



# Transboundary collaboration on crisis management for river flooding and droughts

A CASE STUDY OF THE DUTCH-BELGIAN COLLABORATION ON THE RHINE-MEUSE-SCHELDT DELTA

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## I. Foreword

This research examines the importance and context of the Dutch-Belgian transboundary cooperation within the Rhine-Meuse-Scheldt delta. Both countries share two bigger river basins, the Meuse and the Scheldt, of which both confluence in this specific delta. Regions related nearby these rivers are vulnerable in terms of river flooding, especially since sea levels also influence high water levels in this context. Flood risk management is executed by both water managers and crisis managers, resulting in complex structures within one single country. The system becomes even more complex in case of cross-border regions, flood risk management is dealt with by two different countries that both have other structures in water management as well as crisis management. Problems and challenges in terms of politic-administrative structures, languages and cultures occur in this kind of border regions. However, a flood is unpredictable and can cause severe hazards. A good collaboration is therefore of major importance.

My interest for this region primarily arose as an indirect result of the attention being paid to the Dutch-German Euregio border, which is often seen as an ideal version of transboundary cooperation. The Belgian-Dutch border was barely explored. Besides, the interaction between the major rivers, the sea and the major ports located within the delta asked for my attention. This interest resulted in a research concerning transboundary cooperation in the Rhine-Meuse-Scheldt delta with which my undergraduate program will be completed. Doing this research was a challenging, informative and interesting project in both substantively and research technical ways.

I would like to thank the people who I have been able to interview and who were supporting in terms of providing useful information and insights concerning the transboundary cooperation in the Rhine-Meuse-Scheldt Delta. I'd also like to thank my supervisor for giving his advices with regard to this research.

Kris van den Berg

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## II. Summary (Dutch)

In recente decennia hebben veranderingen in het klimaat een grote impact gehad op alle natuurlijke milieus en mensen over de hele wereld. De aanhoudende krimp van gletsjers en het smelten van permafrost, welke beide zijn veroorzaakt door de klimaatverandering, resulteert in hogere waterafvoeren en stijgende water levels in zeeën en stroomgebieden. Deze water levels in combinatie met de impact van de recente klimaat-gerelateerde weer extremen kunnen gevaarlijk zijn wat betreft vloedgolven, droogte, overstromingen, cyclonen en bosbranden. Om deze reden zijn adaptatie plannen en beleid nodig om burgers te beschermen tegen deze impacts. Overstromings- en droogtegebieden in stroomgebieden strekken zich vaak over meerdere regio's en beïnvloeden verschillende gemeenschappen, provincies en, soms zelfs, landen. Toch heeft de toegang tot een bepaald waterlichaam door meerdere populaties een mogelijk risico tot discourse en conflict. Deze potentiële impacts en tegenstrijdige belangen kunnen het beste worden opgelost door samenwerking, adequaat legale en institutionele richtlijnen, gemeenschappelijke benadering tot planning en gedeelte opbrengsten en kosten (UN Water, 2008). In dit onderzoek wordt de Rijn-Maas-Schelde Delta, een rivierdelta welke is gevormd door het samenvloeien van de Rijn, Maas en Schelde rivieren in het westerse gedeelte van Nederland en het Vlaamse gedeelte van België (Vlaanderen), gebruikt als case study. Het onderzoek streeft naar het verkrijgen van een beter begrip van de manier waarop gezamenlijk crisismanagement voor rivieroverstromingen en droogte in België en Nederland is vormgegeven door het bespreken van overeenkomsten en verschillen tussen de Nederlandse en Belgische toepassingen van samenwerking op het gebied van crisis management voor rivieroverstromingen en droogte. De onderzoeksvraag is daarom:

*“Wat zijn de overeenkomsten en verschillen in de arrangementen van Nederland en België in de Nederlands-Belgische grensoverschrijdende samenwerking in crisismanagement voor rivier overstromingen en droogte in de Rijn-Maas-Schelde delta?”*

De overeenkomsten en verschillen zijn besproken aan de hand van het Stadium Model van Grensoverschrijdende Samenwerking (English: Stages Model of Transboundary Cooperation) en de beleidsarrangementenbenadering (English: Policy Arrangement Approach) en door het analyseren van problemen, uitdagingen en de projecten die worden geïmplementeerd.

### Methodologie

Een hoofdzakelijk verdiepende kwalitatieve onderzoekstrategie is gekozen, omdat het mogelijkheden biedt om een dieper begrip en grondige kennis van het onderwerp te

verkrijgen. Om deze reden is de casestudie van de Rijn-Maas-Schelde Delta gebruikt. Deskresearch en interviews zijn de onderzoeksmaterialen die het meeste zijn gebruikt gedurende het onderzoek. Respondenten zijn geselecteerd naar aanleiding van een gronding onderzoek waarin expertise in overweging is genomen. Omdat dit onderzoek zowel watermanagement als crisis control belicht, zijn experts vanuit beide disciplines geselecteerd en geïnterviewd.

## Actoren

Crisismanagement voor rivieroverstromingen in Nederland en België is goed georganiseerd met duidelijke structuren en taakverdelingen. Toch zijn deze structuren en verdelingen relatief moeilijk te definiëren door actoren van het andere land. Dit resulteert in moeilijkheden bij het vinden van de juiste gesprekspartners en wat kan leiden tot vertragingen in crisissituaties. Structurele veranderingen en de verdeling van taken is in beide systemen deel van deze uitdaging. Daarnaast is de rol van grensoverschrijdende actoren, zoals de Internationale Schelde Commissie en de Vlaams-Nederlandse Schelde Commissie, onduidelijk voor meerdere actoren omdat zij niet bewust zijn van het bestaan van deze commissies of hun taken. Dit gebrek aan transparantie, duidelijke communicatie en continuïteit kan leiden tot problemen en uitdagingen binnen het systeem van grensoverschrijdende samenwerking op het gebied van crisismanagement voor rivieroverstromingen.

## Middelen

Verschillende actoren in crisismanagement voor rivieroverstromingen ervaren een tekort aan middelen, zoals financiële middelen, tijd en personeel. Opvallend is dat Nederlandse partijen, zoals de provincie van Zeeland en de bijbehorende gemeenten, voornamelijk te maken hebben met financiële tekorten, omdat ze afhankelijk zijn van de nationale overheid, terwijl de Vlaams administratieve structuren een gebrek aan personeel als belangrijkste uitdaging hebben. Daarnaast is het Nederlandse nationale crisismanagement systeem (LCMS) een belangrijk communicatief aspect in Nederlands crisismanagement. Een vergelijkbaar systeem wordt uitgerold in België. Dit biedt mogelijkheden voor een link tussen beide netwerken om crisismanagement efficiënter te laten werken.

## Regels en wetgeving

Zowel Nederland als België hebben wetgeving met betrekking tot watermanagement en crisis control. Dit resulteert in de huidige watermanagement structuren en de oprichting van de Nederlandse veiligheidsregio's en Belgische noodplannen. Wetgeving van beide landen is beïnvloed door Europese en internationale wetgeving met betrekking tot

overstromingsrisico's en watermanagement. Op dit moment bestaat er geen gemeenschappelijk beleid voor overstromingsrisico's, omdat de Nederlands-Belgische samenwerking voornamelijk is gevormd door verdragen en overeenkomsten.

### Discoursen

Actoren ondervinden geen problemen en uitdagingen veroorzaakt door discoursen. Toch vormen culturele en politiek-administratieve culturen de basis voor discoursen die grensoverschrijdende samenwerking kunnen compliceren. Deze discoursen hebben betrekking op de complexe structuren van de Belgische autoriteiten, de hervorming van de Nederlandse administratieve structuren en de bestaande culturele verschillen. Elkaar en elkaars cultuur leren kennen is daarom een belangrijk aspect in de huidige samenwerking.

### Effectieve samenwerking

Milieu- en sociale nadelen zijn symmetrisch verdeeld in de stroomop- en afwaartse conditie, omdat er niet veel directe grensoverschrijdende overstromingsgebieden bestaan. Door deze niet wederkerige relatie, zal ruimtelijke adaptatie in één gebied hoogstwaarschijnlijk geen invloed hebben op een ander gebied. Toch leidt de samenwerking van deze twee verschillende administratieve culturen tot verschillende consequenties, zoals misverstanden als gevolg van onbekendheid met elkaars overleg- en beleidsstructuren. Taalbarrières worden gezien als een ander belangrijk aspect in grensoverschrijdende samenwerking. Hoewel mensen in zowel Nederland als België Nederlands spreken, is het over het algemeen niet volledig dezelfde taal. Uitspraak en woordgebruik kan verschillend zijn in sommige situaties, wat kan leiden tot misverstanden en uitdagingen. Toch zijn er ook verschillende successen geboekt, zoals de institutionalisering van de Nederlands-Belgische samenwerking in het Schelde stroomgebied en verschillende kleine projecten.

### Conclusie

Hoewel Nederland en België vaak worden gezien als relatief gelijk wat betreft taal en cultuur, veel verschillen in actoren, middelen, wetgeving en discoursen kunnen worden geïdentificeerd. Volgens het Stadium Model van Grensoverschrijdende samenwerking is de Nederlands-Belgische samenwerking aan het verschuiven van een hebben van een gemeenschappelijke probleemdefinitie door gezamenlijke probleem structurering naar afstemming van elkaars beleid om een gemeenschappelijk beleid te kunnen bereiken. Hoewel een gezamenlijk beleid op dit moment nog niet is bereikt, hebben de bestaande grensoverschrijdende structuren de implementatie van verschillende overeenkomsten en verdragen tot uitvoering gebracht. Toch is de huidige situatie niet klaar om een volledig

gezamenlijk beleidsmakingsproces na te streven door de politiek-administratieve en culturele verschillen. Dit impliceert dat grensoverschrijdende samenwerking gecompliceerd is zonder een gezamenlijke juridische achtergrond waarin een duidelijke structuur is vastgesteld.



### III. Summary

In recent decades, changes in climate have caused a major impact on all natural environments and human beings across the world. The ongoing shrinkage of glaciers and thawing of permafrost, both due to climate change, result in higher runoffs and rising water levels in seas and watersheds. Those water levels in combination with the impacts from recent climate-related weather extremes can be hazardous in terms of waves, droughts, floods, cyclones and wildfires. As a response, adaptation plans and policies are needed to protect civilians from those impacts. However, flood and drought areas within watersheds often cover several regions and include different communities, provinces and, sometimes, countries. Although, the access to a certain water body by several populations has a potential risk for discourse and conflict. These potential impacts and conflicting interests can be best solved by cooperation, adequate legal and institutional frameworks, joint approaches to planning and sharing benefits and costs (UN Water, 2008). In this research, the Rhine-Meuse-Scheldt delta, which is a river delta formed by the confluence of the Rhine, Meuse and Scheldt river located in the western parts of the Netherlands and the Flemish part of Belgium (Flanders), is used as a case study. This research aims for gaining a better understanding of the way in which the joint crisis management for river flooding and droughts of Belgium and the Netherlands is established by discussing similarities and differences of the Dutch and Belgium practices of collaboration on crisis management for river flooding and droughts. The research question is therefore:

*“What are the similarities and differences in the arrangements of the Netherlands and Belgium in the Dutch-Belgian transboundary crisis management for river flooding and droughts in the Rhine-Meuse-Scheldt delta?”*

The similarities and differences are discussed by means of the Stages Model of Transboundary Cooperation, the Policy Arrangement Approach and by discussing problems, challenges and projects implemented.

#### Methodology

A primarily in-depth qualitative research strategy has been chosen because of its possibility to gain deeper understanding and a thorough knowledge of the issue at stake. Therefore, the case study of the Rhine-Meuse-Scheldt delta is used. Desk research and interviews are the research materials used most during the research. The respondents have been selected as a result of thorough research in which expertise have been taken in consideration. Since this research elaborates water management and crisis control, experts of both disciplines have been selected and interviewed.



## Actors

Crisis management for river flooding within the Netherlands and Belgium is well organized with clear structures and tasks divisions. However, those structures and divisions are relatively hard to define for actors of the other country, resulting in finding it hard to find the right interlocutor which might waste time during crisis situations. Structural changes and the division of tasks in both systems is part of this challenge. Besides, the role of transboundary actors, such as the International Scheldt Commission and the Flemish-Dutch Scheldt Commission, is unclear according to several actors since they are not aware of the existence of the commissions or their tasks. This lack of transparency, clear communication and continuity might lead to other problems and challenges within the system of transboundary collaboration on crisis management for river flooding.

## Resources

Many actors in crisis management for river flooding experience a deficiency of certain means, such as financial means, time and personnel. Outstanding is that parties, such as the province of Zeeland and its municipalities, mostly deal with financial deficits since they are dependent on the national government, while the Flemish administrative structures' lack of personnel is one of their main challenges. Besides, the Dutch national crisis management system (LCMS) is an important communicative aspect in Dutch crisis management and a similar network is currently rolled out in Belgium. This offers opportunities in terms of linkage of both networks in order to manage crises more efficiently.

## Rules and legislation

The Netherlands as well as Belgium have legislation concerning both water management and crisis control, resulting in the current water management structures and the establishment of the Dutch safety regions and Belgian emergency plans. Legislation of both countries is also influenced by European and international legislation concerning flood risk management and water management. At this moment, no joint policy concerning flood risk management does exist since the Dutch-Belgian collaboration is mostly formed by treaties and agreements.

## Discourses

Actors within countries do not experience problems and challenges as a result of discourses. However, cultural and political-administrative cultures form the basis for discourses causing cross-border cooperation to be complicated. Discourses include the complex structure of the Belgian authorities, the rearrangements of Dutch administrative structures and cultural differences. Getting to know each other and each other's culture is therefore of major importance.

### Effective cooperation

Environmental and societal damage in the upstream-downstream condition are allocated symmetrically since not many direct transboundary flood areas exist. As a result of this non-reciprocal relationship, adaptation in one area will most likely not affect another area. However, the collaboration of the two different administrative cultures lead to different consequences, such as misunderstandings as a result of unfamiliarity with each other's consultation and policy-making structures. Language barriers are considered as another important aspect in cross border cooperation. Although people in The Netherlands and Belgium both speak Dutch, it's still not the same language. Pronunciation and word use can be slightly different in certain situations and might lead to misunderstandings and challenges. However, there has also been successes, such as the institutionalization of the Dutch-Belgian collaboration on the Scheldt river basin and multiple smaller projects.

### Conclusion and recommendations

Although Belgium and the Netherlands are often considered as relatively similar in terms of language and culture, many differences in actors, resources, legislation and discourses can be identified. However, according to the Stages Model of Transboundary Cooperation, the Dutch-Belgian cooperation is currently shifting from having a joint problem definition by joint problem structuring to tuning with each other's policies in order to achieve joint policy making. A joint policy is not accomplished yet, but the existing transboundary collaborative structures achieved the implementation of joint agreements and treaties. However, the current situation is not ready to create a completely joint policy making procedure, due to political-administrative and cultural differences. This implies that transboundary cooperation is complicated without a joint juridical background in which an explicit structure is established.

## IV. List of abbreviations and acronyms

BD	Birds Directive
ANIP	Regular Emergency and Intervention Plan
BNIP	Special Emergency and Intervention Plan
CIW	Flemish Coordination Committee on Integrated Water Policy
CC	Coordination Committee
CC-gem	Municipal Coordination Committee
CCVO	Crisis Centre of the Flemish Government
CC-prov	Provincial Coordination Committee
DIWP	Decree on Integrated Water Policy
EU	European Union
FD	European Floods Directive
FRD	Flood Risk Directive
FRG	Flood risk governance
FRGA	Flood risk governance arrangement
FRM	Flood risk management
FRMP	Flood risk management plan
FRMS	Flood risk management strategy
FRS	Flood Risk Strategy
GRIP	Coordinated Regional Incident Control Procedure
HD	Habitats Directive
IPCC	Intergovernmental Panel on Climate Change
ISC	International Scheldt Commission
KRW	Decree Integrated Water Policy
LCMS	National Crisis Management System
MLWS	Multi-layer water safety
MOW	Department of Mobility and Public
MLSS	Multilayer Safety Strategy
NWB	Dutch Bank of Waterboards
NWP	Dutch National Water Plan

PAA	Policy Arrangement Approach
RBMP	River basin management plan
ROT	Regional Operational Teams
RWAA	Regional Water Authorities Act
RWS	Rijkswaterstaat – Dutch national water board
SALV	Strategic Council for Agriculture and Fishery
SERV	Social-Economic Council of Flanders
VMM	Flemish Environment Agency
VNSC	Flemish-Dutch Scheldt Commission
VR	Safety Regions
WFD	European Water Framework Directive
WenZ	Waterways and Sea Canal
WVR	Policy for Safety Regions

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# 1. Introduction

## 1.1. Project Framework

In recent decades, changes in climate have caused a major impact on all natural environments and human-beings across the world. Therefore, climate change has been a key challenge for humanity (IPCC, 2014; Brels et al, 2008). Those changes are caused by human activity through alteration of the composition of the global atmosphere in addition to the variability due to natural causes (UNFCCC, 1992). The impacts are the strongest and most extensive for natural systems and results in changing precipitation, melting of snow and ice, and a downward spiral resulting from those conditions. Hydrological systems and water resources are affected in quantitative as well as qualitative ways. The ongoing shrinkage of glaciers and thawing of permafrost, both due to climate change, result in higher runoffs and rising water levels in seas and watersheds. Those water levels in combination with the impacts from recent climate-related weather extremes can be hazardous in terms of waves, droughts, floods, cyclones and wildfires. Difficulties in food production, water supply and damage to settlements are just a few examples of the enormous impact those extremes can have and are regularly limited to the poorest countries (IPCC, 2014).

Plans and policies are needed to protect civilizations from the impacts caused by the change in climate. Multi-level governments, in which local as well as national and international parties are involved, have started to create such adjustment plans and to incorporate those adaptation policies into broader development plans all over the world. For instance, adaption plans are mainly accelerated by integration of climate adaptation policies into subnational management, development planning and warning systems within Asia and Europe (IPCC, 2014). However, flood and drought areas within watersheds often cover several regions and include different communities, provinces and, sometimes, countries. Over 90 per cent of world's population lives in countries that share river and/or lake basins with at least one other country (UN Water, 2008). Those transboundary basins connect the populations of the riparian countries and support the lives and incomes of lots of people. All cross-boundary basins and aquifers create hydrological, social and economic interdependencies between the populations of different countries. Those transboundary water bodies are fundamental for economic development and reducing poverty. Although, the access to a certain water body by several populations has a potential risk for discourse and conflict due to the scarcity of the resource and hydrologic variability, it also provides chances for cooperation in order to pursue economic growth,

regional peace and protection (UN Water, 2008; OECD, 2013; Jägerskog, 2013). Those potential transboundary impacts and conflicting interests can best be solved by cooperation, adequate legal and institutional frameworks, joint approaches to planning and sharing benefits and related costs, according to the UN Water (2008), the United Nations inter-agency mechanism on all freshwater related issues (UN Water, 2008).

Conflicting interests, discrepant agendas and a lack of trust are major challenges in transboundary water cooperation (Global Water Partnership, n.d.). Countries often try to achieve and maintain the aspect that is most beneficial for their own instead of focusing on the advantages from water's shared use (Global Water Partnership, n.d.; Jägerskog, 2013). Different ideas on development, environmental issues and economic interests between riparian countries can be the result. Consequently, those conflicting ideas can affect the willingness of countries or regions to collaborate with the neighbouring country, while most water related projects and situations in one country most likely affect the quality as well as the quantity of water in the other riparian countries (Global Water Partnership, n.d.; Jägerskog, 2013). Up to date information and water management plans are barely shared among those riparian countries. Those challenges are intensified by issues such as the changing climate, population growth and the water-food chain, which have all been key challenges in the past few decades (Global Water Partnership, n.d.).

A case-study will be used in order to clarify its specific collaborative structure. Since cross-boundary collaboration can have multiple results favouring economic growth, protection and regional peace, it might lead to a stronger cooperative bond that implies a positive feedback loop. The Rhine-Meuse-Scheldt Delta is a river delta formed by the confluence of the Rhine, Meuse and Scheldt rivers located in the western parts of The Netherlands and the Flemish part of Belgium (Flanders). The result is a multitude of (former) islands and sea/river arms centrally located in one of the south-western provinces of The Netherlands. The Rhine-Meuse-Scheldt Delta has multiple ports which offer entrance to the bigger cities in the hinterlands of Europe. Because of its economic relevance and the constant need for water safety, and thus management, transboundary cooperation on crisis management in this basin can be beneficial at several aspects to both societies involved in the process. Crisis management in this context refers to water management and crisis control. However, the multiple actors, funds, conflicting benefits and different local, European and international legislation cause the policy-making process within this Dutch-Belgian border area to be unclear and messy and should therefore be clarified before further development towards improving the cooperation process can be achieved.

## 1.2. Societal and scientific relevance

Societies located in lake or river basins are being exposed to hazardous events due to extreme weather conditions combined with changes in climate. This research aims to gain an in-depth understanding of the processes of transboundary crisis management regarding floods and drought in the Dutch-Belgian boundary region, in order to provide insights for improvement of the crisis management for river flooding processes within this specific region. Recommendations will be provided to a lesser degree. As mentioned above, transboundary cooperation can have several positive results such as economic growth, protection and regional peace, which possibly leads to a stronger cooperative bond that implies a positive feedback loop. Transboundary cooperation in river basins can therefore be beneficial at multiple aspects to both societies.

The scientific relevance includes applying present theories about transboundary cooperation to the case study by means of introducing the transboundary crisis management in river flooding and droughts in a specific area. There has been lots of scientific research on water management across borders and crisis management in watershed areas in general (UN Water, 2008; Rosenthal & 't Hart, 2012). The Dutch-German collaboration on the Rhine River Catchment is a case study often used regarding this topic, because of its successful and strong collaborative bonds (Dieperink, 2000; Rosenthal & 't Hart, 2012; Van Eerd et al, 2014). The cooperation between The Netherlands and Belgium on the Rhine-Meuse-Scheldt Delta is barely looked into while this specific area is important in terms of safety and trade. This indicates a lack of existing literature concerning this case study and the related topics that should be further elaborated and clarified.

## 1.3. Research objectives

The main goal of this research is to gain a better understanding of the way in which the joint crisis management for river flooding and droughts of Belgium and the Netherlands is established by discussing the similarities and differences of the Dutch and Belgian practices of collaboration on crisis management for river flooding and droughts which complements the existing theories on transboundary cooperation on crisis management between riparian countries and regions. The case under study is particularly related to crisis management for river flooding and droughts which will be studied in the Rhine-Meuse-Scheldt Delta.

This research will apply the Policy Arrangement Approach (PAA) (Van Tatenhove et al, 2000; Arts & Leroy, 2006; Wiering et al, 2010; Wiering & Arts, 2006) and the Stages Model of Transboundary Management (SMTM) (Wiering et al, 2010; Wiering &

Verwijmeren, 2012; Linnerooth, 1990). The research objective also implies to gain knowledge about the functionality of the PAA and the Stages Model of Transboundary Management from a cross-border perspective. The existing lack of literature on the way in which two riparian countries provide and implement policies concerning river floods and droughts, will be tackled by applying empirical methods which will be elaborated in section 3.

These objectives are formulated in order to be able to do further research and be finally able to draw recommendations for a better cross-border collaboration.

#### 1.4. Research questions

The main question in this research is formulated as follows:

*“What are the similarities and differences in the arrangements of The Netherlands and Belgium in the Dutch-Belgian transboundary crisis management for river flooding and droughts in the Rhine-Meuse-Scheldt Delta?”*

Researching and answering this question will be guided by the formulation of five sub-questions, which are based on the research objectives and aim to acquire the information needed to answer the main question.

- I. “What local, regional and international actors are involved in the policy-making process and in what way are they related to each other in transboundary crisis management for river flooding and droughts in the Rhine-Meuse-Scheldt Delta?”
- II. “What formal and informal local, regional and international legislation contributes to the process of policy-making in the Dutch-Belgian transboundary crisis management for river flooding and droughts in the Rhine-Meuse-Scheldt Delta?”
- III. “What discourses are involved in the policy-making process and how do they influence the crisis management for river flooding and droughts in the Rhine-Meuse-Scheldt Delta?”
- IV. “To what extent do the actors use different kinds of resources and in what way are those resources manifested within the process of policy making in the Dutch-Belgian boundary region?”

- V. “What problems and challenges occur during the process of the transboundary crisis management for river flooding and droughts in the Rhine-Meuse-Scheldt Delta?”

*Key words: Water Management, Flood, River, Transboundary, Cross-Border, Policy Arrangement Approach*

## 2. Theoretical Framework

This research draws on different theories and theoretical insights. This section provides a scientific debate on the theories relevant for this research. Firstly, the concept of crisis management for river flooding will be further elaborated and clarified. Secondly, flood risk management strategies will be explained by means of the multiple level cooperation which is often used in policy-making in risk management for river flooding and droughts. This section is followed by an illustration of transboundary water cooperation, its definition, effective cross-border cooperation and the different degrees of effectiveness. The policy arrangement approach and an elaboration of the case study will be the final substantively parts of the theoretical framework. This section will be concluded with the conceptual model forming the guiding line in this research.

### 2.1. Crisis management for river flooding

Crises are becoming more complex and harder to manage because of its increasing cross-boundary and interconnected nature resulting from long-term trends, such as globalisation, the greater use and dependence on technology and social fragmentation. Additionally, the potential impact of those crises is likely to grow (Boin & Lagadec, 2000). Small disruptions in every-day life in combination with those conditions can cause rapid escalation (Perrow, 1999). Therefore, crisis management becomes more and more necessary.

Multiple scholars have tried to define a crisis to get a thorough understanding of the phenomenon. According to Boin & Lagadec (2000, p.186), a crisis can be defined as “a situation in which something out of the ordinary happens”. This definition is based on the idea that disruption affects the working of a system as a whole, and threatens the basic assumptions and existential core of this system (Pauchant & Mitroff, 1992). Parsons (1996) suggest a division of crises in three types to be able to understand and manage each form of crises in a better way. First, immediate crises include little or no warning prior to the crisis resulting in researchers being unable to examine and prepare the crisis before it hits in. Second, crises slower in developing, known as emerging crises, might be able to be stopped or limited by taking actions. Third, the sustained crises may last for a longer period (e.g. weeks, months or even years) (Parsons, 1996). Crisis management strategies vary depending on time, the extent of control and the magnitude of the situation.

Flood risks from rivers and deltas will increase in the next few decades due to changes in climate as well as increasing urbanization of those areas and soil subsidence. Flood Risk

Strategies (FRSs) should be implemented to protect land and communities against the violation of those floods (Hegger et al, 2016). Five FRSs have been identified by scholars, and are closely related to the EU Flood Risk Policies, such as the European Floods Directive. Flood prevention reduces the exposure of land to river and delta flooding, while flood defence and flood mitigation both aim to decrease the likelihood and magnitude of flood hazards. Flood preparation and recovery focus on the potential consequences of floods. Diversification of those strategies is an important aspect concerning the implementation of the FRSs since the extent of fit and successfulness of the implementation depends on the physical and institutional context of the case. Efficient use should be made of resources and the ongoing process of policy-making should be considered as correct and legitimate by the actors involved in the process in order to achieve a successful form of water management. The development of flood warning systems, disaster management and the creation of evacuation plans are thus major aspects of crisis management (Hegger et al, 2016; Wiering et al, 2010; Matczak et al, 2016). Additionally, managing risks implicates optimizing monitoring procedures adequate for providing accurate information on the circumstances to be managed. Therefore, information can be transferred in an optimum manner. It implies that in case of river flooding or when such an incident might happen, information needed to immediately intervene should be ideally transferable and available to all involved individuals and actors (November et al, 2007).

## 2.2. Transboundary water cooperation

Cross-border cooperation is of growing importance in both crisis and water management. This section describes multiple aspects of transboundary water cooperation. First, the definition of transboundary water management will be stated and discussed. This will be followed by an elaboration of the principles of multiple level cooperation. The section will be concluded by a description of effective cross-border management and how it can be achieved.

### 2.2.1. Definition transboundary water management

Multiple scholars have tried to define a cross-border cooperation to get an in-depth understanding of the phenomenon. Therefore, several definitions of transboundary collaboration can be distinguished. One of the major definitions in water management, stated by Perkmann (2003, p. 156), describes cross-border cooperation as “a more or less institutionalized collaboration between contiguous subnational authorities across national borders”. It assumes the presence of transboundary regions for the establishment of institutional cross-border cooperation, which is often the case in transboundary waters such as river basins (Perkmann, 2003). Therefore, cross-border water cooperation is



highly recommended and is increasingly viewed as a logical consequence of an integrated perspective on the management of major river basins (Wiering et al, 2010). Cross-border cooperation, particularly at the local and regional level, also refers to “a means of managing complex processes of globalization while eliminating structural and cognitive barriers to problem-solving within international border regions” (Scott, 1999, p.3). This transnational form of governance is a relatively new phenomenon that acknowledges that economic, political and environmental interdependencies on a global scale are intensifying resulting in blurry distinctions between domestic and international policies (Scott, 1999). Additionally, Elhance (1999, p. 13) acknowledges cross-border cooperation as one of the two most logical options in case of a transboundary river basin: ‘The hydrology of an international river basin also links all the riparian states sharing it in a complex network of environmental, economic, political, and security interdependencies, in the process creating the potential for interstate conflict as well as opportunities for cooperation among the neighbors’.

Transboundary water bodies often refer to border crossings of several types beyond those of political jurisdiction (Blatter & Ingram, 2001). It includes sources of fresh water that are shared among multiple users that have diverse values and different needs associated with water. Water, thus, crosses boundaries, such as economic sectors, legal jurisdictions or political interests (UPTW, n.d.).

### 2.2.2. Multiple level collaboration

In transboundary cooperation, multiple levels of authority are involved in the policy-making and collaborative processes. This include multiple levels within countries involved, within countries involved and in overarching levels, such as the European Union. This section provides insight in the use of multiple level and multidisciplinary collaboration.

The diversification of flood risk management strategies can result in the fragmentation between different actors and on multiple levels, causing inefficiencies and ineffectiveness which can possibly undermine societal resilience. Learning, cooperation and exchange of knowledge between actors, regions and countries might be a solution to overcome the problem of fragmentation within a water management region (Hegger et al, 2016; Global Water Partnership, n.d.). European and international legislations form the guiding line in those collaborations and might result in less diversification of water management within Europe in general. The relevant European and international legislations are discussed in the analysis. Decentralisation might also be helpful in creating a better cooperation between multiple levels of management to ensure a joint governance of top-down and bottom-up influences (Hegger et al, 2016; Matczak et al, 2016).

Besides the influences of governmental institutions, the involvement of public parties in flood risk management is highly recommended for substantive and normative matters. Since not all sets of resources and capacities needed for flood governance is available within those governmental institutions, input from private and commercial companies and actors is necessary (Hegger et al, 2016; Matczak et al, 2016). Those non-governmental actors are involved in decision-making processes because governments in Europe are restricted in controlling exclusively in a top-down manner as manifested by the European Union. Although most of the resources are available within governmental institutions and those collaborating private and commercial actors, citizens can have a major influence as well. Taking actions in and around their own properties, such as decreasing the amount of hardened surface and flood proofing their house, contribute to the institutional governance as such (Hegger et al, 2016). The involvement of this large number of public and private actors requires an open and broad debate about a division of responsibilities to clearly define the tasks and roles for all actors. Hegger et al. (2016) suggest this public-private cooperation as a 'comprehensive multi-actor coproduction'. As a result, a more dynamic view of cooperation as on on-going and non-linear process in which public and private actors establish, challenge, modify and legitimize multi-layered governance structures should be aimed (Kistin, 2007). It includes a further development of different forms of participation and public-private partnerships (Hegger et al., 2016; Matczak, 2016).

### 2.2.3. Effective cross-border cooperation in river management

Transboundary cooperation involves many factors influencing the outcomes of the process that can affect and complicates the process. This section discusses the basic assumptions for an effective collaboration.

International agreements and legislations are often seen as the basis for this kind of transboundary cooperation since it forms a playground for common goals. Cooperative water regimes turned out to be resilient over time once they are established through international treaties and policies (Zeitoun & Mirumachi, 2008; Global Water Partnership, n.d.; Matczak, 2016). Wolf et al. (2003) suggests that those agreements might even favour collaboration between hostile neighbouring countries that are in conflict over other issues. However, components of those treaties that are not implemented or favour just one actor instead of pursuing mutually beneficial objectives, are seen as poor cooperation or in some cases even non-cooperation (Zawahri, 2008). This said, cooperation is more likely in situations with more symmetrically allocation of environmental and societal damages than in an upstream-downstream condition where often just one part of the region experiences benefits at the expense of another part, which is known as dead lock games (Bernauer, 2002; Wiering et al, 2010). If those agreements persist for a long time,

reality and desired situation might drive apart causing unstable collaborations (Gyawali, 2001). However, tensions and unstable collaborative regimes don't need to be considered as a negative aspect. Unstable collaboration might lead to tensions over water resulting in a productive confrontation and cooperation of other political issues (Zawahri, 2008). Jägerskog (2003) mentions the important difference between harmony and cooperation for understanding that conflicts are necessary for an effective cooperation. This effective cooperation requires some sort of mutual influence that allows all riparian countries to influence and be influenced by others (Brown & Ashman, 1996; Global Water Cooperation, n.d.).

The effective side of cooperation therefore lies in the aspects indicating the effectiveness of collaboration, other than the standard indicators. Daoudy and Kistin (2008) suggest four criteria to measure the effectiveness of treaties (i.e. cooperation) in water related cases: compliance, goals, interests and problem-solving. Effective cooperation is thus based on riparian compliance, goals, interests and problem-solving characteristics and has been differentiated from the typical indicators of cooperation, such as the signing of a treaty (Zeitoun & Mirumachi, 2008). However, a clear definition of effective cooperation is not mentioned in those researches.

### 2.3. Stages Model of Transboundary Cooperation: Degree of Cooperation

The degree of cooperation between riparian countries in transboundary river basin management can be explained by means of the Stages Model of Transboundary Management which elaborates three major criteria in relation to successful border cooperation, namely cooperation formation, cooperation performance/effectiveness and stakeholder satisfaction (Wiering et al, 2010; Wiering & Verwijmeren, 2012; Linnerooth, 1990). The SMTM is a means resulting from tuning different scientific researches and has been used more often in water related topics, such as the research of Van Eerd et al (2014) about the cross-border cooperation between North-Rhine Westphalia and the Netherlands.

The first concept of *cooperation formation* includes the institutionalization of an initiative. It refers to the procedures of structuring the ways of doing and ways of thinking in transboundary regions in order to achieve cooperation, which are basically processes of institutionalisation triggered by cooperative initiatives. This ranges from specific rules and procedures to creating communication channels or develop common problem definitions. The level of formation can be qualified by analysing the output of cooperation e.g. the amount of interactions, joint research reports and policy documents. *Cooperation effectiveness*, or performance, is a more complex criterion which refers to the outcome of

cooperation formation, e.g. cooperative operations and its actual capacities in river flooding management. Causal links between the formation and the degree of problem solving are hard to distinguish. Therefore, the degree of implementation of the notions, such as project development, can be used as an alternative. The third concept of *stakeholder satisfaction* is about the views and opinions of actors involved in the process about the degree of successful cooperation (Wiering et al, 2010; Linnerooth, 1990; Wiering & Verwijmeren, 2012).

A further operationalisation of the criteria is shown in the table below (1).

*Table 1. Aspects and indicators of three criteria explaining the degree and successfulness of cooperation*

Criteria	Aspects
Cooperation formation	Policy actors
	Principles, norms, rules and procedures
	Resources
	Joint problem-definitions
Cooperation effectiveness	Degree of implementation
	Project development
	Decisions being made
	Problems and challenges affecting cooperation
	Effective cooperation
Stakeholder satisfaction	Views
	Opinions
	Feelings

Sources: own figure, information based on Wiering et al (2010).

The three concepts together form the basis for the process in which different phases of cross-border governance became evident. Distinct stages in the creation of patterns of communication and organizations in the collaborative regions, and in the extent of shared discourses were revealed. Therefore, the definition of stages of the organizational and substantial institutionalization of the processes of approaching each other, orienting and actual cooperating. This Stages Model of Transboundary governance contains four stages ranges from segregation to full integration. The goals of each successive stage include

communication, problem structuring, tuning, transferring authorities and the removal of administrative borders, which all refer to the corresponding phase. The phases refer to segregation (phase 0), mutual understanding (1), joint problem definition (2), joint policy making (3), joint implementation (4) and full integration (5). The policy coherence increases when the transboundary cooperation is further in the process (i.e. the higher phase) (Wiering & Verwijmeren, 2012).

## 2.4. Policy arrangement approach

The first section of analysis, the cooperation formation, will be discussed by means of the Policy Arrangement Approach (PAA), which is one of the major approaches applied in the environmental and water management domain. It enables scholars to look at the discrepancies and similarities of policy arrangement and the consistency of institutions in policy domains on both sides of the border (Van Tatenhove et al, 2000; Arts & Leroy, 2006; Wiering et al, 2010; Wiering & Arts, 2006). Wiering & Arts (2006) define a policy approach as “the way in which a certain policy domain – such as water management – is shaped in terms of organisation and substance”. Policy arrangements are defined as “the temporary stabilization of the substance and organisation of a policy domain” and is an analytical concept to describe and analyse the procedures and results of institutionalisation in a particular policy area (Van Tatenhove et al, 2000; Wiering et al, 2010). The method elaborates both institutional and discursive aspects of policy-making in which stability and changes in policy structures are important concepts (Wiering et al, 2010; Wiering & Arts, 2016). It includes four dimensions of policy-making: the actors involved, the resources of those actors, the rules of the game and the relevant policy discourses. According to Verwijmeren & Wiering (2007), an identification of main differences and similarities of policy arrangements between relevant water policies and treaties in the specific transboundary region (e.g. watershed) is possible with this approach.

The dimension of actors and coalitions relates to all actors operating in crisis management and are able to, informally as well as formally, influence the processes and procedures of policy-making. Collaborations, conflicts, roles, interactions and positions of those actors are also indicated within this dimension. The rules of the game involve all institutional models containing formal and informal regulations that include joint policies, treaties and projects linked to the issue. It refers to the formal as well as informal content of public policies, procedural rules and the rules of coordination between actors (Larrue et al, 2013; Wiering & Arts, 2006; Verwijmeren & Wiering, 2007). The third dimension of discourses refers to the context of a particular phenomenon. Discourses are defined as “ensembles of ideas, concepts and categories through which meaning is given to social and physical

phenomena, and which is produced and reproduced through an identifiable set of practices” by Hajer and Versteeg (2005, p. 175). Discourses are thus distinct for each case and should be examined separately. Communication is structured by discourses by means of framing and different interpretative manners (Wiering & Arts, 2006). The last dimension, resources, relates to all kind of means that can be used by the actors involved and empowers them (Wiering & Arts, 2006; Verwijmeren & Wiering, 2007). It focuses on the disposal of resources, the distribution between actors and the impact it has on the outcomes of policy-making (Larrue et al, 2013). It is useful for implementing specific policy arrangement. It should be noted that the means in this dimension are not equally divided among the actors resulting in differences in power relations and impact. Besides, not all resources are as favourable as others which can depend on the actor using it (Wiering & Arts, 2006; Verwijmeren & Wiering, 2007). Figure 1. shows the relation between the four dimensions of the Policy Arrangement Approach.

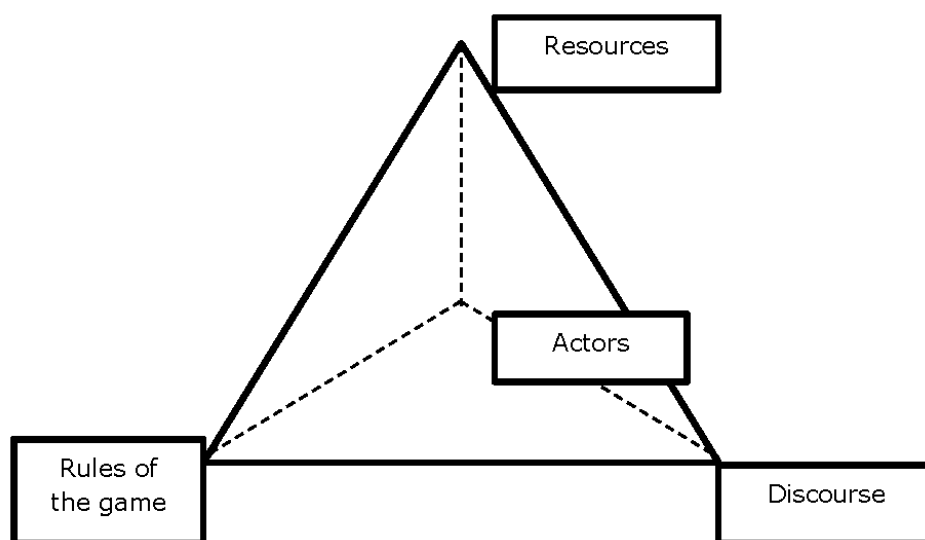


Figure 1. The relations between the four dimensions of the Policy Arrangement Approach (PAA). Source and reprinted from: Majale-Liyala (2013).

An operationalisation of the four dimensions mentioned above is displayed in table 2 below.

Table 2. Aspects and indicators of the four dimensions of the PAA.

Dimension	Aspects
Actors	Actors at the national level
	Public actors involved
	Experts and researchers
	Market parties

	Representatives of civil society
Resources	Formal competences (legislative power)
	Financial resources
	Knowledge resources
	Technical and interaction skills
	Political networks
Formal and informal rules of the game	Legislation (regional, national & international)
	Substantive norms
	Legal instruments
	Procedural norms
	Integration or coordination of rules
	(Transnational) programmes and projects
Discourses	Ideas and visions
	Concepts
	Scientific paradigm
	Strategies
	Epistemic paradigm

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Source: Larrue et al (2013).

## 2.5. Case: Dutch-Belgian cooperation on the Rhine-Meuse-Scheldt Delta

The Rhine-Meuse-Scheldt Delta, also known as Helinium or Rhine-Meuse Delta, is a river delta formed by the confluence of the Rhine, Meuse and Scheldt rivers located in the western parts of The Netherlands and the Flemish part of Belgium (Flanders). The result is a multitude of (former) islands and sea/river arms centrally located in Zeeland, one of the south-western provinces of The Netherlands. The economic interest of this delta is highly important since each of the three waterways are well navigable. Notable ports in the Rhine-Meuse-Scheldt Delta are Rotterdam, Antwerp and even Amsterdam via the Amsterdam-Rhine canal. The delta offers the entrance to central European and German hinterlands. Since the Rhine contributes most of the water, the shorter term 'Rhine Delta' is used more often.



### 2.5.1. Hydrography and geography

The hydrography of the delta exists out of the delta's main arms, several disconnected arms (i.e. Hollandse IJssel and Vecht) and smaller rivers and streams. Many rivers and streams have been dammed and now serve as drainage channels for the polders. The major rivers are the Rhine, Meuse and Scheldt, only the latter one enters the Netherlands directly in the Delta. The construction of the Delta Works changed the delta fundamentally in the 20<sup>th</sup> century.

26 percent of The Netherlands is located below sea level and another third must be protected against river flooding in high discharge periods (PBL, n.d.). Therefore, managing water is one of the key challenges in this river delta resulting in important man-made changes in the last few centuries, such as damming of rivers, changing of river courses and the construction of Delta Works. All those projects contributed to the shape of the delta as it is nowadays. The Delta is a tidal delta, meaning that not only sedimentation of the rivers but also tidal currents strongly influence its shape. Before the construction of the Delta Works, these high tides formed a genuine risk since strong tidal currents could tear huge parts of land into the sea. The tidal influence still acts far inland nowadays, but the Delta Works diminished this influence fundamentally.

The exact location of the Rhine-Meuse-Scheldt Delta is shown in the map (figure 2) below.

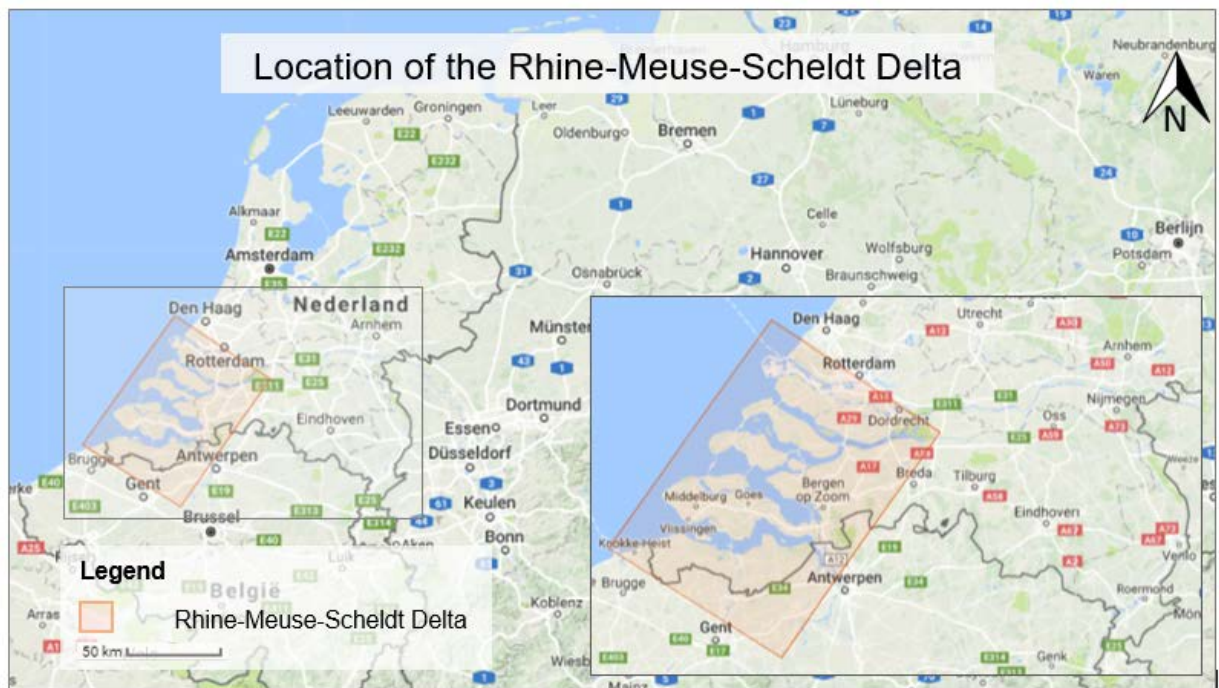


Figure 2. Map of the location of the Rhine-Meuse-Scheldt Delta: the study area of this research. Source base map: Geobasis-DE/BKG (2017).

### 2.5.2. Economic situation

The economic interest of this delta is highly important since each of the three waterways are well navigable. Notable ports in the Rhine-Meuse-Scheldt Delta are Rotterdam, Antwerp and even Amsterdam is reachable via the Amsterdam-Rhine canal. The ports play a significant role for exporters and importers because of their connectivity, logistic opportunities and cluster forces. Those ports work up to almost one fifth of the total transshipment. The delta offers the entrance to central European and German hinterlands, which creates important opportunities for trade and cooperation.

The ports also offer employment opportunities and an added value generated in the sea ports of the delta, which are of great important for the economics and welfare of the surrounding regions (M. Matthijsse, personal communication, May 16<sup>th</sup> 2017). It includes direct as well as indirect employment and added values since ports are suppliers as well as demanders of goods and services (Vanelslender et al, 2011).

### 2.6. Conceptual model

This conceptual model (fig. 3) includes relevant concepts and links mentioned in the theoretical framework. It shows the relations between Dutch and Belgian arrangement policies, and the influence of European and international actors on their cross-boundary cooperation in the Rhine-Meuse-Scheldt Delta. The transboundary collaboration might lead to problems and challenges, or results in a form of effective cooperation within the region. As a reaction on this, stakeholders and actors might be satisfied or not resulting in a negative or positive feedback loop on the transboundary cooperation itself.

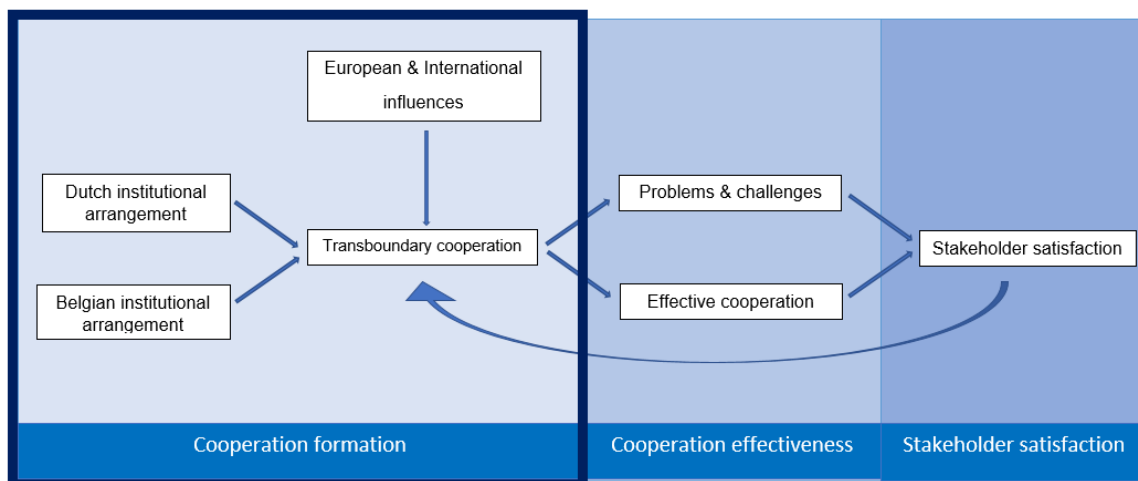


Figure 3. Conceptual model of the research. Source: own figure

The conceptual model displayed in figure 3 shows the link between the Stages Model of Transboundary Management (i.e. cooperation formation, cooperation effectiveness and stakeholder satisfaction), the Policy Arrangement Approach and the theoretical

background of effective cooperation. The PAA mainly elaborates the formative part of the cooperation, which will be the main focus of this research because of the need to clarify the interdependencies and processes before further steps can be undertaken to approach the effectiveness of the cooperation and the stakeholder satisfaction. The similarities and differences within those arrangements might cause problems and challenges, resulting in changes in the degree of effective cooperation. Since this cooperation effectiveness is therefore closely linked to the cooperation formation, this section will be included within the research. However, the main focus will still be on the cooperation formation and the research question is therefore linked to this specific part. Cooperation effectiveness will thus be discussed to a smaller extent.

### 3. Methodology

This section aims to clarify the general methodological characteristics used during the research and explains the choices made in this process. First, the strategies used in the research will be described, followed by the research materials involved in the process.

#### 3.1. Research strategy

A primarily qualitative research strategy has been chosen because of its possibility to gain deeper understanding and thorough knowledge of the issue at stake. This will be more useful than a quantitative data collection method and analysis referring to the research questions, since this research demands for an in-depth strategy to discover the interdependencies and complex system of transboundary water management in this specific area. An in-depth strategy includes research on smaller scale and the outcomes are less suitable to generalise because of its thorough, detailed and complex knowledge of a specific issue (Verschuren & Doorewaard, 2015; Vennix, 2011). Measurements in numbers and figures will be less useful because of the complexity of research topic. Therefore, a qualitative, in-depth method is applied to the research.

A case study is used to provide a thorough and integral understanding of one object or process that has been chosen by selective sampling. It has a holistic approach and focuses on the subject as a whole instead of units and variables, which is mostly the case in quantitative research (Verschuren & Doorewaard, 2015; Vennix, 2011). In this research, a single case study is used in order to minimize coincidences and to optimize the internal validity. The research unit is the above-mentioned case, while the observation unit (resources of data) includes the different countries and policies involved in the process. The case study is chosen because of its ability to acquire integral knowledge about the case. Using a case study as research method has the advantage of versatility of the strategy. Therefore, less pre-structuring of the method is needed which makes it easier to adjust the course of the research during the whole process (Verschuren & Doorewaard, 2015). Although the outcomes of a case study are being accepted more easily by the field than a survey or an experiment, the external validity of this method can be discussed. Because of the small number of units to be studied, generalization of the outcomes cannot be achieved by just applying the theory on other cases. However, outcomes of case studies can be helpful in addition to theories when the context of the case is taken into regard (Verschuren & Doorewaard, 2015).

Triangulation is a useful concept for this research method. Gaining in-depth understanding of a case is achieved by using different forms of data generation (Verschuren & Doorewaard, 2015; Vennix, 2011). This research is based on desk research and semi-structured interviews. Triangulation in this research refers to cross-examining by using different sources in order to minimize contingences and eliminate randomization.

## 3.2. Research materials

This section describes the research materials used during the case study. A division will be made between desk research and the conduct of interviews.

### 3.2.1. Desk research

The emphasis in desk research is on mostly written material such as documents and literature. Literature as a source of knowledge provides theoretical insights and links between different ideas. Useful literature included, among others, research concerning the cultural differences between the Netherlands and Belgium, and about the way in which actors are able to cooperate and communicate with each other. Those interpretations are helpful for writing a theoretical framework as well as for reaching a better understanding of the research as such and its outcomes (Verschuren & Doorewaard, 2015). A major advantage of this source of knowledge is that lots of insights and theories already exist and are easily accessible, so that it's not necessary to start from the very beginning. Literature is limited by a certain amount of data and information (Verschuren & Doorewaard, 2015). Therefore, researchers always need more sources in order to get to new insights and often use triangulation (Creswell, 2012; Verschuren & Doorewaard, 2015).

Literature study is part of an iterative process in which the study of documents is also included. Documents refer to information media with an evident addressing or without any extern addressing. Documents have a broad range of diversity, such as political programmes, annual reports, dossiers or diaries (Verschuren & Doorewaard, 2015). In this research, mostly reports, plans and treaties will be used since those documents contain major information about policy-making and implementation plans in risk management for river flooding. Important documents will be project documents from institutions such as DeltaNET and local water boards as well as documents analysing different cases provided by the European Union and research institutes.

High quantities and diversity are important advantages of using documents as data and knowledge sources. However, those quantities can also result in challenges finding the right documents in the overwhelming number of sources (Verschuren & Doorewaard, 2015; Vennix, 2011).

### 3.2.2. Interviews

People, individually or in groups, can provide a great diversity of information and knowledge in a relatively short time. Therefore, interviews are important sources for gaining data and knowledge in this research. Those interviewees serve the functions of informant and/or expert (Verschuren & Doorewaard, 2015). Interviews have a great control range compared to other research methods resulting in getting the information needed easily. It takes less time than observing a process or study documents which is a major advantage of doing interviews. Challenge in using interviews as research method is that some subjects are not suitable since people might not be willing to talk about their feelings or experiences, e.g. legal offenses and the abuse of alcohol (Verschuren & Doorewaard, 2015; Creswell, 2015). This problem is not likely to occur in this research because of its non-personal character.

An interview can be characterized by a limited degree of pre-structuring and the open interaction. Interviews in this research are semi-structured which enables the researcher to steer the interview and to react on interesting and relevant answers. The interaction between researcher and interviewee is an important aspect of the semi-structured interview for which an interview guide is used to make sure all topics will be discussed. This interview guides are listed in the appendices. Face-to-face interviews are used in order to be able to observe body language and facial expression. It also enables the researcher to provide extra information if needed and to stimulate and motivate the interviewee, e.g. reflective listening. Disadvantage is that conducting and studying interviews and its outcomes is very time consuming (Verschuren & Doorewaard, 2015; Creswell, 2015).

The respondents are selected as a result of thorough research in which expertise have been taken in consideration. Each respondent is an expert in his own field, such as water management, crisis control and transboundary cooperation. Since this research discusses water management and crisis control, experts of both disciplines have been selected and interviewed, while seeking for approaching experts being involved in the transboundary collaboration between the Netherlands and Flanders on crisis management for river flooding and droughts in the Rhine-Meuse-Scheldt Delta. Interviewing equal numbers of experts from both countries was a major aspect in approaching and contacting experts. However, experts originating from Belgium replied less often than their Dutch counterparts and are therefore interviewed to a lesser extent. A list of final respondents, informants and experts is provided below (table 3). Four face-to-face interviews have been conducted and two respondents provided useful information by email.

Table 3 Information about respondents

Name	Organisation	Country	Work position	Date and place
E. van Campenhout	Waterways and Sea Channel NV	BE	Policy officer and planning manager of the Dijle-Zennebekken basin.	Email, 24-4-2017
F.H. Schumacher	Province of Zeeland	NL	Policy specialist Water Safety and Spatial Adaptation	Interview, 24-5-2017
M.J. Matthijsse	Safety Region Zeeland	NL	National project specialist Water and Evacuation   Strategic Advisor Safety Region Zeeland	Interview, 16-5-2017
M. Gullentops	Waterways and Sea Channel NV	BE	Policy officer Legislation & Coordination	Email, 10-05-2017
R. de Meyer	Province of Zeeland	NL	Secretary of Transboundary Safety Consultations Westerscheldedelta   Member of the Cabinet of the Commissioner of the King Zeeland	Interview, 02-06-2017
M. de Feiter	Waterboard Scheldestromen	NL	Crisis coordinator	Interview, 14-06-2017

Sources: own figure

### 3.3. Data analysis

An adequate method of analysis needs to be applied after the data had been collected. Qualitative research can be analyzed by different kinds of scientific methods of analysis. Describing findings and data related to the case study is an often used and appropriate way for analyzing single case studies.

The four conducted interviews have been recorded and transcribed by means of the qualitative data analyzing program Atlas.ti, which is suitable for organizing, categorizing and analyzing qualitative data, in order to be able to describe all relevant information in the analysis. The interviews were held in Dutch while this research is written in English, indirect instead of direct quotes have, therefore, been used to increase understanding. The codes assigned to the information, during the coding phase, are listed in a code book, which is listed in the appendices (3). The coding was done rather abstractly and not too narrowly, resulting in the codes divided based on the four aspects of the PAA referring to the cooperation formation phase. These codes are aggregated into code families that are directly relevant for certain topics, such as 'actors' or 'legislation'. In the cooperation effectiveness phase, codes were based on the identification of problems, challenges,



successes and project implementation. Information provided during the interviews has been verified or falsified by means of documents or other interviews, such as legislation documents or planning material, and vice versa.

The occurrence of the same codes in the four different interviews provided information about the four aspects of the PAA, i.e. actors, legislation, resources and discourses, and the resulting problems, challenges, successes and project implementations. For example, interactions between the cooperation of actors and the problems occurred have been identified this way. Cresswell (2012) referred to this method as intercode agreement, which is often used to aim for providing answers on the main research question and related sub-questions.

## 4. Analysis

The research started with a theoretical framework discussing relevant theories and topics by giving definitions and conceptualizations of crisis management for river flooding and transboundary water management, followed by the two most important theories used to analyze the case: The Stages Model of Transboundary Cooperation and the Policy Arrangement Approach. The theoretical framework has been concluded by a brief overview of all relevant concepts and theories by means of a conceptual model. The methodology section has been elaborated next, which provided all information about research strategies and materials, and has been followed by the analysis which discusses the first two aspects of the conceptual model: cooperation formation and cooperation effectiveness. This chapter elaborates the empirical results of transboundary collaboration within the Rhine-Meuse-Scheldt Delta by means of the Policy Arrangement Approach and the Stages Model of Transboundary Management, which were both explained in the theoretical framework. Guiding line in this chapter is the research question and the associated scientific sub-questions linked with the case study described in paragraph 4.1. Each sub-question will be elaborated in a separate paragraph and refers to the results of the cross-examination of the desk research and interviews. There should be noted that the case study includes two countries and the situation should therefore be analyzed per country before a cross-border analysis is possible. First, a brief overview of the flood risk management strategies of both the Netherlands and Belgium will be given in order to clarify this research's structure. It will be followed by an elaboration of the four aspects of the PAA, which all include one section per aspects. The research will be concluded by giving the conclusions and to a lesser extent by doing recommendations. The final section will reflect and discuss the procedures in order to give more insight in the validity and reliability.

The analysis is divided into two sections: the cooperation formation and the cooperation effectiveness. Both aspects have been introduced by the Stages Model of Transboundary Cooperation. The first section of analysis, cooperation formation, will be discussed by means of the Policy Arrangement Approach. This approach is often used in water management analyses and is therefore a useful concept in order to provide and structure all information. The second section of analysis, cooperation effectiveness, is discussed by the definition of cooperation effectiveness as stated by multiple scholars, the projects implemented, and the problems and challenges that occurred during the cooperation process.

## 4.1. Flood risk management approaches

Before starting with the analysis of the PAA aspects, a brief overview of both Dutch and Belgian flood risk management approaches will be given in order to clarify the structure and information provided in this research.

### 4.1.1. Dutch multi-layered safety approach

The concept of multi-layered safety in The Netherlands is implemented in the National Water Plan (NWP) in order to achieve a sustainable water safety policy. This approach contains out of three layers aiming for prevention, spatial planning and crisis management (M. Matthijsse, personal communication, May 16<sup>th</sup> 2017; E. Schumacher, personal communication, May 24<sup>th</sup> 2017; Van Der Most et al, 2013). Firstly, the layer of prevention includes measures reducing the chance on flooding, such as dike reinforcements, the construction of dikes or quays, the lowering of hydraulic load (i.e. Room for the River projects) or building with natural resources. In this context, the central government and provinces are responsible for the standardization of primary and regional embankments, while the national water board (Rijkswaterstaat) and local water boards focus on the construction, management and maintenance of those embankments (E. Schumacher, personal communication, May 24<sup>th</sup> 2017). Secondly, the layer of spatial planning refers to measures that restrict the consequences of risks, such as compartmentation, the protection of critical infrastructural networks, risk zoning or adapted buildings. This phase involves the Dutch government, provinces and municipalities as they are all responsible for a certain part of the management plans (i.e. national, regional and local plans). Water boards, private parties, managers of specific areas and individuals are mainly involved as initiators of spatial development or construction projects. Thirdly, measures regarding crisis management and disaster relief are elaborated in the third layer and include the development of crisis management, the improvement of planning and communication, and the development of shelters and evacuation strategies (Van Der Most et al., 2013). This phase is related to the warm phase, which is the actual phase of an emerging crisis. Safety regions, water boards, provinces and the national government are involved in this phase.

### 4.1.2. Belgian Flood Risk Governance

Belgian flood risk governance cannot be described with one arrangement due to the complexity of the government structure, resulting in five separate flood risk arrangements (FRGAs) to be identified. The first three are linked to the Dutch multi layered safety approach of strategies of prevention, mitigation and defense, and are referred to as the Water System Arrangement. Important to note is that defense in this context only refers to water management in terms of dikes and watercourse maintenance, which is in contrast to

the Dutch strategy of defense that also applies to communication systems and evacuation strategies. Responsibilities related to these strategies belong to regional governance and are therefore separate for Flanders, Walloon and the Brussels-Capital Region. The fourth FRGA is the Flood Preparation Arrangement, focusing on emergency planning and crisis management. This arrangement is mainly governed at the federal level and also bears responsibility for evacuation strategies and communication systems. The fifth FRGA is the Flood Recovery Arrangement, which mainly concerns insurance issues and is also primarily governed by the federal authorities (Mees et al, 2016).

#### 4.1.3. Water managers and crisis managers

As a result of the Dutch Multi-Layered Safety and Belgian Flood Risk Governance, it should be noted that crisis management for river flooding and droughts exists out of two domains, the water management domain and the crisis control domain. Preparation and spatial planning/mitigation are mostly executed by water managers and is therefore related to the water management domain. Crisis control is mainly managed by other actors, such as the Belgian federal government and Dutch Safety Region's. Consultation and collaboration between both domains are important in terms of emerging crises, but responsibilities are, to a certain extent, shifting from the water managers in the 'cold phase' (i.e. preparation and mitigation) to crisis managers in the 'warm phase' (i.e. emerging crises). Each section in this research will therefore provide information about water management and crisis management. Especially the section about actors and actor coalitions will discuss both domains separately, followed by a paragraph about the collaborative aspect.

### 4.2. Actors and actor coalitions

This section deals with the sub-question regarding actors and actor coalitions involved in the transboundary cooperation on crisis management for river flooding and droughts in the area to be studied. Hence, it describes how local, regional, national and international actors are involved in The Netherlands and Belgium and how they collaborate in crisis management for river flooding and droughts. First, the Dutch and Belgian actors and actor coalitions will be described separately by discussing the water management domain followed by the crisis control domain. This section's analysis will be concluded by an elaboration of the transboundary cooperative actors and a figure showing the links between the Dutch and Belgian arrangements.

#### 4.2.1. Dutch actors, actor covenants and the organization of crisis management for river flooding and droughts

Dutch actors and processes involved in transboundary cooperation in crisis management for river flooding and drought are elaborated in this section. The Dutch actors and actor

covenants in water management will be discussed, followed by the organization of crisis management within The Netherlands. This section will be concluded by a figure showing the links between the water management and crisis control domain.

#### *Dutch actors and actor covenants in water management*

Since collaboration is an important prerequisite for effective government, water management in The Netherlands is the joint responsibility of the central government, provinces, municipalities and water boards (M. Matthijse, personal communication, May 16<sup>th</sup> 2017; E. Schumacher, personal communication, May 24<sup>th</sup> 2017; Van Der Most et al., 2013). The Administrative Agreement of Water (2011), which are agreements set down on the financing of the High Water Protection Program, describes clear agreements as to what institution is responsible to what aspects of water management, including the basic principle that no more than two administrative actors will be involved in a certain topic.

#### National level

The first key actor in Dutch national water management is the Dutch central government. Tasks of the national government include national policy making and the implementation of national measures. They are also ultimately responsible for the norms of water safety from the primary embankments, which are dykes and dunes safeguarding The Netherlands against sea water and water from the major rivers. Flood risk management and good fresh water supply in the major water are therefore the responsibility of the central government.

The second key actor on national level is the Dutch water authority (Dutch: Rijkswaterstaat - RWS), which is part of the central government and manages all major waters (i.e. sea, rivers and polders). It cautions the relevant authorities for high tides and storms on sea that can form a risk for Dutch grounds. Water boards are thus partly dependent on the provision of information from RWS, those two institutions therefore form a coalition in this context. RWS also maintains dykes, dams, water barrages and stows in order to protect the shore, and provides more room for rivers by means of floodplains and secondary channels (Rijksoverheid, n.d.).

#### Local level

The first key actor in local water management are provinces. They bear responsibility for the translation of national water policies, such as the Water Act, into regional measures and has operational tasks for a part of the water management (Havekes et al, 2015). In the Rhine-Meuse Scheldt Delta, the Province of Zeeland is responsible for the coordination at regional level, the management of flood risk maps and ensures the provision of information about primary and secondary barriers and regional flood simulations. The participation of provinces is also required in case of calamities with an

impact across the region. However, tasks in relation to calamities and crisis management are mainly taken over by the safety regions (Van Den Berg & Slager, 2012; M. Matthijsse, personal communication, May 16<sup>th</sup> 2017; E. Schumacher, personal communication, May 24<sup>th</sup> 2017). The safety region coordinates the emergency services dealing with all kinds of incidents or calamities (Institute of Physical Safety, 2014). Safety regions and their tasks will be further elaborated in the section discussing the 'Organization of Crisis Management'.

The second local key actors are the water boards, which are functional, decentralized government institutions with tasks exclusively in the field of water management (i.e. managing water defenses, quantity and quality, and navigable waterways). The boundaries of the water boards are defined by geographically and natural aspects of the environment, such as catchments and drainage basins. Consequently, water boards do not correspond with municipal or provincial borders and have therefore an interprovincial character (Havekes et al, 2015; M. de Feiter, personal communication, June 14<sup>th</sup> 2017). The most important water board in this case study is the Water Board Scheldestromen, which covers a large part of the Rhine-Meuse-Scheldt Delta (E. Schumacher, personal communication, May 24<sup>th</sup> 2017). The water board has multiple tasks concerning crisis management in case of river flooding, including the preparation on potential future floods, such as the storage of sand bags and the administration of other equipment. The board also needs to have an actual overview of the situation, share this information with all safety regions involved and give advices on the current situation.

In conclusion, the field of water management in The Netherlands involves the concept of multi-level collaboration which includes many organizations and individuals contributing to the same goals of water management (Scholtens, 2008). Dutch water management involves many actors on local as well as national level that are able to influence Dutch water policies and direct water management.

#### **Citizen participation**

Citizen participation is barely existing in crisis management for river flooding in The Netherlands. Respondents explained this to be this low because of the low risk awareness of inhabitants concerning the chances of river flooding (E. Schumacher, personal communication, May 24<sup>th</sup> 2017; M. Matthijsse, personal communication, May 16<sup>th</sup> 2017; De Feiter, personal communication, June 14<sup>th</sup> 2017).

#### **Organization of Dutch crisis management**

Organization of Dutch crisis management, in mainly the warm phase (i.e. the incidental phase itself), is characterized by the GRIP structure. In case of a complex incident, aid workers of monodisciplinary emergency services should be able to switch quickly from

their daily activities to one multidisciplinary organization that takes up incident control. The Dutch authorities developed the GRIP, the Coordinated Regional Incident Control, structure in order to minimize complexities and problems during this process of upscaling. It describes when the multidisciplinary teams form and how they cooperate mutually. The GRIP structure is included in the regional crisis plans of all 25 safety regions, but is not a statutory regulation (Institute of Physical Safety, 2014). Safety regions are organizations for multidisciplinary crisis control, including preparation, established as a result of the Safety Regions act. The safety region plays a key role in the preparation of crisis control and the control itself since 2010. An incident in this context is defined as a threat of vital interests and/or social disruption, including threats of the five pillars of national security (i.e. territorial, physical, economical, ecological, social and political security and stability). It should be noted that those incidents involve all kinds of calamities and not just water-related events (Van Oudheusden, n.d.). Events with an impact across more than one region require the participation of the Ministry of Security and Justice, the Commissioner of the King and provinces (M. Matthijsse, personal communication, May 16<sup>th</sup> 2017). Those institutions are only involved if the impact of the calamity is nationwide and are coordinated by the GRIP structure (Institute of Physical Safety, 2014). Local municipalities are involved in the process by taking part in decision-making processes about safety and disaster management as a member of the safety region.

The GRIP structure is initially based on regional disaster control and crisis management by emergency services of the safety region and includes GRIP phase 1 to 4. GRIP phase 5 refers to the organization of supraregional incidents and is followed by the highest phase which is setting in motion for a national incident. GRIP 0, which is not included in the official GRIP structure, refers to incident response in a daily routine (Institute of Physical Safety, 2014). The six GRIP phases are being described as follows:

- GRIP 1 includes all incident control in which multiple disciplines, such as police, fire department, medical care and municipality, are involved and structural coordination of emergency services on location of the incident is needed.
- If structural use of emergency services outside the region is required, GRIP 2 is coming into effect.
- GRIP 3 refers to the organization of incidents if administrative involvement is necessary (e.g. support of the mayor or the proclamation of emergency powers) which is still limited to one municipality.
- Incidents affecting more than one municipality will cause GRIP 4 to be launched. The president of the safety region is the only one with authorized supervision, therefore the incidents are limited to one safety region.

- GRIP 5 includes disasters or crises that extend over more than one safety region. Upscaling to this phase only happens when there is administrative necessity. Presidents of all safety regions involved maintain their authorized supervision without a transfer of power to 'a higher level'. However, they do provide a playground for an interregional incident control in which one of the safety regions coordinates the administrative and operational settlements. The choice of what region will coordinate is based on decisions between regions, the main location of the incident or what region is equipped best.
- GRIP 1 to 5, as described above, involve crisis control in the field of public order and safety, which is the domain of safety regions. However, crises can be covered by other domains, such as power supply, drinking water supply, public health or transport. Those sectors are divided among different ministries, which takes the lead in case of an incident in its sector. An intern crisis control organization has been developed in order to control such incidents. GRIP Rijk (translation: State) can be proclaimed in case a crisis involves more than one ministry and national security is at stake. Representatives of ministries involved are adjusted to each other by means of the interdepartmental commission crisis control, which creates a platform for consultation on high official levels (Institute of Physical Safety, 2014). The National Crisis Centre further coordinates the incident in which the minister of Security and Justice has a leading role (Van Oudheusden, n.d.).

In case of a crisis, all relevant actors work multidisciplinary and get together in specific groups, such as Regional Operational Teams (ROT), in which representatives of all disciplines cooperate with each other and are allowed to share relevant information during acute crises caused Dutch calamity control to have high standards of quality and expertise (Ministry of Safety and Justice, 2011; M. Matthijsse, personal communication, May 16<sup>th</sup> 2017). It offers multiple advantages in terms of knowledge and skills which improves the collaboration on crisis management for river flooding. All emergency calls are redirected to and collected in one central emergency room (Dutch: meldkamer) which outsources all relevant emergency services and communicate via the National Crisis Management System (M. Matthijsse, personal communication, May 16<sup>th</sup> 2017). Overarching institute of the safety regions is the Ministry of Security and Justice to which the chairman of the security regions provides information on the way in which the security region performs its tasks to the Dutch Minister of Security and Justice (Van Den Berg & Slager, 2012). Besides the security regions and the Ministry of Security and Justice, the Dutch government is represented in the provinces by the Commissioner of the King (CvK), which has therefore a key role in the administrative supervision in the preparation of crisis



situations. Additionally, the CotK bears also responsibility in stimulating and supporting transboundary cooperation. The Cabinet of the CotK in Zeeland supports the CotK in its task in terms of cross-border collaboration by means of e.g. organizing network meetings, introducing new functionaries in the network, stimulating good transboundary arrangements in plan-making and by involving each other in exercises (De Meyer, 2016; De Meyer, personal communication, June 2<sup>nd</sup> 2017).

Special arrangements are made along borders with Germany and Belgium in case a cross-border event occurs or when help is necessary to provide effective crisis control. Working together as a daily routine is a main pillar in those areas which possibly provides bilateral assistance on the daily basis (Ministry of Safety and Justice, 2011; M. Matthijsse, personal communication, May 16<sup>th</sup> 2017; De Meyer, personal communication, June 2<sup>nd</sup> 2017). Those arrangements will be further elaborated in section 4.2.3.

#### *Conclusion: Dutch crisis management for river flooding*

Actors, actor coalitions and the most important relationships mentioned in the previous paragraphs can be combined to form the overall structure for crisis management on river flooding and droughts in the Netherlands. Figure 4 displays this structure. All actors shown in this figure are discussed in either the water management section or the crisis control section above.

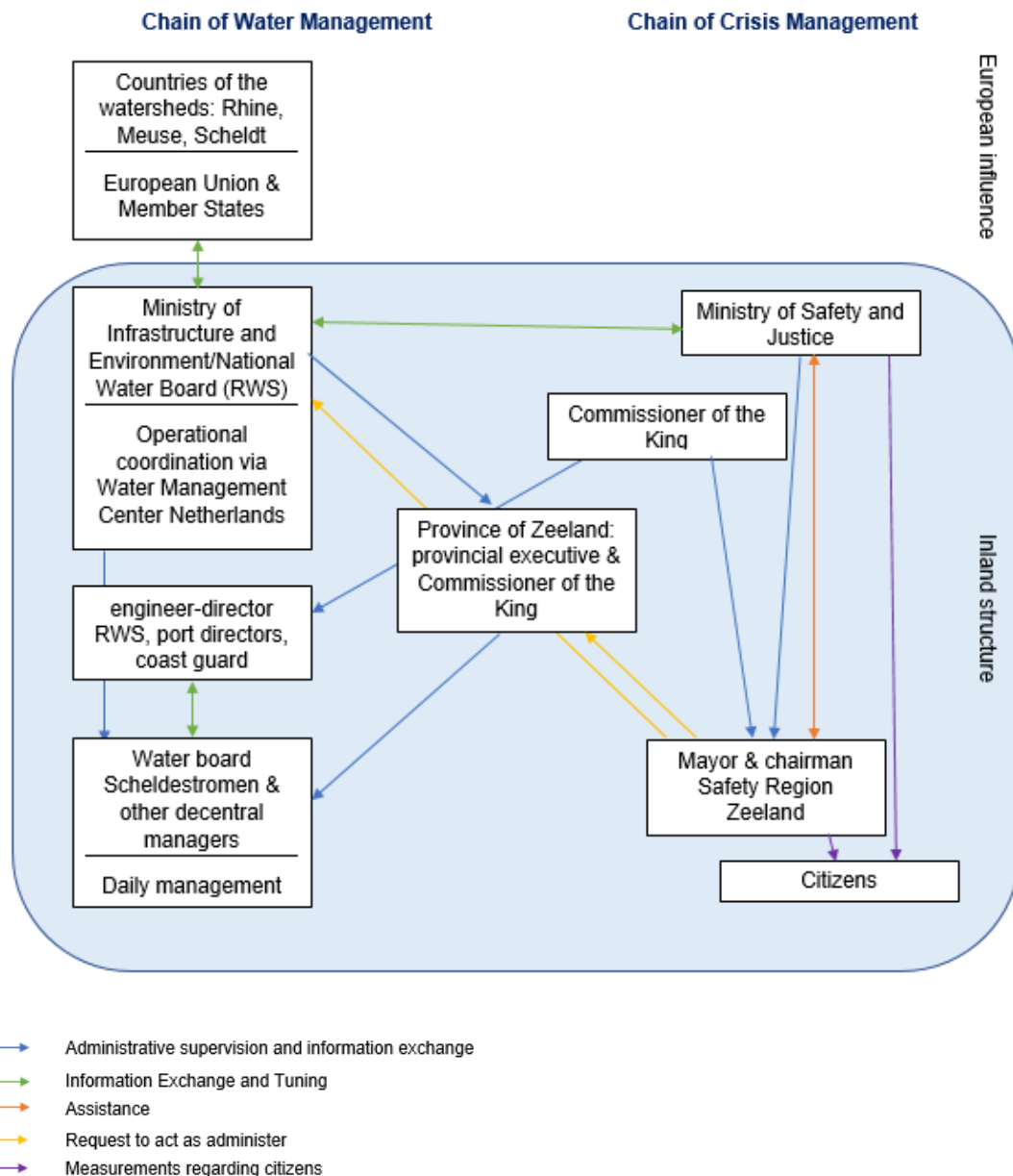


Figure 4 Overall structure of crisis management for river flooding. Source: own figure, based on Network Map 3: surface water and embankments (Ten Dam, 2015)

#### 4.2.2. Belgian actors, actor covenants and the organization of crisis management for river flooding and droughts

Flemish actors and processes involved in transboundary cooperation in crisis management for river flooding and drought are elaborated in this section. The Flemish actors and actor covenants in water management will be discussed, followed by the organization of crisis management within Flanders.

##### *Flemish actors and actor covenants in water management*

Since flooding and droughts surpass administrative boundaries and water exceeds the competency of multiple governments and administrations, an integrated water policy is

developed in Belgium (table 4). In this water policy, involved policy areas (e.g. environmental agencies, maritime access and nature) cooperate on multiple management levels (i.e. Flemish, provincial, local) in order to tackle water related issues such as flooding or a low water quality. This collaboration proceeds via integral water consultation structures (CIW, n.d.b).

*Table 4 Governmental actors at Flemish, provincial and local level*

Level	Type watercourse	Actor
Flemish	Navigable	Department of Mobility & Public Works
		- Waterways and Sea Canal
		- De Scheepvaart
		- Agency of Maritime services and Coast
	Non-navigable of 1 <sup>st</sup> category	Maritime Access
		Flemish Environment Agency
		Department Space Flanders
		Agency for Nature and Forests
Provincial	Non-navigable of 2 <sup>nd</sup> (&3 <sup>rd</sup> ) category	Provinces
Local	Non-navigable of 3 <sup>rd</sup> category	Municipalities
	Non-navigable of 2 <sup>nd</sup> and 3 <sup>rd</sup> category under their charge	Polders and Wateringues
Source: own figure. Based on Mees et al, 2016		

#### Flemish level

The first key actor on the Flemish level, The Flemish government, describes its vision on general policy of the integral water policy in a water policy note, after which the Flemish minister of Environment and Water Policy is responsible for its coordination and organization. The water policy note provides a framework for the implementation of EU's Water Framework Directive (WFD) and its River Basin Management Plans (RBMPs). Water management issues have been included in the note and refer to situations that can lead to a deterioration of the water system or discourages improvements and restoration (CIW, n.d.c).

The second key actor on the Flemish level, The Department of Mobility and Public Works (MOW), is responsible for navigable waterways within Flanders. The actual management is, however, executed by four separate governmental actors: Waterways and Sea Canal, de Scheepvaart, Agency of Maritime Services and Coast, and Maritime Access. Those institutions also support policy-making by contributing expertise, relevant information and analytical results (Mees et al, 2016). Navigable refers to waterways that are accessible for shipping traffic, and non-navigable to waterways that are not accessible for shipping.

The third key actor on the Flemish level is the Flemish Environmental Agency (Dutch: Vlaamse Milieu Maatschappij – VMM), which contributes to the realization of the environmental policy objectives by reporting on the state, and by preventing, limiting and reversing harmful impacts on water systems and pollution of the atmosphere (CIW, n.d.c.). Non-navigable waterways are also in hands of the VMM (Mees et al, 2016). The realization of the integrated water policy objectives is therefore one of their main goals. It supports the operation of the basin structures and coordination of the basin-oriented operation within the agency. The coordination of the preparation and financing of the River Basin Management Plans are also part of their tasks (CIW, n.d.c). On the Flemish level, other governmental actors are also involved in flood risk management. The Department Space Flanders (RWO) is, for instance, responsible for the policy concerning spatial planning. The Agency for Nature and Forests is the competent authority for conserving natural habitats along Flemish rivers.

The fourth key actor on the Flemish level is the Commission of Coordination Integral Water Policy (CIW), founded to increase the coordination between water managers and the Flemish Department and Spatial planning (Mees et al, 2016). This institution is part of the Belgian government and is responsible for the official consultation, coordination and accommodating different actors involved in water policy in the province of Flanders. It organizes consultation meetings on the level of the province of Flanders, the basin consultation meetings on the level of the basin and the meetings of international river commission. The latter provides multilateral cooperation based on the level of the international river basin districts. The official preparation of the integral water policy is also the liability of the CIW. It supervises the implementation of the Water Framework Directive and the Flood Risk Directive and plays a key role concerning planning and implementation of water policies on the levels of catchment areas. Therefore, the CIW forms the center of integral water management within Flanders (CIW, n.d.c).

#### Local level

The first local key actor in the Belgian water consultation structures are basin structures, which are similar to the Dutch water boards (Van Campenhout, personal contact, 24 April

2017). Flanders is divided in eleven basins meaning that all water in the catchment flows in the direction of one or several bigger water streams (CIW, n.d.c). One of the most important basins regarding this research is the Benedenscheldebekken (Lower basin of the Scheldt) located near the Dutch-Belgian border. The consultation structures contain three different groups: the basin board, the basin council and the basin secretary. Representatives of the Flemish policy areas (i.e. local water administrators) and the local authorities (i.e. provinces, municipalities, polders and wateringues) are established in the basin board, which makes administrative decisions. The second group, the basin council, serves as the advisory body of the catchment and organizes community consultation with the civil society on the level of the basin. Sectors represented in the basin council include agriculture, nature, tourism and recreation, agroforestry, environment and landscape, industry and trade, transport, reclamation and power, fishery and the housing sector. The official pillar is the basin secretary, which takes charge for the daily operational tasks within the catchment and the preparatory work of the structure itself. The daily management of the secretary lies in hands of the basin coordinator who is supported by one or multiple planners (CIW, n.d.c). The basin structures are thus overarching institute for all water managers on local level, i.e. provinces, municipalities, polders and wateringues. Provinces bear responsibility for non-navigable waterways of the 2<sup>nd</sup> category, municipalities of the 3<sup>rd</sup> category, and polders and wateringues of 2<sup>nd</sup> and 3<sup>rd</sup> category that are under their charge.

#### *Citizen participation*

Citizen participation barely exists in Flanders. Possibilities for participation are limited to the official public enquiry and citizens hardly contribute to FRM delivery, such as flood-proof building. More intensive cooperation in integral water management on Flemish levels is maintained with organized stakeholder groups by means of annual meetings and strategic advisory councils, such as the Environment and Nature council of Flanders (Minaraad), the Social-Economic Council of Flanders (SERV) and the Strategic Council for Agriculture and Fishery (SALV) (CIW, n.d.d). Their advises are not binding but decisions deviating from them must be motivated. Extensive deliberation can take place in specific projects.

#### *Organization of Belgian crisis management*

The Flemish government actively develops structures and procedures aiming for the preparation and organization of incident control within Flanders. When an incident occurs, a structure of crisis management is activated. This team takes care for the normalization of the situation and the restart of daily processes. Disciplines involved in Belgian calamity and crisis control are emergency services (i.e. fire department, police force, medical

services), medical, sanitor and psycho social services, police force, logistic support and information provider (Federal Services of Internal Affairs, 2013). Emergency planning and crisis management are a shared responsibility of the federal government, the federal services of the provincial governor and the municipalities. Regional government take no part in emergency planning. However, flood forecast information and hydrological expertise is derived from regional government and regional authorities are therefore involved in crisis management and emergency planning (Mees et al, 2016)

### Emergency plans

Emergency plans have been developed by the Flemish government in order to enable a quick and coordinated emergency service during crisis situations. Those plans are set up on the levels of the major, governor and minister. The emergency plans' main objective is the protection of the civilization and the environment and can be divided into three different categories (Federal Services of Internal Affairs, 2013; M. Matthijssse, personal communication, May 16<sup>th</sup> 2017). Firstly, intern emergency plans mainly include the limitation of harmful consequences within an institution and is therefore formulated by the institution itself. This kind of emergency plans are not relevant in this context. Secondly, the monodisciplinary intervention plans (i.e. emergency services, police force, logistic support and information services) regulate intervention models one single discipline in accordance with the existing NIP, such as the Medical Intervention Plan. Thirdly, the arrangement of the general emergency and intervention plan (Dutch: Algemeen Nood- en Interventie Plan - ANIP) can be supplemented by special bye-laws mentioned in the special emergency and intervention plans (Dutch: Bijzondere Nood- en Interventie Plan – BNIP). Coordination on international levels regarding mutual assistance on the protection against calamities and incidents is enabled by the possibility to add arrangements and accords of international collaboration. (Federal Services of Internal Affairs, 2013). In those plans, multidisciplinary coordination is performed on operational and policy-oriented fields. The operational command station (Dutch: operationale commandopost – CP-OPS) executes all operational tasks and contains directors of relevant disciplines. Their tasks include drafting reports, advising authorities and organizing intervention areas. The policy-oriented field is performed by the coordination committee (CC) which evaluates emergency situations, provides information to civilians and other municipalities and execute protective actions. The CC is set up on provincial (CC-prov) and municipal (CC-gem) level and is represented by chairmen of disciplines and the civil servant responsible for emergency plans. A national coordination committee comes into force when the federal phase is promulgated. During this phase, three committees are convoked to contribute to the decision-making process. The evaluation committee evaluates the crisis situation and is executed by experts and scientists of multiple authorities or services.

Authorized ministers and representatives together form the policy committee, which makes all necessary decisions. The third group, the communication committee, includes informing the civilization on regular time slots and is executed by spokesmen of departments involved (Federal Services of Internal Affairs, 2013).

#### Levels of crisis control

In Belgium, the level of crisis control is determined based on certain criteria (i.e. geographical area, number of victims, effects on the environment, economic effects etc.) resulting in four phases of crisis control. Firstly, in the municipal phase, the major will coordinate the crisis control when the extent of the calamity does not exceed the boundaries of the municipality. He communicates all relevant information to the governor. Secondly, the provincial phase refers to a situation in which the extent of the direct consequences of the calamity exceeds the municipal area or management by the governor is necessary (Federal Services of Internal Affairs, 2013; M. Matthijssse, personal communication, May 16<sup>th</sup> 2017). The governor and major together develop a safety team bearing responsibility for the development of emergency plans, evaluating emergency situations and practices, create a risk inventory and analyses, and the organization of crisis planning and control. Those teams include the major or governor (depending on the phase), a representative of each discipline and a civil servant of emergency planning. Thirdly, the governor provides information to the minister of Internal Affairs coordinates national calamity control if two or more provinces are involved in the event or measures featured by the governor are not enough to provide all necessary help. This is referred to as the federal phase (Federal Services of Internal Affairs, 2013). The governor has a coordinative task in crisis situations that exceed the boundaries of municipalities and transnational crises, including the preparation of emergency planning. Meetings and exercises for all disciplines involved are organized by the governor as well. Fourthly, in the transboundary phase, cross-border cooperation is one of the aspects of emergency planning which is a primary task of the federal service of the governor. This means that the governor is the first contact point of the province of Zeeland in terms of multidisciplinary collaboration. In case of collaboration between fire departments, Assistance Zones (Dutch: hulpverleningszones) are contacted directly instead of via the governor (De Meyer, 2016). Those Assistance Zones are similar to the Dutch Safety Regions, except that Assistance Zones only include fire departments instead of all disaster relief institutions (De Meyer, personal contact, June 2<sup>nd</sup> 2017).

Citizen involvement could form a valuable asset but the use of citizens in crisis management is currently underdeveloped, since Belgium does not have a tradition of community involvement in crisis management.

#### 4.2.3. Transboundary cooperative actors and actor covenants

In the previous sections, the relevant actors in Dutch and Belgian arrangements have been elaborated. In this paragraph, the national and transboundary actors influencing or cooperating in Dutch-Belgian crisis management for river flooding and droughts will be analyzed.

Belgium and The Netherlands are negotiating water related subjects for over decades. Especially water agreements concerning the aim for transboundary water quantity and quality dominated the collaboration process. International agreements and treaties regarding the management of cross-border water systems, such as the final act of the Helsinki Convention in 1992, resulted in a shift of territorial to integral and transboundary water management. Nowadays, EU guidelines and legislation, such as the Water Framework Directive, form the basis for multilateral collaboration and provides frameworks for water management as well as crisis management within Europe. The European Union has therefore a major influence on crisis management for river flooding (Troost & Gosolf, 2016). Since 2002 a collaborative structure in terms of safety has been established to which all transboundary projects are linked. In this collaborative structure, the neighboring provinces of Zeeland (NL), West-Flanders (BE) and East-Flanders (BE) work together by requesting support, information exchange and tuning with each other. A big stimulant has been the European division in Euregios and the opportunities for European subsidies in transboundary projects (Interreg). Those three provinces were joint together in the Euregio Scheldemond (De Meyer, 2016). By the enlargement of the Interreg areas (i.e. Euregios) from those two Belgian provinces and Zeeland (NL) to the whole Dutch-Belgium boundary, collaboration with the city of Antwerp came into view. All new initiatives as well as the elaboration of practical issues have to be included within this structure. The cross-border crisis control plan of Zeeland is adjusted to the existing transboundary protocols and arrangements with the Belgian provinces of Antwerp, East-Flanders and West-Flanders, which means that the governor is being informed in case of an incident (Troost & Gosolf, 2016; M. Matthijssse, personal communication, May 16<sup>th</sup> 2017). This enlargement resulted in the Safety Consultation Westerscheldedelta (Dutch: veiligheidsoverleg Westerscheldedelta), which is a consultative meeting of the provinces of Zeeland, West-Flanders, East-Flanders and Antwerp, advances the coordination of transboundary collaboration in terms of safety and secures the existing structure of cooperation. This consultative meeting takes place twice a year and is alternately presided by the Commissioner of the King Zeeland, the governor of West-Flanders, the governor of East-Flanders and the governor of Antwerp (De Meyer, 2016).



### *The institutionalization of transboundary cooperation in International Commissions*

The cross-border cooperation between The Netherlands and Belgium resulted in the establishment of two key actors regarding crisis management on river flooding and drought in the Rhine-Meuse-Scheldt Delta, namely the International Scheldt Commission (ISC) and the Flemish-Dutch Scheldt Commission (VNSC). The ISC is an intergovernmental institution aiming for sustainable and integral water management in the international Scheldt's river basin district by cooperation between riparian states and districts. It works towards a joint performance by the riparian states and provinces imposed by the EU's Water Framework Directive, and draws therefore a single management plan for the international Scheldt River Basin District in which precautions and protection measures against high tides are being elaborated. Member states of this institution are France, Belgium and The Netherlands (ISC, 2015).

A second international commission is the Flemish-Dutch Scheldt Commission (Dutch: Vlaams- Nederlandse Scheldec commissie - VNSC) in which Flanders and The Netherlands collaborate on a sustainable and vital Scheldt estuary. It works towards a dynamic and natural ecosystem, optimal accessible ports and flood protection measures. The Dutch-Flemish cooperation is another main objective by the VNSC. The VNSC is composed by Flemish and Dutch authorities cooperating within colleges and an executive secretary (VNSC, n.d.). This includes a Political College, Official College and the executive secretary. The latter bears responsibility for organizational and administrative support to the other two colleges and therefore executes tasks formulated by the colleges. The Political College determines policies of the VNSC, and is represented by the Dutch minister of Infrastructure and Environment and the Flemish minister of Mobility and Public Works. The Official College prepares policy-making processes of the Political College and executes their decisions (VNSC, n.d.). Senior officials of both countries (i.e. civil servants) are taking part in this college. Besides these three colleges, the Scheldt Council has been established in 2014 and is the advisory council of the VNSC. It contributes to prospective policies of the VNSC in order to maintain support of all actors involved in the Scheldt estuary. The Scheldt Council includes representative of regional authorities, such as water board Scheldestromen, the province of East-Flanders, West Flanders and Antwerp. Local authorities involved in the council are representatives of local municipalities and ports. Employers, agricultural organizations and environmental institutions are also able to participate in the Scheldt council (VNSC, n.d.). In this context, The Netherlands and Belgium have a treaty regarding a joint long-term vision, which was established by the Scheldt treaties (par. 4.4.3.). Flanders and The Netherlands together conduct research on abstract as well as fundamental levels (M. Gullentops, personal contact, May 10<sup>th</sup> 2017). The Dutch safety region of Zeeland has, however, no collaborative contact with the ISC as

well as with the VNSC (M. Matthijssse, personal communication, May 16<sup>th</sup> 2017). Representatives of the Province of Zeeland itself and the water board Scheldestromen are included in meetings of the Scheldt Council, but not in the ISC (E. Schumacher, personal communication, May 24<sup>th</sup> 2017; M. de Feiter, personal communication, June 14<sup>th</sup> 2017).

Another form of institutionalization of water management is the transboundary working group 'Creeks and Polders', which is a joint management group of the secretary of the Brugse Polders and the water board Scheldestromen. In 2011, more flexible transboundary working group structures were being established based on location, area specific or theme specific subjects, which are resorted under the basin structures of Flanders and the Regional Administrative Consultations of the Netherlands (Secretary Benedescheldenbekken, 2014). Besides, special arrangements are made along borders with Belgium in case a cross-border event occurs or when help is necessary to provide effective crisis control. Working together as a daily routine is a main pillar in those areas which possibly provides bilateral assistance on the daily basis (Ministry of Safety and Justice, 2011; M. Matthijssse, personal communication, May 16<sup>th</sup> 2017).

#### 4.2.4. Influence of actors on cross-border cooperation

The transboundary cooperation in crisis management between Flanders and the Netherlands includes a complex structure because of the differences in administrative cultures and structures (M. de Feiter, personal communication, June 14<sup>th</sup> 2017). However, the main relationships and links between actors on both sides of the boundary in case of an emergency are displayed in the figure below (6). All actors mentioned in this figure are discussed in previous sections. Those actors communicate with other important actors within the country if necessary for a certain action (e.g. communication with water managers, such as the province, concerning closing or opening of embankments).

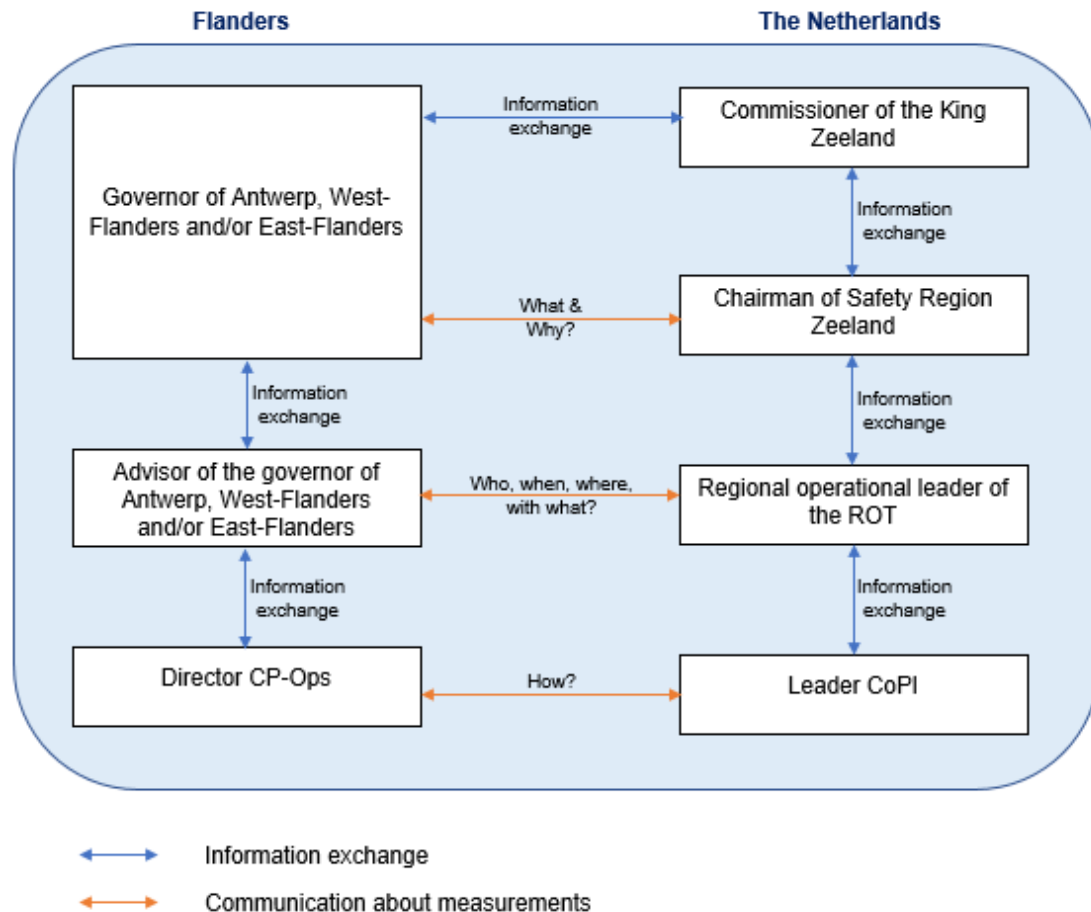


Figure 6. Regional structures of communication and collaboration in crisis management. Source: own figure, based on De Meyer (2016)

Structures regarding water management are more complicated and involved multiple actors that are not involved in crisis management. Figure 7 shows the links between water managers in The Netherlands and Flanders. Important to note is that responsibilities with regard to water management in Flanders is divided into non-navigable and navigable waterways. The latter means that waterways are accessible for shipping.

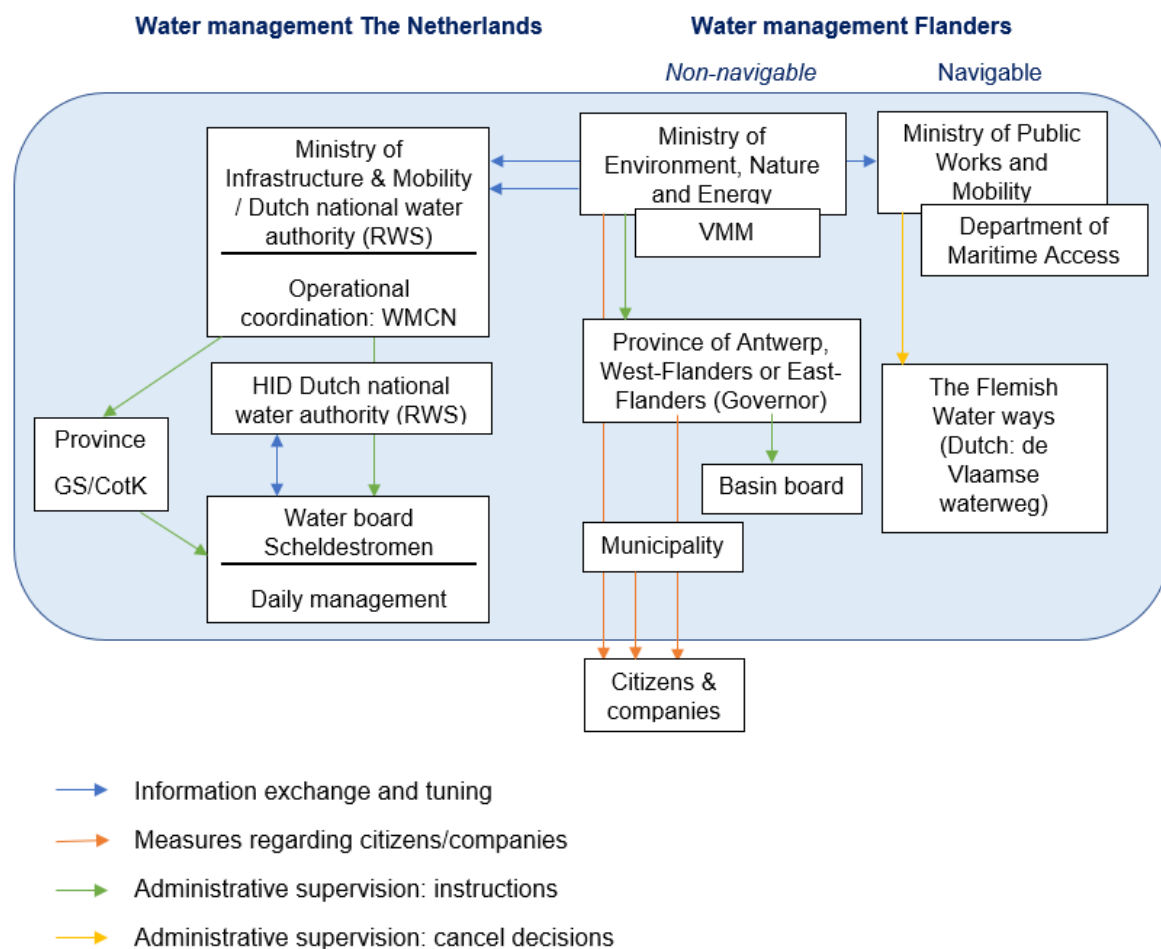


Figure 7. Organization of the Dutch-Belgian cooperation on water-related topics. Source: own figure, based on Ten Dam (2016).

As the figure shows, formal communication lines exist between higher authorities on the political level, whereas those communication lines do not exist on the lower administrative level of water boards and its Flemish equivalent. The water board Scheldestromen is currently aiming for creating this form of communication in order to improve the Dutch-Belgian collaboration on all water-related aspects, among which crisis management for river flooding (M. de Feiter, personal communication, June 14<sup>th</sup> 2017). Besides, notable is that the transboundary international commission (i.e. VNSC, ISC) are not mentioned in the figure. These commissions are not included in the official institutional arrangements and are therefore barely known by other actors, such as the safety region of Zeeland, the province of Zeeland and water board Scheldestromen (M. de Feiter, personal communication, June 14<sup>th</sup> 2017; M. Matthijsse, personal communication, May 16<sup>th</sup> 2017; R. de Meyer, personal contact, June 2<sup>nd</sup> 2017).

#### 4.3. Resources and funds

In this paragraph, the question will be examined to what extent the resources and funds used by different actors and actor coalitions during the process of policy-making in the

case to be studied affects the cooperation on transboundary crisis management for river flooding and droughts.

#### 4.3.1. Dutch resources and funds of relevant actors

Resources used by Dutch actors are elaborated in this section. Firstly, the resources in water management will be discussed, which will be followed by the resources used in crisis management.

##### *Water management*

In the Netherlands, water management is almost entirely in the hands of the governments (i.e. central government, provinces, water boards and safety regions). All kinds of water-related tasks come under public law and are executed by governmental institutions. The national government, provincial councils, water boards and municipal councils are all democratically chosen by inhabitants of the specific areas. This situation refers to a democratic legacy of the institutions and therefore social support and power. It also forms the basis for legal power, since powerful and social supported institutions are able to influence national and local policy making.

The water related tasks under public law are mainly financed by the national government's general funds or revenues generated by various decentralized taxes (M. Matthijsse, personal communication, May 16<sup>th</sup> 2017). The only exception is drinking water supplies, which are taken care by the water companies and the costs are recovered from the citizens by means of invoices under private law. The total expenditure for water-related activities including those of water companies were 6.9 billion euros in 2013 (Havekes et al, 2015). The province of Zeeland has basically no funds or other financial aids itself (E. Schumacher, personal contact, May 24<sup>th</sup> 2017). Provinces and municipalities are largely dependent on support from the central government via grants (M. Matthijsse, personal communication, May 16<sup>th</sup> 2017). Regional water authorities, such as water boards, are to a large extent financially independent since they have an own broad tax area. Their tasks can be financed of the revenues from the regional water authority taxes, such as the water system levies and the surface water pollution levy. The Dutch government only provides financial subsidies to strengthen the primary flood defenses (Water Act, art. 7.23). Regional water authorities also pay a share as they will contribute half of the costs by means of annual payments to the Ministry of Infrastructure and Environment. The financial independence of the water boards resulting from their own tax system forms an important building block in the Dutch regional water authority model (Havekes, 2015).

The organizational and financial structure of Dutch water management has been determined historically but is also based on the notion that water management is relevant to the public domain. This is partly due to the geographic position of The Netherlands and

the interest of its habitants in a good and sustainable water management organization (Havekes, 2015; M. Matthijse, personal communication, May 16<sup>th</sup> 2017; E. Schumacher, personal communication, May 24<sup>th</sup> 2017). Even after all measurements, river flooding is still a possibility. The province and safety region has therefore launched several programs to raise awareness among inhabitants, which might increase their public and social powers. All kinds of Dutch water governance tasks, responsible organizations and financing methods are shown in the table below (5).

*Table 5 Tasks, responsible organizations and financing methods in Dutch crisis management for river flooding*

Task	Organization	Financing
Flood protection, water quantity and water quality (main system)	State (public)	General resources, pollution levy national waters
Flood protection, water quantity and quality (regional)	Water authority (public)	Regional tax

Source: own table, based on Havekes et al (2015).

This financial system of water boards causes water boards to be largely financially independent of national politics and economic fluctuations and is therefore the basis for a long-term sustainable water governance. The function of water boards is based on stakeholder participation and the principle that stakeholders (i.e. residents, owners of open land, owners of natural areas and owners of real estate) pay a tax in order to have a say in the water authority body (Havekes et al, 2015). Besides, local water managers have a lot of knowledge within the company, whereas the Dutch water authorities mainly use extern sources such as engineer companies. This knowledge is transferable between all water boards within the Netherlands. Materials, such as filling machines and pumps, are also interchangeable. Water boards therefore have lots of resources in terms of knowledge, materials and systems (M. de Feiter, personal communication, June 14<sup>th</sup> 2017).

### *Crisis management*

Safety regions are, just like the water boards, mainly financed by incoming taxes (M. Matthijse, personal communication, May 16<sup>th</sup> 2017). A major difference is that inhabitants not directly pay their contribution but municipalities contribute a certain amount per citizen. It should be noted that the safety regions have a broad spectrum of duties and crisis management is only a small part of their tasks. Therefore, crisis management for river flooding in the Rhine-Meuse-Scheldt Delta is an even smaller part of their expenses,

which implies that this topic is not their main focus point (Havekes et al, 2015; E. Schumacher, personal communication, May 24<sup>th</sup> 2017). Nevertheless, safety regions also have resources in form of a network and expertise since all Dutch safety regions are connected with each other. Communication and information exchange is therefore relatively easy, and the decision-making process runs fast. This situation indicates power in terms of knowledge closely linked to the power of technological materials, since those communication networks are highly dependent on technologies such as the National Crisis Management System (LCMS), mapping and simulators (M. Matthijsse, personal communication, May 16<sup>th</sup> 2017). An effective communication with other actors is required in order to have a successful process. Therefore, this online platform LCMS has been developed to organize this communication and data sharing between the other relevant actors (Van Den Berg & Slager, 2012; M. Matthijsse, personal communication, May 16<sup>th</sup> 2017). Water board Scheldestromen is not linked to this system yet, but is aiming for implementation of LCMS before the end of this year (M. de Feiter, personal communication, June 14<sup>th</sup> 2017). Water boards have an own crisis management and should therefore always be able to act operationally (Van Den Berg & Slager, 2012). Information is thus immediately transferable and available to all involved individuals and actors on Dutch grounds, which is a precondition mentioned by November et al (2007). Besides, in case of emerging crises, crisis managers (i.e. safety regions, waterboards) are allowed not too obey certain agreements or procedural policies, such as the policy concerning outsourcing tasks. Respondents mentioned that necessity knows no law, referring to the ability to do everything needed in order to maintain citizen's safety during crises periods (M. de Feiter, personal communication, June 14<sup>th</sup> 2017). This is an important kind of resources, since it offers solutions that are not being discussed during non-crisis situations. However, discussing what procedures are eligible not to obey and what resources may be used is of high importance to keep consultation periods low during warm phases (M. de Feiter, personal communication, June 14<sup>th</sup> 2017).

#### 4.3.2. Belgian resources and funds of relevant actors

Resources and funds used by Belgian actors are discussed in this section. Firstly, the resources in water management will be discussed, followed by the resources used in crisis management.

##### *Resources in water management*

Flood risk measures in the water system arrangement are financed by general tax income. The Flemish government funds water management in the form of grants to the Flemish Environmental Agency, Waterways and Sea Canal and the Scheepvaart. Water managers are also allowed to collect other resources, such as public private partnerships

and EU funds. Investments have been constant in general, but there is a human deficiency at all governmental levels since the start of the economic crisis in 2008 (Mees et al, 2016).

Expertise is mainly generated within the governmental structures themselves. A major source of expertise in Flanders is the Flanders Hydraulics Research which is a governmental scientific institute specialized in water dynamics. Governmental actors can also generate knowledge from experts of a variety of knowledge institutes outside of the governments (i.e. universities and consultancy bureaus). The expertise available within municipalities is limited in comparison with provincial or federal water managers. Local institutes are supported by the Flemish Environmental Agency, which organizes information sessions and training on various topics. A holistic view on flood problems in basins are rendered by unique knowledge offered by the sub-basin boards (Mees et al, 2016).

As discussed in the section concerning Flemish actors and actor covenants, multiple forms of power can be assigned to several institutions on local as well as national level (table 6).

*Table 6 Division of power in Belgian Integral Consultation Structures*

	Level	
	Catchment area	Regional
Administrative power	Basin board	Flemish government and minister
Official power	Basin secretary	Commission of Coordination Integral Water Policy
Social power	Basin council	Strategic Advisory Council

Source: own figure, based on information of the Commission of Coordination Integral Water Policy (n.d.c & n.d.d.).

Representatives of Flemish policy areas are established in the basin board on the local level and the Flemish government on the Flemish level, which both make administrative decisions and therefore have administrative powers. Daily operational tasks and the preparatory work of policies are executed by the catchment's basin secretary and the Flemish CIW. Those actors thus have official powers in terms of water management. The basin council and Strategic Advisory Council have social power as a result of the support of multiple actors and stakeholders who are able to contribute in the council's sessions.

#### *Resources in crisis management*

Crises often remains in the municipal phase and the response costs are therefore paid by the municipality. The federal government provides funds in case the calamity exceeds the



boundaries of the municipality and the provincial or federal phase gets into force. The flood forecasting systems are paid by the regional governments.

The flood preparation arrangements experience a lack of resources, especially in terms of human resources (i.e. personnel). Multiple smaller municipalities have limited financial resources and have often difficulties appointing an emergency planning official. Therefore, planning officials are often hired on a part-time basis or shared among multiple smaller municipalities. Since the economic crisis in 2008, other governmental levels also experienced this decline in personnel, a cut back in funding of daily operations and the reduce of funds for new projects.

There is a wide variety in the expertise of crisis managers. Crisis managers, such as crisis coordinators in water boards and the safety regions, in provinces and big cities are trained intensively and often confronted with crisis events, while calamity managers in smaller municipalities and rural areas experience crisis situations at a less regular basis and do not have a similar capacity to build up a professional crisis response structure. However, the federal government is currently assembling a mobile expert team of communication officials that can assist local authorities during emergencies, which indicates an increase in professionalism (Mees et al, 2016). Additionally, an Incident & Crisis Management System (ICMS), which is similar to the Dutch LCMS, is being rolled out over Flanders. Belgian authorities, organization and institutions involved in the integrated management of emergency situations are always able to communicate in case of crises (De Meyer, personal communication, June 2<sup>nd</sup> 2017).

#### 4.3.3. International resources and funds

The European Union has a major influence on water management as well as transboundary cooperation. It provides programs and legislation in order to achieve joint management in multiple policy fields, such as water management (WFD) and flood risk management (FRD). Interreg Community Initiative, or Interreg in short, is a European program focusing on border congestion within Europe. It encourages collaboration between regional areas in different countries and is paid for by the European Union (M. de Feiter, personal communication, June 14<sup>th</sup> 2017). Main objective is to strengthen the economic entity and cohesion in the EU as a whole. Interreg includes three programs for which funds can requested: transboundary collaboration, transnational cooperation and interregional collaboration. Transboundary collaboration refers to relatively small scale cross border projects in border region, such as The Netherlands being able to cooperate with Belgium Germany, France and England. Belgium and The Netherlands also collaborate in projects applied in North-West-Europe, which is a form of transnational cooperation. The last part, interregional collaboration, includes projects of EU itself.

Depending on the project and the regions in which it is applied, funds and financial contribution can be requested by the member states. The amount of capital transferred within this program can be illustrated by the period 2007-2013, since it is the last Interreg period finished. During this period, 290 billion euros were being available including 138 billion euros directly from the European Union. The 162 billion euros were collected by local and regional authorities and parties submitting projects (Dutch national service for enterprising, n.d.).

#### 4.3.4. The role of resources in transboundary cooperation on crisis management for river flooding and droughts

Respondents clarified that the amount of resources in terms of finances has no influence on prestige or power of the institution. Responsibilities are made clear and the network is well-balanced. Actors know when and how to approach each other, especially on local or regional level. Besides, respondents also mentioned that the LCMS system is a major resource in crisis management. However, an international LCMS system in which (parts of Belgium) and The Netherlands are included does not exist. Several respondents noted that such a system would be a good addition to the collaboration as such. November et al (2007) also mentioned this immediately transferable and available information exchange for all actors involved as an important precondition for successful cooperation. However, Flanders is currently rolling out a similar system, called ICMS, in which a possible link between LCMS and ICMS would be possible (De Meyer, personal communication, June 2<sup>nd</sup> 2017).

### 4.4. Formal and informal legislation

This paragraph elaborates to what extent the collaboration on transboundary crisis management is affected by local, regional, national and international regulations and policies. This content is related to the rules of the game dimension as mentioned in the PAA. Firstly, relevant Dutch laws and regulations will be discussed, to be followed by the Belgian ones and a cross-border analysis of applicable laws.

#### 4.4.1. Dutch formal and informal legislation

Crisis management for river flooding and droughts within The Netherlands is mainly regulated by two important key laws which together form the basis for Dutch crisis management for river flooding and droughts. The first policy, the water policy (Waterwet), refers to all water related topics. The Policy for Safety Regions (Wet Veiligheidsregio's – WVR) includes more crisis management related subjects.

##### *Safety Regions Act*

The Safety Regions Act (Dutch: Wet Veiligheidsregio's – WVR) aims for an improvement of Dutch disaster relief and crisis control in which administrative and operational

procedures of parties involved in disaster relief and crisis control are improved (Dutch government, 2010). In the Netherlands, safety is a local responsibility meaning that the disaster or crisis should be remedied by the municipality (E. Schumacher, personal communication, May 24<sup>th</sup> 2017). However, multiple smaller municipalities are having difficulties concerning disaster relief and crisis control. By combining the fire department, medical care, population care, police force on a regional level in case of disaster relief and crisis control, the needed strength, unambiguity and unity can be achieved (Dutch government, 2010). The Safety Regions Act forms the basis for a common regulation in which the tasks of all separate emergency services are being merged in a joint regional organization. Regional authorities provide a coordinating role by tuning between partners within the safety regions and the ones from outside the region itself (Dutch government, 2010).

#### *Water Act*

The Water Act (Dutch: Waterwet) consists of a merge of eight laws concerning water and its management. It provides all necessary legislation for the management of surface water as well as ground and soil water, and improves the coherency between water legislation and spatial planning. The Water Act also contribute to the government's objectives of decreasing the number of rules, licensing systems and administrative charges. Water boards are enabled to accomplish a policy concept of integrated water management by means of the juridical instruments offered by the Water Act, including a new emphasis on the norm for flooding and the tuning duty of water boards and municipalities (Dutch Government, 2009).

A displacements series, which is the establishment of a national ranking order of water deficits, is secured in the Water Resolution. This is part of the Water Act. It includes the allocation of surface water bodies administered by the State and rules about the provision of information concerning water management (Dutch government, 2009). The Water Resolution also arranges procedural and substantive aspects of the national water plan and the management plans of water bodies, and several substantive aspects with regard to the plans linked to the implementation of the EU's Water Framework Directive (WFD) and the Flood Risk Directive, which will both be explained in the section of international formal and informal legislation (par. 4.4.3.) (Dutch government, 2009; Ministry of Water, Transport and Environment, n.d.).

A second important part of the Water Act, the Water Regulation, contains rules and legislation about the organization of water management, multiple maps of the division of management, the boundaries of surface water bodies and the designation of drier shoreline areas, as well as rules concerning data provision based on European

commitments. Besides, the Water Regulation barely includes substantive aspects of the regional water plan and management plans (Dutch government, 2009; Ministry of Water, Transport and Environment, n.d.).

The Water Act acknowledges one water license, meaning that one request is sufficient even though several authorities and governments are involved. There's one authorized supervisor of the licensing and the enforcement after all, causing authorities to make necessary agreements with each other. Those agreements can be secured by means of a cooperation agreement, which is often used in practice (Dutch government, 2009; Ministry of Water, Transport and Environment, n.d.).

It should be noted that the Water Act is in force until the Environmental Act will be revised, because of the complexity of the contemporary law containing different laws and legislation for space, environment, nature and water. Therefore, the Environmental Act has become too complicated. The Dutch government aims to bundle and simplify the Environmental Act. The major difference, for water management institutions, will be that the Water Act is going to be integrated within the Environmental Act (Union of Water Boards, n.d.). Those changes are planned for 2018 (Ministry of Water, Transport and Environment, n.d.).

#### *Others*

The Water Act and the Policy for Safety Regions together form the basis for the Dutch crisis management for river flooding. Several other acts and bye-laws are involved.

The Water Act contains almost all the laws relating to water. However, in the context of crisis management for river flooding the institute of the regional water authority is still regulated in the RWA Act. The Regional Water Authorities Act (RWAA) has a major influence on the structure and duties of the regional water authorities and defines those authorities are bodies of public administration and are, thus, part of the Dutch governmental organization. Therefore, regional water authorities can make decisions that are binding for citizens and draw up regional water authority bye-laws with mandatory and prohibitory provisions, grant or refuse permits and levy taxes. The second element of the RWAA entails the territorial boundaries of regional water authorities. The regional water authority is part of the territorially decentralized administration of The Netherlands, causing them to have particular districts within which they execute their tasks. Those areas are defined by means of geographical or natural aspects, such as drainage areas and catchment basins. The way in which regional water authorities are only responsible for water related issues in a certain area, differs from municipalities in terms of task

restriction (i.e. tasks of municipality are only restricted to certain powers of higher authorities) (Havekes et al, 2015).

The Administrative Agreement on Water (Dutch: Bestuursakkoord Water), which came into force in 2011, further increases the efficiency of water management in The Netherlands. A large number of agreements were recorded in this agreement. This indicates that the intergovernmental cooperation also takes places within the framework of administrative agreements. Besides increasing efficiency, this administrative agreement increases transparency and effectiveness, and reduces the administrative burden and vulnerability.

#### 4.4.2. Belgian formal and informal legislation

Crisis management for river flooding and droughts within Belgium is mainly regulated by the Decree Integrated Water Policy (Dutch: Decreet Integraal Waterbeleid – KRW) which forms the juridical framework for integrated water regulation in Flanders. It also includes the implementation of the EU's Water Framework Directive and the Flood Risk Directive.

##### *Decree Integrated Water Policy*

The Decree Integrated Water Policy, which went into force in 2003, secures the objectives and principles of integrated water policy in which multifunctionality of water systems is highly emphasized (CIW, n.d.a.; Mees et al, 2016). It forms the umbrella framework for the implementation of the Water Framework Directive and the Floods Directive (Mees et al, 2016). Instruments have been handed to improve the quality of integrated water policy, such as the water test, riparian zones, the acquirement of real estate and the mandatory provision of information in flood-sensitive areas. In order to create a clear structure of water management, water systems have been divided into river basins, river basin districts, drainage basins and sub-basins. The decree is a framework which forms a guiding line for policy-making. Implementation resolutions concretize those policies (CIW, n.d.a.).

The most important implementation bye-laws are:

- The *first bye-law* includes the geographical division of water bodies by means of a demarcation of river basins, river basin districts, drainage basins and sub-basins in the province of Flanders. It also contains additional provisions concerning the operation of the consultation structures on multiple levels.
- The *implementation bye-law water test* provides guidelines for the application of local, provincial and regional authorities delivering licenses.
- The *implementation bye-law of financial instruments* give effect to the financial instruments of the decree, such as the expropriation for general use, the right of

pre-sales, a purchase obligation and the obligation for compensation (Commission of Coordination Integrated Water Policy, n.d.a.).

#### *Legislation concerning Belgian risk management*

Internal control and risk management itself are relatively recent phenomena for Belgian authorities resulting in minimal legislation concerning those topics (ICCI, 2015). Civil protection is only established in the Law on Civil Protections of 1963 which aims to assist people and to protect goods at all times in case of calamities, catastrophes and damages (Mertens, 2008). However, the most important legislation concerning crisis management is the Royal Decree of February 2006 which draws a distinction between three different types of plans: multi-disciplinary and intervention plans, mono-disciplinary intervention plans and internal emergency plans. Those plans are further described in the section about the organization of Belgian crisis management (Federal Government of Internal Affairs, 2006; Mertens, 2008). At the federal level, the 2006 Royal Decree on Emergency Planning and the 1992 Insurance Act are the primordial frameworks for the Preparation and the Recovery Arrangement (Mertens, 2008).

Additionally, coastal protection is a regional responsibility in Belgium (De Meyer, personal contact, June 2<sup>nd</sup> 2017; Mertens, 2008). The Flemish authorities defined the minimum safety level of the coastal protection at once in 1000 year, but this primary safety standard is not implemented yet in a law or decree. However, the Coastal Division of the Flemish Region started to work out an integrated Master Plan for Coastal Security in 2007, in which the coastal parts of Flanders should be protected against erosion and flooding on a short and long-term basis (Mertens, 2008).

#### **4.4.3. International formal and informal legislation**

As water problems cross borders of regions, countries and sometimes even continents, international formal and informal legislation has been developed. Especially legislation adopted by the European Union influences Dutch and Belgian local policy-making. The EU encourages cross border cooperation by means of the Interreg I to IV research projects, which were designed to strengthen economic and social cohesion in the European Union by promoting cross border, transnational and interregional cooperation. Besides this project, the Water Framework Directive (WFD) and the Flood Risk Directive (FRD) are the directives affecting local legislation the most. Both EU water directive form the basis for the notion of transboundary collaboration in water management by stimulating the cooperation of different countries and regions (i.e. introducing water-related projects and common policies).

### *EU's Water Framework Directive (WFD)*

The Water Framework Directive (WFD) is a European Union directive containing an institutional framework for the protection of water. Water in this context refers to groundwater, inland surface waters, estuarine waters and coastal waters (European Commission, 2015b). The WFD aims for achieving a good water status for all waters in the EU member states. More specifically, this WFD's objective is achieving a "long-term sustainable water management based on a high level of protection of the aquatic environment" (European Commission, 2015a). The WFD came into force in 2000 and the deadline for implementing the policy was in 2015. Other EU water policies were into force before 2000, such as the Urban Wastewater Directive and the Drinking Water Directive. In relation to these policies, the Water Framework Directive that followed mainly served to integrate the fragmented water policy into a single framework. Key objectives of the WFD besides water protection, are supporting citizen involvement, achieving quality standards and providing water management of river basins. Therefore, a major part of the WFD are the River Basin Management Plans (RBMPs), which is one of the requirements of the Water Framework Directive since it serves as the joint management of Europe's international rivers (European Commission, 2015b). Member states have been required to divide their territory into River Basin Districts, which basically are river management areas. Within these structures the Member States aim to achieve the water management objectives through cross-border cooperation (Grindlaya et al., 2011, p. 244). The Rhine, Meuse and Scheldt all have their own river basin districts, resulting in international consultation commissions in those districts. Neighboring countries therefore collaborate on river basin management plans, such as the cooperation on the Scheldt river basin by the International Scheldt Commission, Flemish-Dutch Scheldt Commission and institutional structures.

### *EU's Flood Risk Directive*

The Flood Risk Directive (FRD), which came into force on the 26<sup>th</sup> of November 2007, focuses on the assessment and management of flood risks. Main objective is to reduce and manage the risks that floods cause to human health, the environment, cultural heritage and economic activity. The FRD now requires EU member states to critically look if all water courses and coast lines are at risk from flooding, followed by mapping the flood extent and assets or human beings at risk in those areas, and to take adequate measures to reduce the risk of flooding. It also reinforces the rights of civil society to have access to all information and to be able to influence the planning process. The deadline for implementing this directive was set for 2015, after which flood risk management plans focused on prevention, protection and preparation should have been developed and implemented (European Commission, 2016).



The Flood Risk Directive is carried out in coordination with the Water Framework Directive (WFD), especially concerning flood risk management plans and River Basin Management Plans (RBMPs). According to both directives (FRD & WFD), all assessments, maps and plans are made easily available to the public (European Commission, 2016). Another key aspect of this FRD is that all EU member states have to coordinate their flood risk management practices in shared river basins, without excluding third countries and undertaking measures that could increase flood risk in riparian countries. During individual policy making of member states long term developments, such as climate change and sustainable land use practices, have to be taken into account (European Commission, 2016; E. Schumacher, personal communication, May 24<sup>th</sup> 2017).

Water safety is a major challenge in The Netherlands and is therefore extensively incorporated into policy and implementation plans. As a result, The Netherlands have chosen for a more inventory and structure-based path than other EU member states, which means that more attention is paid to information that is already available and using existing policy plans that address prevention, protection and preparedness (Van Den Berg & Slager, 2012). The FRD also addresses all layers of the Multilayer Safety Strategy from the Dutch National Water Plan (NWP), especially through the plans focusing on prevention, protection and prevention. There should be noted that the definition of the three safety layers defined in both strategies do not match exactly, but are still quite similar (Van Den Berg & Slager, 2012).

#### *Additional EU directives*

The WFD and FRD are the most relevant directives with regard to crisis management for river flooding and droughts. However, other directives also influence local legislation and policy-making. The Birds Directive (BD) and the Habitat Directive (HD) connect nature conservation areas in principle, but those plans also affect possibilities and difficulties in crisis management for river flooding and droughts since restrictions are set regarding certain measures and areas.

#### *Dutch-Belgian Scheldt treaties*

The Scheldt treaties, four arrangements signed by the Netherlands and Flanders, went into force on December 21<sup>st</sup>, 2005. The treaties are the result of six years of negotiations between provinces, local authorities and other stakeholders of both countries. It involves a political agreement aiming for a joint long-term policy for the Scheldt in which accessibility, safety and naturalness are essential aspects. The treaty concerns arrangements about the implementation and finances of the Scheldt deepening, and the development of nature which is necessary for the next period. It provides opportunities to realize nature measurements by the province of Zeeland. The treaty serves to strengthen the



collaboration between authorities of both countries in the context of the accessibility of the ports in the Scheldt river basin, the nature and the safety against flooding. The other treaties include the formalization of the already existing situation with regard to safety and accessibility of the Scheldt ports, and the disengagement of the pilot fees. By signing the treaties, the Netherlands and Flanders haven taken important steps. The Netherlands endorse the importance of the optimal function of the waterway for Antwerp and Flanders endorses the starting point that the waterway can't be deepened at the expense of the safety and naturalness. Both countries together invest in a sustainable improvement of the catchment of the Scheldt river in which the province of Zeeland is involved (VNSC, 2012). The Scheldt treaties thus form a political and institutional basis for the Dutch-Belgian cooperation on the Scheldt of which water safety is a major aspect.

#### *Dutch-Belgian protocols concerning transboundary cooperation in the Rhine-Meuse-Scheldt Delta*

The Commissioner of the King Zeeland together with the chairman of Safety Region Zeeland (VRZ) have contracted three identical protocols for transboundary cooperation with the governors of West-Flanders, East-Flanders and Antwerp. The protocols form a certain institutional and administrative basis for the cross-border cooperation between Belgium and The Netherlands with regard to crisis situations. These protocols respect the position of the CotK, the governors and the chairman of the VRZ in case of cross-border requests for assistance, information exchange and tuning between the regions. Parties organizing a structural form of collaboration between authorities and emergency services in which attention is being paid to guaranteeing periodical meetings and the actualization of arrangements. In crisis situation, parties involved are able to delegate a liaison to take place in each other's administrative center. The chairman of the VRZ and the CotK accommodate the liaison to the CC-Prov. Specific protocols include the Disaster Protocol of 2003 which aims for multidisciplinary, large-scale assistance in accidents and disasters, and tuning authorities in both sides in the Euregio Scheldemond. The monodisciplinary Fire Department Protocol of 2009 includes the accommodation of fire departments in a foreign municipality and contains assistance of local teams as well as first intervention teams. Since fire departments in Flanders are united in a joint Assistance Zone, this protocol also applies to the Assistance Zones (De Meyer, 2016).

## 4.6 Dutch-Belgian Discourses

Belgium is, historically seen, dependent on the Netherlands in terms of international accessibility, especially concerning the attainability of its main ports and the Scheldt (De Vries et al., 2007). The Dutch way of working and decisions were often seen as untrustworthy and based on economic self-interest by the Flemish. However, the unilateral

dependency was replaced by the reciprocal dependency as new infrastructures, such as highways, were in appearance (De Vries et al., 2007). Transboundary projects are featured by largely separated political-administrative worlds that both work in diverse ways. Communication and bonding between inland parties is easier and more clear than in case of cross-border collaboration (M. Matthijsse, personal contact, May 16<sup>th</sup> 2017). Local and national politics function in national organized political parties and its (in)formal meetings, which offers opportunities in conflict control. International projects do not have such contexts and have therefore less opportunities to weaken tensions and conflicts. Besides these separate political-administrative worlds, the political-administrative cultures are also different (De Vries et al, 2007).

#### 4.6.1. Political-administrative discourses

The context of political and administrative structures within both countries are characterized by many differences. Firstly, the Flemish-Belgian inland context is characterized by a complex formal and informal division of decision-making between federal and regional authorities (M. Matthijsse, personal contact, May 16<sup>th</sup> 2017; E. Schumacher, personal contact, May 24<sup>th</sup> 2017; De Vries et al, 2007). The realization of bigger projects by the Flemish government is, despite of its financial autonomy and relative wealth, hard as a result of its dependency of the federal government and other regions. According to the respondents, the context of Dutch crisis management for river flooding is less complicated since less actors are involved in comparison with Belgium and structures are more clear (M. de Feiter, personal communication, June 14<sup>th</sup> 2017; R. de Meyer, personal communication, June 2<sup>nd</sup> 2017; M. Matthijsse, May 16<sup>th</sup> 2017). However, plans on crisis management for river flooding of several institutions (e.g. province, safety region, water board) are not tuned. The field of crisis management in The Netherlands involves the concept of multidisciplinary and multi-level collaboration which includes many organizations and individuals contributing to the same goal of crisis relief and management (Scholtens, 2008). Organizations in question are not only the traditional emergency services, but also refer to local authorities, security regions, government departments, businesses and international government bodies. The Dutch crisis management is therefore characterized by all kinds of leadership authorities (Scholtens, 2008). Tasks and responsibilities of the actors are not completely clear to all actors involved. Secondly, ministers have a lot of freedom in Belgian decision making. The administration has a limited part in the preparation of decision making resulting in a lack of writing down all information. This habit, on the other hand, goes well with Dutch administrative culture in which nota's form the basis in policy-making. Nota's and plans in Flanders are written down when the actual decision or accordance is made. As a result, policy-making in Flanders is based on consultation before setting up a document, while

The Netherlands first make up drafts and negotiate afterwards. Thirdly, the Flemish politicized administrative context is strongly bonded to making compromises with politicians, who often have direct and personal contact with stakeholders and citizens. Respondents mentioned the Flemish “lunch”, which refers to the Flemish habit of making decisions during extensive lunch breaks, which would be inconceivable in Dutch meetings (M. de Feiter, personal communication, June 14<sup>th</sup> 2017). The Flemish make, therefore, compromises relatively quick compared to The Netherlands. However, respondents stated that Belgian policy making is working slower than Dutch policy making because of its complex consultation structure and the Flemish culture (M. Matthijssse, personal contact, May 16<sup>th</sup> 2017; E. Schumacher, personal contact, May 24<sup>th</sup> 2017). The Dutch decision-making process about bigger projects is highly regulated. Dutch policy makers are more bounded to procedural requirements than their Flemish equivalents (M. Matthijssse, personal contact, May 16<sup>th</sup> 2017; De Vries et al, 2007; M. de Feiter, personal communication, June 14<sup>th</sup> 2017). The Dutch bureaucracy is more bonded to the administrative civil society of social organizations in The Netherlands resulting in an insidiously character of Dutch decision making in which adjustments are being made in multiple consultation structures. Overtaking where and when certain parts were compromised is therefore a challenging task (De Vries et al., 2007).

#### 4.6.2. Cultural discourses

In the context of cultural differences, the Dutch are relatively good in the development of work schedules and the costs of political-administrative tasks. However, it costs multiple meeting and theoretical research to achieve this (De Vries et al, 2007). Concrete results are therefore not always achieved. As a result, Dutch policy makers consider Flemish culture as a situation with a lack of planning and big political opportunism (M. Matthijssse, personal contact, May 16<sup>th</sup> 2017; De Vries et al, 2007). The differences in cultures are mainly based on the relationship between political and administrative tasks in public administration. The Belgian-Flemish administration cultures are strongly politicized, meaning that politics and political parties have dominant positions in bureaucracy, while bureaucracy in The Netherlands has a position more important than politics. The Dutch public administration is thus based on bureaucratic rationality and the Belgian public administration on a strong Flemish government being more involved in political rationality (De Vries et al., 2007). Another cultural difference between those two countries is the straightforwardness of the Dutch, while the Flemish are less uncomplicated. This is possibly a result of historical backgrounds, norms and values of both countries. The Dutch are able to speak to different authority levels within the country, which is unthinkable in the Flemish culture (De Meyer, personal communication, June 2<sup>nd</sup> 2017).

## 4.7. Cooperation effectiveness: problems, challenges, mutual influences and successes

The protection of water cannot be achieved by only the water management institutions. Rivers are affected by many human activities and sectoral institutions. One of the main challenges of policy-making and implementation of directives in water management is a policy gap, which means that a gap exists between the water management planning and the land-use planning (Moss, 2003). In order to achieve an effective transboundary cooperation, it is thus important to close the gap between all relevant actors (i.e. Dutch and Belgian). The successfulness of improved spatial differences is therefore dependent on parallel improvements in institutional interplay. A perfect fit is hardly reachable, and requires use of multiple mechanisms to overcome the key problems. Besides, the RBMPs include water management divided in catchment and drainage basin areas which cross political boundaries and therefore result in new boundary problems (Moss, 2003; Newson, 1997). The problems and challenges encountered in the Dutch-Belgian cooperation on the Rhine-Meuse-Scheldt Delta will be elaborated in this section.

### 4.7.1. Mutual influences

Respondents stated that not many cross-boundary flood areas exist and that possible damages (i.e. societal or environmental) in the upstream-downstream condition are therefore allocated symmetrically (E. Schumacher, personal contact, May 24<sup>th</sup> 2017; M. Matthijssse, personal contact, May 16<sup>th</sup> 2017). As a result of this non-reciprocal relationship, adaptation in one area will most likely not affect another area. A dead lock game, the situation in which one areas experiences benefits at the expense of another part, does therefore not exist. In the existing transboundary collaborative regimes, the concept of mutual influences can be applied. Belgium as well as the Netherlands are able to influence and being influenced by each other.

### 4.7.2. Problems, challenges and successes

The collaboration of the two different administrative cultures in transboundary projects, as mentioned in the previous section, has different consequences. Unfamiliarity with each other's culture might lead to misunderstandings. A Dutch civil servant who is not familiar with consultation and policy-making structures in Belgium might experience difficulties finding the right person to negotiate over specific cases. For example, it might appear that a Dutch civil servant is negotiating with his Belgian component who's less powerful because of the Belgian administrative structure, without the Dutch knowing this. Therefore, getting to know each other by means of joint projects and exercises is important and highly recommended by the respondents. Flanders and Zeeland have a lot of communication on interpersonal level, resulting in a good understanding of each other's

ways of working and structures (M. Matthijsse, personal contact, May 16<sup>th</sup> 2017; E. Schumacher, personal contact, May 24<sup>th</sup> 2017). The ways of working of both cultures do thus not necessarily fit together. The Dutch culture of consultation causes the administrative capacity to be available for deliberation, since there are a lot of policy officers. The Flemish administrations have smaller numbers of civil servants in the function of policy officer resulting in more difficulties concerning intensive consultation (De Vries et al, 2007; M. Matthijsse, personal contact, May 16<sup>th</sup> 2017). Besides, Dutch decision making, in which former decisions can be adapted or revoked, can be understood as unreliable and untrustworthy (De Vries et al, 2007).

Language is considered as another important aspect in cross border cooperation. Although people in The Netherlands and Belgium both speak Dutch, it's still not the same language. Pronunciation and word use can be slightly different in certain situations and might lead to misunderstandings and challenges. All respondents noted this challenge and measures have been undertaken in order to reduce those differences in water management and crisis control (M. Matthijsse, personal contact, May 16<sup>th</sup> 2017; E. Schumacher, personal contact, May 24<sup>th</sup> 2017). For example, maps have been made to show what local water or crisis management pictograms in Belgium are supposed to be in the Netherlands.

#### 4.8. Project developments and implementation

The institutionalization of the Dutch-Belgian collaboration on the Scheldt river basin and thus on the Rhine-Meuse-Scheldt Delta, is one of the most important results of transboundary cooperation in this specific area. The International Scheldt Commission and the Flemish-Dutch Scheldt Commission form a joint basis on crisis management for river flooding across borders. In this context, the VNSC executes multiple projects according to its Agenda for the Future in which a safe, accessible and natural area is pursued. The project of the Flemish Bays and the Dutch Delta program provide solutions to maintain coastal and fluvial safety. The VNSC researches the water safety strategies of both The Netherlands and Flanders to make sure none of the strategies affect the circumstances negatively elsewhere (VNSC, 2014). The joint fire department, which was mentioned earlier, is also an example of the institutionalization of joint crisis management (M. Matthijsse, personal contact, May 16<sup>th</sup> 2017).

Another project, the new lock of Terneuzen, is not a primarily water safety or crisis management related project since it aims for a better accessibility of the ports of Gent and Terneuzen. However, one of the main characteristics of this new lock is the two to three meters height difference with respect to the old lock which will protect against high tides.

The plans are made in 2012 and are prepared by a Flemish-Dutch project team taking into account technical properties, environmental impacts and a better accessibility. The Dutch national waterboard (Rijkswaterstaat) bears responsibility for the construction of the lock and is planned to be finished in 2021 (VNSC, 2014).

The Sigmaplan, a masterplan prepared and implemented by the Flemish government, introduced measures in order to protect inlands against river flooding. Along the Schelde river and its tributaries a chain of controlled flood plain areas, low-lying areas surrounded by a dyke, will be created. Water flows into the flood plain if the water reaches a certain level and will be returned to the river when the level lowered by means of a special construction. One of the polders that will be unpolished is the Hedwige-Prosperpolder, which has a transboundary character. 295 hectares of the total area are located in the Netherlands and the other 170 hectares in Flanders. Dykes in Flanders were realized in 2015 and the Netherlands started to replace their radar tower in 2016. The suspected completion of the construction on Dutch grounds is set in 2019. Since this specific project has a cross-border character, The Netherlands as well as Belgium are involved in the process. Flanders is the main contributor in financial goods and also bears responsibility for the constructions on Dutch grounds by the Waterways and Sea Canal NV in collaboration with the Province of Zeeland. Waterways and Sea Canal, the Agency for Nature and Forests, the Province of Zeeland and the Dutch Ministry of Economic affairs prepare the plans for this project (VNSC, 2014). However, the project of the Hedwige-Prosperpolder is determined in 2005 in the joint Schelde treaty, but is still not completed. Several complications and challenges occurred during the process which decelerated the implementation. Those complications include problems and challenges discussed in the previous section, such as cultural and administrative differences. The Schelde treaty, in which the flooding of the polder is discussed, has been signed in 2005 by representatives of both countries. However, the Netherlands refused to flood that certain area because of social vulnerability and resistance of inhabitants of Zeeland. Elections of national government, municipalities and water boards decelerated the process by new parties making other decisions concerning the floodplains. Flanders did not accept the long period of time it took to decide that the polder had to be flooded anyway and thought that the Dutch are unreliable and untrustworthy. The European Union also got involved since the Netherlands did not adhere to EU legislation concerning the habitats framework. Belgium already flooded their part of the floodplains and had to relocate about twenty farmlands (Sinke, 2014).

The European Union also supports and subsidizes transboundary projects by means of the INTERREG, which resulted in many water-related projects involving multiple

countries. One of themes of those projects was risk management along rivers and coasts, referring to projects as, among others, COMCoast and Flows. The programs aim for the provision of stable social, economic and environmental opportunities through the reduction of flood risk in coastal areas and along rivers. Partners include the Flemish authorities, several Dutch provinces, and German, Danish and English ministries or universities. The projects have been considered as successful since they developed long-term solutions, such as coping systems of future flooding, creating coastal defense systems and gaining public support of multifunctional zones. The project took 4 years and costed almost 6 billion euros (North Sea Region, n.d.; R. de Meyer, personal communication, June 2<sup>nd</sup> 2017).

Other projects executed by joint management are for example projects to raise awareness among civilians concerning flood risk, such as among kids in playcenters and education. Those kids could build dykes and dunes, and observe how it affected water flows. Websites and apps were also developed in order to show what happened to a certain area when water reaches certain levels (M. Matthijsse, personal contact, May 16<sup>th</sup> 2017).

## 5. Conclusions

The previous analysis elaborated the main question and its related sub-questions. Firstly, the similarities and differences of the Dutch and Belgian arrangement will be discussed, and will be followed by a discussion of the level of cooperation between those two riparian countries.

### 5.1. Similarities and differences

#### 5.1.1. Actors

##### *Water management related*

The tasks and responsibilities of the Dutch national government is similar to the Flemish government. Important difference is that the national government of the Netherlands is the highest authority in the Netherlands, while the Flemish government is overarched by the Belgian federal authorities, which does not bear responsibility for water management. Another difference concerns the actual water management, which is executed by the Dutch national water board (Rijkswaterstaat – RWS) in the Netherlands and by four separate public-private actors in Belgium: Waterways and Sea Canal, de Scheepvaart, Agency for Maritime Services and Coast, and Maritime Access. Belgian water management is thus highly dependent on public-private actors, while Dutch water management is mainly regulated by governmental actors. Besides, provinces in the Netherlands have specific roles in water management, whereas provinces in Belgium are barely involved. They manage non-navigable waterways of second and, sometimes, third category, and parts of their tasks are allocated to the Commission of Coordination Integrated Water Policy (CIW). The Belgian basin structures are similar to the Dutch water boards. However, formal communication lines exist between higher authorities of the Netherlands as well as Belgium (fig. 7), but the current Dutch-Belgian consultation structures on water-related topics lack communication lines on the lower administrative level. Water board do not have communication lines with its Flemish equivalent, while it would be useful to have. Although the aspects of learning, cooperation and exchange are important in the context of transboundary cooperation, they are barely applied in the collaboration between Dutch and Belgian institutional and administrative actors. Water boards barely have contact with their Belgian colleagues, because Flemish actors still contact representatives of the province in case of water-related emergency while the role of provinces in crisis management for river flooding is decreased in the past years. This supports the importance of stability, while changes might result in misunderstandings and processes to slow down. It might also contribute to a better understanding of each other's structures and ways of working. Another similarity involves the citizen involvement, which



is in both countries barely existing. Improving awareness among citizens is one of the key challenges crisis as well as water managers currently face.

#### *Crisis management related*

Emergency plans that have been developed by the Flemish government in order to enable a quick and coordinated emergency service during crisis situations can be compared to the Dutch GRIP structures. However, the Belgian emergency plans are divided into three different categories, namely multidisciplinary and intervention plans, monodisciplinary intervention plans and intern emergency plans, whereas the Dutch GRIP is mainly focused on the multidisciplinary aspect of emergency control. Another difference is that the level of Belgian crisis control is determined based on certain criteria, such as geographical area, number of victims, effects on environment and economic effects, while especially the geographical area is the main focus of the Dutch GRIP. This GRIP structure was developed in order to minimize complexities and problems during the process of upscaling. However, responsibilities and tasks of Dutch actors concerning crisis management for river flooding (i.e. safety region, province and water board) are not completely tuned to each other, resulting in other problems to occur during crisis situations. Communication lines are therefore not always as short as possible, which might result in delays. Other differences refer to the intern structures of crisis management. Crisis control in the Netherlands involve the Commissioner of the King, the chairman of Safety Regions, Regional Operational Teams and Command Place Incident. In Flanders, the governor the region, advisors and the operational Command Post. The Commissioner of the King and the governor of a Flemish region can be considered as relatively similar, but their tasks can differ in certain situations. The same applies to the operational Command Post and the Command Place Incident. The Netherlands also have Safety Regions, while Flanders recently introduced Assistance Zones. The tasks of both institutions are mainly the same. However, the Dutch safety regions involve multidisciplinary teams whereas Flanders only involves fire departments. Multidisciplinary teams, such as police forces and public health care teams, are thus limited to crisis situations within Flanders. Incidents are mainly managed by local monodisciplinary teams located in the municipality itself.

#### *European and transboundary actors*

It should be noted that both countries are influenced by the European Union, its legislation and international legislation to the same extent. The Netherlands as well as Belgium are involved in the institutionalization of their transboundary cooperation in the form of International Commissions, such as the International Scheldt Commission and the Flemish-Dutch Scheldt Commission. Learning, cooperation and an exchange of

knowledge are some of their key aspects. The establishment of those commissions might still have led to a smaller degree of fragmentation within this Rhine-Meuse-Scheldt Delta, since they jointly work on policies and river plans. The role of these institutions is mentioned and discussed in several planning documents. However, respondents were not aware of the role and tasks of the two commissions.

#### 5.1.2. Resources

All governments and authorities in Belgium as well as the Netherlands are directly or indirectly chosen by their civilians, which forms the basis for their legal power. In the Netherlands, water related tasks under public law are mainly financed by the national government's general funds or revenues generated by various decentralized taxes. Provinces and municipalities are therefore largely dependent on support from the central government. Flood risk measurements in the water system of arrangement of Belgium are financed by general tax income. The Flemish government funds water management in the form of grants to the Flemish Environmental Agency, Waterways and Sea Canal and the Scheepvaart. Belgian water managers are also allowed to collect other resources, such as public-private partnerships and EU funds. Flood risk management within Belgium is thus highly influenced by public parties, since they provide sets of resources and capacities (i.e. mainly human) for flood governance which is not available by governmental institutions. In the Netherlands, however, local water authorities (i.e. water boards) are not dependent on public parties and institutions, since resources in Dutch water management are transferable between all water boards. Only the Dutch national water authorities (i.e. Rijkswaterstaat) is highly dependent on knowledge provided by public parties. In this context, it might be favorable to have those resources and capacities to be ideally transferable and available to all actors within the border region of the Rhine-Meuse-Scheldt delta. This might also contribute to a non-fragmentation of the border region to strengthen transboundary cooperation. Water boards are also financially independent because of their own broad tax area. Safety regions are also mainly financed by incoming taxes. The Dutch government only provides financial subsidies to strengthen the primary flood defenses.

Communication and information exchange between actors involved in crisis management for river flooding within the Netherlands are relatively easy, resulting in that decision-making processes run fast. This indicates power in terms of knowledge closely related to the power of technological materials, since communication networks are highly dependent on technologies such as LCMS, mapping and simulators. Flemish authorities are currently rolling out a similar system, called ICMS. In case of river flooding or high risks, Dutch risk managers take place in Belgian consultations in order to provide all necessary

information. However, since LCMS and ICMS systems are currently not linked to each other, information is not transferred in an optimum manner in order to be directly available to all individuals and actors involved. Creating a link or function to read each other's systems is therefore recommended and could possibly result in a better cooperative bond. Another significant difference in resources is the human capital involved in crisis management for river flooding. Since the economic crisis in 2008, Belgium experiences a major human deficiency in this sector resulting in increasing times of processing.

#### 5.1.3. Legislation

Requirements stated by the European Union influence new legislation in both the Netherlands and Belgium, which causes the differences to decrease. This way, the European Union offers a certain form of stability which results in an increase in transboundary cooperation, such as by the international commission that have been established as a result of the Water Framework Directive. Dutch crisis management for river flooding and droughts is mainly regulated by the Safety Regions Act, the Water Act and several smaller water-related acts. The Decree Integrated Water Policy and the Royal Decree of February 2008 are the main legislative acts related to Belgium crisis management for river flooding. The Water Act and the Decree Integrated Water Policy are relatively similar in terms of water safety and river flooding. The Safety Regions Act forms the basis for the existence of safety regions and their responsibilities. As a result, the GRIP structures have been established. Parts of the outcomes of the Royal Decree are similar, however, the Decree concerns the three different types of emergency plans and does not mention the establishment of a whole new institution such as the Dutch Safety Regions. Those differences maintain the fragmentation in terms of administrative institutionalization. Closing the gap between those Dutch and Belgian institutional arrangements by exchanging information and knowledge, might result in a better understanding of each other's structures and benefits the transboundary cooperation.

#### 5.1.4. Discourses

Political and administrative structures within both countries are characterized by many differences. The Flemish-Belgian inland context is characterized by a complex formal and informal division of decision-making between federal and regional authorities, while the Dutch context is easier to understand. However, structural changes and reformations of both Dutch and Belgian structures caused transboundary cooperation to be more complicated. For example, the Dutch Act for Safety Regions caused a shift of crisis responsibilities from the province to safety regions. Since safety regions do not have all technical knowledge of water, it also meant a shift of water-related crisis responsibilities to the water boards. However, responsibilities concerning crisis management for river

flooding are not completely clear to all Dutch actors involved, resulting in misunderstandings and projects implemented multiple times by different actors. At the same time, those changes resulted in confusion by Flemish actors who are still contacting the province in case of water-related emergencies, while they don't bear responsibilities anymore causing delays in consultation structures. It is therefore recommended to clarify Dutch as well as Flemish responsibilities, tasks and expectations.

Dutch policy makers are more bounded to procedural requirements than their Flemish equivalents. However, new legislation in The Netherlands and Flanders, and the requirements stated by the European Union, cause the differences to decrease. An important aspect of Belgian policy making is that administration has a limited part in policy-making resulting in a lack of writing down information. This habit forms a dissimilarity with Dutch administrative culture in which nota's form the basis in policy-making. Nota's and plans in Flanders are written down when the actual decision or accordance is made. This Flemish politized administrative context is also strongly bonded to making compromises with politicians, who often have direct and personal contact with stakeholders and citizens, and make compromises relatively quick compared to The Netherlands. The Dutch bureaucracy is more bonded to the administrative civil society of social organizations in the Netherlands resulting in an insidiously character of Dutch decision making in which adjustments are being made in multiple consultation structures. These habits might cause a state of non-transparency towards other Belgian actors as well as Dutch actors, who are not able to influence the decision-making process without knowing what procedures are followed. This lack of information exchange and transparency is not beneficial in terms of increasing cross-boundary cooperation and stresses the fragmentation between Dutch and Belgian actors.

## 5.2. Consequences for effective cooperation: the level of cooperation

This section elaborates the aspect of effective cooperation and its link to the level of cooperation as discussed by Wiering and Verwijmeren (2012). The consequences of the differences and similarities, as mentioned in the previous section, will be elaborated by means of discussing the role of the cooperation.

Respondents mentioned that the transboundary collaboration as it is now, is successful and effective, and should not be expanded since it's not necessary and maybe even undue. However, several points of attention can be identified. The most important discourses, and resulting problems and challenges, in the Dutch-Belgian cooperation on crisis management for river flooding refer to the existing differences in administrative cultures and cultural differences between the two riparian countries. Getting to know each

other is therefore a major aspect in successful cooperation. Flanders and Zeeland have a lot of communication on interpersonal level, resulting in a good understanding of each other's ways of working and structures. It should also be noted that although language is similar, pronunciation and word use can be slightly different in certain situations and might lead to misunderstandings and challenges. The discourses affecting transboundary cooperation can thus lead to problems and challenges in collaborative bonds. However, multiple projects have been succeeded as a result of this cooperation. Since influences from each other's flood risk management are relatively low, joint spatial adaptation is prepared and implemented to a lesser degree.

The situation of segregation, as discussed in the Stages Model of Transboundary Cooperation by Wiering and Verwijmeren (2012), is thus left far behind. The Netherlands and Belgium are not completely working independently and cooperate on the shared water basin. Communication about problems and challenges concerning crisis management for river flooding does exist, which is a precondition for mutual understanding of each other's approaches and a joint problem definition (phase 2). New transboundary institutions have been established in order to work on joint policy making and implementation. However, national, provincial and local institutions still have the final responsibility and policies of both countries are not completely tuned. The phase of joint policymaking is therefore not finished (yet). A transfer of authority, which results in joint policymaking, is also not achieved. The Dutch-Belgian cooperation is thus shifting from having a joint problem definition by joint problem structuring to tuning with each other's policies in order to achieve joint policy making. This implies that transboundary cooperation is complicated without a joint juridical background in which a clear structure is established.

## 6. Limitations

Due to time and word count limitations, a restricted number of interviews have been done and not all information given by the interviewed could be processed. Not all actors, especially the Belgian ones, were able to talk to me within this time period. This might have been relevant in the context of the research and its validity. To enrich the validity, multiple documents have been consulted in order to verify information provided by respondents and the other way around. Additionally, public actors have been the main focus during this research due to this limited amount of time. It would have been interesting and would probably have a contribution to this research to interview and gather knowledge from non-governmental actors such as dike associations or citizens. Their point of view on the actual situations have been out of sight. However, by consulting multiple documents and interviewing several actors, a certain degree of triangulation has been reached. A broad range of data have been collected after execution of literature study, an analysis of relevant documents and conducting interviews. Another limitation concerns the context of the case study itself. The Rhine-Meuse-Scheldt Delta has been chosen because of the direct confluence of the Scheldt after crossing the border and the importance of the other two major river arms. However, it was assumed that the transboundary cooperation influenced and affected the whole region as such, but it appeared that it mostly concerned the Westerschelde, which is a smaller part of the region. Besides, the confluence of the major rivers and its estuaries near the ocean caused the aspect of river flooding to be hard to determine. Difficulties rose while determining whether a flood occurred as a result of tides or other influence from sea, or whether it could be assigned to river flooding, since this kind of brackish water cannot be assigned to solely sea or river.

The theories applied in this research have shown some strong points but also weaknesses during the research period. The Stages Model of Transboundary Management is a theory that can provide an extensive image about the aspects and level of cross-border cooperation. Applying this theory was of added value. However, the theory is broad and it is impossible to elaborate every dimension of it during such a short time period. Concluding the level of cooperation is therefore based on only the first two dimensions and omits the stakeholder satisfaction. Besides, the different levels of cooperation are not completely objective. Respondents did not all assign the same level of cooperation, but identified several aspects of multiple levels. The Policy Arrangement Approach appeared to be a complex theory which aims for covering all important dimensions of policy arrangements. By using this theory, a very detailed and extensive

image was gathered. However, this approach is broad and hard to define its aspects, since indicators are subjected to different interpretations and might change by changing the case study, respondents or the use of language (e.g. other case studies might stress other aspects). This might result in differences in outcomes.

Furthermore, there have also been limitations and restrictions concerning the research processes itself. Firstly, the research started with a narrow view on the subject by focusing on projects. In the beginning of the process, I was aiming for improving the cooperation concerning those projects. However, projects are not the only indication of transboundary cooperation. Secondly, irregularities are easier to indicate than aspects that are relatively similar, resulting in a one-sided view and focus on differences in arrangements, which had to be subtracted later in the process. Thirdly, the line between subjectivity and objectivity in certain cases is thin resulting in struggles to be experienced with regard to this. Especially when information is obtained one-sided from one specific group, i.e. the Dutch actors in this case. Belgian aspects have been verified by documents, literature and Dutch actors, but not by Belgian actors which is an important limitation in this research.

#### 6.1. Recommendations for further research and researchers

In this century of extreme weather events, crisis management is essential. This research has restrictions in time and word count and the full extent of crisis management could not be gathered. One of its focus points was the role of actors involved cross border cooperation on crisis management for river flooding. However, time allowed a restricted number of interviews with those actors. Getting in touch and arranging meetings with Belgian actors has been experienced as difficult, resulting in getting information from only two Belgian actors by mail. Although this verified the information provided by several Dutch actors, interviews with Belgian actors could be of extensive importance. Although it was aimed to provide all relevant information in this research, the full extent could not be delivered due to time and word count limitations. A follow-up research in which more in-depth knowledge regarding the sub-questions could be provided is recommended in order to present a more complete conclusion, which could possibly lead to more explicit recommendations.

Moreover, the case study should be transferred and redone in another region along the Dutch-Belgian border in order to compare the results and be able to develop an overall insight of transboundary cooperation along this border. It would enhance the results and outcomes of this research or supplement them.

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# Appendices

## 1. Interview guide (English version)

### Basic information

- Can you explain what your role within the company and within the collaboration between The Netherlands and Belgium?
- Can you tell me what's your personal motivation to be employed in this particular field?
- How would you estimate the actual situation concerning crisis management for river flooding and droughts between the Netherlands and Belgium to be?

### Problems and challenges

- What challenges or difficulties do you experience in the collaboration with (other) Dutch partners?
- What challenges or difficulties do you experience in the collaboration with Belgian (other) partners?
- What challenge or difficulty negatively affects the transboundary collaboration the most?

### Actors and actor coalitions

- What are the most important actors and what kind of relationships have been developed?
- What challenges have been emerged during the formation of those relationships?
- To what extent are locals and communities involved in the process of policy-making?
- Do you see major differences in participation of actors between NL and BE (BE more national, NL more regional)?

### Resources and funds

- In what way are resources allocated? (financial, social, legal, knowledge etc.)
- Who is the main contributor?
- To what extent do contributions influence the position of actors?
- To what extent differs the use of resources in The Netherlands and Belgium?

### Formal and informal legislation

- To what extent is transboundary cooperation on crisis management for river flooding and droughts in the study area influenced by regional, national and international legislation?



- What differences exist between law-making in the Netherlands and Belgium regarding transboundary cooperation in crisis management for river flooding and droughts?
- To what extent is the cooperation influenced by those differences?

#### Discourses and debates

- To what extent are transboundary collaborations influenced by scientific models and historical backgrounds (i.e. paradigms)?
- To what extent do differences exist between Dutch and Belgian regions concerning scientific paradigms?
- To what extent does this influence the rise of problems between Dutch and Belgian actors?

#### Effective cooperation

- To what extent is new legislation established concerning crisis management for river flooding and droughts as a result of cooperation between Dutch and Belgian provinces and regions? Could you give some examples?
- To what extent are new projects developed which can be influenced by Dutch as well as Belgian actors?
- To what extent do you personally consider the collaboration as successful and effective?

#### Final question

- Are you satisfied by the way in which the transboundary cooperation on crisis management for river flooding and droughts is established right now?

## 2. Interview guide (Dutch version)

### Basis informatie

- Zou u kunnen uitleggen wat uw rol in de grensoverschrijdende samenwerking tussen Nederland en België is?
- Zou u me kunnen vertellen wat uw persoonlijke motivatie is om betrokken te zijn in dit specifieke veld?
- Hoe schat u de actuele situatie in wat betreft grensoverschrijdende samenwerking tussen Nederland en België in crisis management voor rivieroverstromingen en -droogtes?

### Problemen en uitdagingen

- Welke uitdagingen of moeilijkheden ervaart u in de samenwerking met (andere) Nederlandse partners?
- Welke uitdagingen of moeilijkheden ervaart u in de samenwerking met (andere) Belgische partners?
- Welke uitdaging beïnvloedt de samenwerking het meeste (op een negatieve manier)?

### Actoren en coalities

- Wat zijn de meest belangrijke betrokkenen en welke relaties hebben zich hierbij ontwikkeld?
- Welke uitdagingen hebben zich voor gedaan tijdens deze formatie?
- In welke mate zijn de lokale bevolking en gemeenschap betrokken in het beleidsproces?
- Zijn er grote verschillen in participatie van actoren tussen Nederland en België? (BE meer nationaal, NL meer regionaal?)

### Middelen en fondsen

- Op welke manier zijn middelen verdeeld? (financieel, sociaal, legaal, kennis etc.)
- Wie is de grootste bijdrager?
- In welke mate beïnvloeden de bijdragen de positie van actoren?
- In welke mate is er verschil tussen het gebruik van middelen in Nederland en België?

### Formele en informele wetgeving

- In welke mate wordt de grensoverschrijdende samenwerking beïnvloedt door regionale, nationale of internationale wetgeving?
- Welke verschillen in beleidsmaking tussen Nederland en België betreffende crisis management voor rivieroverstromingen en -droogtes bestaan er?

- In hoeverre wordt de samenwerking daadwerkelijk beïnvloedt door deze verschillen?

#### Discoursen en debatten

- In welke mate wordt de Nederlands-Belgische grensoverschrijdende samenwerking beïnvloed door wetenschappelijke paradigma's en historische achtergronden? (i.e. culturele, politieke verschillen)
- In welke mate bestaan er verschillen in wetenschappelijke paradigma's tussen Nederland en België?
- In welke mate zorgt dit voor problemen en uitdagingen tussen Nederlandse en Belgische actoren?

#### Effectieve samenwerking

- In welke mate is er nieuwe wetgeving ontstaan wat betreft crisis management voor rivieroverstromingen en -droogtes naar aanleiding van de Nederlands-Belgische samenwerking? Kunt u hier voorbeelden voor geven?
- In welke mate zorgt de grensoverschrijdende samenwerking voor projecten waar actoren uit beide landen invloed op kunnen uitoefenen?
- In hoeverre beschouwt u persoonlijk de samenwerking als succesvol en effectief?

#### Laatste vraag

- Bent u tevreden met de manier waarop de grensoverschrijdende samenwerking in crisis management voor rivieroverstromingen en -droogtes is gevestigd op dit moment?