (2000-2015)	Place: office Rijkswaterstaat, Utrecht Date: 18-5 Duration: 79 min.

The province was interviewed twice, first the project secretary and later the project leader. To ensure all relevant organisations and persons were interviewed several steps were taken. First, a list of interviewees was made on the basis of the book Overdiepse Polder; Vijftien jaar Overheidsparticipatie, written by Peter van Rooy (2015), in which the process is described extensively. On this list were the persons given in Table 2, but with Neelie Kroes and without René Peusens. Secondly, this list was in advance submitted to the project leader of the waterboard Brabantse Delta who confirmed these were the relevant people to interview, but Neelie Kroes was out of range and currently working abroad. At last, I asked every interviewee which people they thought were also interesting to speak to. Project leader of the province, René Peusens, was mentioned several times which was the reason to include him in the list of interviewees. The Water Vision Group was not mentioned. Therefore this organisation was not interviewed in the end.

Secondary documents

To improve the reliability of the results an additional analysis was done for secondary documents, besides the interviews. By doing this, additional insights were obtained. In the analysis I used several data sources. The secondary documents were selected because of relevant information they contained:

- The book of Peter van Rooy (2015): Overdiepse Polder - 15 jaar overheidsparticipatie
- The book of Henri Cormont and Rob Bijnsdorp (2015): Overdiepse Polder
- The book of Nel Mathlener and Hans van Houwelingen (2011): De Overdiepse Polder, 750 jaar geschiedenis van een polder in de delta
- The NPO-KRO episode of journalistic program Brandpunt (2015): Gedonder in de polder
- A newspaper article of BN DeStem (2012): 'Achter in de polder is kans op terp erg klein'
- An acadamic article by Roth and Winnubts (2010): Overdieps polderen. Enkele aspecten van de planvorming voor de Overdiepse Polder
- The PhD thesis of Winnubst (2011): Turbulent Waters

One remark regarding the double use of the viewpoint of Peter van Rooy from Habiforum: an interview is conducted with him and his book about the process was used. The aim of the separation of the analysis of the interviews from the analysis of the secondary documents was to obtain different or additional insights. However, for Peter van Rooy this was not the case. The reason to use both types of data was the major role Peter van Rooy played in the process. In this way, more information was obtained. Still, a distinction was made between pronunciations in the interview and references from the book. The analyses were done while being aware of the fact that the viewpoint of Peter van Rooy was included two times.

4. Analysis

Now, I elaborate on the analysis of the data. First, the eight interviews with persons who have been working on the Overdiepse Polder project for several years (see Table 1). Secondly, I use different types of secondary documents, like books and (news) articles. By doing this I have two different sources of data to score the criteria.

4.1 Analysis of interviews

For each data source I analyse the criteria of the dimensions learning and leadership separately. First, I recap shortly on the meaning of the criteria. Thereafter, I exemplify several positive and negative aspects of the criteria for adaptive capacity and explain why aspects of interviews are part of a criterion. If suitable I elucidate my analyses with quotes of the interviewees. I end by explaining why I come to a certain score for a criterion. After this, I sum up all motivations of scores in a table.

Learning

The five criteria for the dimension learning are trust, single loop learning, double loop learning, discussing doubts and institutional memory. These five are analysed below.

Trust

I explained in the theory section trust as a feature of social life that enables participants to act together more effectively to pursue shared objectives (Putnam, 1995). Distrust can stand in the way of learning. Therefore, when actors trust each other, there is a positive effect on adaptive capacity.

In the interviews different opinions were given about the level of trust. First, the relation between Rijkswaterstaat and the province in the development phase was not very good. The new division of roles led to some distrust. Rijkswaterstaat explained that they had the impression that they were not always fully involved in the planning process by the province. The reason for this was, according to Rijkswaterstaat, that the province claimed the project for themselves and tried to make a common enemy of Rijkswaterstaat. On the other hand, the province pointed out that Rijkswaterstaat did not want the project being led by the province because Rijkswaterstaat normally executed these large projects. These accusations are a sign of distrust between the governmental organisations. This distrust was not taken away because of unprofessional meetings where emotions predominated (Hans Brouwer (Rijkswaterstaat), personal communication, 2016). Despite these pronunciations, both Rijkswaterstaat and the province pointed out that these disagreements are normal for a new process like the Overdiepse Polder.

Additionally, the relationship between Rijkswaterstaat and Habiforum showed signs of distrust. Rijkswaterstaat pointed out some issues of distrust between them and the head of Habiforum, Peter van Rooy. One of these was that Peter van Rooy had said to the media that government authorities were an unreliable partner, without personally informing the representative of Rijkswaterstaat. This and other statements in the interview gave the impression to me as researcher that the trust between Rijkswaterstaat and Habiforum was limited.

However, in the implementation phase there was a high level of trust between all government authorities involved, as pointed out by the municipality of Waalwijk: ‘the trust between different

governments was good, in a collegiate and professional manner'. The good collaboration resulted in trust between governmental authorities. Also was explained that the collaboration was pleasant and everything could be said anytime (Paul Broers (municipality of Waalwijk), personal communication, 2016). This shows that developments did not suffer because of a lack of trust or a working atmosphere where people could not say what they wanted to say.

The trust between the inhabitants of the polder and the government authorities had also some different aspects. In the beginning of the project poor communication between the authorities and the local inhabitants led to distrust. This meant that, from the start, the trust of the inhabitants in the governmental authorities was low. The reason for this was that the authorities had communicated very poorly about the first plan for the polder, resulting in a shocking notification about their plans to inundate the entire area. It seemed to the inhabitants, according to the OPIG, that the governmental authorities wanted to redevelop the polder with just one purpose: water storage. This would mean all the inhabitants would have to leave the polder. Not surprisingly, this had a large impact on the farmers. This is a bad start for the trust between the inhabitants of the polder and the governmental authorities.

However, despite these issues at the beginning, the trust between different individuals and organisation grew a lot. According to the province the trust grew very quickly because of the cooperation with the frontmen of the OPIG:

''In the beginning we had to get used to the participation of the frontmen of the OPIG in the official counselling group, but it worked fine eventually because the interaction was very good. Nol (Hooijmaijers) and Sjaak (Broekmans) had also noticed that we were working on the project in a serious way, and that it was not our intention to take advantage of them, or vice versa. This meant, a good trust had developed very quickly. […] And this trust also had an effect on the people they represented.'' (Jaap Sonnevijlle (province of Noord-Brabant), personal communication, 2016)

The increasing amount of trust between the farmers and the government authorities was also pointed out by the frontmen of the OPIG. Reasons for this were the regular conversations with the authorities, like the province, and the good cooperation about the compensation arrangements. This means that, despite some distrust in the beginning, there was an institutional base for trust to develop between the inhabitants and the governmental authorities.

The conclusion for the criterion trust is that between governmental authorities issues of distrust were present in the development phase but in the implementation phase the level of trust was high. Between the inhabitants of the polder and the government authorities existed quite a lot of distrust in the beginning. However, this changed because the frontmen of the OPIG could participate in the official counselling group. The overall score I give to trust is therefore -1.

Single loop learning

In the theory section single-loop learning is described as the ability of institutional patterns to learn from past experiences and improve their routines (Gupta et al., 2010). In this way single loop learning improves adaptive capacity.

In the development phase the possibility given by the institutions for single loop learning was high. This was the result of two major communication opportunities besides the official counselling group and directing council. The first important element of single loop learning came from the emphatically involvement of Habiforum. According to Peter van Rooy this organisation reflected on working methods and organized a continuous learning path at the Overdiepse Polder. In these conversations, that took place a few times a year, not the content of the project was the topic but the way everyone worked together. This means that individuals and organisations involved could improve their cooperation and other routines. This was very enriching for the process according to the province of Noord-Brabant. In this way did Habiforum stimulate single loop learning.

The second element that makes single loop learning possible is another regular conversation. This was the so-called SNP-consultation where the frontmen of the OPIG, Peter van Rooy and the province could openly say what was bothering them. This also enables collaboration and the improvement of routines. This conversation was very informal as the province pointed out. This improves the possibility everyone could say what was on their mind. The OPIG was very proud of the cooperation in the end, as a result of the single loop learning during the process of the development of the Overdiepse Polder. Additionally, the frontman of the OPIG pointed out that he was very proud of the cooperation and that the OPIG was important for efficient communication between the farmers and the government authorities. Good communication and collaboration is important for single loop learning to occur. In other words, the involvement of the OPIG made that routines could be improved, as can be seen in an example given by the OPIG:

''We communicated very direct and good with the governmental authorities. This meant that the government communicated to us, the management of the OPIG, and then we informed the other inhabitants and communicated back to the government. In this way, we reduced the timeframe by preventing that the government authorities had a lot of work to communicate to all the inhabitants of the polder.'' (Nol Hooijmaijers (OPIG), personal communication, 2016)

Also in the development phase the collaboration between organisations went well because of good communication, according to the municipality of Geertruidenberg. Here also applies that good communication improves single loop learning. In other words, in the development phase as well as in the implementation phase institutions made the improvement of routines possible.

I now sum up the aspects of the criterion single loop learning. In the development phase the possibility for single loop learning to occur was very high because there were two discussion occasions. In the implementation phase the communication between organisations also went well. The meant the possibility to improve the routines was present. For these reasons a score of +2 is given to single loop learning.

Double loop learning

As explained in the operationalization double-loop learning occurs when assumptions are changed in underlying institutional patterns (Gupta et al., 2010). With double-loop learning institutions have to reconsider their routines and do things rather differently.

An important aspect of double loop learning mentioned by all interviewees was the extensive involvement of the local inhabitants of the polder. Close collaboration between governmental authorities and the farmers was a new way of working. Especially at the start of the project, in the year 2000, the active involvement of inhabitants was a uncommon, according to the province of Noord-Brabant. Despite the fact that this was not done before, the institutions made it possible for the local farmers to contribute a lot to the development of the polder. The frontmen of the OPIG were given a place in the official counselling group and Peter van Rooy represented the farmers in the directing council. In other words, the farmers were extensively involved in the planning process. This is a great example of double loop learning because this was an all-new approach of citizens participation, as the waterboard Brabantse Delta pointed out:

''What made this project a success was the cooperation with the farmers and the willingness of the government authorities to allow this. Here at the waterboard but especially in the beginning at the province and also by the politicians in The Hague. This came at exactly the right moment because it is a 'forerunner' of the social development of citizens participation. This project started 15 years ago, exactly at the beginning of the revolution in thinking in the Netherlands and The Hague.'' (Simon Hofstra (waterboard Brabantse Delta), personal communication, 2016)

Another aspect of double loop learning was the division of roles between Rijkswaterstaat and the province. Before the Overdiepse Polder project it was common practice for Rijkswaterstaat to execute large projects like this. It was rather uncommon for the province to do this. However, for a policy experiment of decentralisation the Ministry decided that the province could do the planning process of the Overdiepse Polder (René Peusens (province of Noord-Brabant), personal communication, 2016). This is also an aspect of double loop learning because the underlying institutional patterns were done rather differently.

In the interviews, several reasons were given for the success of double loop learning in the Overdiepse Polder project. First of all the continuous learning path, initiated by Habiforum, contributed to the development of double loop learning, besides single loop learning. According to Peter van Rooy, people reflected in these consultation on the division of roles, for instance the relation between the province and Rijkswaterstaat. The second reason for the success of double loop learning was that Peter van Rooy acted as a disruptor sometimes. He acted this way to get people out of their routines, as he pointed out himself. This means that he was able to let individuals and organisations break with their institutional patterns. Thirdly, the abilities of the frontmen of the OPIG were very important for double loop learning to occur. According to the province and the waterboard, these two people had experience with working for the governmental authorities and improved the communication between the government authorities and farmers. The abilities of the frontmen were a key factor for the institutions to adopt the new strategy of cooperating with local inhabitants.

However, these aspects of double loop learning were not without difficulties. In the beginning of the project, it took several government authorities quite some time to adapt to the involvement of the local inhabitants. According to Peter van Rooy, Rijkswaterstaat opposed against the 'terps plan', the waterboard's attitude was wait-and-see and the municipalities hooked on very late. It was the province which cooperated first. These perspectives changed later on when an official decision was

made to make the Overdiepse Polder a 'forerunner project' for Room for the River. In the beginning, the different attitudes of these governmental authorities interfered with double loop learning. In other words, at the start several authorities did not allow double loop learning in the Overdiepse Polder project.

In conclusion, two major changes in assumptions underlying the institutional patterns can be seen. First, the collaboration between the governmental authorities and the local inhabitants. Secondly, the role of the province instead of Rijkswaterstaat to lead this large project. Several reasons for the occurrence of these aspects of double loop learning are mentioned. It seems that the institutions allowed double loop learning. However, in the beginning several government authorities opposed to double loop learning. As a result a score of just +1 is given.

Discussion of doubts

In the theory section I defined discussion of doubts as the institutional openness towards uncertainties (Gupta et al., 2010). It is important to raise and discuss doubts in complicated dynamic events (Weick & Sutcliffe, 2011). Openness towards uncertainties contributes to adaptive capacity.

During the process of the Overdiepse Polder, several organisations were not completely open about their uncertainties and did not always discuss their doubts. At the beginning of the process uncertainty among the inhabitants of the polder was high because of a miscommunication by the government authorities. According to Rijkswaterstaat, the governmental authorities were still searching for options for the Overdiepse Polder. However, towards the inhabitants they made it look like the choice to inundate the polder was already made. Instead of discussing the doubts and possibilities with the farmers, they sent the message that there was no choice anymore. There was no consultation about possible developments of the polder.

When later on inhabitants of the polder came up with their own plan to build their farms on mounds, the option was thoroughly discussed. According to the waterboard, Rijkswaterstaat investigated the alternative options for the Overdiepse Polder besides the 'terps plan'. This means that the 'terps plan' was well considered. This dispelled any doubts about what would be the best option for the polder.

Another good aspect of the discussion of doubts was the debate between the national government and the regional directors. Rijkswaterstaat pointed out that the former Secretary of State explicitly asked the regional directors to give the national government advise about what they wanted in relation to the Room for the River program. Therefore, for this aspect of the process the communication between national and regional directors was good. This alignment led to increased consensus between different levels of governmental authorities (Hans Brouwer (Rijkswaterstaat), personal communication, 2016).

Regular discussions in the official counselling group also provided for the debate of uncertainties. The presence of representatives of the farmers in these conversations was of great value for all organisations. For instance, the discussion about the number of mounds in the new polder was discussed with the farmers. The farmers could easily determine how much mounds were needed because they had a good overview about the number of farmers that wanted to stay. As the province

pointed out, everything was openly discussed in the official counselling group. The frontmen of the OPIG could also debate the uncertainties and questions of the farmers because they were present in these conversations. In other words, there was attention for questions of the farmers and measures were undertaken by the governmental authorities to reduce the farmers doubts. An example was given by the OPIG: on a given moment farmers doubted if they should still invest in their enterprises, for instance by buying new feeding fences. The province responded to this by insuring the entrepreneurs that the costs for the fences would also be compensated. However, this did not take away all doubts of the inhabitants about the project. Questions about the timeframe of the project remained as long as the implementation did not start, indicating that the institutions could not take away all uncertainties. This had a large impact on the businesses of the farmers as was pointed out by the OPIG:

''Entrepreneurs in the polder doubted if they should still invest in their farms because no one knew how long it would take before we would go to our new farms on mounds. For a long time we were uncertain about this. Some said it would take just a few years but others said it could take ten years. No one could give us the assurance.'' (Nol Hooijmaijers (OPIG), personal communication, 2016)

Summing up, the discussion about the first plan by the government authorities was poor because they did not engage the inhabitants into the debate. However, later on Rijkswaterstaat did discuss all alternative options for the Overdiepse Polder. The debate between national and regional governments was also proof of the discussion of doubts. Regular discussion sessions in the official counselling group and the participation of the OPIG in this group provided for the debate of uncertainties. However, this did not take away al uncertainties of the farmers. All things considered, a score of -1 is given to this criterion.

Institutional memory

As explained in the operationalization, institutional memory is the provision of documentation and evaluation of policy experiences (Gupta et al., 2010). This is done extensively for the process of the Overdiepse Polder. An important aspect of this is the book 'Overdiepse Polder – 15 jaar overheidsparticipatie' by Peter van Rooy. He describes many moments of the planning process in order to learn from experiences of the Overdiepse Polder. Besides that, Henri Cormont and Rob Bijnsdorp describe the process in a book using a visual chronicle and Nel Mathlener and Hans van Houwelingen elaborate on the project in their local history book about the Overdiepse Polder. Furthermore, many video's about the development of the Overdiepse Polder, like the regular 'journals', can be found on the internet. Brandpunt, a journalistic program of the national public broadcaster made a short documentary about the planning process. Finally, several academic research papers are written about the Overdiepse Polder to which this research also regularly refers. All this was done besides the standard reporting by governmental authorities like the proper documentation of all official meetings. For instance the documentation of the official counselling group and directing council in order to trace decisions and arguments afterwards (René Peusens (province of Noord-Brabant), personal communication, 2016). All these book's, document's and video's make that the institutional memory was good.

A result of good institutional memory can be seen in the ease of new individuals to participate in the process, for instance when a project leader is replaced. It is important for new individuals to get all

the required information when they join a project. When the process is well documented new persons can easily get all the information needed to participate in the process. This was the case for the Overdiepse Polder, as confirmed by the project leader of the province who joined the process in 2006 and could easily adapt to it.

The conclusion for the criterion institutional memory is as follows: the policy experiences were well documented in different ways, like books, academic papers and governmental reports. This made that new persons could easily participate into the process. Therefore a score of +2 is given to this criterion.

Leadership

The three criteria for the dimension leadership are visionary, entrepreneurial and collaborative leadership.

Visionary leadership

Visionary leadership, as explained in the theory section, means that there is room for long-term visions and there are reformist leaders (Gupta et al., 2010). Visionary leadership was extensively present at the Overdiepse Polder because of two persons. First, the provincial executive Jan Boelhouwer was important at the beginning of the process. He advised the local inhabitants, when they heard about the first plans to inundate the polder, to come up with their own plan. According to the waterboard, Jan Boelhouwer knew that the plans of the governmental authorities were not yet very solid and if the farmers made an alternative plan it could come out favourably for them. Therefore, he played an important role in convincing the farmers to anticipate to future events: increased river discharges of the Bergsche Maas and perhaps more important for them, the potential plans to inundate the entire polder. As a result of the efforts by Jan Boelhouwer the inhabitants of the polder came up with their own plan to build farms on mounds. Besides this, Jan Boelhouwer often promoted the 'terps plan' of the inhabitants at the national government, as was pointed out by the OPIG. By doing this he tried to convince the former Secretary of State of the opportunities that were offered and he tried to get support for the plan. This is a sign of a reformist leader because he communicated his personal commitment to make large changes to the existing situation, namely the cooperation with local inhabitants in large developments projects like these. This indicates that Jan Boelhouwer played a major role in visionary leadership.

The second person who was important for visionary leadership was Peter van Rooy. He had a clear vision in mind, as he told himself: to make it possible for the farmers to stay in the polder by an innovative solution. He inspired others in keeping this dot on the horizon during the entire process which is a characteristic of a visionary leader (Young, 1991). He also communicated his personal commitment about the Overdiepse Polder towards the farmers. By doing this he convinced others about his dot on the horizon as illustrated in the next pronunciation:

''The 'terps plan' was developed quite quickly by the farmers themselves and I supported this plan. I told them extensively in their cowsheds: this is going to work! I will use my entire network of people to make it a success.'' (Peter van Rooy (Habiforum), personal communication, 2016)

As a result of the work by Jan Boelhouwer and Peter van Rooy a score of +2 is given to the criterion visionary leadership. Jan Boelhouwer convinced the inhabitants of the polder to anticipate the first plans of the government authorities and promoted the 'terps plan' at the national government. Peter van Rooy had a clear vision in mind an communicated his personal commitment to the farmers.

Entrepreneurial leadership

In the operationalization I defined entrepreneurial leadership as the room for leaders that stimulate actions and undertakings (Gupta et al., 2010). The difference with visionary leadership, where the formulation and promotion of targets is central, is that with entrepreneurial leadership people manage to get practical aspects done to achieve goals. This kind of leadership was also present at the Overdiepse Polder process. First, the province clearly took the lead in the Overdiepse Polder project. They were important to accomplish things. According to the province, several executives of the province made an effort to get the 'terps plan' approved by the national government and got the financial recourses that were needed. For this reason, the province clearly showed signs of entrepreneurial leadership.

Also the OPIG with their frontmen Sjaak Broekmans and Nol Hooijmaijers had a major role in entrepreneurial leadership. The best evidence of this is that they were able to implement their own 'terps plan' in collaboration with the government authorities. This had never been done before. The ability and expertise of these frontmen were essential for the success of the participation of the inhabitants. According to the waterboard they were socially capable, were not afraid to take firm decisions and had governance experience. Therefore, Sjaak Broekmans and Nol Hooijmaijers provided entrepreneurial leadership to this process.

In the beginning Rijkswaterstaat, the waterboard and municipalities opposed to the involvement of the local inhabitants in the planning process (Peter van Rooy (Habiforum), personal communication, 2016). This caused a struggle which hampered the progress of the project. For this reason, the opposition of these governmental authorities is a shortcoming of entrepreneurial leadership.

In conclusion, two important organisations in the project showed clear signs of entrepreneurial leadership. The province explicitly took the lead and made a great effort the get the 'terps plan' approved by the national government. The frontmen of the OPIG had the capabilities to implement their plan in collaboration with the governmental authorities. However, in the beginning Rijkswaterstaat, the waterboard and municipalities opposed to the involvement of the local inhabitants, leading to a score of 0.

Collaborative leadership

Collaborative leadership means that there is room for leaders who encourage collaboration between different actors (Gupta et al., 2010), as explained in the theory section. The frontmen of the OPIG were also important for collaborative leadership. They had a major role in the collaboration and communication between the local inhabitants and the governmental authorities. According to the province, Sjaak Broekmans and Nol Hooijmaijers were the voices of the OPIG in the official counselling group and made it possible for the inhabitants to participate in the planning process. They were able to take the responsibility for their followers in the polder but also dared to say no to

the farmers when something was not possible. In this way they were an important link in the communication between government authorities and citizens.

Another aspect of collaborative leadership is the effort of Peter van Rooy to connect people. He was also a key player in the collaboration between the local inhabitants and the governmental authorities. This was important because inhabitants and government authorities were not used to profound cooperation. Therefore, he communicated between them. As Peter van Rooy pointed out: ''the role of connector is crucial for a process to succeed and without a person like this the process will probably stall''. He also said that, according to the OPIG, he was seen as a translator between the farmers and the government authorities. This shows that he was important for the cooperation. Besides that, Peter van Rooy also used his network of people to propel the process forward. For instance, he sometimes asked Neelie Kroes, a nationally influential politician, for help when the process jammed and needed a political boost.

There was a lack of collaborative leadership in the relation between Rijkswaterstaat and the province. This led to distrust as described at the criterion trust above. None of the parties stood up in this situation to improve the collaboration between these organisations. According to Rijkswaterstaat, little effort was made to solve the disagreements because most conversations were about the content of the project.

Summarizing, the frontmen of the OPIG had an important role in collaboration and communication between the local inhabitants and the governmental authorities. This also applies to Peter van Rooy. He used his network of people to propel the process when needed. The disagreement between Rijkswaterstaat and the province was an bad aspect of collaborative leadership because no one stood up to improve the relation. For these reasons a score of +1 is given to the criterion collaborative leadership.

Summary learning and leadership according to interviews

All results of the analysis of the interviews are summarized in Table 3. An overview is given of all positive (in green) and negative (in red) aspects of the criteria leading to a given score. The names of the representatives of the province are appointed in the last column between brackets. The abbreviation JS stands for Jaap Sonnevijlle and RP for René Peusens. The meaning of scores and the corresponding colours are explained in the methodology section.

Table 3 Overview analysis of interviews per criterion

Criterion	Score	Motivation	From which interview
Trust	-1	- Disagreement between Rijkswaterstaat and the province about responsibilities - Personal tensions between Rijkswaterstaat and Habiforum - Collegial collaboration between government authorities in implementation phase leads to trust - Miscommunication about first plans lead to distrust farmers-government - Participation of OPIG in official counselling group leads to trust - Good cooperation about compensation arrangements improves farmers trust in government authorities	- Rijkswaterstaat and the province (JS) - Rijkswaterstaat - Municipality of Waalwijk - OPIG - Province (JS) - OPIG
Single loop learning	+2	- Continuous learning path by Habiforum gives possibilities to reflect on working methods - SNP-consultation between frontmen OPIG, province and Peter van Rooy - Good communication in implementation phase	- Peter van Rooy and the province (RP) - Province (RP) and OPIG - Municipality of Geertruidenberg
Double loop learning	+1	- Intensive collaboration between government authorities and citizens is new - Division of roles between province and Rijkswaterstaat is new - In beginning opposition of several governmental authorities	- Province (JS) and the waterboard - Province (RP) - Peter van Rooy
Discussion of Doubts	-1	- Exclusion of inhabitants into debate about first plan to inundate the polder - Discussion of all alternatives by Rijkswaterstaat - Debate between national and regional government - Regular discussion and involvement of OPIG - Continued uncertainty for farmers about timeframe	- Rijkswaterstaat - Waterboard - Rijkswaterstaat - Province (JS/RP) - OPIG
Institutional memory	+2	- Well documented policy experiences in different ways - New persons could easily participate in process	- Province (RP)

Visionary leadership	+2	- Jan Boelhouwer convinced inhabitants to come up with their own plan and promoted this 'terps plan' at national government - Peter van Rooy had clear vision in mind and communicated personal commitment to farmers	- Waterboard and OPIG - Peter van Rooy
Entrepreneurial leadership	0	- The province explicitly took the lead and made a great effort the get the 'terps plan' approved by the national government - The capabilities of the frontmen of the OPIG to implement their plan - Several governmental authorities opposed to the involvement of the local inhabitants in the beginning, which hampered the progress	- Province (JS) - Waterboard - Peter van Rooy
Collaborative leadership	+1	- Frontmen OPIG important for collaboration and communication between inhabitants and governmental authorities - Peter van Rooy important for collaboration and communication between inhabitants and authorities, and uses network of people to propel process - No one improved collaboration and trust between Rijkswaterstaat and province	- Province (RP) - Peter van Rooy - Rijkswaterstaat

The aggregated results of the criteria give a score for the dimensions learning and leadership. The average score of the dimensions leads to the score of adaptive capacity. This is displayed in the wheel in Figure 6. The scores and colours are exemplified in Table 4.

Table 4 Effect on adaptive capacity, according to aggregated scores.

Effect of institutions on adaptive capacity	Score	Aggregated score for dimensions and adaptive capacity as a whole
Positive effect	+2	1,01 to 2,00
Slightly positive effect	+1	0,01 to 1,00
Neutral or no effect	0	0
Slightly negative effect	-1	-0,01 to -1,00
Negative effect	-2	-1,01 to -2,00

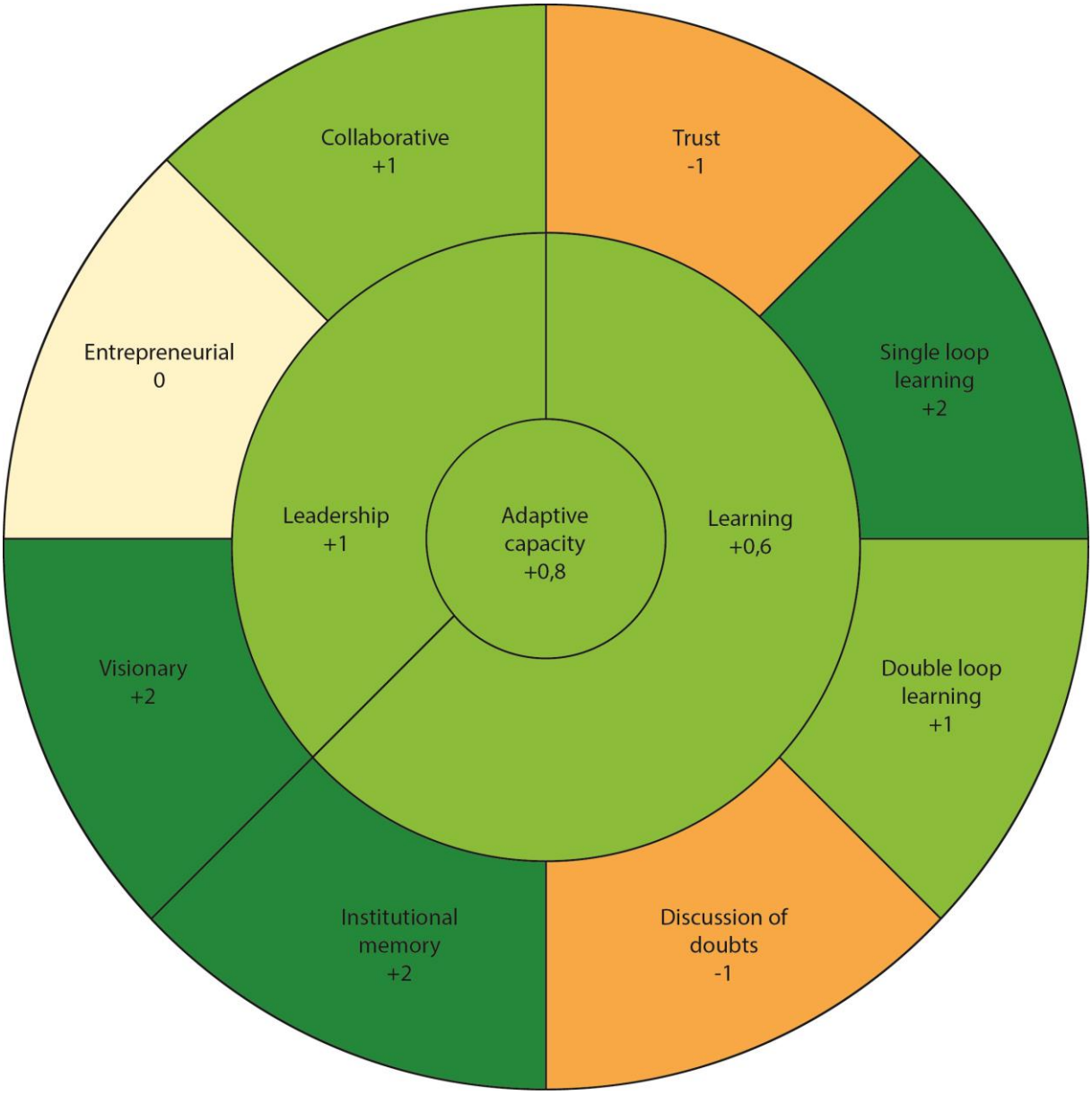

Figure 6 Summarized wheel of criteria, dimensions and adaptive capacity for the Overdiepse Polder, according to the interviews.

4.2 Analysis of secondary documents

I analysed also secondary documents. This improves the reliability because in this way additional insights are obtained. In this analysis I used several data sources: the book of Peter van Rooy (Overdiepse Polder - 15 jaar overheidsparticipatie), the book of Henri Cormont and Rob Bijnsdorp (Overdiepse Polder) and the book of Nel Mathlener and Hans van Houwelingen (De Overdiepse Polder, 750 jaar geschiedenis van een polder in de delta). Additionally, I analysed the NPO-KRO episode of journalistic program Brandpunt (Gedonder in de polder) and a newspaper article by BN DeStem ('Achter in de polder is kans op terp erg klein'). At last, I used an academic article of Roth and Winnubts (2010) and the PhD thesis of Winnubst (2011). Many aspects that come forewords in these documents are already addressed in the analysis of the interviews. Therefore, I will only shortly explain these and elaborate more on aspects that are new. The rest of this analysis will be the same as the analysis of the interviews.

Learning

First, I explain the five criteria of the dimension learning.

Trust

Like in the interviews, Cormont and Bijnsdorp (2015) and Mathlener and Houwelingen (2011) describe in their books the designation of the Overdiepse Polder as a water storage area in the year 2000. This led to distrust between the local inhabitants and the governmental authorities. However, the province made an effort to improve the trust between the inhabitants and the government authorities by extending the communication between the two (Roth and Winnubst, 2010). Mathlener and Houwelingen (2011) also describe that the built up of trust between inhabitants and the project leaders of the province was crucial for the success of the project. The trust of the inhabitants in the provincial government was mainly based on their faith in individuals like in the provincial delegate and the project manager (Winnubst, 2011). The trust in specific individuals proved to depend on the abilities of these people to resolve conflicts and find solutions, indicating that the relation could easily change if the residents demands were not met (Winnubst, 2011). An example of this is the request of the inhabitants for a project leader the be replaced. This is a sign that mutually trust was absent. The province excepted this request and installed a new project manager who met the requirements. These are several examples of distrust but they also prove that the institutions were able to develop trust during the process.

However, another aspect of distrust between the inhabitants and the government authorities was about a basic arrangement for the compensation of ground and the farms. This distrust developed both ways. First, the inhabitants thought they did not get enough compensation and that the negotiations would strand, leading to more delay. According to Peter van Rooy (2015), as a sign of distrust the OPIG even wrote a formal letter to the national government before the 'core decision' Room for the River was taken. Secondly, the government authorities also needed to have trust in participating inhabitants. Because the governmental authorities allow inhabitants to cooperate in the process they must have a sort of assurance that inhabitants have a moral consciousness about the compensation arrangements. This is because a lot of public money is invested in the project. A city councillor of Waalwijk describes in the book of Peter van Rooy that some inhabitants were never satisfied with proposals from the governmental authorities. This led to distrust of the government authorities towards the citizens. However, as was also pointed out, most farmers were very

reasonable and trust between the inhabitants and the government authorities was also present and considered as an important factor for a the project to become a success (Rooy, 2015).

The trust between the local inhabitants and Peter van Rooy, who became their confidant, facilitator and mediator built up rapidly (Winnubst, 2011). Peter van Rooy was extensively involved with the inhabitants. Therefore, trust between the inhabitants and Peter van Rooy was important.

Among the inhabitants were also issues of distrust. Some families felt they were expelled out of the polder because they could not get a mound in the redeveloped polder. The reason for this was that their old farms and land were not located on the south side of the polder where mounds came. This led to envy as can be seen in the Brandpunt episode (NPO-KRO, 2015). One farmer told that he will not shake hands with some other farmers anymore. Also, an article of a local newspaper describes that at a celebration to demonstrate all inhabitants agreed to the 'terps plan', only half of the people did not show up because they were uncertain about their future (BN DeStem, 2012). This shows that not all inhabitants agreed to the plan which supposedly was supported by all famers. These are signs of distrust among the inhabitants.

As mentioned before, there existed a strained relationship between the province and Rijkswaterstaat during the planning process of the Overdiepse Polder. Collaboration proved to be difficult for them to achieve because a tolerant atmosphere where trust could grow was absent (Winnubst, 2011). This is also a negative issue of trust.

As a conclusion for the criterion of trust based on the secondary literature, I give a score of -1. At the start of the project the trust between the inhabitants and the governmental organisations was poor but the institutions allowed trust to develop during the process. However, the negotiations for compensations were a source of distrust for both the inhabitants and the government authorities. The trust between the inhabitants and Peter van Rooy developed rather quickly. Among the inhabitants were some issues of distrust because not everyone benefited equally in the development of the Overdiepse Polder. At last, trust was absent in the relation between the province and Rijkswaterstaat.

Single loop learning

The Overdiepse Polder project was a new process in various ways, like the cooperation between inhabitants and governmental authorities and the decentralisation of the development. These are aspects of double loop learning. However, to execute these new institutional patterns new routines had the be developed or improved. This is done extensively at the Overdiepse Polder. As described by Winnubst (2011), the project was made a 'mirror project' by the Water Vision Group to experiment with the new aspects. This shows that there was a lot attention for the Overdiepse Polder as a case example to improve practical routines. Besides that, the Overdiepse Polder was a 'forerunner' for the program Room for the River. This meant that the project team had to learn how to deal with specific (theeting) problems which was done by trial and error (Winnubst, 2011). New procedures like the compensation arrangements were developed because the Overdiepse Polder was a 'forerunner project'. This improved routines in order execute next projects more quickly and efficiently.

As described in the analysis of the interviews, there were also a lot of possibilities to reflect on ambitions and conditions of the project. The book of Peter van Rooy points out that there was attention for active reflection during the process and that there were also interventions to apply improvements of routines directly. In other words, there was a lot of room for single loop learning during the process.

At the Overdiepse Polder project were also aspects of routines not improved because institutions did not allow this. The Brandpunt episode reviewed the stiffness of the governmental regulations when it comes to reacting to practice and the inability to improve their routines. An example is given by Peter van Rooy about the maximum height of grass in the winter period. This example is given to explain the large amount of regulations during large area developments of which cannot be deviated from. Additionally, the Minister of Infrastructure and Environment said that we must reconsider the importance of some of these regulations for next projects. According to Peter van Rooy, this is done too little in this project, leading to delay and unnecessary costs (NPO-KRO, 2015). This indicates that single loop learning was restrained by institutions. However, we must bear in mind that governmental authorities cannot just ignore regulations.

Summing up, the Overdiepse Polder was a new process in several ways, giving it the titles of 'mirror' and 'forerunner project'. This meant that learning was an important aspect to improve the routines for following cases. Besides that, during the process was attention for active reflection and there was room to apply improvements of routines directly. On the other hand, there were issues with the rigidity of governmental regulations and the inability to improve routines leading to delay and unnecessary costs. Out of these aspects derives the conclusion to give a score of +1.

Double loop learning

The new relation between citizens and government authorities was a major aspect of double loop learning. This is also described in the analysis of the interviews. The Overdiepse Polder project provided the change in the underlying institutional patterns like the cooperation with the OPIG in the official counselling group. However, this happened not without difficulties. Peter van Rooy and Henri Cormont and Rob Bijnsdorp describe the trouble to change the institutional patterns that were hampering the new ideas. Institutions at the Overdiepse Polder opposed, to a limited extent, to the participation of citizens. It came down to the driving force of individuals to get the inhabitants involved (Winnubst, 2011). It is a rather strange phenomena that governmental authorities (Rijkswaterstaat) that work for society are not willing or able to work with society to resolve public problems, exemplifies Winnubst (2011). Besides that, the province focussed in conflicts too much on regulation and risk avoidance instead of experimenting and taking initiative (Roth and Winnubst, 2010). This means that, although double learning took place, institutions opposed to some extent to renew their underlying patterns.

Also the relation between the province and Rijkswaterstaat is already analysed with the interviews. Roth and Winnubst (2010) also describe this relation extensively. They say that the institutions at the Overdiepse Polder made the decentralisation of responsibilities possible. This was a change in the underlying institutional patterns and therefore an aspects of double loop learning. However, just like the double loop learning aspect of citizens participation were there some difficulties. From the start was the relation between the province and Rijkswaterstaat poor because of disagreement about the

division of roles (Roth and Winnubst, 2010). According to Winnubst (2011), Rijkswaterstaat showed that devolving responsibilities was not their strong point during the process. They wanted to keep control over the project although it was decentralized to the province. This point shows that Rijkswaterstaat opposed to double loop learning.

However, Peter van Rooy describes that the learning processes of Habiforum improved the collaboration between government authorities. Instead of the previous top-down method a new network management emerged. The network management improved the cooperation by helping the new division of roles to develop. Habiforum assisted the development towards a network management, meaning that the opposition of several governments was decreased by Habiforum.

The conclusion for double loop learning is as follows. Institutions at the Overdiepse Polder allowed double loop learning to take place like the intensive citizens participation and decentralization of responsibilities. However, in both cases did this not come easily because of opposition of governmental authorities which stuck to old mindsets. On the other hand, Habiforum improved the division of roles between different governmental authorities by introducing network management to guide the organisations into their new roles. This improved the double loop learning of the institutions. For these reasons I give a score of +1 to this criterion.

Discussion of doubts

As also pointed out in the analysis of the interviews, the first plans to inundate the polder were not discussed with the inhabitants of the polder (Cormont and Bijnsdorp, 2015; Mathlener and Houwelingen, 2011). The exclusion of the local inhabitants into the debate is a bad aspect of this criterion. The functioning of the 'terps plan', that came as a response to the first plans of the governmental authorities, was thoroughly examined by Rijkswaterstaat. According to the episode of Brandpunt, they compared the cost efficiency and sustainability of the 'terps plan' to alternatives several times and it always came out on top. This helped the discussion about functioning of the 'terps plan' in comparison to other options.

Despite the fact that the 'terps plan' was clearly the best option, the inhabitants stayed uncertain until 2008 whether the project would proceed or not (NPO-KRO, 2015). The discussion with the inhabitants about these doubts was therefore poor. Also Peter van Rooy and Henri Cormont and Rob Bijnsdorp describe the uncertainty of the inhabitants during the process. According to them, besides doubts about the completion uncertainty remained about the extent of the compensation. These uncertainties hindered the business management of the farmers. The province tried to take some doubts away by immediately destroying farms of families who left as a sign that the process was not a fable. The province assigned also a full-time project leader in 2006 to improve communication with the inhabitants of the polder and to take away some of their doubts. According to Roth and Winnubst (2010), this led to clarification about the position of people staying in or leaving the polder.

Because the Overdiepse Polder project consisted of many new aspects of a planning process, a lot of uncertainties were debated by governmental authorities and the inhabitants. According to Winnubst (2011), subjects for discussion were the compensation after flood damage, the design of the mounds and the location of the new dike. Rijkswaterstaat and the province also discussed the responsibilities for this project and Rijkswaterstaat raised doubts about the usefulness of the 'terps plan' (Winnubst,

2011). These were all aspects of debate, meaning that the openness towards uncertainties was improved.

Another good aspect of the discussion of doubts were agreements in the beginning of the project about principles between the frontmen of the OPIG and the public actors. The frontmen demanded clear communication about shared values. These agreements of principles could help to bridge disagreements and restart the discussion when the process stalled (Rooy, 2015). In this way, these principles improved the debate between OPIG and the governmental authorities.

These aspects of the discussion of doubts lead to a score of 0. The inhabitants were not involved in the discussion about the first plans for the polder. The functioning of the 'terps plan' was thoroughly examined by Rijkswaterstaat. Despite this plan was clearly the best option the inhabitants stayed uncertain for a long time. The province successfully made an effort to clarify some doubts of the inhabitants. Additionally, many new aspects of the planning process were debated by the governmental authorities and the inhabitants. At last, the agreement for clear communication between the OPIG and the governmental authorities improved the discussion of doubts.

Institutional memory

For the criterion institutional memory I come to the same conclusion as in the analysis of the interviews. Namely that the process of the Overdiepse Polder is well documented. This analysis of secondary documents is for a large part based on this institutional memory. Additionally, Peter van Rooy points out in his book that observed patterns and inventions out of the learning processes initiated by Habiforum are all described in many publications. This improves the possible application of these observed patterns and inventions in following processes. A score of +2 is given to the criterion institutional memory because of this extensive documentation.

Leadership

Now, I elaborate on the criteria for the dimension leadership.

Visionary leadership

The book of Mathlener and Houwelingen (2011) also describes the role of the provincial executive Jan Boelhouwer who convinced the inhabitants of the polder to come up with their own plan. Another aspect of visionary leadership of Jan Boelhouwer was the announcement of the 'terps plan' at the Water Vision Group. By doing this, he involved other reformist leaders in the 'terps plan' which is a clear quality of visionary leadership. For these reasons Jan Boelhouwer was important for the success of the project in the development phase (Mathlener and Houwelingen, 2011).

Another aspect of visionary leadership is given by the former Secretary of State, Monique de Vries. Already in 2001, she embraced the 'mirror project' (Rooy, 2015). By doing this, she wanted to improve the discussion about the different ways of coping with water safety. In other words, she wanted attention to anticipate the potential future event of flood risk.

A third aspect of visionary leadership comes from Habiforum. This organisation was on the lookout for innovations. One of which was the way to deal with processes in a dynamic and only partly makeable society. In their approach they have attention, among other things, for what they call

'panorama' (Rooy, 2015). This means that it is important to have a shared outlook or goal in an area development. This is an aspect of visionary leadership. According to Peter van Rooy, the Overdiepse Polder is the first process where this approach was applied.

Summing up, a score of +2 is given to visionary leadership. Three strong points of this criterion come forward in the secondary documents. The provincial executive Jan Boelhouwer convinced the inhabitants of the polder to come up with their own plan and announced the 'terps plan' at the Water Vision Group. Secretary of State Monique de Vries embraced the 'mirror project' early in the process to improve discussion about potential future flood risk. At last, Habiforum introduced an approach for the Overdiepse Polder process in which the importance of having a shared outlook or goal is emphasized.

Entrepreneurial leadership

Several inhabitants of the polder showed entrepreneurial leadership. They did this by establishing the OPIG in order to defend the interest of the local citizens (Roth and Winnubst, 2010). They were able to change the opposition of the inhabitants towards a constructive attitude. Eventually, Sjaak Broekmans and Nol Hooijmaijers had an major role in the planning process of the Overdiepse Polder. They have done a lot for the interest of the inhabitants. The frontmen of the OPIG often took the initiative in the development process (Mathlener and Houwelingen, 2011). For this reason, the frontmen of the OPIG showed entrepreneurial leadership.

During the entire process there was a group of people with a drive to propel the process forward. The book of Peter van Rooy describes that these people were from various organisations: the OPIG, municipalities, province, waterboard, national government, consulting firm and the construction consortium. The Water Vision Group also made an effort to get the 'terps plan' on the national agenda. This indicates that there were many people showing entrepreneurial leadership.

Despite these aspects of entrepreneurial leadership, the process of the Overdiepse Polder met in the beginning resistance of governmental authorities. For instance, the province focussed in conflicts too much on regulation and risk avoidance instead of experimenting and taking initiative (Roth and Winnubst, 2010). According to Winnubst (2011), the national government failed in terms of coordinating mechanisms and consistency resulting in a weak capacity the act. Additionally, Rijkswaterstaat held on to their old mindset which conflicted with various aspects of the process (Winnubst, 2011). These aspects hampered the entrepreneurial leadership of the Overdiepse Polder process.

To conclude, I give a score of 0 to entrepreneurial leadership. This is because the local inhabitants stimulated actions and undertakings and there was a group of people involved who propelled the process forward. However, the Overdiepse Polder process met also resistance by governmental authorities on a national and regional level.

Collaborative leadership

As pointed out in the analysis of the interviews, Peter van Rooy of Habiforum had a role as mediator in the process. He was important for the collaboration between the inhabitants and the governmental authorities, for instance by representing the inhabitants in the directing council. Peter

van Rooy had also excess to several governmental levels, allowing him to communicate with politicians (Roth and Winnubst, 2010). In this way, he provide collaborative leadership to the Overdiepse Polder process.

The involvement of the Water Vision Group is also an aspect of collaborative leadership. By doing this, networks were connected and a coalition between the Overdiepse Polder and the Water Vision Group was made. This is described in the book of Peter van Rooy. An example of the utility of connecting networks is the involvement of Neelie Kroes. The mayor of Waalwijk asked her to use her position and status to invigorate the viewpoint of the directing council towards the Ministers. In this way, the connection to Neelie Kroes made it possible that she could propel the process when needed.

The collaborative link between the province and Rijkswaterstaat was weak during the Overdiepse Polder process. The interaction between these authorities led to debate and conflict as a result of recurring disputes in the area of responsibility (Winnubst, 2011). This is an issue of bad collaborative leadership because it hindered the process.

These aspects regarding collaborative leadership lead to a score of +1. Peter van Rooy as mediator had a major role in the collaboration between the inhabitants and the government authorities and was able to communicate directly with politicians. The involvement of the Water Vision Group build a coalition to improve the development process. However, a bad aspect of collaborative leadership was the weak link between the province and Rijkswaterstaat, as a result of disputes about responsibilities.

Summary learning and leadership according to secondary documents

All results of the analysis of the secondary documents are summarized in Table 5. An overview is given of all positive (in green) and negative (in red) aspects of the criteria, leading to a given score.

Table 5 Overview analysis of secondary documents per criterion

Criterion	Score	Motivation	From which secondary document
Trust	-1	- Poor trust between inhabitants and government authorities in the beginning - Institutions made development of trust possible - Negotiations of compensation source of distrust between inhabitants and governmental authorities - Trust between inhabitants and Peter van Rooy developed quickly - Distrust among inhabitants - Distrust between province and Rijkswaterstaat	- Cormont and Bijnsdorp (2015), Mathlener and Houwelingen (2011) -Roth and Winnubst (2010), Mathlener and Houwelingen (2011), Winnubst (2011) - Rooy (2015) - Winnubst (2011) - NPO-KRO (2015), BN DeStem (2012) - Winnubst (2011)
Single loop learning	+1	- New process meant that learning was an important aspect to improve routines for following cases - Attention for active reflection and room to apply improvements of routines directly - Stiffness of governmental regulations and the inability to improve routines, leading to delay and unnecessary costs	- Winnubst (2011) - Rooy (2015) - NPO-KRO (2015)
Double loop learning	+1	- Intensive citizens participation and decentralization of responsibilities took place - Opposition of governmental authorities to these changes in underlying institutional patterns. - Habiforum improved new division of roles by introducing network management	- Rooy (2015), Cormont and Bijnsdorp (2015), Roth and Winnubst (2010) - Roth and Winnubst, (2010), Winnubst (2011) - Rooy (2015)
Discussion of Doubts	0	- Exclusion of inhabitants in debate about first plans to inundate polder - Functioning of the 'terps plan' thoroughly examined by Rijkswaterstaat - Inhabitants stayed uncertain for long time	Cormont and Bijnsdorp (2015), Mathlener and Houwelingen (2011) - NPO-KRO (2015) - NPO-KRO (2015), Rooy (2015), Cormont and Bijnsdorp (2015)

		- Province clarified doubts of inhabitants - Many new aspects of planning process were debated by governmental authorities and inhabitants - Agreement for clear communication between OPIG and governmental authorities	- Rooy (2015), Roth and Winnubst (2010) - Winnubst (2011) - Rooy (2015)
Institutional memory	+2	- Extensive documentation of process - Observed patterns and inventions out of the learning processes are described in many publications by Habiforum	- Rooy (2015)
Visionary leadership	+2	- Jan Boelhouwer convinced the inhabitants to come up with their own plan and announced the 'terps plan' at the Water Vision Group - Monique de Vries embraced the 'mirror project' to improve debate about potential future flood risk - Habiforum introduced an approach for the process emphasizing the importance of having a shared outlook or goal	- Mathlener and Houwelingen (2011) - Rooy (2015) - Rooy (2015)
Entrepreneurial leadership	0	- OPIG change the opposition of the inhabitants towards a constructive attitude and took initiative in the development process - Group of people with a drive to propel the process forward during entire process - Resistance of national and provincial authorities	- Roth and Winnubst (2010), Mathlener and Houwelingen (2011) - Rooy (2015) - Roth and Winnubst (2010), Winnubst (2011)
Collaborative leadership	+1	- Peter van Rooy as mediator important for collaboration between inhabitants and government authorities, and communicated directly with politicians - Involvement of the Water Vision Group build a coalition to improve the development process - Weak collaborative link between the province and Rijkswaterstaat	- Roth and Winnubst (2010) - Rooy (2015) - Winnubst (2011)

The aggregated results of the criteria are given in a score for the dimensions learning and leadership. The average score of the dimensions leads to the score of adaptive capacity. This is displayed in the wheel of Figure 7.

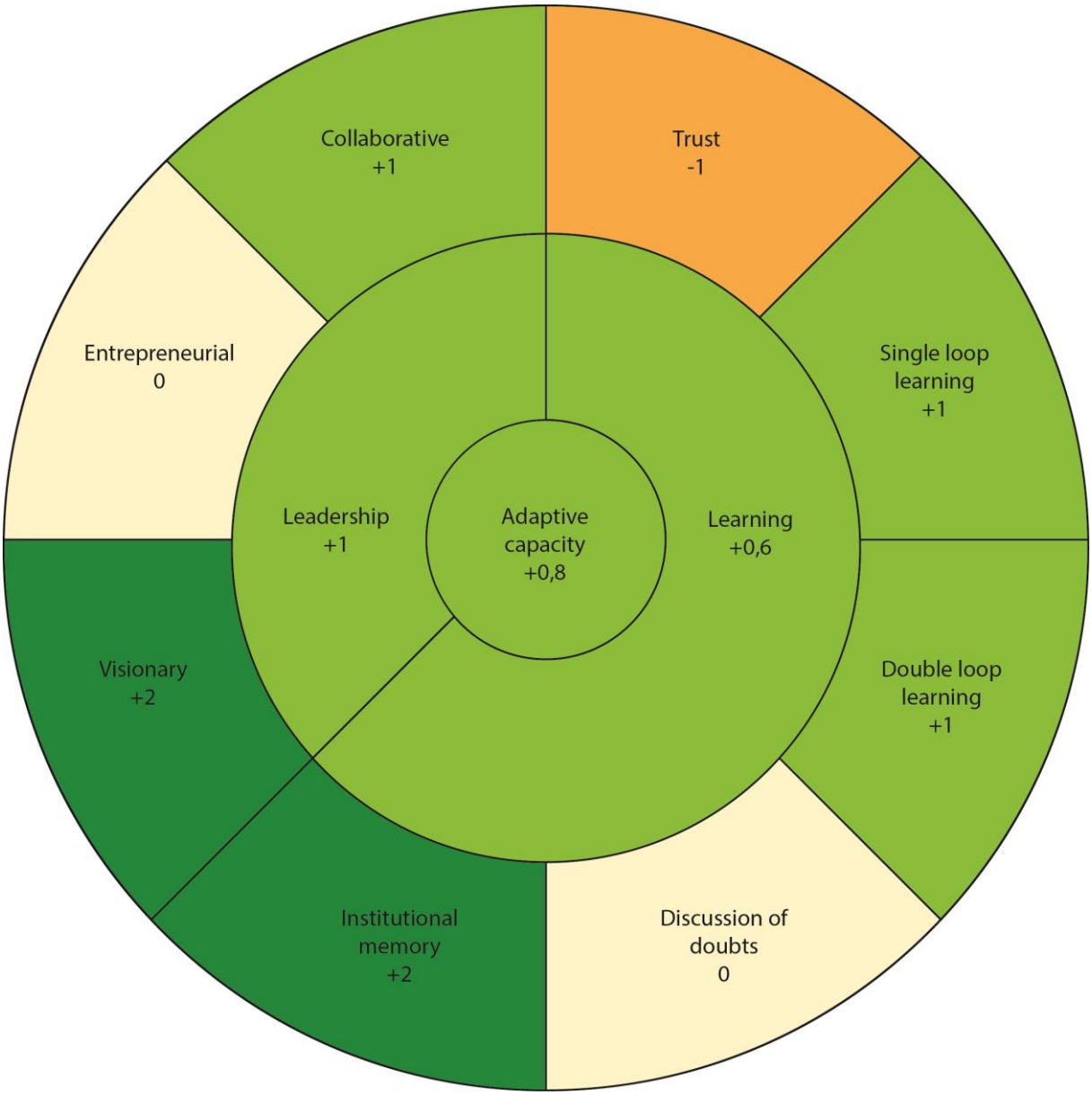

Figure 7 Summarized wheel of criteria, dimensions and adaptive capacity for the Overdiepse Polder, according to the secondary documents.

5. Conclusion and discussion

5.1 Summarized results

The analysis of criteria by interviews and secondary documents ensures all relevant information about learning and leadership is obtained. This means the analysis is thoroughly and reliable. Now, I will explain some noticeable differences between the two analyses. Thereafter, I elaborate on remarks and summarize the most important aspects that came forward in the analysis. By doing this, I give insight in the major issues enhancing or hampering adaptive capacity at the Overdiepse Polder. This is done point by point for every criterion. A concluding wheel is also given at the end (see Figure 8).

Remarks about analysis

In general, small contradictions are seen between the analysis of the interviews and the analysis of the secondary documents. Some aspects are only mentioned in one of the two data sources. However, this is not remarkable because some aspects are very profound. Also the goal of analysing the criteria two times was to collect specific aspects of information. Most aspects come forward in both data sources. The score of the criteria does not differ a lot between the two analyses. However, there are several striking aspects which I will discuss briefly.

Only two criteria are scored differently between the two analyses. First, single loop learning got a rate of +2 by the interviews and +1 by the secondary documents. The main reason for this is that in the interviews only positive aspects of single loop learning are emphasized, like consultation possibilities and good communication. However, the secondary documents explain also the rigidity of some institutions about governmental regulations and the inability to improve routines. This is why, according to the secondary documents, a score of just +1 is given. The fact that this is not appointed in the interviews can be explained by two reasons: this was not specifically asked and interviewees perhaps did not want to emphasize this.

Secondly, discussion of doubts has a score of -1 for the analysis of the interviews and 0 for the secondary documents. The motivations for the two analyses are almost equal. However, in the analysis of the secondary documents discussion about new aspects is emphasized more. This is due to the ‘forerunner’ status of the project. This is a positive aspect of the discussion of doubts, leading to a higher score. Because of little attention of this aspect in the interviews this is not mentioned in the analysis of the interviews.

The last remarkable aspect of the analyses can be seen in the criterion entrepreneurial leadership. In the analysis of the interviews the leading role of the province during the process is emphasized. On the other hand, the secondary document explains that the province focused too little on experimenting and taking initiative (Roth and Winnubst, 2010). This was probably not mentioned in the interviews because it is a specific and negative aspect of the province. Additionally, as the document explains, the province appointed a new project leader in 2006 to improve this. Perhaps, this is not mentioned in the interviews because this is almost ten years ago.

Now, I summarize the most important aspects per criterion, given by the two analyses.

Trust

- Trust was absent between the inhabitants and the governmental authorities in the first years because the inhabitants were overwhelmed by the plans to inundate the polder. Later on the negotiation about compensation was a source of distrust between the two. However, several actions were taken to improved the trust, like the involvement of the OPIG in the official counselling group and the appointment of a new project leader by the province to improve the communication with the inhabitants.
- The new relation between Rijkswaterstaat and the province led to some distrust. According to Rijkswaterstaat they were not always fully involved in the planning process by the province because the province claimed the project for themselves and tried to make a common enemy of Rijkswaterstaat. On the other hand, the province pointed out that Rijkswaterstaat did not want the project being led by the province because Rijkswaterstaat normally executed these large area developments. Collaboration proved difficult for them to achieve because a tolerant atmosphere where trust could grow was absent (Winnubst, 2011).

Single loop learning

- Several occasions allowed single loop learning to take place. For instance, the continuous learning path by Habiforum which made reflecting on working methods possible. The content of the project was not the topic in these conversations but the way everyone worked together. There was room to apply improvements of routines directly. Additionally, informal and open communication between the local authorities and the inhabitants allowed single loop learning to occur. An example is the SNP-consultation between the frontmen of the OPIG, province and Peter van Rooy. However, there still was stiffness of governmental regulations and inability to improve existing routines, leading to delay and unnecessary costs, according to Peter van Rooy.
- The Overdiepse Polder was a new process and therefore called ‘mirror’ and ‘forerunner’ project, meaning that learning from new issues was important to improve following cases. There was room to improve practical routines and attention for learning how to deal with specific (theeting) problems.

Double loop learning

- Intensive citizens participation, like the involvement of the OPIG in the official counselling group and decentralization of responsibilities between national and regional governments are aspects of double loop learning. The institutions at the Overdiepse Polder allowed the change of these underlying institutional patterns. The network management method, introduced by Habiforum, improved the double loop learning.
- However, in both cases this did not come easily because of opposition from governmental authorities who sometime stuck to old mindsets. The province focussed in conflicts too much on regulation and risk avoidance instead of experimenting. Rijkswaterstaat wanted to keep control over the project as they were used to, although it was decentralized to the province.

Discussion of Doubts

- The exclusion of inhabitants in the discussion about the first plans the use the Overdiepse Polder as water storage area is an aspect of poor discussion of doubts. Because the inhabitants were not involved the ‘terps plan’ was initially not invented.

- On other occasions a lot of discussion took place. For instance, the former Secretary of State asked the regional directors to give the national government advise about what they wanted in relation to the Room for the River program. This alignment led to increased consensus between different levels of governmental authorities. The governmental authorities and the OPIG also debated multiple aspects, for instance how to deal with new issues like the compensation.
- Rijkswaterstaat thoroughly examined the costs and efficiency of the 'terps plan' in comparison to alternatives. This took away doubts about the functioning of the 'terps plan'.
- Continuing uncertainty about several aspects, like the timeframe of the project, hampered the business operations of the farmers. The province was able to clarify some doubts of the inhabitants but could not take away all uncertainties.

Institutional memory

- The policy experiences of the Overdiepse Polder are documented in various ways, like books, videos and (news) articles. This improves the possible application of observed patterns and inventions in following cases.

Visionary leadership

- Provincial executive Jan Boelhouwer convinced the inhabitants to come up with their own plan, announced the 'terps plan' at the Water Vision Group and promoted the plan of the inhabitants at the national government. By doing this, he convinced others to anticipate the future, involved other reformist leaders and communicated a personal commitment.
- Peter van Rooy had clear vision in mind, namely to make it possible for the farmers to stay in the polder by an innovative solution. He also communicated personal commitment to the farmers. Besides that, Habiforum introduced a process approach emphasizing the importance of having a shared outlook or goal.

Entrepreneurial leadership

- The province explicitly took the lead. They made a great effort to get the 'terps plan' approved by the national government and got the financial recourses that were needed.
- The OPIG has changed the opposition of the inhabitants towards a constructive attitude and took initiative in the development process. Therefore, they were able to develop and implement their own 'terps plan'.
- Rijkswaterstaat, the waterboard and municipalities opposed in the beginning to the involvement of the local inhabitants in the planning process. This led to a struggle which hampered the progress of the project.

Collaborative leadership

- Both the frontmen of the OPIG and Peter van Rooy were very important for the collaboration between the inhabitants and the government authorities. For example, the frontmen of the OPIG represented the inhabitants in the official counselling group and Peter van Rooy had the role of mediator during the process. Peter van Rooy also used his network of people to propel the process forward when needed.
- The collaborative link between the province and Rijkswaterstaat was weak during the Overdiepse Polder process. The interaction between these authorities led to debate and conflict as a result of recurring disputes in the area of responsibility (Winnubst, 2011).

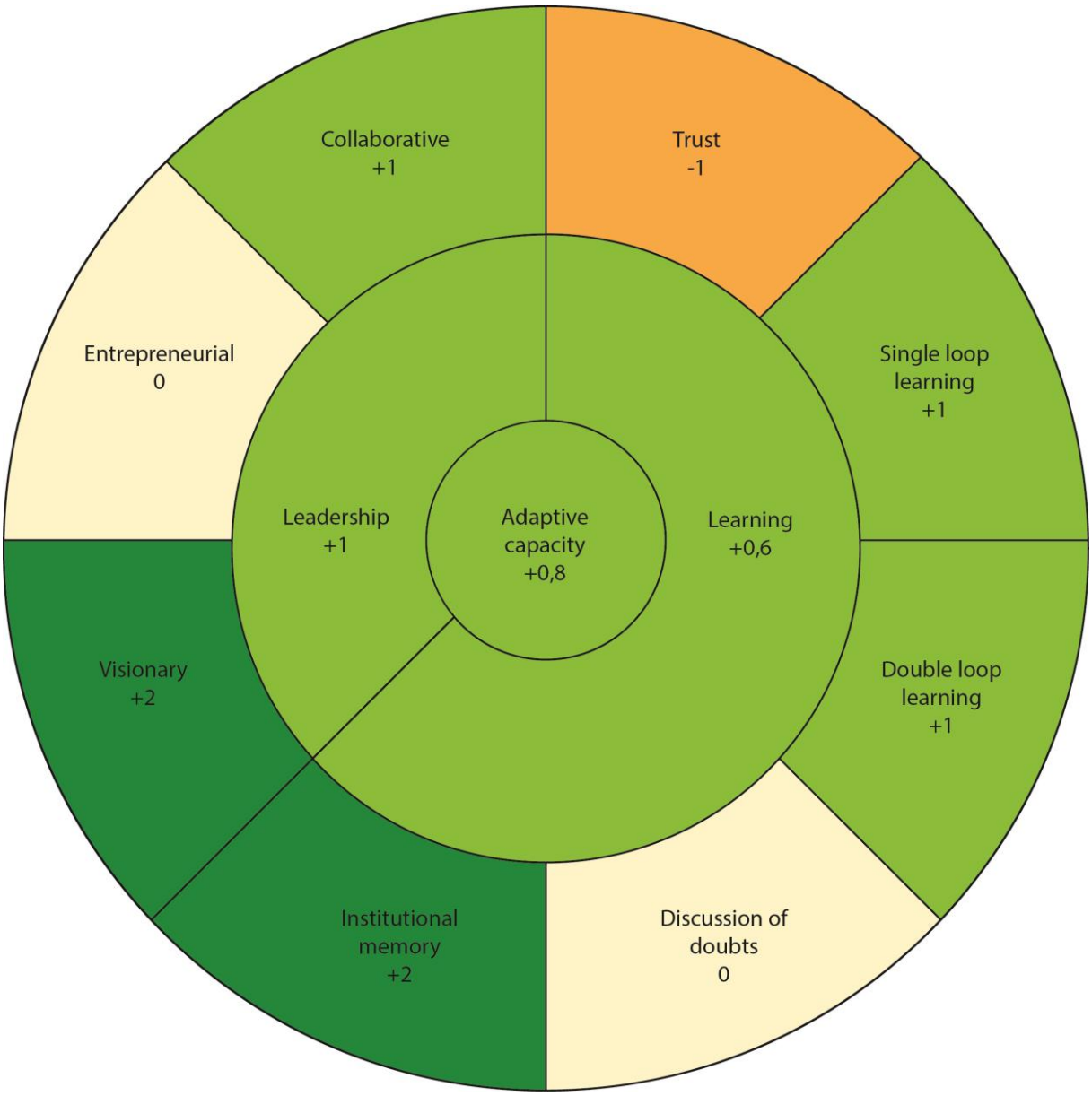

Figure 8 Aggregated results of criteria, dimensions and adaptive capacity for the Overdiepse Polder.

5.2 Conclusion

Based on the results, I can now reflect on the conclusion of the main question of this bachelor thesis:

The goal for this research is to analyse the adaptive capacity of the flood risk management of the Overdiepse Polder case by assessing learning and leadership of the institutions involved. By doing this, more insight in adaptive capacity is obtained, which will help institutions to adapt to the uncertain future of climate change.

Learning (+0,6) and leadership (+1) of the Overdiepse Polder both have a slightly positive result (see Figure 8). According to these dimensions, the adaptive capacity of this case is also slightly positive (+0,8). On the basis of this, I can conclude that the institutions of the Overdiepse Polder case were

reasonably capable to promote climate proof planning for flood prone areas. The historically grown planning institutions allowed, to a limited extent, learning and leadership in this process.

This conclusion is based on quantitative results of the analysis, namely the scores given to the criteria. Despite numbers are appointed to give an overview of the results, this thesis remains a qualitative research. The comprehensive assessment of two dimensions of the Adaptive Capacity Wheel makes it possible to distinguish positive and negative aspects of adaptive capacity in this case study. For this reason, I elaborate on the actual conclusions of the interviews and secondary documents in the next section. Additionally, I zoom out from the criteria back to adaptive capacity in order to explain the essence of these aspects for this case.

Distrust between some organisations was a weak point of learning. This means that these participants did not act together more effectively to pursue shared objectives which hampered adaptive capacity (Putnam, 1995).

There was room for single loop learning. Institutions learned from past experiences and improved their routines, which is important to adapt to new situations. For instance different consultation possibilities to figure out small problems. However, there still was stiffness of governmental regulations and inability to improve existing routines. This also affected the double loop learning because governmental authorities stuck to old mindsets. On the other hand, two major aspects of new institutional patterns were seen in this project: intensive citizens participation and decentralisation of responsibilities by governmental authorities. Double loop learning is important for adaptive capacity because this is, in essence, the ability to rethink institutional patterns and to do things rather differently (Gupta et al., 2010).

The effect of the discussion of doubts on the adaptive capacity at the Overdiepse Polder was neutral because of several positive and negative aspects. It is important to discuss uncertainties in complicated dynamic events (Weick & Sutcliffe, 2011). Exclusion of the inhabitants in the making of the first plan and the continuing uncertainty for the farmers are therefore negative aspects for adaptive capacity. However, the national government involved the regional governments in the making of the Room for the River program and Rijkswaterstaat examined alternative options for the Overdiepse Polder. This improves the adaptation. Additionally, the extensive documentation of the process improves the adaptive capacity of institutions because future policies can be linked to the experiences of this case (Folke, Hahn, Olsson, & Norberg, 2005).

Leadership is important for adaptive capacity as driver for change, showing a direction and motivation for others to follow (Gupta et al., 2010). Visionary leadership had a positive effect on adaptive capacity because of the efforts of Jan Boelhouwer and Peter van Rooy. The effect of entrepreneurial leadership was neutral. The province clearly took the lead and the OPIG stimulated actions and undertakings. However, several governmental authorities opposed the process in the beginning. This hampered the progress of the project and was therefore negative for adaptive capacity. Collaborative leadership in this case had a slightly positive effect on adaptive capacity. The OPIG and Peter van Rooy improved the collaboration between the inhabitants and government authorities and therefore improved adaptation (Folke et al., 2005). On the other hand, the

collaborative link between the province and Rijkswaterstaat was weak during the Overdiepse Polder process which hindered the adaptive capacity.

Associated research

The Overdiepse Polder process was part of the Room for the River program. This research is scientifically relevant because it contributes to the literature on Room for the River and to the subject of institutional dynamics in water management. This thesis reveals difficulties of achieving adaptation by giving examples of this case study. This improves the understanding of flood risk management. Next, I exemplify on other research that is associated with this thesis to demonstrate this case study contributes to the scientific literature.

First, Buuren, Keessen, Leeuwen, Eshuis and Ellen (2015) also assessed the case of the Overdiepse Polder in order to reveal the main characteristics affecting the adaptability of institutions. By scoring five criteria they compared the flexibility of arrangements for climate adaptation of nine cases (Buuren et al., 2015). By comparing their result with this research several similarities can be seen. Buuren et al. (2015) found that the adaptation from an interaction perspective was positive because of the flexible process during the development phase and the involvement of inhabitants. These result are also seen in this thesis. In this thesis, the flexibility of the process is addressed in the criteria single and double loop learning. These criteria, which are scored slightly positive, assess whether institutions allow changes in routines or underlying patterns. However, rules about compensation were binding and not flexible, according to Buuren et al. (2015). This conclusion contradicts the results of this research because this research found that the discussion about compensation had a positive effect on adaptive capacity. This is because institutions allowed adjustment of the implementation of the compensation arrangement. Unfortunately, Buuren et al. (2015) do not further elaborate on this conclusion but it shows cases can be interpreted differently.

Secondly, Edelenbos and Teisman (2013) explain the complex nature of water management as a result of the multiplicity of levels, sectors and stakeholders. They draw several conclusions to improve the governance capacity to act between these levels, sectors and stakeholders (Edelenbos & Teisman, 2013). They found, for instance, that the combination of top-down and bottom-up governmental authority and the aim for each level to add value are important for water management (Edelenbos & Teisman, 2013). This is associated to this thesis because I explain the division of roles and responsibilities between Rijkswaterstaat and the province at the Overdiepse Polder case, which is an example of the multiplicity of governmental levels in water management. Edelenbos and Teisman (2013) also explain the importance of trust and public-private alliances in water management. These aspects are also extensively assessed in this research.

Thirdly, Herk (2014) gives recommendations for governmental arrangements to provide for IWRM. He elaborates on the importance of trust, learning and the seizing of opportunities from a dynamic context (Herk, 2014). This research supports this standpoint. The aspects trust and learning are extensively explained for the Overdiepse Polder. By involving the inhabitants extensively, institutions allowed an opportunity, which is the presence of the inhabitants, to be seized. Herk (2014) also exemplifies that the collaboration structure must be fit-for-purpose. This means different individuals and organisations take a role that fits them best. This also came forward in the Overdiepse Polder case, for example the leading role of the province or the involvement of the inhabitants. As

demonstrated above, this thesis is associated with the literature and contributes to scientific knowledge of flood risk management.

5.3 Discussion

Several aspects of this research are important to discuss afterwards. First, only two dimensions of the Adaptive Capacity Wheel are reflected on the institutions of the Overdiepse Polder process: learning and leadership. Therefore, several other dimensions are not addressed. However, some criteria are included in learning or leadership because they were important for this case. For instance, the involvement of multiple actors, levels and sectors which is a criterion of variety in the Adaptive Capacity Wheel. This aspect comes forward in the participation of inhabitants and is addressed in the criterion double loop learning. On the other hand, this research could be extended by assessing more dimensions of the Adaptive Capacity Wheel. By doing this, more thorough conclusions about adaptive capacity of the Overdiepse Polder can be made.

Secondly, some criteria might be interpreted differently. I discussed my result with Dr. M. A. van den Brink, an expert on the Adaptive Capacity Wheel. In general, she agreed with most of my interpretations. However, whereas I assess intensive participation of inhabitants in the process as an indicator for double loop learning, she suggested this is more appropriate as an issue of single loop learning. She argued that, in general, the involvement of citizens already exists for some time. The well-known ladder of citizens participations was indeed developed almost 50 years ago (Arnstein, 1969), showing citizens involvement is not a new concept. On the other hand, the way inhabitants were extensively involved in the official counselling group was revolutionary and a total new institutional pattern, according to the interviews with the province and the waterboard. For this reason I found that the extensive citizens involvement is a change in the underlying institutions and considered it as double loop learning in this research on the Overdiepse Polder.

Another critical remark is the time gap. The area development of the Overdiepse Polder started in the year 2000 and was completed in 2015. This means the entire process is assessed in this research but several interviewees had to recall experiences of more than ten year ago. One can argue that this is too long because it can have an effect on the reliability of the interviews. However, most interviewees gave the impression this was not a problem because they explained without trouble different aspects of the process. Additionally, it is possible that the experience of the process has changed over the years. In other words, interviewees can today think more positive or negative about issues compared to ten years ago. This possibility was not taken into account in the conducting of the interviews.

The analysis focusses primarily on the development phase, despite three of the eight interviewees (waterboard and both municipalities) were more involved in the implementation phase. However, the period between 2000 and 2010 is most relevant for adaptive capacity because in this phase the more fundamental decisions were made that differ from other area developments. For this reason, the development phase is more interesting to examine institutional dynamics of flood risk management. This does not mean these three interviews were not significant for the research. Because these interviews were the first conducted, they gave good first insights in the development process. Additionally, the project leader of the waterboard was able to exemplify several aspects of the development phase.

5.4 Recommendations

As the final part of this thesis I give recommendations for following research and for the practice of water management.

Research

The Adaptive Capacity Wheel was a good method to analyse the Overdiepse Polder. The wheel gives clear dimensions and criteria which help to structure the research. Besides that, a positive aspect of the Adaptive Capacity Wheel is the possibility to adjust it. The method can be enlarged by fitting more categories to the wheel, like the inclusion of psychological factors as done by Grothmann, Grecksch, Winges and Siebenhüner (2013). The Adaptive Capacity Wheel also gives the possibility to assess only a few dimensions, provided that this is explained properly. This is an advantage for a bachelor thesis because one can customize the methods to fit within the framework of a thesis. A negative aspect of the Adaptive Capacity Wheel is the difficulty to link criteria to the practice. One must thoroughly comprehend the criteria when conducting the interviews and analysing the data. This is because some aspects, like trust or single and double loop learning, are rather abstract. This makes it difficult to identify the criteria out of the interviews. Good preparation of interviews and operationalization of the criteria and the asking for practical examples is therefore crucial for the proper applying of the Adaptive Capacity Wheel.

In this research the analysis of the interviews and the analysis of the secondary documents is done separately. By doing this a clear distinction is made in the data triangulation. However, I found this separation not strictly necessary because few contradictions were seen between the two analyses. Despite that, it is important to collect different types of data like interviews and secondary literature. When all possible data are collected, the separation of analyses makes little difference and is therefore not necessary. Furthermore, one can argue that, because interviewees have to recall experiences of more than ten years ago, it is better to integrate the two data sources. An iterative analysis of interviews and documents can help to ensure all possible data are collected. Future research is therefore not recommended to separate the analyses.

Another recommendation for further research is to expand the assessment of the Overdiepse Polder with the remaining dimensions. Although this research gives a comprehensive assessment of adaptive capacity it was not complete because four dimensions of the Adaptive Capacity Wheel were not investigated. By assessing the remaining four dimensions a total view of adaptive capacity of the Overdiepse Polder can be made. It is also interesting to compare this case study to other cases, for instance the analysis of other Room for the River projects. By doing this, similarities and differences between cases can be discovered. This improves the general understanding of the institutional dynamics of large flood risk projects.

Practice of water management

The recommendations for the practice of water management make this thesis socially relevant. First, in large area developments, like the Overdiepse Polder, it is important to take advantage of available opportunities. By seizing opportunities new and innovative solutions can be found. These opportunities can be various, like the presence of persons, organisations or physical aspects. Institutions must provide room to accommodate these opportunities. An example of the Overdiepse Polder is the development of the ‘terps plan’ by the local inhabitants which led to an innovative

development in flood risk management. The exclusion of certain individuals or organisations in general must therefore be avoided because this can decrease the occurrence of opportunities. This would hamper innovation.

Other important aspects for the practice of water management are several criteria used to analyse this case study. Trust is important for a productive relationship between individuals and organisations. Investing in a good relationship is therefore recommended. For instance, providing the same opportunities for local inhabitants in major area developments and clear communication about responsibilities can improve trust. Room for single loop learning is important for institutions to improve their routines. At the Overdiepse Polder, for example, this was done by active reflection on working methods by Habiforum and the possibility to adjust routines directly. Institutions must allow double loop learning as well because this is fundamental for adapting to new circumstances. Releasing old mindsets, for instance by involving inhabitants in official consultation, is crucial for double loop learning. The discussion of possibilities, doubts and uncertainties is also necessary. These aspects all contribute to the adaptive capacity of institutions to adjust to climate change. As can be seen in the Overdiepse Polder case regular discussion is important for adaptive capacity but exclusion of inhabitants and the uncertainty of inhabitants must be avoided. Proper documentation of processes must be stimulated so that future projects can learn from experiences. The book of Peter van Rooy is an example of this because it describes the process in detail.

Institutions must also allow different forms of leadership. Leadership drives institutional change because leading people propel new ideas in various ways. Visionary, entrepreneurial and collaborative leadership are all important for adaptation to occur. Institutions must encourage people who show commitment and encourage others. These aspects of visionary leadership were, for example, demonstrated by the provincial executive Jan Boelhouwer. Entrepreneurial leadership, like the inventing of the ‘terps plan’ by the inhabitants must also be stimulated. Governmental authorities must not oppose innovative solutions, like this was done in the beginning of the Overdiepse Polder project. At last, proper collaboration between organisations and individuals is important. Persons who improve collaboration between organisations must be stimulated, like the role of the OPIG to represent the inhabitants and the role of Peter van Rooy as mediator.

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Illustrations

Cover: Rudolf Das (2008)

Figuur 5: Noord-Brabant. (2009). *Rivierverruiming Overdiepse Polder.* Inpassingsplan Overdiepse Polder (concept 14 april 2009). Vastgesteld door Provinciale Staten Noord-Brabant. Retrieved 5 June 2016 from: https://www.brabant.nl/politiek-en-bestuur/provinciale-staten/vergaderingen-ps/ps/20090605/download.aspx?qvi=29678

Appendix: Interview guide

Wat wil ik weten?

Het doel van de interviews is om de twee aspecten van het Adaptive Capacity Wheel, learning en leadership, te analyseren, zoals dit in de onderzoeksvragen is benoemd. Aan de hand van deze criteria wil ik de adaptive capacity van de Overdiepse Polder uiteindelijk kunnen beoordelen. Daarom zal ik voor de acht subgroepen (trust, single en double loop learning, discussion of doubts, institutional memory en visionary, entrepreneurial en collaborative leadership) vragen in welke mate deze aanwezig waren. Belangrijk hierbij is dat concreet naar aspecten uit het plan- en ontwikkelingsproces gekeken wordt en er dus voorbeelden van deze subgroepen aan het licht komen. Aan de hand van de uitleg van de geïnterviewde, moet ik inzicht krijgen in deze aspecten en ze uiteindelijk een score kunnen. Op deze manier moet ik uiteindelijk een score kunnen geven van -2, -1, 0, 1 of 2, wat dan respectievelijk betekend dat het criterium niet, matig, voldoende, ruim voldoende of sterk aanwezig was.

Waarom wil ik dat weten?

Ik wil inzicht krijgen in deze acht aspect van learning en leadership om de adaptive capacity van de Overdiepse Polder te kunnen beoordelen. Hierdoor ontstaat inzicht in het aanpassingsvermogen van instituties bij dergelijke planologische vraagstukken op het gebied van overstromingsrisicomanagement. Via deze interviews krijg ik beter inzicht hoe adaptive capacity verbeterd kan worden voor toekomstige processen.

Wat is de theoretisch gedachte achter mijn vragen?

Zoals eerder vermeld volg ik in het interview de deelaspecten van learning en leadership zoals deze in het Adaptive Capacity Wheel genoemd worden. Omdat veel begrippen van deze subgroepen abstract en lastig te interpreteren zijn, is het van belang dat ik deze subgroepen begrijpelijk uitleg aan de geïnterviewde. Hiervoor gebruik ik de uitleg van deze begrippen uit de operationalisatie. Ik zal de acht aspecten één voor één behandelen in het interview. Hierdoor kan ik elk onderwerp eerst kort uitleggen als het voor de geïnterviewde niet duidelijk is.

Opbouw interview

Aangezien het een semi-gestructureerd diepte interview is, heb ik een aantal inleidende vragen voorbereid, maar zal ik vooral ook doorvragen naar aspecten die verteld worden. Aan de hand van deze eerste vragen, en wat de geïnterviewde hierop antwoord, probeer ik zoveel mogelijk relevante informatie te verkrijgen over adaptive capacity van de Overdiepse Polder. Ook de introductie en afsluiting van het interview heb ik voorbereid, aangezien hier een aantal belangrijke aspecten in terug komen die verteld moeten worden.

Introductie

Welkom meneer (…) bij dit interview in het kader van mijn bachelor scriptie over de Overdiepse Polder. Allereerst wil ik u vragen of u ermee akkoord gaat dat ik dit interview opneem? Dit doe ik om het achteraf te kunnen analyseren. Ik zal de opnames daarom ook vertrouwelijk gebruiken.

Het gesprek zal ongeveer een uur duren. Ik ga mijn best doen om binnen deze tijd het interview af te ronden. Mocht u op vragen geen antwoord willen geven, dan mag u dat aangeven en gaan we door naar een volgende onderwerp.

Ik ga u een aantal vragen stellen over het proces rondom de ontwikkeling van de Overdiepse Polder. Mijn doel is om uiteindelijk de 'adaptive capacity' van de instituties te analyseren. Deze 'adaptive capacity' is dus een soort eigenschap van instituties die bepaald in welke mate ze in staat zijn zich aan te passen veranderende situaties, zoals bij de Overdiepse Polder het omgaan met hogere rivierafvoeren. Om dit te analyseren gebruik ik een methode die 'adaptive capacity' opdeelt in een aantal categorieën en subcategorieën. Naar deze (sub)categorieën zal ik vragen in dit interview.

Inleidende vragen

-Wat was uw rol?
-Hoe heeft u het proces ervaren?
-Wat was er nieuw als je het vergelijkt met andere projecten, en hoe is daarmee omgegaan?

Hoofdonderwerp learning

Vertrouwen:

-Hoe verliep de samenwerking?
-Waren er veel bijeenkomsten, en hoe verliepen die?
-Was vertrouwen belangrijk?
-Hoe zou u het vertrouwen omschrijven binnen het proces?
-Was er volgens u sprake van wederzijds respect?

Single loop learning:

-Was er aandacht voor het verbeteren van het proces?
-Werd het proces rondom de Overdiepse Polder geregeld geëvalueerd?
-Zijn er andere methoden gebruikt om het proces te versoepelen?

Double loop learning:

-Zijn er nieuwe werkwijze of grondslagen toegepast in het proces?
-Hoe is dit verlopen?

Onzekerheden:

-Waren er vaak onzekerheden, en hoe werd hiermee omgegaan?
-Werden er geregeld vraagtekens gezet bij aspecten van het planproces?
-Heeft u het idee dat instituties aspecten van het proces opzettelijk voor zichzelf hielden?
-Werd tegenover de belangenorganisatie van de bewoners openlijk over onzekerheden gesproken?

Vastlegging van proces:

-Op wat voor manieren werd het proces vastgelegd?
-Denkt u dat dit voldoende is geweest?

Hoofdonderwerp leadership

Uitstralen van visie:

-Wat waren volgens u de belangrijkste personen bij dit proces, en waarom?
-In hoeverre werd er naar de lange-termijn gekeken, en was dit volgens u voldoende?
-Waren er personen of organisaties die hierin het voortouw namen?

Ondernemen en aanpakken:

-Zijn er personen geweest die gefocust hebben daadwerkelijk voor elkaar krijgen van aspecten in het proces, of die opstonden als het proces vastliep?
-Op welke manier deze zij dit?

Samenwerking:

-Zijn er personen geweest die de samenwerking tussen partijen verbeterd hebben?
-Op welke manier hebben zij dit gedaan?

Overige vragen:

-Wat is verder nog belangrijk?
-Wat zijn volgens u de drie belangrijkste punten die de uitkomst van Overdiepse Polder bepaald hebben?

Afsluiting

Inhoudelijk over het proces was dit het laatste wat ik graag wilde weten. Vindt u het goed als ik u mail, wanneer bij mijn analyse blijkt dat ik nog iets aanvullends wil weten? Heeft u documenten/rapporten voor de Overdiepse Polder die ik kan lezen? Als u wilt, kan ik het uitgetypte interview naar u toesturen, mocht u het willen controleren. Tevens zal ik u het eindrapport van mijn scriptie sturen, zodat u de resultaten van mijn onderzoekt kunt inzien.

Een laatste vraag van mijn kant is of u nog aanvullende personen heeft die u mij aanraadt om mee te praten? Tot nu toe heb ik gekozen om naast u (…), (…), (…) etc. te interviewen.

Heeft u nog vragen aan mij?

Dan wil ik u graag bedanken voor dit interview wat een belangrijk aspect is van mijn onderzoek!

Opname apparatuur

Voor het opnemen van de interviews gebruik ik mijn telefoon. Deze is getest en werkt. Voor het telefonische interview gebruik ik een applicatie die telefoongesprekken opneemt. Ook deze is getest en werkt.

Overig

Belangrijk tijdens het interview is door te vragen wanneer de geïnterviewde korte antwoorden geeft, of wanneer ik meer wil weten van een onderwerp. Tevens is het belangrijk om naar voorbeelden te vragen van situaties tijdens het proces. Dit maakt de analyse achteraf concreter en duidelijker.

Evaluatie interviews

Na elk interview zal ik het gesprek kort evalueren voor mijzelf. Op die manier kan ik de volgende interviews verbeteren. Hierbij kijk ik naar de volgende aspecten:

- Was de introductie goed? Wat kan verbeterd worden?
- Heb ik voldoende diepte informatie verkregen? Hoe had dit beter gekund?
- Waren de vragen duidelijk voor de geïnterviewde?
- Is de volgorde van de vragen goed geweest?
- Was de afsluiting van het interview goed?