DRAWING LESSONS FROM LEARNING

A reflection on enabling conditions for social learning in multi-level flood risk governance arrangements

ruimte voor de rivier

Research partners

Rijkswaterstaat
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Universiteit Utrecht

Copernicus Institute of Sustainable Development

Colofon

Author	Jacomien den Boer (3575950)
Organization	Utrecht University, Faculty of Geosciences, Copernicus Institute of Sustainable Development.
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Supervisors	Dr. Carel Dieperink, Utrecht University Cor Beekmans, Rijkswaterstaat, Room for the River program office
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The photos in this report are made available by the Room for the River program office, Rijkswaterstaat.

RIVER WIDENING

A river consists of
water and time.
Too much of one
equates to too little
of the other. Somewhere
in the middle it flows
onwards, between the
banks of flood and desert.
If water melts elsewhere,
time starts ticking here.
The water goes around,
always comes back, time
disappears into a hole
and that is us, temporary
beings with a sense
of a passing nature,
armed with sense
for future and past,
we cycle on top of the dike
and point to left and right
into low land: look,
Napoleon stood over there
and here it was extended
for flood to come, a
reservoir ahead of his time,
full of space for high water.

RIVIERVERRUIMING

Een rivier bestaat
uit water en tijd.
Te veel van het één
komt neer op te weinig
van het ander. Ergens
in het midden stroomt
het voort, tussen de oevers
van zondvloed en woestijn,
Als het water elders smelt,
gaan hier de klokken lopen.
Het water gaat rond,
komt altijd terug, de tijd
verdwijnt in een wak
en dat zijn wij, tijdelijke
wezens met een bewustzijn
van voorbijgaande aard,
gewapend met gevoel
voor toekomst en verleden
fietsen we hoog over de dijk
en wijzen links en rechts
het laagland in: kijk,
daar stond Napoleon
en hier werd het verruimd
voor vloed die komen moet
een reservoir, zijn tijd vooruit
vol ruimte voor hoogwater.

Ingmar Heytze

Adapted from Ingmar Heytze's *Rivierverruiming*
This poem was written on the occasion of the festive delivery
of the Room for the River project Room for the Lek, Vreeswijk, May 12th , 2016

PREFACE

Luctor et emergo

When studying sustainable development, the entire world is your object of research. Sustainability cuts through the borders of disciplines, methods and time. Safeguarding our planet and preserving its resources for future generations has never been a more relevant task. None of the resources is determining life more than water, especially in our Dutch delta. We depend on it, but water is as much our enemy as our friend. It has brought us wealth, but also loss. This everlasting fight and the capricious character of our water has inspired me to focus on the topic of flood protection for this research.

At the start of my masters, I decided I wanted to write a research report that would have a strong relation with the outside, world, instead of only having a meaning within the walls of the university and getting me a diploma. I was curious for the world of flood protection projects, and after some wandering around in the Rijkswaterstaat-world, my thesis proposal on learning for integrated flood risk management was accepted and turned into an internship at one of the most prestigious and successful Dutch program of the last decades: Room for the River.

I am grateful I got the opportunity to do this research at the Room for the River program bureau. I am very much impressed by the huge effort that was put in the program, by a group of dedicated people. They were willing to share their enthusiasm, experiences and stories to make this research a success. Many thanks to the respondents that were eager to join in the interviews and share their lessons learned. Without them, this research hadn't been possible.

Many other people put time and effort in this report as well. I want to thank a few people in particular: Cor Beekmans, thank you for sharing your views and ideas for direction of this research. Sander Greter, thank you for sharing your thesis-experiences and your sharp eye. Johan de Boer and Jade Wissink, thank you for you practical help. Carel Dieperink, thank you for being positive about my research and helpful with feedback.

I hope reading this report may transfer just a bit of the fun it was to do this research. Enjoy reading it!

Jacomien den Boer

Wageningen, December 17th, 2016

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ABSTRACT

This thesis presents a detailed analysis of social learning conditions in the 2.3 billion euro integrated flood risk management (IFRM) program Room for the River (RftR). This research aims to conceptualize social learning for IFRM and consequently identify enabling conditions for social learning in this context. An IFRM approach is characterized by a multi-level governance structure and integration of multiple objectives (e.g. spatial planning and flood protection). By using literature on adaptive co-management, sustainable land and water management and IFRM, social learning for IFRM was conceptualized. A list of enabling conditions for social learning originating from this literature was drawn up and tested for the specific context of an IFRM program, by addressing learning in the multi-level governance structure. The learning experiences in the program were analyzed in order to identify the conditions that enable social learning. Methods applied in this research are document analysis and semi-structured interviews with professionals in the program. Lessons learned for IFRM are how to integrate flood protection measures and riverine area development, on multiple levels and scales. It was found that among others, a strong personal commitment to learning and mutual trust in working groups are important preconditions for successful social learning. Conditions hindering social learning are political indecisiveness and stereotypical thinking. Recommendations for future flood protection programs are focusing on facilitation of exchange of experiences and creating an organizational environment committed to learning.

SAMENVATTING

Deze scriptie bevat een gedetailleerde analyse van condities die sociaal leren beïnvloeden. Het doel van dit onderzoek is het creëren van een bruikbaar concept van sociaal leren en een lijst met condities die sociaal leren mogelijk maken. De context van het onderzoek is het programma Ruimte voor de Rivier (RvR), een voorbeeld van programma waarin integraal (hoog)waterbeheer (IFRM) is toegepast. Uit verschillende literatuurstromingen (adaptive co-management, water governance, integrated flood risk management) zijn elementen gehaald om het concept sociaal leren vorm te geven voor deze specifieke context. Sociaal leren voor IFRM is het proces van groepsleren in een multi-level governance structuur, die op regionaal niveau streeft naar samenwerking om een gezamenlijk doel te bereiken. Met behulp van diezelfde literatuur is een lijst opgesteld van condities die het sociaal leerproces al dan niet positief beïnvloeden. De lijst is omgevormd naar een interviewlijst, die vervolgens gebruikt is om de condities te testen voor sociaal leren in de case study RvR. Dit is gedaan middels interviews met vertegenwoordigers van de betrokken overheidspartijen in RvR. Sociaal leren in RvR is geoperationaliseerd door de multi-level governance structuur als context te nemen, omdat RvR door die overheidssamenwerking gekenmerkt wordt. De onderzoeksmethoden in dit project zijn semi-gestructureerde interviews en documentanalyse van drie RvR programma evaluaties. De evaluaties zijn zowel gebruikt om de context van het onderzoek te schetsen en daarmee de relevante condities te selecteren voor de interviewlijst, als om de resultaten van de interviews te verifiëren.

De leerervaringen van professionals in het programma zijn gebruikt als opstapje om de condities waaronder geleerd werd te benoemen. De leerervaringen voor IFRM zijn onder andere het zeer vroegtijdig betrekken van mogelijke stakeholders in de aangewezen projectgebieden, het integreren van waterveiligheid en gebiedsontwikkeling en het leren kennen en begrijpen van werkprocessen en procedures van andere partijen. Condities die leren mogelijk maken zijn onder andere een persoonlijk commitment aan leren en verandering, wederzijds vertrouwen in werkgroepen en frequente reflectie en feedback, zowel inhoudelijk als procesmatig. Condities die leren juist bemoeilijken is politieke besluiteloosheid en het denken in stereotypen.

Dit onderzoek heeft tot een aantal aanbevelingen geleid voor toekomstige waterveiligheidsprogramma's. Allereerst is het van groot belang om de te focus leggen bij uitwisseling van kennis en ervaringen, wat tegelijkertijd ook de kracht van een programma is. Een andere aanbeveling is het creëren van mogelijkheid om vroegtijdig problemen op te schalen naar hogere bestuurslagen, zodat problemen vroegtijdig ondervangen kunnen worden. Als laatste, het creëren van een organisatievorm die gecommitteerd is aan leren en verandering, onder andere door reflectie en feedback is een uiterst belangrijke aanbeveling voor toekomstige programma's.

1. INTRODUCTION: AN INTEGRATIVE APPROACH FOR FLOOD PROTECTION

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1.1 Integrated flood risk management in the Netherlands

Due to climate change and increased socio-economic activity, frequency and consequences of floods have increased rapidly worldwide in recent decades (van Herk et al. 2015a). The increase in socio-economic activities in e.g. floodplains and population growth are important factors in increased flood risk, combined with the more recent effects of climate change (Pahl-Wostl et al. 2013). In the Netherlands, this became clear in early 1980s already, but most prominently in 1993 and 1995, when heavy rainfall caused dikes along the Rhine river to nearly breach, resulting in significant damage and the evacuation of 250.000 people and 1 million cattle (Rijke et al. 2012a). As a result, a gradual shift became visible in flood protection management: from flood defense ('fighting against water') to flood risk management ('living with water) (Zevenbergen et al. 2008). This shift in water management is twofold: on the one hand, it is an integration of multiple disciplines (e.g. spatial planning, ecology, flood risk management). On the other hand, flood defense measures (e.g. dike strengthening and -heightening) are combined with and reshaped into flood risk management measures (e.g. lowering of flood plains and dike relocation). This shift in flood protection measures over the last decades is known as integrated flood risk management (IFRM) and is increasingly being adopted as the basis for a number of flood protection programs in the Netherlands (van Herk et al. 2015a).

This IFRM approach aims at integrating disciplines, actors and policy levels with regard to policy development and implementation (see Pahl-Wostl et al. 2007a on 'integration', p. 2). Amongst others, engineering solutions and spatial planning projects need to be combined and aligned (van Herk et al. 2015b). Regarding actors and policy levels, multiple actors (e.g. national, regional and local governments, civil society and private parties) need to design and decide collaboratively on new flood risk management policies on multiple policy levels (e.g. national, regional and in-between, e.g. program based management authorities). IFRM can therefore be seen as a multi-level governance practice (van Herk et al. 2012; Rijke et al. 2012a). This poses multiple governance challenges, e.g. aligning multiple disciplinary objectives (e.g. spatial development, housing, economic activity), funding from different policy domains and collaboration between multiple stakeholders. IFRM programs with a multi-level governance structure will be the focus of this research project.

Many authors advocate a multi-level governance approach for integrated water management (Pahl-Wostl et al., 2010), mainly because 'more complex and diverse governance regimes have a higher adaptive capacity' (Pahl-Wostl, 2009, p.354). In the context of integrated water management, co-management, adaptive management and adaptive co-management are emerging concepts (van Herk et al., 2015b, e.g. Armitage et al., 2008; Berkes 2009; Huitema et al. 2009; Pahl-Wostl 2009; Rijke et al., 2012a). These concepts relate strongly to the multi-level governance structure of IFRM. They have multiple overlapping elements with regards to learning and collaboration as requirements for adapting to the complexity, uncertainty (e.g. due to climate change) and dynamics of the physical systems (Folke et al., 2005 in: van Herk et al, 2015b). In order to deal with this complexity and uncertainty, the multi-level governance structures in IFRM need to be flexible and fit for learning, so as to deal with the dynamic character of both the social and the physical system at hand in IFRM policies (Rijke et al., 2012a; van Herk et al., 2015b). Complexity and uncertainty are key concepts in this context, as changing circumstances (e.g. climate change effects or socio-economic development) require changes in policies or paradigms on flood management. Learning, both individual and wider social learning, is an important way of dealing with this uncertainty and complexity (Mostert et al. 2007; Huitema et al. 2009; Pahl-Wostl, 2009; van Herk et al. 2011). At this point, the term 'social' is added to learning, as learning is no longer an individual process of a change in understanding, but a 'process of change that goes beyond the

individual and becomes situated within wider social units or communities of practice, and it occurs through social interactions and processes between actors within a social network' (Reed et al., 2010, p. 6). For this research, social learning is taken to be the key concept, since the multi-level governance structure of IFRM policies are studied, which are social networks in which learning takes place. However, an unambiguous delineation of the concept of social learning is lacking, especially for the context of this research, learning for IFRM, in a multi-level governance setting. The next paragraph will problematize this issue and point out the literature gap identified for this research.

1.2 Knowledge gap & problem definition

This paragraph will elaborate on the gap in the body of literature that will result in the problem definition for this research. The knowledge gap is drafted from a scholarly point of view, i.e. what is known so far and what knowledge is lacking about learning in the scholarly domain on IFRM. As previously mentioned, a clear concept of social learning that is both describing what learning entails, and can be made operational to study, is lacking (Bennett & Howlett, 1992; Armitage et al., 2008; Pahl-Wostl, 2009; Crona & Parker, 2012; Cundill & Rodela, 2012, van Herk et al, 2015b). Social learning as a phenomenon is highly divergent and little guidance and empirical evidence on learning processes exists in scholarly literature (e.g. Armitage et al, 2008; Reed et al, 2010; Medema et al, 2014). Scholars in the domain of adaptive management, co-management and IFRM acknowledge the lack of a proper delineation of learning, most notably phrased by Armitage et al. (2008, p. 87): '[I]f learning is acknowledged as being of central importance to adaptive co-management and related to governance models, why is it usually employed in an everyday familiar sense with little detail examination?' Learning is employed in multiple ways in both general policy theory and in literature specific on natural resources management and adaptive co-management. However, a single definition and conceptual framework for analyzing learning processes is lacking (e.g. Bennett & Howlett, 1992; Armitage et al., 2008; Pahl-Wostl, 2009; Reed et al., 2010, van Herk et al., 2015b; Cundill & Rodela, 2012; Muro & Jeffrey, 2008; Bos et al., 2013; Medema et al., 2014). Scholars struggle to find a balance between individual and organizational learning processes, as multi-level governance structures have a distinct character compared to static, single actor organizations and its individuals (Armitage et al., 2008). Besides that, learning goals, outcomes and preconditions are often used interchangeably, while they are not (Reed et al., 2010).

Bennett & Howlett (1992) argue that in general policy theory on learning, scholars disagree on the conceptualization of learning, thereby obscuring explanations for policy change. 'Political learning', 'policy oriented learning', 'lesson drawing' and 'social learning' are concepts used in policy theory to explain policy changes in public policy making. According to Bennett & Howlett (1992), 'many of the fundamental elements of learning remain conceptually unclear and, as a result, the entire phenomenon of experience induced policy change remains difficult to operationalize' (Bennett & Howlett, 1992, p.276). Scholars in adaptive co-management agree on this, while also adding the dimensions of uncertainty and complexity to deal with.

A number of authors address the causes of confusion with regard to the concept of social learning (Armitage et al, 2008; Pahl-Wostl, 2009; Reed et al., 2010). Armitage et al. (2008) speak of 'the paradox of learning', pointing at the increased and widespread (scholarly) interest for learning in adaptive co-management, yet struggles to learn from experience are on-going. Armitage et al. (2008) argue that this is due to concepts, assumptions and approaches being used in an ambiguous and uncritical way. They address five dimensions of this paradox, in the context of the learning and linking functions of adaptive co-management: '(1) learning definitions, (2) learning goals and expectations, (3) learning mechanisms, (4) questions regarding who is involved in the process of learning, and (5), the risks and ethical ambiguities faced by different actors expected to willingly participate in a learning process, whether formal or informal' (p. 86). The last

consideration is especially important in the case of learning experiments in management of natural resources that affect livelihoods.

Reed et al. (2010) identify three key problems with the current use of the term social learning. First, social learning is often confused with the methods and conditions that are needed to facilitate social learning. Social learning and stakeholder participation are often treated as similar concepts, although they are not. Stakeholder participation may stimulate and facilitate social learning, but participatory processes do not inevitably imply that social learning takes place. Second, there is often confusion between social learning itself (the process of learning) and its outcomes. This points to the question whether social learning should be seen as an iterative, ongoing process or as an outcome (see also Muro & Jeffrey, 2008). Another common misconception is envisioning the effect of social learning as e.g. pro-environmental behavior. Mixing up learning and its potential outcomes is problematic, as social learning is not the only process that leads to e.g. pro-environmental behavior. Financial incentives or coercion can also be explanations for changed behavior. Third, little distinction is made between individual learning and wider social learning (Armitage et al., 2008; Reed et al., 2010). Learning can take place at different levels (e.g. changes to everyday practices and changes in norms and values (Medema et al., 2014)) and in different social contexts (groups, communities or at societal scales).

The lack of a clear conceptualization encompasses two other issues: when a clear concept of what social learning entails is missing, this hinders the operationalization and might also hinder the facilitation of social learning. The absence of a clear conceptualization has limited the possibilities to assess whether social learning has occurred, to what extent, between whom, when and how (Reed et al. 2010). Conditions that enable or frustrate social learning in an IFRM context haven't been mapped yet. Existing research on social learning has mainly focused on regime wide learning, e.g. at river basin level (Mostert et al, 2007; Huntjens et al. 2011) or water governance (Pahl-Wostl, 2009), or social learning for sustainable land and water management (Medema et al. 2014). These researchers have identified conditions that influence social learning, but conditions for social learning in the context of IFRM haven't been mapped as such. Since these conditions are not fully identified, creating a learning environment for social learning might be troublesome in this context. Empirical evidence on what and how is learned in an IFRM context is needed to map the conditions that enable social learning and the facilitation of learning processes. The problem that this research will address is conceptualizing social learning and identifying enabling conditions for the context described, thereby enabling both operationalization and facilitation of learning, through creating a concept of learning and a learning conditions framework.

1.3 Research objectives

This research aims to fill the gap knowledge previously identified, by focusing on learning processes for IFRM, conceptualizing social learning and mapping the enabling conditions for social learning. The social learning processes in an IFRM context are studied. The constellation of actors involved in a specific IFRM program is taken as the object of study, in order to operationalize the IFRM context for social learning research. The constellation of actors in IFRM is part of the institutional design of the flood risk management practice. The main objectives for this research are to conceptualize and operationalize social learning for IFRM and to create a framework with enabling conditions for social learning to take place. This research will also result in a list of recommendations on social learning conditions for future IFRM programs, such as the Delta Program (DP) and the Dutch Flood Protection Program (HWBP). Therefore, the study aims at gaining insight in learning processes for IFRM, by creating a theoretical framework on enabling conditions that is tested using a case study set-up on IFRM.

This involves:

- creating a **conceptualization** for social learning for IFRM by integrating learning definitions from multiple authors in the natural resources management literature (e.g. Mostert et al., 2007; Armitage et al., 2008; Muro & Jeffrey 2008/2012;Berkes, 2009; Huitema et al., 2009, Pahl-Wostl, 2009; Reed et al., 2010; Huntjens et al., 2011; Crona & Parker, 2012; Cundill & Rodela, 2012; Rijke et al, 2012a/b; van Herk et al., 2015a/b; Medema et al. 2014;);
- **refining** and **merging** conditions for social learning found in the literature into conditions that are applicable in research on learning for IFRM;
- creating a **testable framework,** by operationalizing the conditions that enable, stimulate or hinder learning processes, focused on multi-level governance structures for IFRM;
- **Test** this framework on an IFRM case study, thereby strengthening the empirical base on social learning processes;
- delivering a **list of conditions** that enable and influence learning for IFRM and its corresponding multi-level governance arrangements;
- lastly, writing a set of **recommendations** for future IFRM programs on social learning conditions.

This research is scientifically relevant since it adds to the scientific debate on social learning in general, and to social learning for IFRM in particular. It is a theory exploring research, as its expands and strengthens the theoretical underpinnings of social learning theory by creating empirical evidence of social learning processes. This research will connect to the body of literature on social learning in adaptive co-management, and more specific for IFRM. The scientific relevance of this research therefore lies in filling the knowledge gap currently existing on social learning for IFRM.

The social relevance of this research lies in arriving at recommendations for future flood protection programs with an IFRM design, based on the findings on enabling conditions for social learning. Creating a social learning environment in these programs is crucial, since IFRM programs need to be adaptive and flexible to deal with dynamics in both the physical and societal surroundings of the program. Adaptation and flexibility require learning, and the context of multi-level governance requires social learning.

When lessons learned in previous, similar projects are taken into account while planning new projects, project development and implementation will be more efficient and may even be perceived as more legitimate (Edelenbos & Klijn, 2005, in: van Herk et al., 2011). As IFRM will mainly be program based in the future, this recommendations will be of use for facilitating learning in future IFRM practices, like the Delta program and the Dutch Flood Protection Program (Hoogwaterbeschermingsprogramma, HWBP) (van Herk et al. 2015b). Managing flood risk is a continuous task for water managers in the Netherlands. As the saying goes, ‘flood protection is a verb’, but an addition could be that learning is its conjugation.

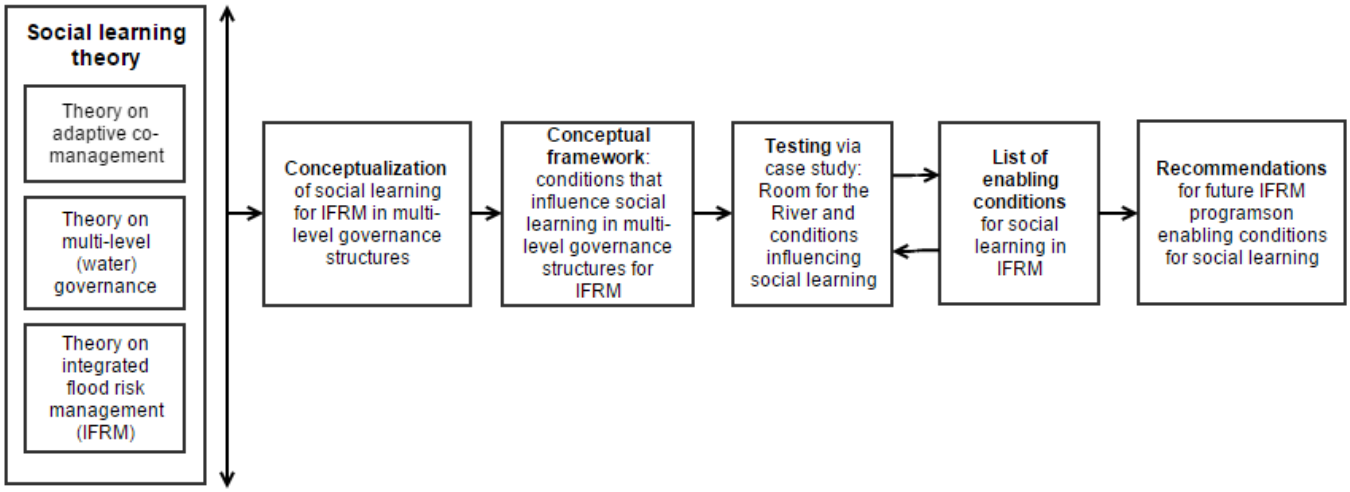
This research was conducted for the Room for the River (RftR) program, a €2.3 billion flood protection program, in which a multi-level governance approach was adopted to improve flood protection and spatial quality in the Dutch riverine area. The program was designed using an IFRM approach, hence the multi-level governance structure adopted. The program consists of 34 regional projects, in which the RftR program office, provinces, municipalities, water authorities and societal organization work together in both a centralized and decentralized decision making process. The RftR program will function as a case study for testing the theoretical framework on enabling conditions for social learning.

1.4 Research questions & framework

To achieve the objectives set for this research, an suitable research question was phrased and decomposed in sub questions. The question that follows from previous paragraphs and that will be addressed in this research is:

What conditions enable social learning on integrated flood risk management in multi-level governance arrangements?

The research question is divided in sub questions, in order to formulate a research strategy, that is depicted in the research framework, fig. 1. The sub questions relate back to the different parts of the research framework.



integrated flood risk management.

The framework (fig. 1) depicts the different steps as found in the research objectives and point to the research (sub) questions. Conceptualizing learning is necessary in order to come up with a testable framework. As can be noticed, there is a two-way arrow between testing and the list of enabling conditions, as this is an iterative process that lasts until the list of enabling conditions is specific enough for the context of this research, and exhaustive with regards to the literature. In other words, 'practice and theory inform each other' (Blackmore, 2007). Besides, official evaluations of the program so far will be used to steer the empirical part of this research, which is also illustrated by the two-way arrow.

The sub questions that will be addressed in order to answer the overall research question are:

1. How can social learning be conceptualized for an integrated flood risk management context?
2. What conditions influence social learning according to the literature?
3. How did social learning for integrated flood risk management occur in the Room for the River program?
4. Which conditions were enabling social learning for integrated flood risk management in the Room for the River program?
5. What recommendations can be given for conditions that enable social learning for integrated flood risk management?

The case study will have a longitudinal, within-case approach, which means that the RftR program will be studied over a longer time (approximately 2007-2016), looking at different multi-level governance arrangements (working groups for the different projects in the program). There is no comparative aspect with other IFRM programs in the case study design.

1.5 Reading instructions

Chapter 1 has explained what knowledge gap will be filled by this research and stated the problem definition. In the remainder of this report, the sub questions will be answered, leading to an overall answer on the research questions and recommendations for policy makers and academics. The report has been structured accordingly: chapter 2 will sketch the theoretical fundamentals for the conceptualization of learning and the framework used for testing learning conditions, answering sub questions 1 and 2. Chapter 3 will elaborate on the methods as applied for this research and shed light on validity and reliability of the research design. Chapter 4 will present a comprehensive overview of the results found in this study, thereby answering sub questions 3 and 4. Chapter 5 will address the limitations of this research, and give a reflection on the outcomes in relation to the literature used. Chapter 6 will answer the overall research questions by drawing conclusions from the research results, and putting these back in perspective of the theoretical framework. Recommendations on social learning conditions for IFRM programs will be added to this chapter as well, thereby answering sub question 5. Finalizing this report are some suggestions for future research on learning processes.

2. THEORY & CONCEPTUAL FRAMEWORK

2 THEORY & CONCEPTUAL FRAMEWORK

2.1 Introduction

In this chapter, sub questions 1 and 2 will be addressed, as phrased in paragraph 1.4 and shown in the research framework. The questions address how social learning should be conceptualized for a multi-level governance context in IFRM, and what conditions influence social learning. These questions will be answered using literature research on IFRM, adaptive co-management and multi-level governance. These strands of literature all explain a part of the social learning concept: adaptive co-management explains the rationale behind social learning, namely learning for collaboration and learning for adaptation. Multi-level governance literature explains learning for a multi-party approach. The IFRM literature explains why social learning is important in an integrative, multi-party approach for flood protection. Additional literature on river basin management and sustainable land and water management was used to create the conceptual framework on social learning conditions.

For the conceptualization of social learning, a combination of search words (e.g. policy/social learning, learning-by-doing, multi-level water governance, adaptive/collaborative management, adaptive co-management, natural resources management, IFRM) was used in Google Scholar and Scopus to select suitable literature. The most recent literature was found using specific time horizons in the search specifications (e.g. 2010 and later, since IFRM is a relatively new term). Subsequently, a snowball approach was used with regards to relevant authors in the field of (social) learning for multi-level governance. Multiple authors are used to prepare this theory chapter (e.g. Mostert et al., 2007; Armitage et al., 2008; Muro & Jeffrey, 2008; Huitema et al., 2009; Pahl-Wostl, 2009; Reed et al., 2010; Huntjens et al., 2011; Cundill & Rodela, 2012; Rijke et al., 2012a/b; Medema et al., 2014; van Herk et al., 2015b).

Due to the abstract character of the specific literature used, a brief literature overview of the literature on adaptive co-management, multi-level governance and IFRM will be given, thereby also showing their interrelation. This makes the conceptualization a more tangible process.

For explaining the key concept of social learning, the term *conceptualizing* is used. This indicates that learning is a broad concept for which a strict *definition* is not sufficient for proper understanding. Conceptualizing allows for the concept to be addressed in a specific context, so it is not a general conceptualization of social learning.

This chapter is divided in three sections: paragraph 2.2 will give a brief overview of the different strands of literature used for the conceptualization of learning. Paragraph 2.3 will subsequently address the conceptualization of social learning for the context of this research. This is the dependent variable for this research. In paragraph 2.4, the conditions that play a role in the learning process will be sketched and discussed. These are the independent variables in this research. Together they form a conceptual framework on conditions that influence social learning.

2.2 Literature overview

This paragraph will briefly dig into the literature used for this research, as mentioned in the previous paragraph. This is done to make the literature used less abstract and useful for the conceptualization of social learning. The literature strands are interconnected due to their relation with social learning. Together they create a comprehensive overview of the social learning theory.

2.2.1 Adaptive co-management

Adaptive co-management literature was used since it has a strong focus on learning and adaptation in the specific context of complex collaborative processes in socio-ecological systems. Adaptive co-management originates from two streams of literature, namely adaptive management, focused on learning and experimentation, and co-management, which emphasizes the sharing of rights, responsibilities and power between different levels and sectors of government and civil society (Huitema et al., 2009).

Huitema et al. (2009) argue that both ecosystems and social systems exhibit similar characteristics in their behavior: they are, to some extent, unpredictable, complex, spontaneous and variable. Social systems only get more complex and unpredictable over time due to an increasing amount of interconnections between e.g. countries, their economies, and governments, as a consequence of globalization. The challenging task of managing these socio-ecological systems is addressed in the literature on adaptive management and co-management.

Adaptive co-management is the combination of the learning dimension of adaptive management and the linkage dimension of co-management (Huitema et al., 2009; Cundill & Rodela, 2012). In adaptive management, (ecological) complexity and uncertainty has been the main driver for an interest in social learning, whereas for co-management the context of multiple stakeholders and their interactions are the primary reason for an interest in learning. For adaptive co-management, the interest for learning is a combination of the two mentioned above, namely social-ecological complexity and the management of uncertainty (Huitema et al, 2009; Cundill & Rodela, 2012).

2.2.2 Multi-level governance

Multi-level governance literature was used for this research since social learning in IFRM takes place in a multi-level governance structure. Governance is a very broad concept, used and interpreted in many different ways (Huitema et al. 2009; Rijke et al. 2012b). A basic understanding of governance lies in the shift from a hierarchical, strongly institutionalized and centralized government to a distribution of power between various actors and organizations at various levels of society (see Arts et al., 2006; Kjaer, 2004; Rhodes, 1996; Rijke et al., 2012b). Government is no longer the single decision making authority. Instead, governance takes into account a variety of governmental and non-governmental actors that together formulate and implement public policy (Pahl-Wostl et al, 2008). Driessen et al. (2012) take a more policy oriented point of view, and describe governance as ‘policy formulation and implementation in dynamic contexts where multiple actors interact at multiple levels’ (p. 143).

Governance refers both to processes and structures for managing society (Kooiman, 1993). As a *process*, governance refers to the management of networks, communities or markets (Rijke et al. 2012; Kjaer, 2004; Rhodes, 1996). This notion relates to ‘governing’, and is defined by Kjaer (2004, p. 12) as ‘the setting, application and enforcement of the rules of the game’ and as ‘all those activities of social, political and administrative actors that can be seen as a purposeful efforts to guide, steer, control or manage societies’ (Kooiman, 1993, p. 2). As a *structure*, governance refers to pattern of institutional design and the mechanisms in which social order is generated and reproduced (Voß, 2007). Kooiman (1993) defines governance as ‘the

patterns that emerge from governing activities of social, political and administrative actors' (p. 2). When these two notions (process and structure) are combined, governance is the total of 'the networks of actors, institutional frameworks and the processes that take place within these networks and frameworks' (Rijke et al. 2012b, p. 75). When speaking in terms of 'modes of governance' (see Driessen et al. 2012), this governance arrangement can be earmarked as decentralized governance, since government as its various levels of aggregation is represented in this governance arrangement.

2.2.3 Integrated Flood Risk Management (IFRM)

IFRM is the context for the social learning processes that are researched. IFRM is a relatively new, holistic approach to flood protection. It has been increasingly recognized that a strict engineering response to flood risks will not be a sufficient strategy to deal with the growing risk of flooding in the future (Pahl-Wostl et al. 2007a; Huntjens et al. 2011; Ashley et al. 2012; Rijke et al. 2012b; van Herk et al. 2015). On a national level, IFRM policies are designed using a co-adaptive management approach (van Herk et al., 2015). An integrated approach to flood protection is needed to minimize the risks of flooding, using both structural and non-structural measures (van Herk et al., 2015b). Structural measures are technical engineering measures (e.g. dike reinforcements and heightening), while land-use planning is considered one of the most crucial non-structural measures in managing flood risks (Wheater & Evans, 2009; Scott et al. 2013). However, such an integrated approach has some consequences: physical measures to reduce flood risks need to be aligned with spatial planning objectives, which can range from housing to nature or economic development. This leads to a number of governance challenges (Rijke et al., 2012a; van Herk et al, 2015b, see chapter 1). Problems and solutions need to be framed for multiple spatial scales, (from individual property to river basins) and long-term, adaptive strategies need to be integrated in flood risk management. These challenges require multiple stakeholders to cooperate, thereby combining objectives and funding from multiple policy domains. Second, stakeholders need to take into account a wide range of possible solutions at multiple spatial scales (from local to international), and at different time horizons (short-, medium- and long term). Third, multiple disciplines (engineers, spatial planners, project managers) are required to work together in order to find the right balance in measures taken. Learning plays a central role in effectively integrating the different levels and sectors to deal with the governance challenges arising from aligning spatial planning with physical interventions aimed at reducing flood risk.

2.2.4 Literature connected

Collaboration, learning and adaptive strategies are required for implementing flood risk management strategies in order to deal with uncertainty (e.g. effects of climate change) and complexity (e.g. multi-stakeholder structures; socio-economic development) (Pahl-Wostl, 2009; van Herk et al., 2015b; Armitage et al., 2008). The relation between adaptive co-management, multi-level governance structures and social learning is complex, but is best approximated by assuming that a multi-level governance approach is an inherent feature of the co-management dimension of adaptive co-management. Learning and experimenting, on the other hand, are the core features of adaptive management. The learning processes of adaptive co-management are therefore taking place in the specific multi-level governance structures of the projects aiming for sustainable resources management. However, one must be mindful of learning being an intangible, cognitive process and its outcome, and the multi-level governance structure as the institutional design of a resource management activity. This indicates that learning is not a controlled and delineated process, but works throughout the policy formulation and implementation process, both individual and in a social setting throughout the multi-level governance structure.

2.3 Conceptualization of social learning

This paragraph will address the sub question on how social learning can be conceptualized for the context of IFRM and multi-level governance arrangements. At the start of this paragraph, at first it must acknowledged that learning and social learning are broadly discussed topics on which numerous theories exist regarding who learns, what is learned and what the effect of learning is (see e.g. Bennett & Howlett, 1992; Blackmore, 2007; Armitage et al, 2008; Muro & Jeffrey, 2008; Reed et al, 2010). Not one theory prevails over another. Understanding and application of the concept depends very much on the context in which the concept is studied. Cross-fertilization of ideas and theories on learning in general and social learning in particular has made a strict categorization of learning theories problematic. Social learning literature is a many-headed monster with a high level of abstraction. It is therefore troublesome, if not impossible, to arrive at one definite answer on the question what social learning is and how it should be conceptualized. In order to arrive at a conceptualization that suits the context of this research (IFRM and its multi-level governance structure) the concept of learning is delineated, according to findings in the literature. For this research, learning is taken to be:

- ***Social learning*** (e.g. Pahl-Wostl et al, 2007; Armitage et al, 2008; Reed et al, 2010)*:* this research is about a social context (a multi-level governance arrangement) in which decisions are made and policies are implemented, with stakeholders having different levels of authority and delivering different inputs in the learning process in terms of sources of knowledge or time. This boundary explicitly excludes theories on individual learning, but in turn emphasizes the social and collaborative nature of learning;
- ***Learning as a process*** (Mostert et al, 2007; Muro & Jeffrey, 2008; Reed et al, 2010): '[…] social learning may be both the process of people learning from one another, and an outcome, i.e. the learning that takes place as the result of the social interactions' (Reed et al, 2010, p. 2). For this research, social learning is taken to be a process, not an outcome of a process itself. Learning outcomes are e.g. increased trust, collective action or mutual agreement, while learning as a process points to the acquisition of knowledge through communication between different stakeholders and consequently, the different stages of learning that can be distinguished (see e.g. Pahl-Wostl, 2009). This is explicitly done to prevent mixing up of process and outcome. By approaching learning as a process, the adaptive capacity of the stakeholders involved in IFRM is emphasized;
- ***Learning for sustainable development*** (Pahl-Wostl, 2009; Medema et al, 2014; van Herk et al, 2015b)*:* the concept of learning is perceived from a sustainability point of view. This means that learning is instrumental in the formulation and implementation of policies that strive for more sustainable management of land and water resources. Addressing e.g. policy learning in this chapter is therefore less relevant, as policy learning is not explicitly aiming at fostering change, but merely explains how change comes about in policies (e.g. Sabatier (1988) and Howlett & Benett, 1992). Policy learning aims at efficient goal attainment (Cheng et al., 2011), whereas learning for sustainable resources management aims for a change that alters behavior and attitudes to such an extent that collective action towards sustainable development is achieved. In the specific context of IFRM, learning for sustainable development is illustrated in the shift from 'fighting against water' to 'living with water' (Zevenbergen et al., 2013);
- ***Micro-level learning*** (Pahl-Wostl et al, 2007a; Medema et al, 2014; van Herk et al, 2015b)*:* Medema et al. (2014) argue that learning can occur at different levels (macro-, meso-, micro level, see also Pahl-Wostl et al., 2007a). The micro level is the focal level in this research, which is 'the multiparty collaboration process in which representatives from different stakeholder groups interact' (Pahl-Wostl

et al, 2007a, p.6). In other words, the level of concrete meetings, in which different parties discuss their interests and possibilities, during different phases of a policy planning and implementation process.

The synthesis of these four strands together forms the concept of social learning that will be used throughout the remainder of this research.

2.3.1 Learning as social learning

In order to build the concept of social learning, some introductory remarks on individual learning are needed. Learning theorists draw from a multitude of learning theories, distinguished by their learning contexts and motivations for learning (Muro & Jeffrey, 2008). All theories have a specific focus and underlying assumptions on learning, which makes different theories complementary rather than incorrect (Muro & Jeffrey, 2008). In the 1960s and 1970s, learning was defined as a change in behavior (Muro & Jeffrey, 2008). Behavioral change was seen as the indicator for learning, since a change in both behavior and attitude is measurable and observable (Hergenhahn & Olson, 2001). This assumption is challenged in two ways: (1) not all learning leads to a change in attitude and behavior and (2) not all change in attitude and behavior originates from learning (Muro & Jeffrey, 2008). Saljö (1979) argues that 'learning is a multi-faceted phenomenon, including (1) acquiring information and increasing knowledge; (2) memorizing; (3) acquiring facts, skills and methods; (4) making sense or abstracting meaning; and (5) interpreting and understanding reality in a different way by reinterpreting knowledge' (in Muro & Jeffrey, 2008, p. 327). This abstract definition ('facts, skills and methods') shows that learning can take many forms, from learning to walk to memorizing songs.

Although describing learning on an individual level does not suffice to explain and operationalize social learning, it helps to understand the basic assumptions and processes on which social learning is based (Reed et al. 2010). When moving the focus to social learning, the natural resources management literature comes into play. Reed et al. (2010) and Armitage et al. (2008) observe that learning is increasingly becoming a normative goal for natural resources managers. They explicitly link this development to the emerging literature on adaptive management and stakeholder engagement (i.e. adaptive co-management). Learning is focused on enhancing adaptive capacity through involvement in decision making (Folke et al. 2005). Early work on social learning conceptualized learning as individual learning taking place in a social context, thereby shaped by social norms (Bandura, 1977). Kolb (1984) understands learning as 'a process where people have concrete experiences, and learn increasingly deeply as they reflect upon these experiences. They are then able to derive abstract concepts from these experiences and apply what they have learned through active experimentation' (in: Reed et al. 2010, p. 3). An alternative approach is suggested by Mezirow (1995), who distinguishes three types of learning: learning can be *instrumental*, which means learning individuals acquire new skills; learning can be *communicative*, which means that learning individuals increase their understanding of a phenomena through communication with others; and learning can be *transformative,* which means that behavior, attitude and social norms change due to examination of underlying assumptions. Communicative and transformative learning resemble characteristics of social learning.

More recently, a different school of thought has emerged (e.g. Mostert et al, 2007; Ison & Watson, 2007; Pahl-Wostl et al, 2007; Huntjens et al., 2011), which is based on notions of organizational learning (e.g. Argyris & Schön, 1978). Learning here is conceptualized (often implicitly) as a process of social change, in which people learn from each other, which benefits the wider socio-ecological systems they operate in (e.g. river basins or community forests). Social learning theory emphasizes the dynamic interaction between individuals and their environment. However, for learning to be social, it must occur at a larger scale, through social interaction (Reed et al, 2010). A change in understanding must be observed in individuals, but this change must ultimately go beyond the individual, to affect all actors in a social network (Reed et al, 2010, p. 1). Thomas &

Allen (2006) argue in a similar way for organizational learning, from which social learning is partially derived: 'while organizations learn through individual learning, organizational learning is not a cumulative result of individual learning. Rather, organizations learn when discoveries, evaluations and insights by individuals are successfully embedded in the organization's mental models or cognitive systems and memories' (p. 125).

The concept of social learning relates to notions of 'learning communities' and 'communities of practice' (Armitage et al, 2008). These communities consist of people that share a common concern and pursue knowledge through regular interaction, based in practice (Armitage et al., 2008). Elaborating on social learning, Cheng et al. (2011, p. 90) distinguish three (broad) types in the natural resources management literature, that resemble Mezirow's (1995) types of learning: (1) *transformative reflection,* which enables the change of individual perceptions and understanding through social interaction. This transformation can result from two processes: (a) framing and reframing the (policy) problem and its solutions, or (b) reinterpretation of meanings, intentions and values through communicative interaction; (2) mutual sharing of knowledge and experiences, which relates back to the 'communities of practice', and (3) experiential learning or learning-by-doing, which entails reflective observation and active experimentation. These three classifications of social learning give a rather good overview of the different aspects of social learning.

Regarding social learning requirements and outcomes, Muro & Jeffrey (2008) argue that 'social learning requires the communication and interaction of different actors in a participatory setting which is believed to result in a set of social outcomes, such as the generation of new knowledge, the acquisition of technical and social skills as well as the development of trust and relationships which in turn may form the basis for a common understanding of the system or problem at hand, agreement and collective actions' (p. 330). Social learning outcomes are numerous (e.g. Mostert et al, 2007; Muro & Jeffrey, 2008; Medema et al, 2014). Among others, increased understanding of key issues, trust building, acquisition of factual knowledge and social skills are the results of social learning processes.

Finalizing this paragraph, it must be emphasized that stakeholders or participants in the learning process cannot be 'coerced' into learning, but that they can be encouraged to learn, by facilitating a learning environment (Rist et al., 2006). Mostert et al. (2007) add to this that social learning is a naturally occurring phenomenon, which is intensified when stakeholders with different viewpoints engage with each other. It is an iterative and ongoing process (Pahl-Wostl & Hare, 2004). Shared problem solving is the source for a learning experience in a multi-level governance setting, as opposed to individual learning, in which an individual experience leads to learning. In the context of multi-level governance for IFRM, the constellation of actors that are involved in the IFRM policies, need to learn from each other through deliberation about the goals and means of the policy.

2.3.2 Learning as a process

There is debate on whether learning should be seen as a process or as an outcome (Reed et al., 2010; Muro & Jeffrey, 2008). Learning as an outcome is learning as the result of social interactions, while learning as a process can be seen as the process in which people learn from one another (Reed et al., 2010, p. 2). For this research, learning is studied as a process, in order to research the conditions that enable learning as a process in the very specific context of IFRM. Mostert et al. (2007, p. 1/2) perceive social learning as a process within a specific context, which includes both a natural context (ecology, geography), and a social context (economy, culture, governance system). A learning process emerges when stakeholders realize they are interdependent in pursuing a goal or policy, which means that individual action will yield less or no result, and collaboration is thus necessary. The learning process can be initialized by the stakeholders or by an external party. According to Mostert et al. (2007), the learning process involves 'the development of trust, joint problem

definition, joint fact finding, the development and assessment of different alternatives, joint decision making and joint planning for implementation' (p. 2). Process outcomes are better relations, increased trust and empowerment of stakeholders. They emphasize the participatory character of the process. Similarly, Bos et al. (2013) define social learning as 'a collective process enabling change in a situation, as opposed to social learning as an outcome or 'emergent property' of a process to change a situation' (p. 399). The notion of social learning as a process points to 'actors developing shared meanings, values and understanding through interaction, which provides the basis for joint future action' (Pahl-Wostl et al. 2007b; Muro & Jeffrey, 2008 in: Bos et al. (2013)).

A social learning process evolves around a shared problem with a shared goal of a group of stakeholders. The process can be roughly divided in two parts (see Cheng et al., 2011). In the first stage of a social learning process, inclusion and integration of 'ways of knowing' (see van Buuren, 2009) and diverse sources of knowledge takes place. In order to reach a comprehensive and systematic understanding of the problem, collaboration and a system orientation are important. This phase is relevant to include the right stakeholders and accordingly arrive at a shared problem definition and group goals. The second phase is characterized by monitoring, evaluation and reflection, in order to adapt actions or to change underlying assumptions, governing values and structures (Cheng et al., 2011, p. 90). Cundill & Rodela (2012) point out that these phases can be seen as the different aspects of adaptive co-management dimension. On the one hand, they describe social learning as taking place through deliberative interaction, in which stakeholders learn to work together and build relationships for collective action. On the other hand, experimentation and 'reflective practice' helps stakeholders to cope with uncertainty when managing complex systems. The latter implies iterative learning cycles, in which participants reflect on the outcomes of their actions. This iterative cycle is strongly reflected in the adaptive co-management literature. Many scholars advocate the multiple loop learning cycle, in which the intensity of a learning process and its outcomes is reflected (e.g. Muro & Jeffrey, 2008; Pahl-Wostl 2009; Cheng et al. 2011; Huntjens et al. 2011; Medema et al. 2014). Originating from Argyris & Schön (1978), the multiple loop learning cycle emerged in the organizational learning theory, as a guiding concept for managing change in organizations (Pahl-Wostl, 2009). In this multiple loop learning cycle, three loops are distinguished, and every next loop is an extension of the previous one (see fig. 2). *Single loop learning* ('are we doing the things right?') refers to improving and refining existing practices and routines, but without examining underlying beliefs and assumptions on how causes and effects are related (Pahl-Wostl, 2009; Medema et al. 2014). Medema et al. (2014) speak of incremental learning, or correcting an unacceptable result or outcome by learning new skills, leading to changes in everyday practices. *Double loop learning* ('are we doing the right things?') can be described as reflecting on the rules and assumptions on which practices are based. Questioning and changing these practices requires reframing of policy problems and goals (Pahl-Wostl, 2009). Medema et al. (2014) call this loop 'reframing', which results in changes in behavior and values. *Triple loop learning* ('how do we decide what is right?') refers to a transformation of the institutional context, such as decision-making procedures, existing governance norms, actor groups and power structures (Pahl-Wostl, 2009; Medema et al. 2014). It requires recognition that the existing paradigms on resources management do not suffice to adopt the necessary measures for successful resources management (Pahl-Wostl, 2009). Medema et al. (2014) refer to triple loop learning as transformational learning. Figure 2 shows how the different learning loops relate to each other and what each learning loop encompasses. The cyclical character of multiple loop learning relates back to learning as a process. In relation to the concept of social learning it must be noted that multiple loop learning goes beyond learning in a group setting. According to Bouwen & Taillieu (2004, p 143) multiple loop learning involves 'understanding the limitations of existing institutions and mechanisms of governance and experimenting with multi-layered, learning oriented and participatory forms of governance'.

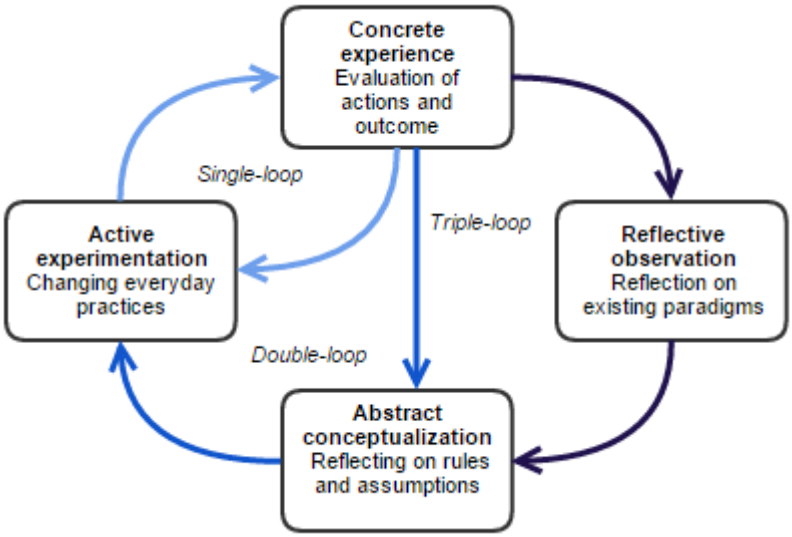


Figure 2. Multiple loop learning and outcomes. Adapted from Medema et al. (2014, p. 28).

The multiple loop learning process becomes visible in a number of learning outcomes, or learning indicators. Huntjens et al. (2011) describe the indicators for single-, double-, and triple-loop learning. When single loop learning takes place, this becomes visible in small changes that are made to specific practices or behavior. Goals, values and frameworks in the organization, however, remain the same. For double loop learning, modifications to programs, personnel and legal or organizational structures are made, due to the incorporation of new information and assumptions. This leads to a more perceptive process, a wider range of capabilities and more effective policy. Besides that, new stakeholders might be included in the organization, which increases reflection on the current assumptions. Strategies become more adaptive (e.g. working with climate-change scenarios), due to identified uncertainties. Indicators for triple-loop learning are the development and implementation of entirely new management measures or physical interventions, a major shift in regulatory frameworks or even paradigm shifts that alter the way of thinking and behaving.

2.3.3 Learning for sustainable development

Learning, and especially social learning, is seen as a key capacity for individuals, organizations and societies to create change that sustainable development asks for (Blackmore, 2007). Sustainable development is seen as a 'wicked problem', of which the solution ultimately lies in the capacity of different societal actors (governments, civil society and market parties) to communicate, negotiate and reach collective decisions (Pahl-Wostl, 2002; Muro & Jeffrey, 2008). The traditional approaches to solving societal problems, such as technological development and market strategies have proven insufficient to realize the change (Röling & Maarleveld, 1999). An alternative approach is needed. Muro & Jeffrey (2008) argue in a similar way that the complexity of sustainable development requires new approaches to societal problems. Learning helps a person to construct a certain understanding of a situation, together with others, 'which is especially relevant in the context of wicked problems where there is no clear knowledge, or perhaps conflicting knowledge, available about the situation or best solution' (p. 329). An even more appealing facet of social learning is the prospect of not only changing individual behavior, but also facilitate collective action, which is key to sustainable development.

When applied to the field of water governance, learning plays a role in dealing with climate change and its related uncertainties, and in the shift of a technocratic water management paradigm to an integrated paradigm (Pahl-Wostl et al., 2013). Over the past decades, human flood management has been mainly been organized by technological and engineering measures. According to Pahl-Wostl et al. (2013) this has led to 'unsustainable trade-offs between human and environmental water needs' (p. 1). Besides, the combined effects of climate change and socio-economic expansion in flood-prone areas has increased the risk of flooding. In an integrated flood management paradigm, it is believed that instead of altering natural capital by e.g. strengthening and heightening dikes, preserving and restoring natural infrastructure is necessary to improve the adaptive capacity of the area (Pahl-Wostl et al., 2013). Plate (2002) gives a more practical argument for an adaptive and innovative approach in IFRM measures: 'the recognition that the adjustment process [altering landscape areas for flood protection] is open ended […] is part of the principle of sustainable development: while revising or constructing a flood protection system to meet our needs, this principle requires us to consider that future generations may have other needs and other knowledge, and that we should not cast our solutions into immutable solidity, such as producing irremovable gigantic concrete structures, or soils that are permanently degraded, or eroded down to base rock.' The ability of governance arrangements to generate this recognition is largely based on its learning capacities (van Herk et al., 2015b). Armitage et al. (2008, p.87) state that '[b]uilding the capacity of individuals, organizations and societies to collaboratively learn through change and uncertainty is fundamental to environment and resource management and sustainability science.' Medema et al. (2014, p. 24) join in this view, and state that 'multi-stakeholder collaboration and multi-loop social learning processes have been recognized as key elements to understanding and developing collective commitment and capacity to tackle increasingly complex problems with innovative and creative solutions.' Hopwood et al. (2005) argue that despite sustainable development being a disputed concept in term of interpretation and responses, its proponents all agree that it requires society to change. Sustainable development and social learning did not emerge in the literature simultaneously. Social learning was already a topic in the 1980s, as Friedmann (1984) points out, when it came up as a criticism on the discourse of a rationally planned and built future. The connection between sustainable development and learning is therefore a strong focus on changing practices, by means of collective action.

2.3.4 Learning as micro level learning

Medema et al. (2014) and Pahl-Wostl (2007a) argue that learning processes are largely influenced by the governance system in which they are embedded. The governance structure includes 'the pertinent legal and organizational framework as well as the cultural and socioeconomic environment' (Pahl-Wostl et al. 2007a, p. 4). Social learning can be described as a multi-scale process, hence learning can occur at multiple levels of agent interaction (Pahl-Wostl, 2007a; Medema et al. 2014). The macro-level is the level of the governance structure at societal level. The meso-level is at the level of actor networks, or organized stakeholder groups. The micro-level is at the level of collaboration processes between stakeholder representatives of flood protection authorities (i.e. actual meetings). The three levels of agent interaction correspond with three time scales: on short to medium time scale at the level of actual collaboration processes, at the medium to long time scale at the level of change in actor networks, and on long time scales at the level of change in governance structure at the societal level (Pahl-Wostl et al. 2007a, p. 5). The levels are interdependent, and learning occurs in an iterative, non-sequential way (Pahl-Wostl et al. 2007a).

According to Pahl-Wostl et al. (2007a) the multiparty collaboration processes are the 'nuclei' of the learning process (p. 5). These learning processes take place in the communities of practice, as previously described. The micro-level is the institutional context in which social learning in a multi-level governance structure takes place, since the micro-level is the level where representatives of governmental organizations work together to

implement the policies. The participants of a participatory process (re)negotiate goals and strategies within prevailing paradigms and value structures (Pahl-Wostl et al, 2007a, p. 8-9). This may eventually feed back into the overall social construction of water management (i.e. the macro- and meso-level), leading to changes in the overall water management paradigm (e.g. 'fighting against water' to 'living with water', Zevenbergen et al. 2008) (Pahl-Wostl et al. 2007a). When transferring this multi-scale learning process to a geographical level, Huitema et al. (2009) advocate a bioregional approach (i.e. at watershed level) for water governance, reflecting the micro-level of regional multi-party collaboration processes. With regard to conditions that explain learning processes, they will also pertain to the micro-level.

Concluding the previous four paragraphs, social learning in the context of IFRM is a *process* of change in understanding, that goes *beyond the individual*, at the micro-level of *multi-party (governmental)* collaboration, aiming at *collective action* for integrated flood protection (see fig. 3). Learning is explicitly addressed as stimulating change, and not as an explanatory factor for change. With regards to more sustainable natural resources management, learning is a very important driver for change in an environment of complexity and uncertainty.

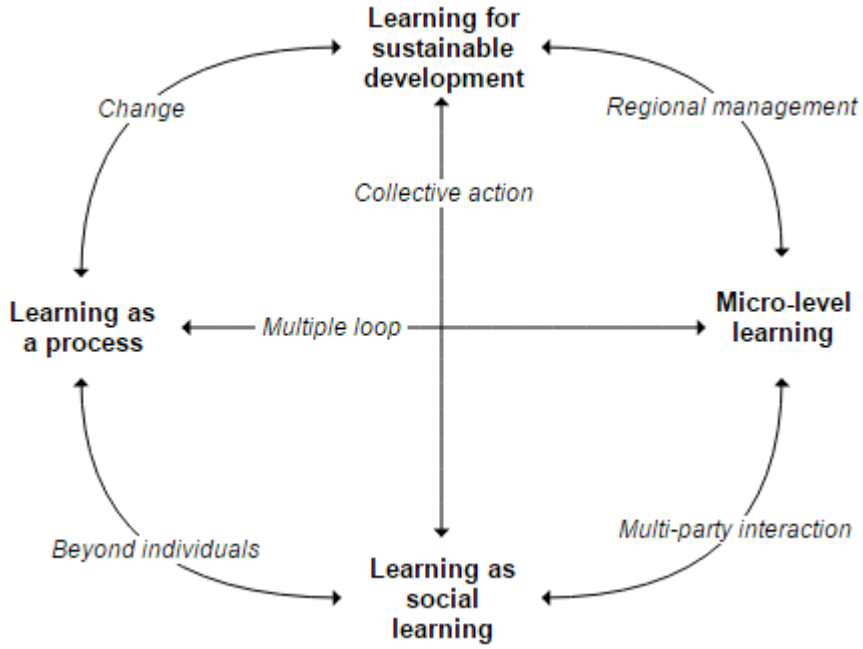


Figure 3. Social learning conceptualized for IFRM. The arrows indicate how the concept was composed.

2.4 Conceptual framework on conditions that influence social learning

2.4.1 Literature used for conceptual framework

This paragraph will address the sub question on conditions that influence the learning process (see par. 1.4). The scholarly literature mentions multiple conditions influencing the learning process, both positive and negative. An extensive overview of these conditions will be given, which will then be used to craft a conceptual framework for the case study of RftR. The authors used to draw up the framework (Verbeeten, 1999; Mostert et al. 2007; Muro & Jeffrey, 2008/2012; Medema et al. 2014) mention very explicit conditions and factors that influence the social learning process in natural resources management. They have different starting points: Verbeeten (1999) conducted a study on learning in Wadden Sea policies, Mostert et al. (2007) and Muro & Jeffrey (2012) focus on learning in water resources management, and Medema et al. (2014) conducted an

extensive literature study on social learning for change towards the sustainable management of land- and water resources. This set of authors combines an extensive literature base with empirical evidence on social learning in natural resources management.

2.4.2 Categorization of conditions that influence social learning

This paragraph will categorize and explain the conditions that influence social learning. A thorough literature review resulted in a list of 60+ conditions that influence social learning, from a general natural resources management context. Some conditions overlapped and were combined. For pragmatic reasons (available time for the empirical part and interview duration) the list was merged into a list of 19 conditions that fitted the specific context of the RftR program. This list was used to make an interview topic list (see appendix). The conditions are categorized using four groups, based on the categorization by Medema et al. (2014). These categories are *individual attributes*, *internal* and *external context factors* and *process factors*. Medema et al. (2014, p. 26) describe the *individual attributes* as the 'the micro-level factors relating to the reactions to change efforts by stakeholders and individuals' involved in the learning process' or 'the psychological predispositions of the individuals experiencing change' (Judge et al. 1999, p. 107). *Context factors* are described as pre-existing forces and conditions in the *external* and *internal* environment of a *governance system* that impact the effectiveness of the system' (p. 26). Medema et al. (2014, p. 26) distinguish between *external* factors, i.e. conditions over which the stakeholders involved in the learning process have little control, and *internal* factors, i.e. factors that are related to the internal environment of the organization or stakeholder group, on which the participants have more influence. Conditions of the internal context can explain the general attitude towards learning. *Process factors* give an indication of how learning is organized, and refers to 'actions and directions taken during the planning and implementation of a proposed change' (p. 26). This categorization originates from natural resources management literature, but is explicitly aimed at fostering change through learning. It is used in a context for IFRM: a participatory process for developing and implementing policies aimed at flood protection measures, consisting of numerous representatives of organizations that have a responsibility in Dutch water management (e.g. water authorities, provinces, municipalities and Rijkswaterstaat, the executive branch of the Ministry of Infrastructure & Environment). Categorizing conditions helps to increase insights in possibilities for facilitating learning. Mostert et al. (2007) and Medema et al. (2014) explicitly use the multiple loop learning concept (as described in paragraph 2.3.2), so the conditions mentioned are studied from this perspective.

The conditions found by the previously mentioned authors are merged and synthesized into table 1-4. The tables are presented first and described in the following paragraph. Conditions described in the next paragraphs can have a positive and a negative influence on learning, depending on how they are phrased, e.g. as lacking or as being present. The tables are used as input for the empirical part of this research, namely by operationalizing them for the interview topic list (see appendix).

Table 1. Individual attributes influencing the social learning process. Adapted and merged from Verbeeten (1999), Mostert et al. (2007) and Medema et al. (2014).

Individual attributes	**Authors**
Openness to new experiences Commitment to ongoing learning Capability for self-reflection Flexible and open-minded Tolerance of ambiguity	Verbeeten (1999); Mostert et al. (2007); Budner (1962), Pressman (1984), Hofstede (1994), Judge (1992), Gasteyer & Flora (2000), Kusel et al (2000), Wanberg (2000), Webster (2006), Lankford et al (2007), Pahl-Wostl (2009), Sol et al (2012) in: Medema et al. (2014).
Locus of power and control Ability to control and influence ones environment	Mostert et al. (2007); Rotter (1996), Lankford et al (2007) in: Medema et al (2014)
Social skills Sticking to rules and principles of dialogue	Mostert et al. (2007); Lankford et al (2007) in: Medema et al (2014)
Experience with multiparty approaches	Mostert et al. (2007)

2.4.2.1 Individual attributes

Individual attributes are 'the micro-level factors relating to the reactions to change efforts by stakeholders and individuals involved' (Medema et al. 2014, p 26). Individual attributes play an important role in the social learning process. Medema et al. (2014) derived multiple conditions from organizational and natural resources management literature that enable an individual to operate as such in a social setting that a learning process can occur. 'Individuals and their attributes and characteristics form the basis through which change processes are manifested' (Medema et al. 2014, p 31). First of all**,** an commitment to ongoing learning is an important characteristic for learning. Individuals with personality traits like tolerance of ambiguity and **openness to new experiences** are better able to learn from experiences and are less eager to have a confirmation bias, i.e. searching for information that confirms their beliefs. The extent to which a person is flexible and open minded is an important attribute for learning: when the individual has little resistance to changing the way things are done, he or she is more eager to learn from this situation. The concept of *dynamic conservatism* - or fighting to stay the same - is strongly related to this trait. Related to that are the capability for self-reflection, which is crucial for multi-loop learning, and the individual's perception and awareness of its own role and abilities to exercise control in certain situations, or **locus of power and control.** To ensure a legitimate process in which participants are willing to learn, high professional competence and motivation are required. **Social skills,** in the form of sticking to rules and principle of dialogue and interaction (commitment to an integrative process, being respectful of others' viewpoints and ideas) comes into play when differing views and perceptions of parties may lead to conflict (Mostert et al, 2007). When participants address each other in a respectful manner, they are more likely to agree on core issues regarding the policy process, which improves learning conditions. A positive factor for successful learning is **previous experience with a multiparty approach**. A positive experience will make it more likely that participants are willing to learn from other participants.

Table 2. Process factors influencing the social learning process. Adapted and merged from Verbeeten (1999), Mostert et al. (2007), Muro & Jeffrey (2012) and Medema et al. (2014).

Process factors	Authors
Process architecture Frequent interaction Clear and shared perspective and expectations Joint planning approach Appropriate meeting formats and extended engagement Transparency and legitimacy Democratic and enabling environment	Verbeeten (1999); Mostert et al. (2007); Muro & Jeffrey (2012); Pressman (1984), McGinnis (2000), Geels & Green (2004), Dewulf et al. (2005), Keen, Bruck & Dyball (2005), Dyball, Brown & Keen (2007), Pahl-Wostl (2009), Sol et al (2012) in: Medema et al. (2014)
Role and control of parties involved Neutral organizer or leader Including all relevant stakeholders Fear of loss of confidentiality	Mostert et al. (2007)
Mutual trust, goodwill and understanding Acknowledged interdependency	Verbeeten (1999); Lankford et al (2007), Sol et al (2012) in: Medema et al. (2014)
Reflection and feedback Continuous feedback on process and content Feedback on process outcomes Framing and reframing of issues and goals	Verbeeten (1999); Mostert et al. (2007); Staw (1985), Bohm (1996), Alvesson & Skjoldberg (2000), Folke et al (2005), Keen & Mahanty (2006), Dyball, Brown & Keen (2007), Fernandez-Gimenez et al (2008) in: Medema et al (2014)
Available resources (knowledge, budget, time)	Verbeeten (1999); Mostert et al (2007); Pressman (1984) in: Medema et al (2014)
Communication Internal and external communication	Verbeeten (1999); Mostert et al. (2007)

2.4.2.2 Process factors

Process factors refer to the way the participatory process is organized and which actions and directions are taken during a policy planning and implementation phase. It relates to how cooperation and decision making is organized (Medema et al. 2014). Process factors strongly impact the attitudes of the participants in the process. These factors determines if participants feel respected and heard (Medema et al. 2014, p. 30). Important is involving all relevant stakeholders in a participatory process for developing and implementing new policies (Muro & Jeffrey, 2012). With regard to collaboration, crucial factors in the participatory process are **mutual trust, good will and mutual understanding,** as is **acknowledged interdependency** (Verbeeten, 1999)**.** When they lack, learning is unlikely to occur as common understanding and goals will not be reached (Medema, 2008). **Openness and legitimacy** of the participatory process through continuous feedback on the process (e.g. through distribution of meeting records, background documents, questionnaires) is important to create trust and good will (Mostert et al. 2007; Medema et al. 2014). The **overall process architecture** is an important condition in this respect. Frequent interaction among stakeholders is crucial for social learning (Mostert et al. 2007). A clear perspective and direction for feedback is crucial for multi-loop learning, as the feedback navigates the process toward desired goals. It is also crucial that participants have clear expectations on the participatory process. A joint planning approach can facilitate this, and also increase the transparency of the process, which in turn increases trust and good will (Mostert et al. 2007; Muro & Jeffrey, 2012). **Role and control of parties involved** explains what influence the role a party or representative has in

the collaboration process, and what the position of a party is relative to other parties. Related to that is having a neutral organizer or leader who facilitates and presides the participatory process, so as to enable fair balancing of interests. This helps to build a democratic and enabling environment for multiple loop learning processes, in which appropriate meeting formats and extended engagement (repeated and frequent interactions, field trips, bilateral contacts) facilitate trust, collective meaning, constructive conflict solving, that in turn help participants to create a sense of ownership and commitment towards the learning process (Mostert et al. 2007; Pahl-Wostl et al. 2007a; Muro & Jeffrey, 2012; Medema et al. 2014). Besides these rather intangible factors, **available resources** in the form of budget, time and information are essential as well in order to facilitate a successful learning process. An essential feature of the learning process is **feedback and reflection** on the outcomes of the participatory process (e.g. new policies). Feedback, provided there is a clear goal, creates a loop in which participants can learn from their previous experiences, and consequently optimize the collaborative process. Framing and reframing of how a policy problem is perceived can open up individual perspectives, thereby creating win-win solutions (Dewulf et al, 2005; van Buuren, 2009). This results in improved mutual trust and better relations, factors previously marked as crucial for social learning. A final condition, **communication,** both internal (between members of the working groups) and external (to external parties or home organizations), is crucial for diffusion of information throughout the working group and to other organizations.

Table 3. Internal context influencing the social learning process. Adapted and merged from Verbeeten (1999), Mostert et al. (2007), Muro & Jeffrey (2012) and Medema et al. (2014).

Internal context	**Authors**
Commitment to ongoing learning	Mostert et al. (2007); Dyball, Brown & Keen (2007) in: Medema et al (2014),
Internal discussion on interests Equality and balanced interests	Verbeeten (1999), Mostert et al. (2007)
Horizontally and vertically integrated cooperation structures Institutional interplay Bridging organizations Integration and synthesis of knowledge	Verbeeten (1999); Huntjens et al (2011); Muro & Jeffrey (2012); Berman (1978), Weick (1984), Folke et al (2005), Measham (2005), Dyball, Brown & Keen (2007), Pahl-Wostl (2009), Johanessen (2013) in: Medema et al. (2014)
Integration of knowledge and information sources Advanced information management Sound knowledge base	Verbeeten (1999); Muro & Jeffrey (2012); Somach (1993), Ostrom (2001), Adger et al (2005), Pahl-Wostl (2006), Young (2007), Medema et al (2008), Ostrom (2008) in: Medema et al. (2014)
Involvement of parties Reliability and consistency Continuity in organization Changing staff	Mostert et al. (2007); Hofstede (1994), Sol et al (2012) in: Medema et al. (2014)

2.4.2.3 Internal context factors

Internal context factors are pre-existing forces in the governance system, which includes the internal context of the participants' home organization. The internal context factors 'relate to the institutional structures and frameworks in which […] learning processes are taking place' (Medema et al. 2014, p.29). This makes sense

for both the participatory process and the organizations participants originate from. Equality and balanced interests, or the lack thereof**, an internal conflict on interests**, are often mentioned as a prerequisite for social learning or frustrating learning (Mostert et al. 2007), as equal treatment of and opportunities for participating and influencing the policy process will positively influence the learning process.

Entering a long-term working relationship, thereby creating a **horizontally and vertically integrated cooperation structure** brings the context of the participatory process and the home organization together (Mostert et al. 2007; Medema et al. 2014). This facilitates social learning, as information and experiences can be exchanged over different levels and scales. Besides, it prevents contradictory decisions or recommendations in the internal context of an organization. **Integration of knowledge and information sources** through advanced information management and a sound knowledge base is important in this respect. Bridging organizations, learning platforms that facilitate institutional interplay**,** stimulate learning in the participatory process by providing connection between different scale and higher- and lower level organizations, thereby enabling integration and synthesis of knowledge (Folke et al. 2005, in: Medema et al. 2014; Huitema et al. 2009; Muro & Jeffrey, 2012). According to Cash et al. (2006), knowledge is stored and perceived differently at different levels, based on differing beliefs of what is credible and legitimate knowledge and the nature of the problem for which policy is developed and implemented. Cross-level linkages that allow access to validated information makes the information trustworthy and links the participants through the use of the information. Dyball et al. (2007) state that this synthesis is crucial for multiple loop social learning.

Organizational commitment to learning is an important factor as well, compared to individual commitment to learning. Overall **involvement of parties** in the process is an important conditions for social learning. Continuity, facilitated by e.g. transfer of information to other representatives of the same organization, fosters social learning (Mostert et al. 2007). This also creates a sense of belonging for the participants that feed back the process outcomes in their own organizations. Changing staff or participants during the participatory process hinders social learning, as knowledge and experience is lost. Consequently, being a reliable and consistent stakeholder in the policy formulation and implementation processes, is important for a person's credibility and the extent to which other parties are willing to accept e.g. new information, which might lead to learning (Medema et al, 2014).

Table 4. External context influencing the social learning process. Adapted and merged from Verbeeten (1999), Mostert et al. (2007), Muro & Jeffrey (2012) and Medema et al. (2014).

External context	**Authors**
Crisis event (calamity, elections)	Verbeeten (1999); Mostert et al. (2007); Somach (1993), Olsson et al (2006), Lankford et al (2007), Medema et al (2008) in: Medema et al. (2014)
Political support Supportive regulatory framework	Mostert et al (2007); Pressman (1984), Somach (1993), Wurbs (1998), Olsson et al (2006), Lankford et al (2007), Medema et al (2008) in: Medema et al. (2014)
Administrative procedures	Mostert et al. (2007)
Vested interests	Mostert et al. (2007)
Existing laws and regulation	Mostert et al. (2007)

2.4.2.4 External context factors

External context factors are pre-existing conditions and forces, but ones that are difficult to control by a specific governance regime (Medema et al. 2014, p. 29/30). Abrupt periods of change, or **crisis events** (e.g. a flooding or elections) are proven to be very important drivers for change and hence for learning (Medema et

al. 2014, Mostert et al. 2007). Such crises may turn out to be windows of opportunity for bringing about **political support** and supportive regulatory changes, which in turn can alter **lengthy administrative procedures** that hinder social learning (Medema et al. 2014). **Vested interests** may hinder social learning, since existing regulatory frameworks are supported, allowing little room for lessons learning in social learning processes (Medema et al. 2014). **Existing laws and regulation** also affects learning processes, due to inflexible working processes that leave little room for change.

Figure 4 gives a graphical overview of the conditions that influence the social learning process. This is the conceptual framework for this research. The relation between the conditions and social learning hasn't been specified in the theory. Therefore, there are no specified lines between the conditions and learning. In the empirical part, the specific relation between social learning and the conditions described will be searched for. In the next chapter, the conceptual framework will be operationalized for this research.

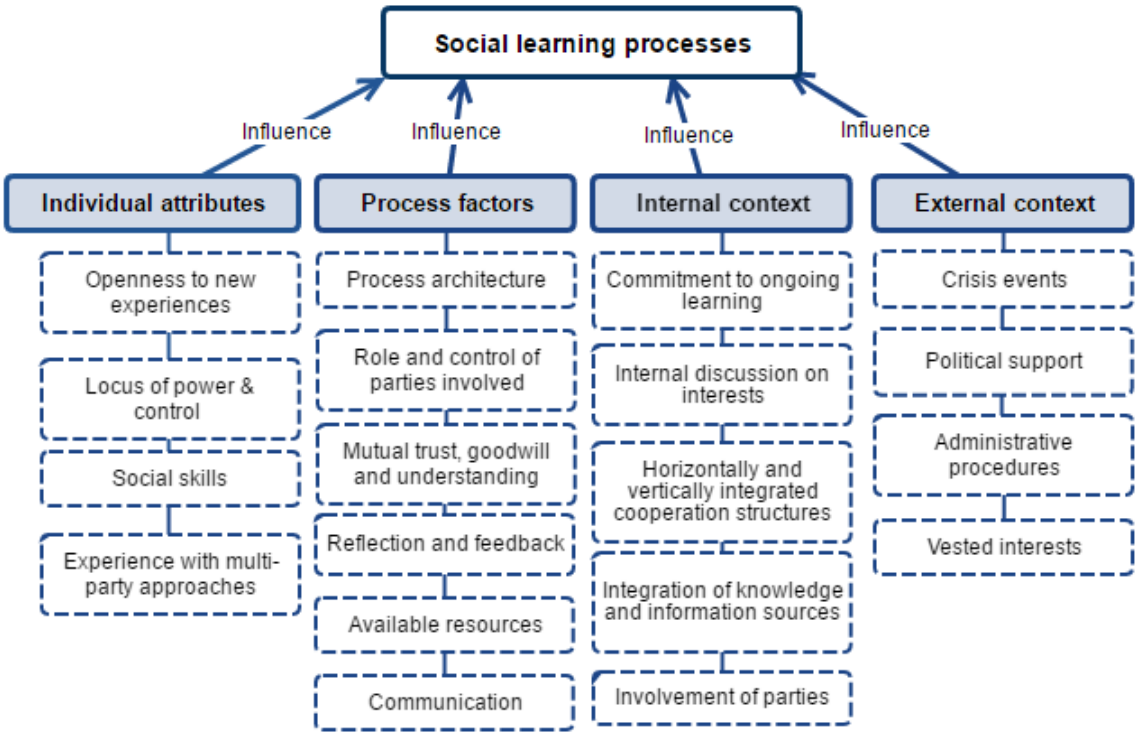


Figure 4. Conceptual framework resulting from paragraph 2.4, which shows the relation between the conditions described and social learning, as identified in the literature.

3. METHODS

3 METHODS

3.1 Research methodology on social learning processes

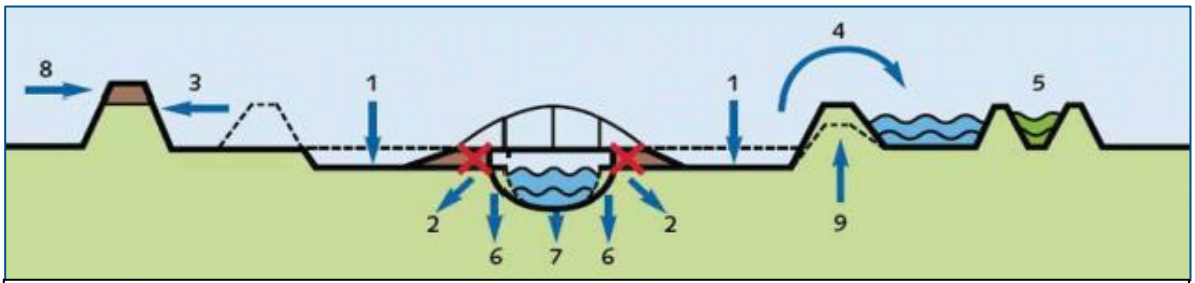
In the previous chapter, a conceptual framework was drawn up from social learning literature. The conditions that influence social learning were divided in four categories. This chapter will address how these conditions will be tested for the context of IFRM, using a qualitative research approach. It will explain the empirical set up of this research and how the relation between social learning and the conditions will be researched.

This research will use a case study approach to achieve the objectives described in chapter 1. The Room for the River (RftR) program was chosen as the case study for this research, since this flood protection program has an explicit IFRM approach, which makes it an suitable object of research. The key concept for this research is social learning, which is learning that goes beyond the individual, aimed at collective action by multi-party collaboration. In the context of social learning IFRM this would mean that all parties involved in the design and implementation of flood protection policies learn in a social learning process. It is a major characteristic of IFRM that multiple (governmental) parties collaborate in order to arrive at integrative approach for flood protection management. Therefore, representatives of all (governmental) parties involved in the RftR program were invited to take part in this research by means of interviews.

3.2 Case study description: the Room for the River program

3.2.1 The Room for the River program

The case study chosen for this research is the Room for the River (RftR) program, a Netherlands based flood protection management program. The shift in flood management practice from flood defense to flood risk management is clearly visible in this program, as rivers are widened to increase their discharge capacity, as opposed to maintaining a loop of dike reinforcements. RftR aims at adapting the river discharge capacity from 15.000m^3/s to 16.000 m^3/s at Lobith, where the river Rhine crosses the German-Dutch border (PDR, 2006). This is done by creating more room for rivers and their branches through making more space for water by e.g. dike relocation and lowering of floodplains (see fig. 5).



1. Lowering of floodplains	4. Water retention and storage	7. Deepening of summer bed
2. Removal of obstacles	5. By-pass	8. Heightening of dikes
3. Dike relocation	6. Height reduction of groynes	9. Dike improvement

Figure 5. Measures applied to create more room for river in the Room for the River program. Source: Rijke et al. (2012a).

The Room for the River program started with 39 projects planned, with a total budget of €2.3 billion euro. Over time, 5 projects were cancelled, due to stronger effects in other projects (PDR, 2016). The program has a dual goal: both flood protection and spatial quality in the riverine area are increased by the projects, by means of e.g. nature development. Hence, multiple disciplines and organizations are involved in designing and implementing the measures for making room for the river. It is exemplary for a multi-level governance program, as multiple actors, multiple disciplines and multiple policy- and decision making levels are represented in the program, both in the design and executive phase (Rijke et al., 2012; van Herk et al., 2015). RftR was initiated in 2000 and will be finalized around 2017 (PDR, 2016). The program was initiated by three ministries: the Ministry of Agriculture, Nature & Food quality, the Ministry of Housing, Spatial planning & Environment and the Ministry of Transport, Public works & Water management. Currently, two government ministries (Ministry of Economic affairs and the Ministry of Infrastructure & Environment, I&E), together with eight water authorities, seven provinces and thirty municipalities are responsible for the execution of the projects in the program (PDR, 2016). 15 out of 34 projects are executed by Rijkswaterstaat, the remaining 19 are executed mainly by water authorities, and some by provinces and municipalities.

The spatial planning decision was initiated and prepared from 2000 until 2006, with the key spatial planning decision (planologische kernbeslissing, PKB) taken in 2006, entering into force on January 26, 2007 (PDR, 2016). During this phase, a total of 600+ ideas for projects were gathered in close collaboration with local, regional, national and non-governmental stakeholders. A selection was made that fitted the designated project areas best. The selection resulted in a list of 39 project that were included in the key spatial planning decision. For planning and designing the projects, a management agreement ('bestuursovereenkomst') in the form of a contract was drawn up between the minister of I&E and local and regional governments. The Room for the River program directorate (PDR) was appointed as 'guard' of the agreement, thereby requesting accountability from regional and local governments, and providing accountability of the projects to the national government.

Between 2006 and 2008/2009, the so called 'preferred alternatives' for the projects were selected. In the spatial planning key decision, the type and location of the projects were decided on, but not the specific attributes of the project. Regional and local parties were very much invited to share their ideas and preferences on how the projects and consequently the area, should look like. From 2008/2009 until approximately 2012, the chosen projects were meticulously prepared by an extensive stakeholder collaboration process (including e.g. Rijkswaterstaat, provinces, water authorities, municipalities, citizens, societal organizations (e.g. nature conservation organizations, environmental groups). Early involvement of politicians and non-governmental stakeholder was deemed crucial for establishing commitment and support (van Herk et al. 2015b). From 2009 until 2017, the projects will be executed, while most will be finished by 2016 (PDR, 2016). The program has a long duration (2000-2017), which allows for learning-by-doing (van Herk et al. 2015b), but it also requires an adaptive approach to deal with ongoing changes in both the internal and external context of the program, like changing stakeholder interests and configuration, socio-economic developments (e.g. elections or economic crises) and new scientific findings (Hertogh et al. 2008). Part of this adaptive approach lies in facilitating learning, by focusing on risk management as a program management approach. The PDR put a strong focus on learning and exchanging experiences, both within and between projects and the different roles in projects (e.g. technical managers, project managers, contract managers), in order to prevent repeated errors and mistakes in terms of budgetary exceedance and time delays (van Herk et al. 2015b). Besides these exchange of experiences, there was also exchange of personnel and guidelines for reporting and quality assurance between projects. Figure 6 shows a graphical overview of the different phases in the RftR program.

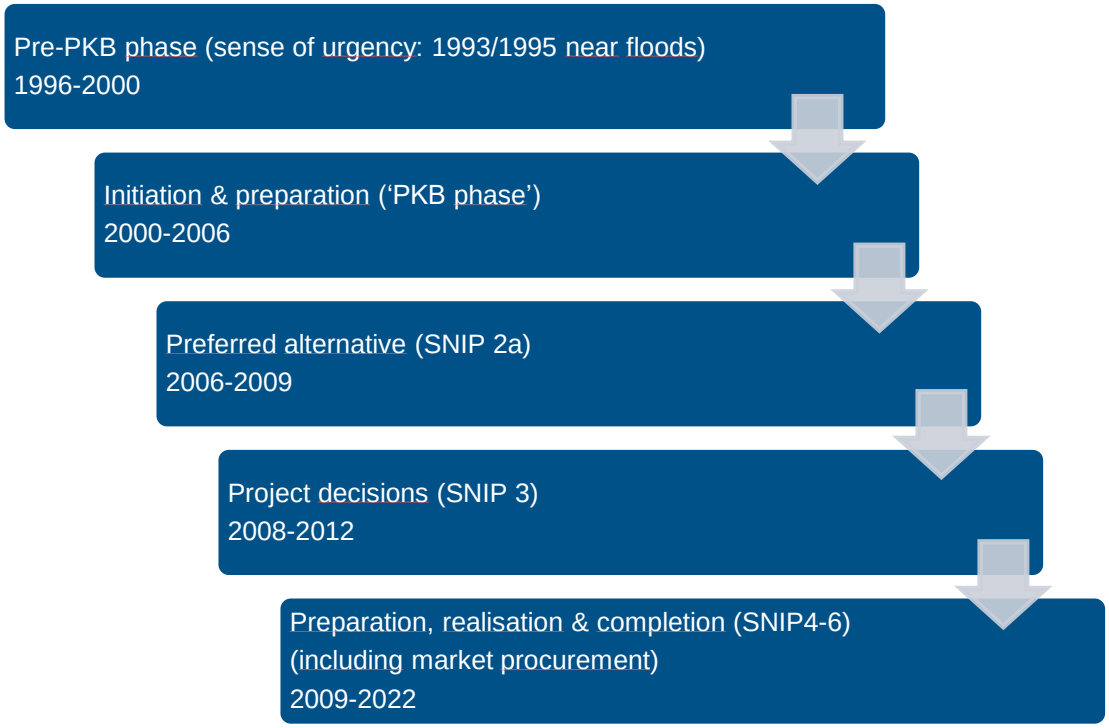


Figure 6. Successive phases in the Room for the River program. Based on Beekmans (2016).

Since its initiation, multiple evaluations of the Room for the River program have taken place, both on program level and on the cooperation process between the decision making authorities (e.g. ten Heuvelhof et al. 2007; van Twist et al. 2011; Andersson Elffers Felix (AEF), 2103). The Room for the River program was marked as a major project by parliament, indicating that the PDR needs to report biannually to parliament on the progress of the program as a whole. These reports also address lessons learned in the program. The evaluations and the progress reports are used as input for a document analysis.

The RftR program fits the new approach for flood management. Its multi-level, co-adaptive characteristics require learning, but how learning processes actually take place and what learning entails is not fully clear yet. The case study of RftR was also chosen to serve as an example for future IFRM programs, as future flood protection and adaptation measures will be mostly organized as programs in a multi-level governance structure, taking an adaptive management approach (van Herk et al., 2015b). A program is described as 'a group of related projects, managed in a coordinated way to obtain benefits and control not available from managing them individually' (PMI 2008, p. 434 in: van Herk et al, 2015b). A project, then, is 'a temporary endeavor with a defined beginning and an end, usually time constrained, and often constrained by funding or deliverables, undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value' (based on Nokes, 2007 in: van Herk et al., 2015b). The focus of this research is on the program as a whole, as a program presents opportunities for learning-by-doing (Armitage et al. 2008), in other words, the repetition of activities enables exchange of experiences and lessons, which is very valuable in a programmatic setting to either prevent mistakes or share lessons learned in specific projects. Jentoft (2007) argues that a program offers opportunities to work together that enable effective learning. In order for RftR to be an appropriate case study, learning as it is conceptualized in this research needs to occur. Huntjes et al. (2011) and van Herk et al. (2015a) state that multiple-loop learning occurred in the RftR program. Van Herk et al (2015a) showed that a program adopting the IFRM paradigm and new approaches for adaptive co-management also fosters double and triple loop learning. Therefore, the RftR program was chosen as a case study for this research.

3.2.2 Multi-level governance structures in the Room for the River program

A key aspect of the RftR program is its multi-level governance approach in designing and executing the projects. The multi-level governance approach was instrumental for arriving at widely supported projects and a beneficial outcome for all parties involved. The multi-level governance structure is characterized by both formal lines (e.g. management agreement and biannual progress reporting, agreements between) and informal lines (e.g. liaison managers, the messengers between the projects and the PDR). In order to study social learning for IFRM, the multi-level governance context that characterizes the program needs to be described. Generally speaking, parties involved in multi-level governance can range from (supra-) national governments to local civil society groups and market parties (Pahl-Wostl, 2009). For this research, the multi-level governance structure is taken to be the interplay of governmental parties, as they are responsible for and active in IFRM. During the design and implementation phase of IFRM policies, civil society, market parties and other stakeholders do have a say in the process, but lack explicit decisive power and authority for executing policies. Therefore, the constellation of actors addressed in this research are the different governmental authorities that have decisive power in flood risk management in the Dutch context. These parties are the RftR program directorate (PDR) on behalf of the Ministry of Infrastructure & Environment (I&E), the Ministry of Economic affairs, Rijkswaterstaat regional office Netherlands-East (RWS ON), water authorities, provinces and municipalities (see table 5).

Table 5. Governmental authorities present in the Room for the River program.

Party	Role, tasks, interests	ABG/AWBG group
RWS PDR, on behalf of Minister of I&E	- Overall facilitation and steering projects (bridging organization) - Testing and approval of process steps (e.g. project decision, public tender) - Interest in goal achievement within time and budget - Program wide risk management (e.g. preventing delays, budget exceedance)	ABG & AWBG
RWS regional offices	- Management and maintenance of riverine area (river, floodplains, infrastructure) - Interest in e.g. navigation and efficient maintenance	ABG & AWBG
Provinces	- Interest in nature management, spatial development - Licensing authority for several permits - Client (‘opdrachtgever’) for projects	ABG & AWBG
Municipalities	- Interest in spatial development - Licensing authority for several permits - Client (‘opdrachtgever’) for specific projects	ABG & AWBG
Water authorities	- Regional water authority responsible for dike- and regional road maintenance - Licensing authority for water related permits - Client (‘opdrachtgever’) for specific projects	ABG & AWBG
Ministry of Economic affairs	- Licensing authority for nature protection regulation - Interest in nature development	AWBG

Multiple interests are represented by this parties. Municipalities and provinces have a stake in spatial development supporting communities, flood protection and nature conservation. The Ministry of Economic affairs has a stake in nature development an protection. The PDR strives for goal achievement (i.e. water level decrease and spatial quality) within planned time and budget. The Rijkswaterstaat regional offices, provinces, municipalities, water authorities are and will be responsible for management and maintenance of the riverine areas and the newly built water management structures (e.g. dikes, bridges, retention areas, see fig. 5), so the design of the projects needs to meet numerous requirements that enable efficient management and maintenance. Altogether, a diverse mix of interests needs to be met in the collaborative process of designing and executing the projects. It must be noted, though, that the interests and stakes of the parties differ in every RftR project. The above only shows a general direction.

The specific multi-level governance arrangements that were researched are the platforms in which the different stakeholders gather to discuss their interests and the progress of the projects, and requirements for the required permits once a project arrives at the realization phase. Two platforms or working groups were topic of research: the administrative guidance working group (ambtelijke begeleidingsgroep, ABG) and the administrative working group for licensing authorities (ambtelijke werkgroep bevoegd gezag, AWBG). In both platforms, similar parties are involved, although with different roles (see table 5). The ABG working group consists of policy officers that in close cooperation discuss what the project should look like in terms of the specific attributes (e.g. placement of bridges and roads), but work within the conditions set, since the water level decrease is fixed in the PKB. They prepare the decisions about the project and advise on them for the steering group, which are the decision making authorities (e.g. municipal and provincial executives). In the ABG working group, municipalities, provinces, water authorities are represented. Over time, the character of the ABG working groups changes slightly. Once the project decisions are approved and the projects enter the realization phase (SNIP3 and onwards), the ABG working group mainly functioned in keeping all members updated on the progress in the realization phase of the project and take up problem solving when small project hiccups occur (e.g. noise disturbance for residents). The AWBG working groups consist of licensing officials of the different governmental parties involved in the projects. For numerous activities in the project a contractor needs permits, e.g. for altering natural areas and (re)moving soil and utility cables. The AWBG working group coordinates the permit procedure. The AWBG working group is a unique platform in infrastructural projects, and was initiated to prevent delays due to not-licensable projects designed in ABG groups. These working groups were chosen as the platform for selecting respondents because the multi-level governance arrangements are institutionalized in these structures, i.e. all layers of governmental parties in the Dutch water sector are represented in these working groups. The ABG working group is mainly active in the preparation phase (i.e. designing and planning the project), whereas the AWBG working group mainly convenes when the project decisions (SNIP3) have been taken, to coordinate the permit procedure with all relevant authorities. The overlap in activity is explained in the relatively early involvement of licensing officials.

3.3 Case study operationalization

3.3.1 Methods applied

In order to obtain the intended results for this study, an appropriate research methodology was formulated. The goal of this research is to explore and understand the phenomenon of social learning in the context of IFRM. According to Bergsma (2003), a qualitative research setup is preferable to a quantitative set up for this purpose, as a qualitative set up is better suited to get a detailed understanding of a phenomenon under study, and how the phenomenon can be explained and interpreted in its context. The research approach is inductive: the specific case of learning processes in the RftR program are used to create a more generally applicable theory on learning in IFRM.

For this research, one case study was chosen, with within-case study variation on spatial and temporal scales. This is depicted in interview respondents that were involved in different projects in the program (spatial variation), and in different periods of time (temporal variation). This case study set-up allows for identification of changes in cooperation structures over time, due to learning experiences of the participants in the projects.
Two qualitative data collection methods are applied for the empirical part of this research, in order to have multiple sources for information. Yin (2009) argues that 'the use of multiple sources of evidence and data overcome potential issues with self-reported data' (in: Bos et al. 2013). Document analysis and a set of preliminary interviews were used to get to know the context of the RftR program and to select interview respondents, and another set of interviews was used to collect data on the learning conditions as described in chapter 2.
The conditions identified in chapter 2 (tables 1-4) are operationalized for empirical use in an interview topic list (see appendix). The topic list consists of three parts: an introductory part, in which the respondents is questioned about his or her background, role and responsibilities in the RftR program, and the parties they worked with. The second part is specifically about their learning experiences for IFRM and the collaborative processes in the program. The third part of the list is the list of conditions derived from the literature and document analysis, divided in the previously mentioned four categories. The interview respondents are specifically questioned on if and how the conditions influenced the learning process.
This research was conducted at the RftR program office at Rijkswaterstaat, the Dutch executive branch of the Ministry of Infrastructure and Environment. This placement works beneficial in two ways: information and data is gathered in close cooperation with the professionals in the program, and in turn, the results of this research are presented directly to them as well, thereby maximizing the efficiency of the information distribution in both directions. This ensures the relevance of this research, for both academic and practitioner purposes.

3.3.2 Data collection and respondent selection

3.3.2.1 Document analysis

The documents used are the Room for the River program evaluations (ten Heuvelhof et al. 2007; van Twist et al. 2011; AEF, 2103). The documents were used to gain insight and understanding in the RftR program, and to verify the interview results on the conditions that influence social learning in the RftR program. Since they are evaluative documents that are based on both document analysis and a qualitative data, they address (part of) the conditions that are derived from the literature. The results of the document analysis on the conditions addressed in the results section.

3.3.2.2 Semi-structured interviews

Empirical data on the learning conditions was obtained using semi-structured interviews. Semi-structured interviewing allows for both detailed questions and respondents' own perspective on the phenomenon addressed. Information retrieved from the first couple of interviews was used to ask more specific questions in the remaining interviews. Respondents for the interviews were selected using expert knowledge. A total number of 16 interviews was conducted. All respondents were invited to introduce themselves in a first short interview, in order to get an overview of both the program and their role and responsibility. Besides getting a first impression of the program and the respondents, the preliminary interview was also used to trigger the respondents on their learning experiences in the program, as many respondents indicated that it was very hard to recall learning experiences over a period of approximately 10 years (2007-2016). Learning experiences were identified by specifically asking questions about respondents' tasks in the RftR program, but also what lessons they brought to their next projects, to make their own learning experiences insightful.
Respondents were selected based on the following criteria:

- They are or have been involved in (multiple) ABG or AWBG working groups for different projects;
- They have been involved in RftR projects for at least five years;
- The selected respondents together form a representative group within the RftR program in terms of projects, home organization (Rijkswaterstaat, provinces, municipalities and water authorities) and role in the cooperation process (e.g. jurist, working group coordinator, liaison manager, licensing authority).

The interviews were structured using the interview topic list, with questions that allowed for structured deliberation. All respondents were asked at a fixed set questions, in order to arrive at comparable answers. These questions were supplemented by some clarifying or more in-depth questions, or examples of answers in previous interviews were used get more specific information. All interviews were recorded, fully transcribed and sent back to the respondent for approval, remarks or additional information. Once approved, the transcripts were used to derive comparable results. The total interview dataset consisted of 16 interviews, with an approximate duration of 1.5-2 hours. The interviews were conducted in Dutch. Table 6 shows the affiliation of the respondents.

Table 6. Respondent list for interviews conducted with representatives of Rijkswaterstaat ON, RWS PDR, Province of Gelderland, municipalities and water authorities.

Name	Affiliation	Organisation	Date of interview
1.	River branch coordinator	RWS ON	September 21, 2016
2.	Location manager, liaison manager	RWS PDR	September 21, 2016
3.	Liaison manager	RWS PDR	September 22, 2016
4.	Liaison manager	RWS PDR	September 22, 2016
5.	Water governance consultant at Twynstra Gudde, location manager for multiple projects	Municipality of Deventer & Nijmegen, Province of Utrecht, water authority Rivierenland	September 23, 2016
6.	Liaison manager	RWS PDR	September 27, 2016
7.	Coordinator licensing	RWS ON	September 28, 2016
8.	Liaison manager, senior advisor on governmental matters	RWS PDR	September 29, 2016
9.	Senior advisor flood protection	Water authority Rivierenland	October 4, 2016
10.	Project manager	Water authority Vallei & Veluwe	October 4, 2016
11.	River branch coordinator	RWS ON	October 5, 2016
12.	Head of juridical department	RWS PDR	October 6, 2016
13.	Licensing authority for nature protection act 1998	Ministry of Economic Affairs	October 7, 2016
14.	Account manager projects	Province of Gelderland	October 19, 2016
15.	Licensing authority for soil excavation	Province of Gelderland	October 19, 2016
16.	Director knowledge management and liaison management	RWS PDR	October 27, 2016

3.3.3 Validity and reliability of the research design

In order to arrive at valid an reliable results and conclusions, two issues must be tackled: the collected data in this case study needs to explain what it was supposed to explain, i.e. the phenomenon of social learning, and the collected data needs to be collected in a reliable way. A number of risks occurred: the researcher is obviously part of the research process and thereby steering perceptions and understanding, using her own background information. This affects the reliability of the data. It is therefore important to have multiple sources in the empirical part, to get a broad overview of the case study context, thereby limiting potential bias from the researcher. It also allows for independent confirmation of statements for both data sources used. Besides that, reflection on the research results with professionals inside and outside of the RftR program was helpful in preventing a one-sided view and understanding of the phenomenon under study. The results of this research are influenced through interpretation of both the literature and the empirical data for the research context. This issue was cancelled out as much as possible by using a broad array of (complementary) literature sources, e.g. Pahl-Wostl, (2006) and the reaction of Reed et al. (2010). Besides that, there was a constant feedback loop for the literature interpretation and selection of relevant conditions with experts in the program. Regarding the empirical data collection, mixed interpretations were limited as much as possible by clearly describing the context of the research to the respondents, and by using an interview topic list in every interview, in order to create unity in the interview results. For the topic list, the same categorization was used as in the Medema et al. (2014) article, to keep the theory and empirical part closely connected. However, a minor modification was made. Medema et al. (2014) state that the categorization used in their article has some flaws: the process factors and internal context are very similar when taking the collaborative process itself as the internal context of the research. To prevent confusion and flawed data for this research, the internal context was taken to be the internal context of a representatives' home organization, as it is assumed that this also influences a multi-level governance learning process.

For the collected data, the interview recordings were fully transcribed, to reduce the chance of wrong interpretation in the transcripts. All recordings were listened to again, which also limits wrong interpretation.

Regular peer-review and reflection moments with academic professionals and professionals in the program were used to guard both content and process of the research. Lastly, a discussion of and reflection on the results of this research contributes to the external validity of the results.

4. RESULTS

4 RESULTS

4.1 Introduction

This chapter will answer the sub question on social learning processes in the RftR program: how did social learning occur in the program, i.e. what learning experiences did respondents gain in the program, and which conditions enabled these learning processes? The results are clustered using the categories described in par. 2.4. The interview results were arranged and labelled using an excel table, which corresponded to the interview topic list: a list of learning experiences and a list of conditions and how they influence social learning processes. Results were derived from interview data and document analysis. The documents were used to verify the presence of the conditions in the program that were mentioned in the interviews.

4.2 Learning experiences for integrated flood risk management

The research question points at learning for IFRM, which is done in a multi-level governance arrangement. The lessons were divided using three categories that were created by clustering the learning experiences of the interview respondents: learning experiences on parties and their interests, learning experiences on the project process and multiple-loop learning, and some more practical learning experiences in the RftR program regarding collaboration with multiple governmental parties.

4.2.1 Parties and their interests

Early involvement of regional parties that may have a stake in the designated project area is one of the most important learning experiences for an integrative approach in flood risk management. Timely involvement creates support for the project, which improves the overall quality of the project and the process. As one respondent remarked, '*an integrative, collaborative process and a joint designing effort creates support and better projects.'* An important facet of this approach is to keep a sharp eye for every parties' interests. Recognition and acknowledgement of one another's interest and to be able to bring in your own stake without denying someone else's has been an important lesson throughout the program. In that respect it is important to have a shared goal and to constantly reflect on that goal to keep it a shared goal. Another learning experience is to do a party a favor regarding their wishes for e.g. spatial development, by allowing them to add small projects like e.g. biking lanes or playgrounds to the design of a project. This creates a reciprocal relation which improves the collaboration. This also applies to the relation between the PDR and the executive parties. In order to make it a shared project, it is important to let the other parties 'tell the story of the project'. More generally speaking, it is important to approach every party with a story that fits their context: '*we framed the dike relocation as an urban development project, but with river widening and flood protection as the occasion. Externally, especially towards citizens, we used the urban framing, but towards Rijkswaterstaat we had to emphasize the flood protection part. So for me, I was constantly telling the project story to different parties, I really had to tune my story for every different party.'* There is no use in telling a very technical story at a city council, but it does so for a water authority. The other way around, a city council might be more interested in urban development, whereas a water authority is less interested.

In order to learn together, it is important to have frequent meetings with working groups (ABGs/AWBGs), even when there are no explicit issues to discuss. Keeping each other informed on the progress of the project and its surroundings is important keep relevant parties attached to the project, especially once the planning phase is over and the contractor is realizing the project. Keeping an eye out for political developments in the project area is important to maintain political (decisive) support in times of changing municipal and provincial politics. Creating and showing explicit added value of the projects for both governmental parties and citizens has been an important learning experience, as it increases support for the measures. This also applies for review

procedures, that were imposed on executive parties (mainly water authorities) by the PDR. By communicating about the underlying idea of the review procedure and the added value for the reporting party, parties became more willing to report in the imposed way. It was also mentioned that it is crucial for a project to choose the right party to lead the project. For e.g. small municipalities, a RftR project puts a major burden on their personnel and the city council. In terms of capacity, but also in terms of interests that are too large for a small municipality to decide on. Related to that is choosing the right executive party for the right phase and the right people for the right phase. A change in staffing is therefore not necessarily a problem. Generally speaking, a municipality is a more suitable party for the planning phase, since politics and conflicts of interests is their core business. A water authority is a more appropriate party to be in charge during the realization phase, since they are a less political organization and have a stronger focus on the project area. The need to include parties early in the process and to acknowledge each other's interests is reflected in the RftR evaluations as an important lesson learned and keeping parties involved is an important recommendation for the remainder of the program (ten Heuvelhof et al. 2007, p. 5; van Twist et al. 2011, p. 43; AEF, 2013, p. 24).

4.2.2 Learning experiences on processes: multiple-loop learning

'A dynamic world outside, asks for a dynamic world inside'. This quote summarizes the learning experiences regarding the processes going on in RftR projects. The dynamic world outside with many parties involved and many (changing) interests, political landscapes and media outlets, versus the more static world of review procedures and handbooks. An anticipatory approach in the 'inside world' is very important to keep on track and move along with the outside world. Many respondents do mention that the PDR as a bridging, facilitating organization succeeded in keeping the inside and outside world connected, by organizing cross-project meetings to share experiences, and special meetings for water authority executives to align intentions and keep them on board. The programmatic approach was very helpful is this respect, since the PDR was able to draw lessons and experiences from one project and bring it to another, since they had a perfect overview of wat happened in the projects. To some extent, learning had a normative character, which is also visible in the specific training sessions, in which people were trained in collaboration process, to get to know each other's world and way of thinking (PDR, 2013).

A frequently mentioned learning experience regarding the working processes is to allow for sharp discussions and debate. It helps to clarify interests and 'the rules of the game'. A respondent stated that friction between parties during the entire project works beneficial for the focus of the project. Related to this is the quick escalation of issues to superiors when agreement remains far away, and quick observation of problems. Once a collaborative process starts, an important lesson for the different parties is to get to know the working practices of other parties, e.g. permit procedures or the frequency of council meetings. Since this is different for every party, it is a communal lesson. Face-to-face meetings are important in this respect. Knowing how to ask the right questions to receive the desired answer is a lesson as well, as is knowing where and how to influence the working processes. Many respondents mentioned getting room to create and design a project, and subsequently take and use this room as well. The RftR evaluations also identified this as an important lesson, both for the PDR, who needs to give parties this room and trust, as well as the parties themselves, who have to take up the role and room given. Besides that, a respondent mentioned that a blueprint for the perfect project does not exist. Even though projects are related and experiences from different projects are shared, every project is different and has its unique approach. It depends on the people and the circumstances how a project is executed. A learning experience from that is that your own working method in is not necessarily the most suitable one for the task at hand. A respondent mentioned that in e.g. permit procedures, it was very hard to change to another procedure. Although, once changed, 'and the apocalypse

didn't happen', the change was accepted. Letting go of your own method to write or publish a permit is a way of learning as well.

Respondents pointed out that learning is a never ending process, and learning itself is done from both success and failure. Learning how to learn and learning how to cooperate are mentioned by some respondents as lessons learned in the program, which shows the cyclical character of learning. Learning how to combine and integrate multiple goals (flood protection, spatial quality, infrastructure, housing) has been an ongoing lessons for RftR professionals.

When looking at multiple-loop learning, a frequently mentioned learning experience is the realization of both Rijkswaterstaat and other parties that severely altering the residential areas of people is no longer possible without involving them in the design process. It can be argued that doing the opposite in RftR has shown to be very effective: involving regional parties and citizens early on in the planning process is one of the reasons for success in the program. The introduction of Integrated Project Management roles (IPM) by the PDR as the management approach in the planning and realization phases of the projects has shown to be very effective. Water authorities involved in RftR adopted this management approach for their own projects.

A lesson frequently mentioned, and one which can be seen as single or double loop learning, is the development of review frameworks for the progress of the projects. When the program started, hardly any review frameworks were available for this context. It has been a joint effort with the project executive party and the PDR to design the frameworks. Many respondents emphasize the cooperation in designing these review methods. Related to this is securing and reporting of decision making procedures. For a the multi-party approach, it is important to keep good records of what decision was made, who made it and when it was made, in order to prevent mistakes and confusion over decisions made. Another outcome of multiple loop learning is a change in regulatory frameworks. During the RftR program a number of laws and regulations changed (see also van Twist et al. 2011, p. 67). Regulation on financial claims was changed to make sure that citizens in project areas were compensated for the loss of value of their properties caused by the project. Another example of multiple-loop learning is the introduction of life cycle costing regarding management and maintenance of newly built structures in the program. Management and maintenance was originally left out of the program's cost estimation, but due to repeated discussion it was eventually taken up in the project budgets. Triple loop learning was not identified in the program, but it can be argued that the program itself is the result of a paradigm shift, namely creating room for the river instead of solely locking them up behind stronger and higher dikes. The RftR program has involved many stakeholders from the start, but the lessons might be that these parties involved had to incorporate these collaborative processes in their organization and working processes. The same goes for modifications in stakeholders involved, and working with climate change scenarios. This research is about a delineated program that can be seen as the result of multiple-loop learning previous to the initiation, especially double and triple loop learning. Ten Heuvelhof et al. (2007) state that the shift in water management of a technocratic approach to an river widening approach had already occurred in the late 1990s, and the Room for the River program was merely a product of this shift.

4.2.3 Practical learning experiences

Some more practical lessons have been learned as well. Diversity in working groups, having team members with mixed backgrounds, is beneficial for the process, as many perspectives are included in the discussion. Many respondents acknowledged that it is important to celebrate successes and so called milestone moments, e.g. project decisions, and especially the delivery of the project once it is finished. It helps to connect parties, to make it a joint effort and it creates positive experiences to build on.

RftR projects need many permits, due to the magnitude of the project (e.g. soil removal, water act, surroundings permit). The permit procedure was coordinated, which resulted in a clustered set of permits, which were open for official views together, to save time and have a clear procedure. This coordinated procedures was relatively new, and a practical lesson learned for the licensing authorities involved. Multiple

parties had to organize their permit process parallel, keeping a sharp eye on the content and scope of the permits. Due to similarities in the permits, parties could copy parts, thereby relieving each other's workload. Another lesson in permit procedures is working with final versions of permits instead of concept versions. A modification in a specific part of a permit might have consequences for other permits. Working with final versions prevents delay in the procedure that is due to modifications in the permits.

Taking field trips and visiting the project location is very important to have an image of what the project is going to look like. Besides, visiting the project area outside as a group has a positive impact on the working group procedures inside, e.g. meetings.

4.3 Conditions enabling social learning

The interview topic list and the interview data were used to make a table that shows which conditions influenced respondents' learning processes. The result is depicted in table 7.

Table 7. Overview of influence conditions have according to interview respondents.

Did this conditions influence the social learning process positively? (i.e. is the condition enabling social learning?) (N=16)	**+ Yes, positive influence**	**- No, no positive influence**	**+/- Both a positive and a negative influence**	**? No answer**
Individual attributes				
Openness to new experience, self-reflection, flexibility	**16**	**0**	**0**	**0**
Locus of power and control	**12**	**1**	**2**	**1**
Social skills	**15**	**0**	**0**	**1**
Experience with multi-level governance structures	**7**	**7**	**2**	**0**
Process factors				
Role and control of different parties	**15**	**0**	**0**	**1**
Mutual trust	**13**	**0**	**3**	**0**
Interdependency	**13**	**1**	**1**	**1**
Reflection and feedback	**15**	**1**	**0**	**0**
Available resources	**8**	**6**	**2**	**0**
Process architecture	**12**	**2**	**2**	**0**
Communication	**13**	**1**	**0**	**2**
Internal context factors				
Organizational commitment to learning and change	**14**	**0**	**1**	**1**
Integration of knowledge and information sources	**9**	**3**	**3**	**1**
Horizontally and vertically integrated cooperation structure	**10**	**4**	**0**	**2**
Internal conflict of interests	**8**	**4**	**2**	**2**
Involvement of stakeholders	**9**	**0**	**6**	**1**
External context factors				
Crisis events	**7**	**4**	**2**	**3**
Administrative procedures	**5**	**8**	**0**	**3**
Political support	**10**	**5**	**1**	**0**
Existing laws and regulation	**5**	**6**	**0**	**5**

The table answers the question whether a specific condition influenced the respondents' learning processes positively, in the context of the working group they were in. Conditions are seen as enabling when a large part of the respondents acknowledge that without it, learning is unlikely to occur, indicating a direct relation between the condition and social learning. The following paragraphs will elaborate on the categories of conditions and describe the relation found between the conditions and social learning.

4.3.1 Individual attributes

This paragraph will explain if and how individual attributes as shown in table 7 enabled social learning in the Room for the River program. All respondents confirmed that openness to new experiences, self-reflection and flexibility influence a social learning process positively. Individuals that are open for new experiences are more likely to observe the lessons to be learned and are more willing to change. '*Learning is change'*, as a respondent put it, and learning is *'Seeing what you can still learn, recognizing that some skills aren't part of your experience or ready to use'*. Self-reflection is an important precondition for individual learning: *'Every now and then you should take a little distance from your own work, and reflect on what's going well, what you should do different. That is the most important thing. [..] Because if you're not open for learning and change, you won't change.'* Social skills, or the ability to express yourself and formulate interests and arguments, is paramount. This skill works in two ways: having the right social skills helps to formulate your own or organizations' point of view in the discussion, but also helps to recognize and formulate viewpoints from other parties or individuals in the collaboration process. Social skills create a cooperative atmosphere and help to empathize with others. It is seen by many as a precondition for collaboration, and consequently for learning. The effect for social learning is creating an open atmosphere by 'sticking to rules and principles of dialogue', leading to respectful collaboration. An individuals' locus of power and control, or his awareness of position and capabilities to exercise control over the environment plays an important role, because it determines his position and the lessons deemed relevant to learn or to share with others. The multi-party approach and the different positions of the parties (project leader, permit authority, advising, facilitating and reviewing organization) enables learning, because individuals look at processes from a different point of view, which enables them to see new methods, that are successful. A liaison manager argued that the PDR, as a facilitating and bridging organization was not necessarily in charge of the projects, but because of that, they could learn from other parties' successful approaches (e.g. water authorities). Opinions on the need to have experience with a multi-party approach differ. Some respondents argue that experiences with a multi-party approach is beneficial, as it helps to determine your own position and the position of others, whereas others argue that the experience may create stereotypical thinking of other organizations, which will create a certain distance between parties, which may frustrate a social learning process. The general opinion is that experience is important, but of a secondary order, since it can be gained, whereas openness to new experiences and social skills is something which is harder to master yourself. An observation during the research is that respondents have a clear idea about their personal competences, which helps them to function in the right place in the projects. This is reflected in the weight they put on the individual attributes.

In the RftR evaluations, individual attributes are scarcely mentioned, since they focus on the program and its processes as a whole. It is noticed, however, that good personal relations in the PDR management team have contributed to the overall success of the program, and that personal commitment on the level of officials at regional and local governments (Ten Heuvelhof et al. 2007). Their personal competences complement each other, which creates a large knowledge- and experience base to build their approach (AEF, 2013). From the interviews is also became clear that the individuals involved in the program were highly motivated and professionally competent. It must be noted that for the individual attributes there is a strong interdependence between the conditions. E.g. openness and social skills are hardly separable.

4.3.2 Process factors

This paragraph will explain if and how process factors enabled social learning. As is visible in table 7, the role and control of different parties and reflection and feedback is seen by almost all respondents as a positive influence on the social learning process. Mutual trust and interdependency are also seen as preconditions for social learning, although some argue that trust is a precondition for collaboration, but not necessarily for learning. Some even argue that a little distrust or suspicion has a positive influence on learning, *'because you learn most of someone who does things differently than you do'.* The opposite was also rhetorically addressed: '*Would you learn without trusting someone? I don't think so. So first of all you'll have to trust someone before you can learn anything. That is crucial. But trust is something you earn. And you earn trust by letting go of the details and checks. […] So giving trust in fact.'* The importance of trust is explained by most respondents by linking it to a safe environment for learning, in which people trust each other and share their issues. A safe learning environment through mutual trust is seen as a preconditions for social learning by many respondents. The score for both a negative and a positive influence on learning is explained by learning when collaboration isn't successful. As a respondent explained: *'Collaboration does not always have to be successful in order to learn, you can also learn when collaboration isn't working out. And you might even learn more from that, but not as a group. You'll learn as an individual, but as a group you won't, because everyone has withdrawn in his own island again.'* A condition that was mentioned in the interviews which influences the level of trust in a working group is stereotypical thinking. Due to parties having a certain image of each other, or ideas about each other's working processes, stereotypical thinking occurs, which negatively affects the collaboration process and consequently the level of trust in a working group. This is also related to previous experiences with other parties. When starting a new project with the same party, it frequently occurs that the participants start the project with a certain idea about the other parties, which frustrates an open start of the project and creates unrealistic or wrong expectations, which in turn affects the level of trust in a working group. Role and control of parties determines which position in the collaboration process you have, which also shapes the interdependency relation with the other parties. This relation determines what your attitude is towards other parties, what is your task and what isn't. One respondent phrased it like this: *'As the program, as RWS, we weren't in charge, we were 'next-in-charge'. This position creates an interdependency relation with for example a water authority, or a municipality. And from the viewpoint if this relation, you sometimes notice they're doing really well. So that's when you do learn from the other party.'*

Reflection, feedback and trust have a reciprocal relation, as trust is needed before individuals will give feedback and reflect on the collaborative process. Reflection is a joint activity in which the collaborative process so far or process outcome is reflected on, whereas feedback is of a more personal nature, between individuals and their performance. Both yield the same results: explicit lessons to be learned to improve the collaborative process. For the other factors, results are mixed. The process architecture appears to be an important condition influencing social learning. The frequency of meetings, field trips, extended engagement through bilateral contacts are helpful in formulating expectations and frameworks for the team to work with. It helps to delineate the process and creates the network in which the parties operate and the agreements on which the collaboration is based. Communication, both internal and external, is seen by many as part of the process architecture and a positive influence on social learning. Without communication in the working group, no information or feedback is fed back in the collaboration process, which would hamper social learning. Timing and what to communicate and what not were mentioned as well. Time was the only resources that was explicitly mentioned by respondents as a resource that influenced learning. Its effect is both positive and negative: getting time to do a task more than once to gain experience helps learning, but time pressure frustrates learning, since there is only little time for feedback and reflection.

Generally speaking, the findings in the documents confirm the findings in the interviews. Van Twist et al. (2011) mention trust as a prerequisite for collaboration*: 'a certain degree of mutual trust is needed in order to get room in the collaborative process,'* as opposed to a more controlled, top-down management approach from the PDR to other parties (p. 33). They also mention an open and transparent atmosphere, in which discussion on decision making procedures was possible. Regarding role and control of different parties, the focus is mainly on the role of the PDR, and not so much on the mutual influence of the parties in the collaborative process. Ten Heuvelhof (2007) mentions a web of interdependency, but mainly in terms of knowledge: knowledge is mostly situated at the central level (PDR, RWS), while mostly used on the decentral level, in the projects. Regarding the collaboration process between central and decentral governments, Ten Heuvelhof et al. (2007) state that joint decision making is a must, but this is only possible when parties give each other room in the process to bring in their own problems and solutions (p. 52). This points back to the necessity of role and control of parties for the social learning process.

4.3.3 Internal context

The internal context of an organization enables learning to such an extent that the organizations that are involved in the working groups need to have a commitment to learning, in order for working group members to learn and for social learning to occur. Organizational commitment to learning allows representatives to deviate from the business as usual, which is beneficial for a social learning process: *'Regarding commitment to learning, I think that has been one of the major strengths of the Room for the River program. […] On all levels, this commitment was created.'* So it is both a condition in the program and a result of the intensive collaboration processes throughout the program.

Integration of knowledge and information sources is important in the context of sharing experiences, but less in sharing actual information and knowledge. The PDR would organize special training days for IPM-team members (e.g. technical manager, contract manager, location manager), to share their experiences and consequently learn from each other. The PDR also made sure that experts from the program office had cross-knowledge of all projects, to prevent similar problems to occur and to transfer experiences and knowledge from one project to another. However, this points at sharing of experiences, and less to actual integration of information, which is therefore seen as less crucial. The negative score for this condition is explained by the fact that information and knowledge management was organized very well by the PDR, and there was a strong focus on facilitation of knowledge sharing to decentralized parties, so the necessity for parties to integrate their own information sources was small (see also van Twist et al. 2011, p. 28).

Internal conflict on interests were deemed less important for social learning, as they are mainly solved in the representatives' home organization, but aligning these different interests is a lessons in itself, although not a 'social lesson'. Involvement of stakeholders also contributes to learning in an ambiguous manner. Involvement of stakeholders was mainly seen as the continuity of staff and consistency in one's role and representation of the home organization. The influence of changing staff on social learning depends on the amount of people that are replaced and their function: when too many people leave at once and from a specific team, the collective memory of the organization is affected, but a small change in staff every now and then results in new, fresh ideas that help to learn. It must be noted that this is also an indirect condition for social learning, as this conditions was researched for the internal context of an organization, and not the multi-level governance structure. Vertically and horizontally integrated cooperation structures is an important condition according to the majority of the respondents, but rather for the collaboration process itself than for social learning. This conditions was also mentioned by van Twist et al. (2011): '*In the program architecture, we see a large degree of administrative and official intertwining, on two dimensions. There is a vertical dimension (centralized steering combined with decentralized realization) and a horizontal dimension (collaboration between parties at the same level).* Regarding changing staff, Ten Heuvelhof et al. (2007, p. 54) emphasize continuity in relations

on which (local) support is based, not so much in staff, since new phases requires new competences and therefore changing staff is necessary.

4.3.4 External context

Overall, external context conditions seem less important conditions for social learning compared to individual attributes and process factors. Political support is seen as both a positive influence and a negative influence on social learning: on one side, political support improves the collaborative process and creates space for a project to get going, whereas the lack of political support will create tension in the collaboration structure. A respondent formulated the role of political support like this: *'The lack of political support creates an even more urgent need to have a successful learning process I think. You are regarded more critically, which means the story you bring about the project needs to be really good. […] when you just go with what the alderman says or wants, he'll like the ideas, and be more like 'we'll just do this', instead of 'why do we want this?', and 'is this really the best option?'.* It shows the need to be more critical of your own work, which helps to learn. On the other hand, political support for the outcome of a design process will create commitment in the working group, which may positively influence learning.

Crisis events do not directly contribute to social learning, but project-hiccups tend to bring people closer together, which in turn may positively influence collaboration and social learning. Administrative procedures do not directly influence social learning, except when they slow down the process to such an extent that the collaboration process suffers from a loss of trust, which frustrates social learning. Regarding changing laws and regulation, an often mentioned change in regulation is the EU-based verdict that forces RWS to put terrains that were acquired for the projects on the market for public tender, instead of directly deliver them to e.g. nature conservation organizations (e.g. Staatsbosbeheer or Natuurmonumenten). This changed the role of some parties in the working groups from e.g. project realizer to terrain management, which did put a strain on the collaboration process in the working groups.

Ten Heuvelhof et al. (2007) and Van Twist et al. (2011) do not specifically mention external context factors, apart from acknowledging that the Room for the River program is realized in a highly complex environment, in which many shifts (technical, juridical, economic, political) are visible (Van Twist et al. 2011, p. 11). They describe a similar dilemma as previously mentioned regarding political support: *'Involving politics creates the dilemma between openness and speed: it generates support, but it may also lead to delays and slow processes'* (Ten Heuvelhof, 2007, p. 6). It may therefore be seen as having both a positive and a negative influence on social learning processes, but not necessarily as an enabling condition.

4.4 Results concluded

When linking the results of this research back to the theory used in chapter 2, many of the conditions described in this chapter apply in a direct or indirect way to the learning processes in the RftR program. For the theoretical chapter it was assumed that all conditions would apply in a similar manner to social learning, but this research shows that some are more important than others in social learning. These can be labelled as key conditions, whereas others are more supporting conditions.

Generally speaking, a positive answer on the questions whether a condition has a positive influence on learning shows a direct relation to social learning, whereas a negative answer on this questions indicates a more indirect, or second order effect or no effect at all.

For individual attributes, the theory is confirmed for all conditions except experience with multi-level governance structures, due to its ambiguous effect. For process factors, mutual trust and interdependency were important conditions, as is the role and control of different parties. Reflection and feedback are important

features, as was described in the literature as well. As opposed to the theory, resources are of little importance, except for time, which has an ambiguous role in the social learning process. For internal context factors, an organization committed to learning is important, other conditions are less important. For external factors, the only condition that really affected the learning process is political support, but also in an ambiguous way.

The findings of this research do not necessarily contradict the theory used, nor do they fully confirm the theory. They merely refine the set of conditions mentioned in the literature, partly by ranking them to some extent, and by showing the relation between the conditions described and the social learning process in a specific context.

5. DISCUSSION

5 DISCUSSION

5.1 Introduction

This chapter will address the limitations of this research and will reflect on the theory used. It will discuss the research operationalization and execution of the empirical part, in order to state the significance of the outcomes of this research. The reflection on the theory is done by referring back to the conceptual framework that was drafted from the literature and compare it to the results in chapter 4. This will result in a new model, in which the findings of this research are incorporated.

5.2 Limitations of the research operationalization

An important limitation of this research is the processing of the data. The diversity and detail in the answers given during the interviews has gotten lost to some extent for the sake of a general results overview. It must be kept in mind that behind every '+' or '-' in table 7 is a story, that was abstracted in order to create a results section from which conclusions could be drawn. The term 'enabling' was used to indicate conditions that have a strong influence on learning. The table in the results section implies a more quantitative approach, but this table was merely used to give an impression of the answers given. It gives a general overview, but it cannot be used 1-to-1 to point out enabling conditions.

In retrospective, the results section and conducting interviews should have written been more simultaneously, to make sure the interviews would yield the intended and necessary results and a certain level of detail in the answers given. Questions like 'what did you do different over the course of the project?' should be replaced by 'if you would do the project again, what would you change?', because that is something respondents might have thought about already, whereas learning experiences is something that requires more conscious deliberation. The interview data was partly used to sketch the relations between the conditions and social learning processes. However, due to both social learning and collaboration being a complex concept, it is not completely clear which precedes the other, i.e. the relation is reciprocal. Social learning occurs within the boundaries of a collaborative process, but collaboration also requires social learning to become a really participatory process in which parties collaborate to achieve a shared goal.

The distribution of parties form which the respondents originate is not completely balanced. Many respondents originate from the PDR (liaison managers), and there is only one respondent who was a representative for two municipalities. However, biased results because of this distribution was avoided as much as possible by explicitly asking people about their role in the projects, and focusing on their home organizations in the questions.

The research focused on a period of time of approximately 10 years. Interviewees stated that it was hard to retrieve memories and explicit lessons over such a long period of time. Multiple phases have passed (initiation, planning and design, realization, evaluation), in which roles of stakeholders have differed over time. This changing role might have implications for their perception of lesson learned, but this was as such not included in the interviews.

5.3 Theoretical reflection

Since this research addresses social learning in a specific context, there is a gap between the theory used and the outcomes of this research. In this paragraph, the theory on which the conceptualization of social learning and the conceptual framework (par. 2.4) are based will be discussed in relation to the outcomes of this research. Starting with the conceptualization of social learning, van Herk et al. (2011/2012/2015a/b)

address learning in their research as a supportive mechanism for the transition towards a 'living with water' paradigm. However, this research explicitly focusses on learning in the collaboration structures between governmental representatives that have a role in the RftR program. The concept of learning was explained and conceptualized differently, hence the limited link with the outcomes of this research. Regarding Reed et al. (2010), the three pitfalls mentioned in paragraph 1.2 are avoided as much as possible when working with the concept of social learning. Especially the pitfall of 'conflating' social learning and participatory processes was avoided as much as possible by always addressing social learning as a process, of which improved collaboration is an outcome.

An important difference in the theory and the outcomes of this research is the occurrence of multiple-loop learning. Multiple-loop learning, as addressed in chapter 2, is an important feature of social learning according to e.g. Pahl-Wostl (2009) and Huntjens et al. (2011). Huntjens et al. (2011) identify elements of double and triple loop learning in the RftR program. However, for this research, no elements of triple loop learning were found in the RftR program. The difference can be explained by looking at the research context. It can be argued that Huntjens et al. (2011) focus on the flood protection regime, whereas this research focused on a specific program in the regime. Triple-loop learning is becomes visible in e.g. paradigm shifts, but no paradigm shift *within* the RftR program was visible. The program itself can be seen as the result of a paradigm shift.

Regarding the conceptual framework (fig. 4, par. 2.4) some remarks can be made. The framework was mainly based on Mostert et al. (2007) and Medema et al. (2014). From the results of the empirical part, a more advanced framework can be made. As may have been noticed, in the results section the individual attributes were given a heavier weighting than the other categories, since the interview results pointed out that these were more important conditions for social learning than the others. Also, the process architecture and a safe learning environment through mutual trust were seen as more important than others in the process factors category. Stereotypical thinking came up as a condition that affects the level of trust and the safe learning environment. The interview results also indicated a strong mutual relation between learning and collaboration.

The relation between the conditions and social learning have become clear in the interviews. Combining the conceptual framework and the research results from chapter 4, a new model was made that explains how the key conditions found enable social learning. Figure 7 shows a model that is a graphical overview of how the different conditions relate to social learning for IFRM, and consequently to improved collaboration.

Although the context, method and the scale of the articles used is different from this research, testing them in the context of IFRM appeared fruitful and may have furthered the theory on social learning.

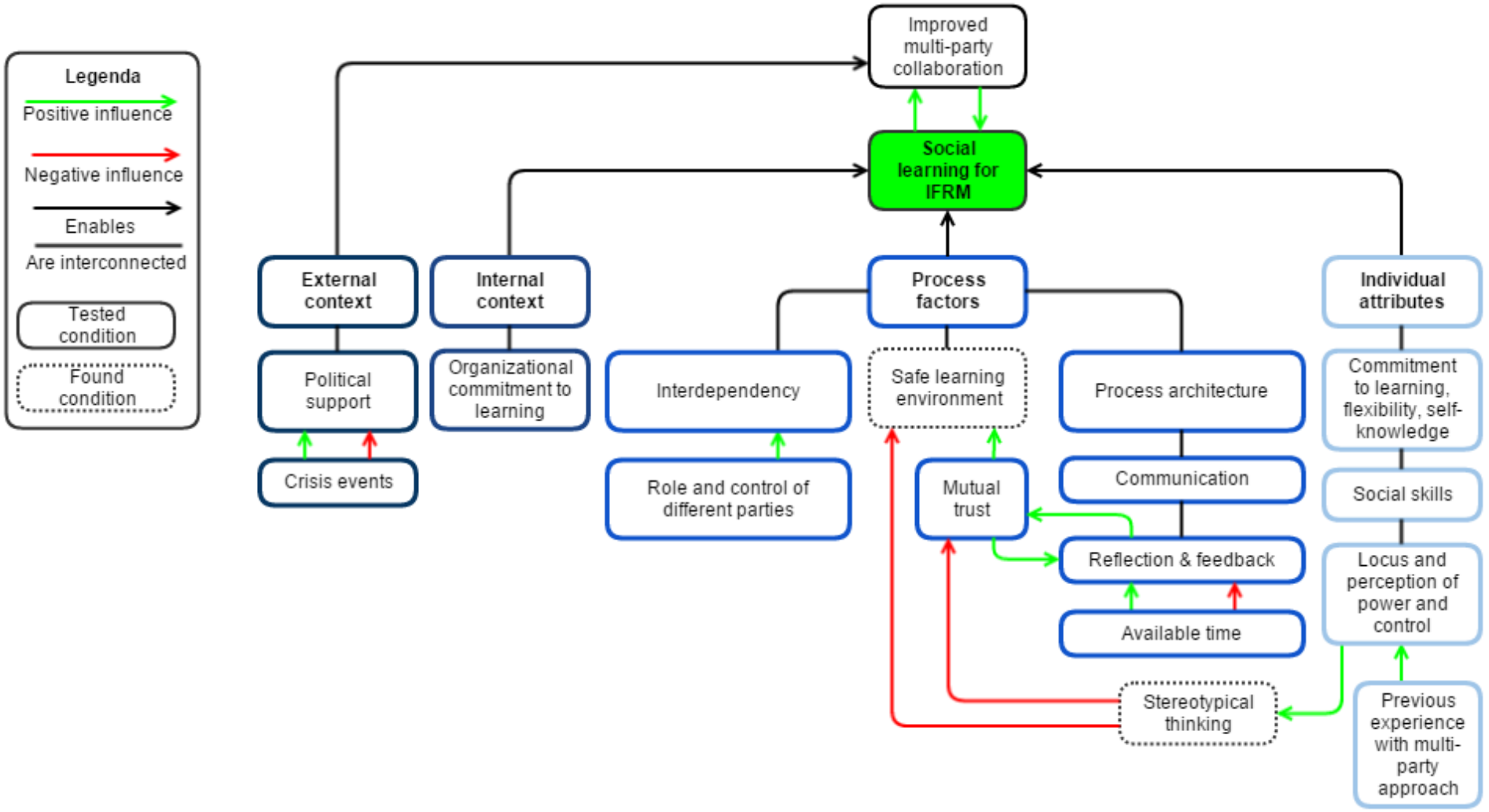


Figure 7. Model based on the combination of the conceptual framework (fig. 4, par. 2.4) and the research results.

6. CONCLUSION & RECOMMENDATIONS

6 CONCLUSION & RECOMMENDATIONS

6.1 Conclusion

This research aims to identify conditions that enable social learning for IFRM, by means of conceptualizing social learning for this context and testing social learning conditions in the IFRM program Room for the River. The knowledge gap that is filled by this research is the lack of a clear concept of learning for IFRM and a set of conditions that enable social learning in this context. The question that is central to this research is:

> **What conditions enable social learning on integrated flood risk management in multi-level governance arrangements?**

The previous chapters consecutively answered the sub questions, that were related to the different steps in the research framework (see par. 1.4). Firstly, literature research was done in order to conceptualize social learning for the context of IFRM and to create a conceptual framework on social learning conditions. The framework was tested in an IFRM case study, namely the Room for the River program. This confrontation of literature and practice resulted in a list of enabling conditions in chapter 4. This chapter will answer the overall research question, by shortly addressing the conceptualization and conditions for social learning. This thesis report is finalized by giving recommendations on enabling social learning in IFRM programs, thereby answering the remaining sub question.

Conceptualization of social learning

Social learning for integrated flood risk management is conceptualized as a process of change in understanding, that goes beyond the individual, at the micro-level of multi-party (governmental) collaboration, aiming at collective action for integrated flood protection. Social learning is characterized as a learning process in a social context, which enables collective action. Social learning takes place at the level of working groups and collaborative processes, i.e. the micro-level. This conceptualization for social learning has a very strong relation with collaboration, but collaboration aimed for change towards sustainable development.

Enabling conditions for social learning

For the conceptual framework, the conditions enabling social learning were divided in four categories: individual attributes, process factors, internal context and external context. The individual attributes appeared to be key conditions in social learning processes. During interviews, most respondents pointed out that a personal commitment to learning and change are crucial conditions for social learning. A locus of power and control, or awareness of one's position and corresponding responsibilities and possibilities was considered necessary as well. Related to this are social skills and the ability to express the organizational interest. Experience with a multi-party approach was deemed less important for social learning.

With regard to process conditions, mutual trust, goodwill and understanding are the key conditions that enable social learning, as a trusting atmosphere encourages an open and flexible attitude of all participants. This is of particular importance in integrated flood risk policies, since parties with different stakes cooperate to achieve a shared goal. Regular feedback and reflection moments on the projects' content and process were considered significant factors contributing to social learning. These moments are important to point out in which area project groups need to improve their overall knowledge or skills and in which area progress has been made. The overall process architecture (e.g. meeting formats, joint planning, frequent interaction, clear and shared perspective) was helpful in creating a safe learning environment in which participants were eager to share issues and information. Regarding available resources, time plays a role, as time pressure may lead to

rushing processes, at the expense of a careful learning process. On the other hand, time pressure increases the speed of learning processes.

The internal context of an organization is important for social learning in integrated flood risk management, to the extent that an organization itself should be externally oriented and committed to learning, in order to be flexible enough to change. Besides that, information should be readily available, as well as sharing of experiences between individuals. Continuity of staff, although with gradual renewal over time, is crucial for maintaining a collective memory, which is helpful in social learning. However, new insight brought in by new people prevents organization from developing blind spots.

The external context of a project is a less determining condition for social learning to occur, although 'hiccups' caused by crisis events (e.g. rejection of decisive documents) may lead to both increased social learning, as working groups overcome these crises together, but may also form a distraction from the working process.

Overall conclusion

Overall speaking, the conclusion for this research is that individual attributes of participants in integrated flood risk management projects play a major role in the social learning process, as a participants' individual attributes ultimately determine the commitment to learning, together with the locus of power and control one has. These conditions form the boundary, enabling conditions for social learning. Besides that, a clear process architecture, facilitation of learning and reflection and feedback moment are crucial, as it provides working group participants with the lessons to be learned. Other conditions, e.g. information sharing, may stimulate social learning, but are no preconditions for social learning. Many conditions can be seen as intermediate, indirect conditions, that affect e.g. the level of trust in a working group, which in turn influences the learning process. It shows the strong interrelation between the conditions and the different categories.

A very important lesson from this research is that social learning is a process that lacks a starting point as well as a finish line. It is a constant process of balancing stakes, sharing information and the creation of mutual trust and a collective memory. Leaning itself is in intangible process that happens without the learner fully aware of it, and is mostly visible in retrospective, although learning is a lifelong process. This emphasizes the necessity for a learning organization, in which reflection and openness to change are core qualities.

In a program organization, collaboration and learning are two sides of the same coin: you learn through collaboration with others, but successful collaboration requires on-going learning as well.

6.2 Recommendations

Policy recommendations

This paragraph will be used to make recommendations for parties that will organize future flood protection programs. They are based on the results and conclusion of this research. The recommendations aim to shed light on how to create a learning environment in an IFRM context. The results of this research show that the individuals working in the program and the process architecture, as well as the internal context of an organization play a major role in social learning processes. To a large extent, an organization or program directorate is able to influence these conditions. Process factors and internal context can be organized as such that individuals committed to learning are attracted and are willing to participate in a collaborative process. A program directorate can trigger social learning processes by designing specific learning workshops, in which mutual trust and reflection are addressed. Besides, a program directorate can contribute to learning processes by actively taking up a bridging function in sharing of knowledge and experiences throughout the program. Learning from past experiences in a program is a major advantage of a programmed approach for flood protection.

Recommendations for further research

This research addressed social learning in an IFRM context, which was done by interviewing policy officers on multiple positions in an IFRM program. The respondents chosen all had key positions in designing projects and advising executives on the projects. This made them very suitable respondents for the goal of this research. However, transferring the research design to the executive part of the multi-level structure of an IFRM program might yield different outcome. This indicates that social learning is a broad concept that changes with the context it is studied in. Future research might look into these different 'learning arenas' and the effects for social learning.

The outcomes of this research are solely based on an IFRM approach for flood protection. Since most respondents in the research are only familiar with this approach for flood protection, there is no comparative element that confirms that the learning experiences and enabling conditions are unique for the IFRM approach, as compared to a non-IFRM flood protection approach. Future research might look into a comparison between a more technocratic approach (e.g. dike strengthening) and the IFRM approach, by comparing e.g. flood protection programs in other flood prone countries with IFRM programs.

This research did not explicitly focus on weighting the conditions for social learning, although a certain hierarchy in the conditions was found. Future research might look into this even further, by taking a quantitative approach for social learning research. This could be done by using surveys and statistical modelling. Bos et al. (2013) describe frameworks for governance experimentation, which is probably an interesting approach for combining social learning research with a quantitative method.

When looking specific at the Room for the River program, another interesting point for further research is its 'legacy' for future IFRM approaches. The integrative approach in terms of a multi-level governance approach is adopted for e.g. the Delta Program. It would be interesting to see whether parties that have been involved in the RftR program really take a different approach in flood protection than parties that have not been involved in the program.

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APPENDIX

Interview topic list

Topic list interview – Social learning in the Room for the River (RftR) program – 2016

Prior to starting this interview, some remarks:

- The interview will have a duration of approximately one hour;
- Do you give permission to record the interview?;
- The interview results are anonymous, and no information nor quotes will be related back to the interview respondent;
- Do you agree for your name and affiliation in the RftR program to be mentioned in a respondents list?
- A transcript will be made of the interview results, which you will receive in order to comment on the text or add new insights, based in the interview results so far;
- The context of this research is a master's thesis project on social learning in integrated flood risk management. The main question for this interview is 'what are the lessons learned in the Room for the River program' and 'what conditions enable social learning?'

Part I. General questions

- What is your background? Technical/juridical/management, what are your tasks in the projects/program?
- For how long have you been involved in the Room for the River program? How did you get involved?
- In which projects have you been involved? In which phases of the projects have you been involved? In administrative guidance group (ABG) or the administrative working group for licensing authorities (CWBG/AWBG)?
- Which parties did you work with in the RftR program/project?
- What was your role and responsibility in the program/project?

Part II. Social learning

- What are your lessons regarding the integrated approach in the RftR program (creating room for rivers, early involvement of multiple parties) compared to the traditional approach (heightening and strengthening of dikes) in flood protection management?
- What are your lessons regarding collaboration with other (governmental) parties in the program?
- Did any changes occur in the collaboration process or project organization of RftR? [Multiple-loop learning]
    - Small changes in existing procedures to refine them;
    - Change in organizational structure (new personnel, new information that leads to a different organizational structure);
    - New management approach/method, new type of measures;
    - Paradigm shift ('we need to change our flood protection approach drastically');
    - Major changes in laws and regulation.
- What did you do different in earlier and later phases of the project, regarding collaboration with other parties?
- What caused this difference/learning experience?
- In case of employment elsewhere, e.g. in another organization or program, what lessons did you take along from RftR?

- Do you see a difference in learning between members of ABGs and CWBGs/AWBGs?

Part III. Which conditions below are important in learning for an integrative approach for flood protection?

Which individual attributes influence learning in collaborative processes with other parties?

- Openness to new experiences, capability of self-reflection, flexible and open minded
    - *Commitment to learning and change*
- Locus of power and control
    - *Ability to exercise control and influence surroundings*
- Social skills
    - *Sticking to rules and principles of dialogue, mutual understanding, being respectful of others' viewpoints*
- Experience with multi-level governance structure
    - *Positive experience in previous projects*

Which process factors influence learning in collaborative processes with other parties?

- Role and control of different parties
    - *Relevant parties, neutral chairman*
    - *Too many parties: loss of control and confidence*
- Mutual trust and interdependency
- Reflection and feedback
    - *Useful, well-timed feedback on content and process*
    - *Framing and reframing of issues and goal, no strictly defined goal yet, not one dominant group*
- Available resources (time, budget, knowledge and information)
- Process architecture
    - *Clear, shared goal*
    - *Frequent meetings, appropriate format, extended engagement, field trips*
    - *Transparent and legitimate process*
- Communication, within working group and to surroundings

Which internal context conditions influence learning in collaborative processes with other parties?

- Organizational commitment to learning and change
- Advanced information management, integration of knowledge and information sources
- Horizontally and vertically integrated cooperation structure
    - *External orientation: interaction between parties on multiple levels and scales*
- Internal conflicts
- Involvement of parties
    - Consistency in role, being representative for your organization
    - Continuity in staff in your organization

Which external context factors influence learning in collaborative processes with other parties?

- Crisis events (e.g. flooding, elections)
- Political support, vested interests
- Administrative procedures
- Existing laws and regulation