Preface

“When people make music together they experience the only form of cooperation that is without competition because only in harmony people can make good music. In all other situations cooperation is a little helpless and thus need to be done carefully.”

J. Marree †

The research that I have done is about cooperation. My grandfather told me when I was little that cooperating is difficult. To teach me how difficult it is we made music together. Despite my great lack of talent, he still managed to teach me how to listen to what he did, to keep the pace with him, and not to hurry. Although it must have hurt his musical ears when we played, we had a lot of fun (I kept the tendency to finish before him). Still I am a very impatient person, which makes cooperating hard for me sometimes. Because when you cooperate you need to listen to the other; listening takes time and really listening is difficult. A trap in cooperating is to assume that your own ideas are better; another trap is to assume that your own ideas are inferior. To enable cooperation I think competition should be reduced to that level where it is possible for everyone who takes part in the cooperation to excel.

This thesis is on cooperation between countries when dealing with water management. Although, I worked on this thesis alone a lot of different ways of cooperating has taken place to come to this result. These were merely one-way cooperation in which I was the one to benefit. Danielle supervised me at ACADIS, but it would do her more just to say that she worked together with me to enhance and structure the final product. My supervisors from the TU Delft were cooperative because they have enriched and sharpened my ideas. The people I have interviewed cooperated by showing me their reality. Henk Surink cooperated by opening doors in Germany, by improving my German and by making me speak this language again. My sister was a very cooperative listener when I did not know what to do anymore and took the time to read my report critically and supportive as always. I want to use this preface to thank you all for this cooperation.

“That stupid money”

G. Stockman †

Another aspect of this thesis is about financing cooperation. To study this is an odd choice for me, I have never been particularly interested in money. Moreover, it has always irritated me that in the end it is always about that stupid money. I think it is not a very illuminating idea that it seems to work like this. On the other hand, when financial means are available many good things can become possible reality, like making it possible to study. This is a priceless gift, which can never be taken away once it is acquired. I want to thank my parents for this gift.

I hope you enjoy reading my research and wish you all the best in any cooperation that you will encounter in your future.

Liesje Loomans, September 2008
Summary

Introduction to the topic
Although River basins do not respect country borders they are managed according to these institutional borders of countries. With the climate changes also the discharges of rivers changes; the summers will bring more droughts and the winter greater extremes. The challenge to manage rivers becomes harder and more important because the economic value of area and the number of people to protect increases. International cooperation is of vital importance in the future to be able to face future climate change (Veerman et. al., 2008). But international cooperation turns out to be difficult. Although the Netherlands is involved in several cooperation platforms with their neighbors, set goals are often hard to realize. Financial contribution can create more solidarity and greater acceptance of measures (Swanenvleugel, 2007).

The aim of this research is to create more insight in cooperation in water management and in the influence of financial contribution in cooperation. International cooperation is a complex issue since, it requires in depth technical understanding of the river basin and the possible measures that can be applied. It requires insight in the political process that deals with mutual dependencies. In addition, it requires insight in the institutional differences of the countries that are cooperating. To reach the aim of this research the model of van der Zaag and Savenije (2002) is used. This model contains the Technical, political and Institutional aspects. These aspects are visualized in a temple with three pillars to underline that these three elements built on cooperation to achieve a safer international river. It is a basic model. Therefore, the second aim of the research is to improve this model to enhance its usability.

Three case studies are performed to meet these two objectives, in which the model is used to structure the case studies. This provided insight in the complex process of cooperation which made it possible to add elements to the pillars and to add new attributes to the model that enhanced its usability.

The cases were performed on the basis of literature studies and 19 international interviews with experts in various fields and levels of organization that are important to water management.
**Cases**

The First case is about cooperation of the Netherlands and Germany. This case has a general character. In this case the model is used to describe the status quo of cooperation for Germany and the Netherlands and is used to analyze possibilities for future cooperation. The second case is a more project based study. The cooperation up to now between Germany and the Netherlands in the compartmentalization study of the international dike rings 42 and 48 is described. This project is a running and is due to finish in 2010. The Third case study is about the Western Scheldt and cooperation between the Netherlands and Belgium in this estuary. In this cooperation process, major international issues where dealt with in the negotiations. These negotiations where characterized with complicated issue linkage (Meijerink, 2008).

**Political Pillar**

The cases showed that in the political process several elements could be distinguished. The first type of elements show that partners who cooperate have different starting points from which they decide to cooperate: Partners can face a common problem, which can better be solved when they cooperate or they can have a complete different motivation. Partners can cooperate both strive to achieve a higher utility or they can have different stakes that they want to realize by cooperating. Last, they can cooperate because they realize that they depend on each other. Sometimes it is just the right circumstance to cooperate. This is called the window of opportunity. These windows of opportunity create a sense of urgency for cooperation by both partners. Cooperating partners have demands prior to contributing to another country. These demands have to do with the guaranties partners want before they consider contribution.

The second type of element has to do with the strategies that politicians use when they are cooperating. These strategies can entail issue linkage creating package deals, or finding compensation structures.

**Technical Pillar**

The technical pillar is important for cooperation because it combines the physical aspects of the river and the possible and feasible measures that are suitable for cooperation with the cooperation between engineers that forms a strong basis for cooperation between two countries. When engineers cooperate they should create a common ‘language’ which makes it possible to understand each others terminology and the calculation methods that are necessary to come up with solutions.

**Institutional Pillar**

The institutions that are important for cooperation should be considered on three levels. These three levels are first the norms and values of a country, second the formal laws and regulations and third the arrangements. The institutions are grouped in water, cooperation and financing. This provides insight in the value system that underlines the formal laws and regulation. In addition, it provides insight in the possible arrangements that should be made between countries to establish guaranties about the future.

**Financial Issues**

Financial contributions in the cooperation influence the cooperation especially on governmental level where the negotiations take place. Cost divisions should be done according to the benefits that a country gains. I agreements perverse incentives should be avoided because it causes inefficient implementation of plans. The degree of influence that comes with financial contributions should be considered in the agreements. To create
solidarity and acceptance of between countries partners should strive cooperate on a combination of measures that enables exchanging upstream and downstream effects.

**Relations**

The relations have two dimensions. The first dimension refers to the relations between the political, technical, and institutional pillars within a country. These relations affect the second dimension. The second dimension refers to the interaction between pillars of the cooperating countries. The interactions between the pillars of countries are only interactions of pillars of the same kind (Political pillar of one country to Political pillar of the other etc.). The Illustration below shows the relations between the pillars.

The norm and value system from the institutional pillar have a great influence on the decision making process and arguments prior to the decision making process. This decision making process and the outcome of the negotiations result in arrangements. Laws and regulation from the institutional pillar are founded in the physical aspects of a river from the technical pillar. But the other way around the law and regulation from the intuitional pillar form constraints for technical measures. These technical measures are again decided on. There is thus a loop of interaction between these pillars influencing the way partners between countries interact. These relations have a different meaning throughout the process of cooperation.

**What to do when cooperating**

Step 1: Determining why to cooperate, what are the stakes in and motivations for cooperation? Does the reasons for cooperation of the partners lay far apart?

Step 2 understand each other organizations and institutions and think of the implications for the differences.

Step 3: Exploring the possibilities of the river and the measures across the border.

Step 4: understand each other language and make agreements on the terminology and methodology that will be used in the process of cooperation

Step 5: Making choices on the basis of fairness and try to exchange as much as possible effects in terms of safety. So that the acceptance and solidarity are easier to achieve.

Step 6: Designing institutions that warrant long term agreements and avoid perverse incentives. So that the implementation goes smooth and efficient.

Step 7: Continue cooperating so that the relations are kept and knowledge is not spilled.
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CHAPTER 1

1.1 CONTEXT OF THE RESEARCH

This research is conducted in order to complete the master Engineering and Policy Analysis (EPA). This master focuses on the policy process regarding complex and large scale technical systems for different sectors including water management. When technical systems are analyzed, EPA includes the social and political implications of these technical systems.

This research is performed with support of ARCADIS by the division water in the consultancy group strategy and decision-making. ARCADIS is an engineering and consultancy company that focuses on realistic solutions for complex problems. This research is in line with activities of the consultancy group strategy and decision-making.

1.2 INTRODUCTION TO THE TOPIC

In the last decennia people are becoming more aware of the fact that the climate is changing and they also become more aware of the risks that this can bring being confronted with more extreme circumstances and natural disasters. As a result people are also more aware of the effect climate change has on the rivers. The hydrologic response to climate change in rivers is still very uncertain. It is expected that due to the climate change more extreme events of abundance or scarcity may occur more often (Krahe et al, 2005).

The effect of climate change becomes larger due socio- and agro-economic developments, such as the intensified tillage based cultivation, population growth, and industrial expansion. Next to these changes, the behavior of rivers has become less predictable because men have intensively modified rivers during the history (Pinters, 2006).

“Extensive research has been done on hydrological impacts in the Rhine basin of climate change (Lammersen et al., 2002; Bronstert, 2003; Buishand and Lenderink, 2004; Pfister et al., 2004; Bogaard et al., 2005), socio-economic developments (Tol et al., 2003; Vis et al., 2003) and flood risk management (Middelkoop et al., 2004, 2001; Van Asselt et al., 2001; Van Stokkom and Smits, 2002). A less investigated research area is analyses of development and implementation of flood protection strategies across country borders (Mostert, 2003; De Moel and Aerts, 2006)” (Becker et al., 2007). Flood protection strategies across country borders will be necessary because the floods are basin wide phenomena that do not respect borders, whether national, regional or institutional (Swanenvleugel et al., 2007; Moellenkamp 2007).

In international river basins, such as the Rhine and the Meuse there are upstream downstream relations and interdependencies related to the morphology of the river. In basins there are strong relations between the surface water and the groundwater and
between the quality of water and the quantity. These interrelations make the basin a coherent system. Managing the river as a coherent system is done in River basin management “Fundamental to River Basin Management (RBM) is the river basin itself” (Mostert et al., 1999). RBM takes into account the river system as part of the broader natural environment and in the relation to the socio-economic environment (Mostert et al., 1999). The socio-economic environment is important because rivers have different users with sometimes-conflicting interests like local communities with households, industry, agriculture, fishing, water supply, environment, and recreation (Mutayoba, 2002). This need to analyze and manage international river basin as a coherent system can only be fulfilled when country borders are crossed and cooperation takes place.

There are several theories about dealing with international river basin management in an integrated fashion. Van der Zaag and Savenije (2000) have developed a model that deals with the technical aspects of RBM but also takes the institutional aspects into account and acknowledge the importance of political issues in RBM. This model will be used throughout this research. The model and its context will be explained in more detail in Chapter 2.

The European Union adopted new directives, which acknowledge the potential for cooperation and the responsibility countries have towards each other in managing rivers. The water framework directive (2006/60/EC) gives new impulses to the river basin approach and to international cooperation in European catchments (Moellenkamp, 2007). The elements of flood risk management are arranged in the Flood Directive (2007/60/EC). The Flood Directive is an addition to the river basin approach as is arranged in the Water Framework Directive. The Flood Directive and the Water Framework Directive, both should use the mutual potential; for common synergies and benefits (DIRECTIVE 2007/60/EC, 2007).

1.3 MOTIVATION

There are several motivations for this report most important are: the new synergies of the flood directive, the increase of threats due to climate change, the different reaction of the neighboring countries on climate change, the fact that common targets are difficult to reach at the moment and that there is little experience in cooperation in realizing flood prevention projects. These motivations will be explained in the next paragraph.

Climate change

Two main factors can be distinguished in having impact on the river discharges namely; climate change and interference by men in the river (like canalization in the Ober Rhine). Recently the Delta committee has reported on the challenges the Netherlands will face with respect to climate change. The Delta commission predicts increase in discharges in the winter and a decrease of discharges in the summer. Recent research by North Rhine-Westphalia, the Province of Gelderland and Rijkswaterstaat estimated a normative discharge of 16,000 m³/s with an extreme discharge of approximately 16,600 m³/s (Grensoverschijnde effecten Hoogwater werkgroep). The normative discharges that will enter the Netherlands at Lobith have a probability of occurrence once in 1250 years. This estimation resulted on an adaptation of the normative discharge of 2001 which was then set at 15,000 m³/s (wet op waterkeringen). The Delta commission confirms the findings of the research done by Province of Gelderland and North Rhine-Westphalia for the period until 2050. For the period until 2100 the Delta commission considers discharges of 18,000 m³/s as the maximum extremes (Veerman et al., 2008).
Is an increase in cross borders effects to be expected between Germany and the Netherlands caused by new measures in Germany? To answer this question the safety levels of Germany and the Netherlands should be compared. At the moment there is no expectation that the Netherlands will become less safe due to actions in Germany: The safety level of North Rhine-Westphalia is 1/500 and more upstream even lower (up to 1/100). This means that the protection of the German area bordering the Netherlands is built for extreme water levels that comes to pass once in 500 years. The protection level in the Netherlands is created to hold with extreme water levels with a probability to take place once in 1250 years (these floods are hence more extreme). Therefore, the normative water discharge will not likely exceed at the German due to different policies border since the dikes will already be overtopped there (report; Ruimte voor de rivier takken). There thus will be an exceed in discharges but these are caused by climate change not by new policies of Germany.

Source: report Delta committee (2008)

However, climate change is not taken into account yet in German flood prevention policies, which makes the question posed still relevant (Lourens (2008), Lammersen (2008), Surink, (2008)). The Delta commission states that it is unlikely that actions on Germany will take measures that will create even higher discharges because of technical limitations (Veerman et al., 2008). On top of that, the Flood directive requires coordination among countries when plans create significant increase of risks:

**Synergies of Directives**

On European level, the Flood Directive deliberately states that when measures have a significant increase upstream or downstream flood risk, coordination between countries
needs to take place. These measures can only be implemented when an agreed solution has been found among the concerned Member States (DIRECTIVE 2007/60/EC, 2007). This gives new incentives to cooperate when increases in cross border effects appear when new flood prevention plans are developed. This may create the need for (financial) cross border contributions.

Coordination and cooperation is thus essential in the future (Veerman et al., 2008), however cooperation has not always been successful in reaching agreed goals:

**Not achieved goals**

In the international commission for the protection of the Rhine (ICPR) at the twelfth minister conference, the Member States 1998 agreed on the Action plan High waters. One of the goals of this plan was to take measures that lowered the water heights with 70 cm at moments of extreme water levels. Where this reduction should be achieved is not expressed very clear in this plan. However the research of the Werk groep Hoogwater/Hochwasser Gruppe permits the conclusion that the position should be Lobith based on the impact appraisal of retention areas in 1999 (ICPR). Until now, this goal has not been achieved. Measures that are planned by the Netherlands and NRW lower only the water height with 25 cm at the border and 30 cm at Bislich/ Lohrwardt. This means that Germany and the Netherlands are not climate proof yet.

In the future plans to make Germany safer may have effect on the safety level in the Netherlands. Then it is important to know how coordination, as is intended in the FD, will come about and how cooperation can create benefits for both countries so that goals can be achieved.

**Cooperation**

Now Germany and the Netherlands cooperate already in many different platforms. For example, the two coordinate policies and develop safety targets in the ICPR. There is data exchange of the hydrological aspects of the joint research projects such as IRMA –sponge and in the High water workgroup and the partners develop joint disaster programs and exercise together to test them in FLIWAS. The partners share knowledge in river management experiences in projects such as Freude am Fluss. But there are no actual flood prevention projects executed on a joint basis. There is thus little experience with a joint approach and therefore little knowledge on the mechanisms that play a role when the Netherlands is cooperating with her neighbors when they are performing actual flood prevention projects.

The Flood Awareness and Prevention Policy (Swanenvleugel B, 2007) is an EU funded network which enables responsible local and regional actors to form partnership. It is suggested in FLAPP (Swanenvleugel B, 2007) that when cross border effects occur, co-financing can have a positive effect on the cooperation. A detailed consideration of the financial consequences can create solidarity and commitment. But cross - border financing mechanisms and compensation measures still need to be considered by the EU (Becker et al., 2007). Not only financial cooperation can help also compensation can make the cross border effects of flood prevention plans more accepted. At this stage there are too few incentives in the current financing regime of flood prevention (Hooier A. et al, 2002).

This research will study how financial contribution in water projects might support the cooperation between the Netherlands and her adjacent countries.
1.4 THESIS OBJECTIVE

Considering the previous, it is concluded that cooperation in international rivers is an complex issue; there are technical issues to deal with, with respect to the upstream and downstream effects of measures in international river basins. This becomes even more important due to the challenges that are to be faced with respect to climate change. Along with the technical issues, institutions are important. There are differences in the institutions of countries; remember the different safety levels of Germany and the Netherlands. In addition, new institutions are developed to support the cooperation and coordination among countries; remember the cooperation platforms such as ICPR and the European Directives. Next to the technical and institutional aspects there are political challenges to be faced since in river basins there are dependencies and contradicting interests; this has to do with the same upstream and downstream effects and with issues like solidarity among the riparian countries.

The objective of this research is to contribute in requiring insight in cooperation, which is so important given the present circumstances of climate change, taking into account that political, technical, and institutional aspects are important. By understanding these aspects of cooperation better, the process of cooperation becomes clearer, which can contribute in making it easier to reach objectives.

Next to that, it is mentioned that financial contribution can create more solidarity and greater acceptance of measures. Therefore, the additional objective is to contribute in the insight on how this is perceived by involved actors and how financial contribution can create more solidarity and acceptance and thus influence the cooperation.

The first research question is therefore as follows:

What Political, Technical and Institutional conditions are necessary in cooperation between the Netherlands and her adjacent countries in cross border water management to overcome the challenges international river basin management, how does financial contribution influence this process of cooperation?

The second element of the research is a more theoretical one. As mentioned the model of van der Zaag and Savenije is used throughout the research. This model is very general initially (as you can see in Chapter 2); it contains three elements that should be warranted in the cooperation process being politics, technique, and institutions. These elements can be interpret and filled in, in various ways and on top of that, the elements are unrelated in the way the model is presented in the initial form. This makes it hard to make the model operational so that it can be used as a tool in cooperation. Because of the general character and the lack of operational possibilities, the question arises, how the model can be better equipped with facets that are more tangible and workable. Therefore the second research question is as follows:

How can the model of van der Zaag and Savenije (2002) be equipped in such a way that it provides better insight in cooperation and the financial aspects of cooperation and how to equip the model to enhance the usability?

1.5 METHODOLOGY

In order to meet the objectives of the research and answer the research question a methodology is set up. This methodology contains several steps that are presented in
illustration 1.1. From the problem exploration a conceptual model follows, that contains the political, technical and institutional aspects of cooperation. It is determined if the model can be used to describe cooperation This is done by studying three cases.

These three cases, developed by literature studies and 20 international interviews, results in adaptation of the existing model. The research concludes with conclusions and recommendations.

The problem exploration is on the basis of literature studies on water management and cooperation. Additional to this desk research 20 experts in the field of German, Belgian and Dutch nationality are interviewed in order to get more detailed insight on the experiences in the working field. For this purpose a balance of experts are selected who have been involved in different levels of government and involved in international policy making in the water field. The interviews address what the current status of international cooperation is, why cooperation is necessary, what problems are encountered and what challenges are to be faced in the future. An overview of the interviewed people is given in Annex 1. This overview also makes clear why these people were relevant interview for this research.

A conceptual model is used that contains the main ingredients for cooperation. This model is an existing model that was developed by the professors van der Zaag and Savenije in 2000. This model will be adapted on the basis of the outcome of the case studies.

**Cases**

The case studies are performed to study cooperation in water managements. The model of Savenije and van der Zaag (2002) is used to describe the cooperation and the financial aspects of cooperation in a structured way. The model itself is revised to make it more complete. This results in general insights about cooperation and a model that is more equipped to use as a tool for describing cooperation and its financial aspects.

The case studies are thus two folded:
- It gives insight in the reality of the cooperation and its financial aspects next to that
- It provides new insights about the model that will be used. The latter insights about the model will contain insights about the limits of the model and how to address these limits.

The three cases studied where selected based on geography and the level of international involvement from the Netherlands. Overall by doing these case studies it will become more
apparent to what extent and how institutions, politics and technical aspect influence cross border cooperation

Case 1: Cooperation in Flood management
The first case is about cooperation of the Netherlands and Germany. This case has a general character. In this case the model is used to describe the status quo of cooperation for Germany and the Netherlands and is used to analyze possibilities for future cooperation.
The scope of this case is cooperation between Germany and the Netherlands on flood prevention in the border region. The borders of North Rhine-Westphalia and Gelderland bound this region. The main focus will be the river Rhine. The influences of the national governments are within the scope of this case.
This case study will be carried out by interviews and literature studies. Experts who are interviewed for this case study are civil servants who have had long-term experience with cooperation in the water field with Germany. Because a general overview is given, civil servants from the different layers of the government who deal with water policy and with financing water policies in an international context have been interviewed.
From studying cooperation ‘in general’, using the structure of the model, it is studied what elements are needed in the model to equip it in order to enhance the level of insight the model provides and to make the model more concrete.

Case 2: International dike rings 48 and 42
The second case is a more project based study. The cooperation up to now between Germany and the Netherlands in the compartmentalization study of dike ring 48 is described. This project is a running project which has not yet been finalized and is about to finish in 2010. The model will be used to get insight in the processes, in which the phases of the process of cooperation are studied that can lead to completion of the project.
The scope of this case is the cooperation that takes place in the risk analysis for the transboundary dike ring 48.
Since the study has not been completed yet, not all findings are published; this case study relies therefore more on interviews. The people interviewed play a leading role in the cooperation and can provide general oversight in the cooperation. Additionally project leaders are interviewed who are directly involved in the cooperation to get a better idea on the practices.
From studying project based cooperation using the structure of the model it is studied what elements are needed in the model to equip it in order to enhance the level of insight the model provides and to make the model more concrete.

Case 3: Western Scheldt Negotiations
The third case is about cooperation between Belgium and the Netherlands, which is at a completed stage. The model is used to describe the process in order to judge whether the model fits reality and makes clear what aspects need to be added. Since this case was dominated by negotiations, it will become apparent what is needed in the model to describe the financial aspects of cooperation. The scope of this case study is bounded by the negotiating topics. For this case study literature studies will be carried out and interviews will be held. Two interviewed experts were leading the delegations of their country and one was an important representative of the delegation.
From studying the negotiation aspects of cooperation using the structure of the model it is studied what elements are needed in the model to equip it in order to enhance the level of insight the model provides and to make the model more concrete.
Adapted model
Based on the case studies the existing model of van der Zaag and Savenije is analyzed and adapted in order to better fit reality and match the financial aspects of it. Per case it is considered if and how the model needs adaptation. The end result of this adaptation is an improved model for international river basin management.

Conclusions
The adapted model helps formulate the conclusions and recommendations for future cooperation and the role of financial contribution.

1.6 THESIS SCOPE

The focus of this research is international cooperation in flood prevention policies and pays special attention to the financial aspects.

This research is limited to the cooperation that the Netherlands has with her adjacent countries.

This case study of Belgium and the Netherlands is not about flood prevention and therefore maybe classified as outside the scope of the research, however this case is chosen because of the mutual dependencies of the two countries and there were negotiations to analyze. These two aspects have turned out to be important for cooperation. Therefore it is valuable to study it after all.

Germany and the Netherlands is chosen as an example for cooperation in river basin management. The reason for this is that these countries already have developed a strong basis for cooperation although joint projects have not been completed yet. There has been a transaction from the Netherlands in a German project for retention in Bislicher Insel. This transaction was related to a speech of the Crown Prince of the Netherland s. The financial contribution was not part of a predetermined policy merely an act to prevent an awkward situation for the Netherlands. Therefore financial cooperation between Germany and the Netherlands can not be evaluated.

1.7 ORGANIZATION OF THE REPORT

The report will be organized as follows:

Chapter 1: Introduction and problem analysis
Chapter 2: Model
Chapter 3, Chapter 4, Chapter 5: cases
Chapter 6 adaptations to the model
Chapter 7: conclusions and recommendations.

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This insight came when I was doing inquiries about the Bislicher Insel case. Persons who gave me this insight information requested not to be quoted in this research. I chose to use this example anyway because it makes clear that until now it has not been the policy of the Netherlands to contribute financially in projects in Germany.
CHAPTER 2 Theoretical framework

2.1 INTRODUCTION

This chapter forms the basis for the theoretical framework of this thesis, it is shown what the main concerns are in international river basins and in integrated river management. In this chapter the model of van der Zaag and Savenije is introduced that describes the important ingredients of cooperation in international river basins. This model is used as a basis for the rest of this thesis.

International river basins

“The foundation for the sharing of international rivers is the realization that the management of water resources should be done in a fully integrated fashion” (Savenije and van der Zaag, 2000). In river basins, that cross border integrated water management also crosses borders. When cooperation is done in an integrated fashion, Durth (1996) argues that the cooperation will be more efficient. Because (a) compensation of upstream countries, which is needed to motivate the latter to cooperate, is easier: (b) Integrated settings enable riparian countries to make more credible commitments to one another because they interact in a larger number of policy areas: (c) Information is likely to be more complete and evenly distributed: (d) Notions of equity or justice are more likely to be congruent: (e) Unequal bargaining leverage is mitigated by transboundary institutions, which also provide for more clearly defined, transferable property rights and lower transaction costs: (f) Opportunities for non-governmental (including private) players to influence outcomes are greater.

The question is then how to establish cooperation in an integrated fashion and what is meant then by “integrated”? In this chapter theories will be discussed on international cooperation in an integrated fashion and a conceptual model will be chosen which is used as the basis for the research of this thesis.

Bernauer (2001) provides conditions on how cooperation could be successful which can be considered as rules of thumb. He states that national governments should be mobilized because national governments are organized and therefore able to negotiate with key players abroad. Also political symbols and prestige effect encourages cooperation. In international cooperation fairness is key to the relationship between riparian countries (Durth, 1996; Marty, 2001; Wolff, 1997). In order to prevent breakdowns in the implementation process it is important to involve principle stakeholders. This may delay the agreement but gains can be made in the innovativeness of the solutions and more avenues for transnational activities can be opened. Because insights and interests will change over time, flexibility in management will be necessary. With respect to the management in an
integrated matter linkages with politics provides opportunities for creative solutions in agreements. This strategy is functional when dealing in an international context.

These conditions will improve cooperation and will be considered in this thesis, but these conditions alone do not provide ‘design tools’ for cooperation in an integrated fashion.

2.2 INTEGRATED WATER MANAGEMENT

To know what is integrated river basin management is, the theories about integrated water management and theories about river basin management need to be studied. According to Mitchell (1990) integrated water management can be looked at in at least three different ways.

First, integrated water management is restricted to encompass various dimensions of water, such as surface water and groundwater, and water quantity and quality. In this level water is an ecological system consisting of a number of interdependent components, which need to be managed with regard to their interrelationships.

Second, integrated water management can mean that, while water is one system, it is at the same time a component which interacts with other systems. With this view, you recognize the interaction with water, land and the environment. When changes are made in one system, it will affect other systems.

Third, integrated water management refers to the interrelationships between water and social and economic development. Water can be an opportunity and a barrier for the economic development.

River basin management emphasis the relations the aspects of integrated water resource management and its geographical and often international dimensions (Mostert et. al., 1999). This research focuses on the fact that river basins cross country borders and therefore acknowledge the fact that when possible and needed river managers should look across their own institutional boundaries. Taking into account that rivers belong to a socio-economic system.

2.3 CHALLENGES IN INTEGRATED RIVER BASIN MANAGEMENT

Since there are different interests according to Mitchells view (surface water versus groundwater and quantity and quality of water, the interaction with the environment and the interrelationship with the social economic system) there are also different actors involved. As White wrote (1996) water has multiple purposes and multiple means. Accordingly different perspectives will need to be taken into consideration. These different perspectives can have different grounds. Grigg (2003) makes a distinction between three grounds for different perspectives: The geographic situation of the actors who can be situated upstream or downstream influences their viewpoint. People with different interdisciplinary backgrounds can have different focus; engineering knowledge has more focus on physical infrastructure systems, whereas sociology or psychology focuses on human impacts. Last the challenge to integrate the perspectives of different levels of governments and interest groups. Different levels of governments have different scales of management to coordinate (local versus national interests). Additionally a different focus of various interest groups striving in favor of their interest.

Next to the different perspectives, there is also the complexity of the system with the above mentioned interrelations to manage.
2.4 CHALLENGES IN INTERNATIONAL COOPERATION

In addition there are also challenges to face when integrated water management is applied in an international context. Where rivers do not respect village, province, district or nation borders, management of rivers are designed to do respect these institutional borders. Plans and practice are sometimes difficult to coordinate between these institutional borders. Because countries are sovereign but at the same time measures can have transboundary effects. Principles like the user or the polluter pays need to be considered while taking into account that the equity and fairness can be interpreted differently by the countries.

2.5 CONCEPTUAL MODEL

The model of van der Zaag and Savenije is designed to overcome both previous mentioned challenges. Their conceptual model (illustration 2.2) forms a basis to share water resources in an international river basin. The foundation is integrated water recourse management (IWRM). Upon the foundation three pillars support the roof of sharing international water resources. The middle pillar is for the operational management to create actual measures that are necessary to come to a safer river basin. The side pillars create the necessary environment for operational management (Mostert et al., 1999). The left pillar is politics which creates the willingness to cooperate and enables putting means to reach the ends. The right institutional pillar provides the rules of the game that enable the formal and informal cooperation. These three pillars create a balance for shared river basin management in an integrated fashion.

Illustration 2.2: Original conceptual framework

![Image of a conceptual framework with three pillars labeled Politics, Technical Cooperation, and Institutions, and a foundation labeled Integrated Water Resources Management]

Fig. 1. The classical temple of sharing international water resources.

Studying the three pillars in international cooperation allows us to examine how agreements are reached and whether financial contribution plays a role in overcoming the challenges that are faced when an international river basin is shared.

This model will be used to structure the case studies in the following chapters.
2.6 STRUCTURE OF THE MODEL

The model of Savenije and van der Zaag will be structured with use of the multi actor system design of Groenenwegen and Koppenjan (2005). This process design makes use of comparable elements as are used in the temple being technological design, institutional design and process design.

**Technical pillar**

Elements in the technical pillar will have to demarcate of the technical problem to solve and give insight in the technological choices to be made (Koppenjan, Groenewegen, 2005). The physical aspects of the river and the effects of the measures will also be in this pillar. Measures can have effect for example on the environment or on the safety levels, depending on the kind of measures that are taken.

**Institutional Pillar**

The institutional pillar will make use of the definition of Groenewegen (2005: Institutions are the rules of the game that are necessary to make the technical system function (Koppenjan, Groenewegen, 2005). Institutions have different levels of formality, being:

- Informal institutes like values, norms and attitudes that are culturally dependant
- Formal institutes like laws, regulations, treaties, or directives. These can be international, national, or local.
- Institutional arrangements that regulate the position and relations between parties (Koppenjan and Groenewegen, 2005) this can be the way an organization is structured or contracts that constitutes the commitment.

**Political Pillar**

In the political pillar elements of process design will be used. Therefore, special attention is given to the actors who participate. As mentioned before the perceptions of actors differ due to their geographical position, their interdisciplinary backgrounds, and their interests. However, in the view of this thesis process and politics are related they are not the same. In the political pillar different interests, opinions and power differences play a role.

The question with respect to the model of van der Zaag and Savenije is whether the model describes the process of cooperation and the relations between the ingredients.
The first case is about cooperation of the Netherlands and Germany. This case has a general character. The scope of this case is cooperation between Germany and the Netherlands on flood prevention in the border region. The borders of North Rhine-Westphalia and Gelderland bound this region in which the focus is on the river Rhine. Regional governmental stakeholders are studied as well as the influences of the national governments.

The model of van der Zaag and Savenije is used to structure this case study which provides insights in the status quo of the cooperation and makes it possible to explore possibilities for future cooperation. The three pillars of the model are made operational throughout this chapter, meaning that the three pillars are equipped with elements that play an important role in this case.

The choices about these elements are made on the basis of the interviews. First the institutional aspects that play a role in cooperation are described following the framework used in chapter 2. Then the political issues will be discussed to see whether the political situation is in favor of cooperation between the two countries. The technical issues will be discussed last, in order to see what projects are suitable for potential cooperation.

Throughout this chapter, comments are made about the conditions for cooperation and for contribution in the cooperation. These are shown in boxes. The chapter concludes with the meaning of these conditions for the cooperation and how the findings about the pillars can be implemented to equip the model and make it more operational.

3.1 INSTITUTIONAL PILLAR

To look into the institutional aspects of the cooperation of Germany and the Netherlands in flood management this paragraph is structured using table 3.1. This table contains the three levels of formality in institutions as defined by Groenewegen (2005). These institutions are combined with the three central themes of this thesis being water, cooperation and financing.
### Intermezzo: Organization of water management in Germany and the Netherlands

To understand water management in both countries a short description is given of the formal organization. In Annex 4 a more detailed description can be found.

Germany is organized as a federal government with quite autonomous states (Ländern). Water management issues are delegated to the states therefore only the federal government can provide legal frameworks that are applicable for the whole country. In North Rhine-Westphalia it is the Ministry of environmental protection, agriculture and consumer protection (“Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz” (UNLV)) who is responsible for flood prevention they have the legal authority as well as the control over the finance in water management. UNLV gets technical support of the State environmental office (Landes Umwelt Ambt (LUA)). One state is divided up in several Bezirken. They have control over the Deichverbande, the Wasserverbande and the Kreise. The Deichverbande have the task to maintain the dikes.

In the Netherlands water management is done on several levels. The ministry of V&W has the overall political responsibility of the safety in the Netherlands when it comes to

<table>
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<tr>
<th>Table 3.1 institutional pillar</th>
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<tr>
<td><strong>Values and norms</strong></td>
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<td><strong>Regulation and laws</strong></td>
</tr>
<tr>
<td><strong>Arrangements</strong></td>
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<table>
<thead>
<tr>
<th>Water</th>
<th>Cooperation</th>
<th>Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority given to water management compared to other policies with safety, ecology, climate change. Determined by physical or cultural aspects.</td>
<td>Cultural differences</td>
<td>The priority water management has compared to other policies.</td>
</tr>
<tr>
<td>National water policies, European water policies, Policies that are related to water management.</td>
<td>National policies, European policies.</td>
<td>Available Budget, Budgetary regulation, Assessment of budget.</td>
</tr>
<tr>
<td>Responsibilities of different organizations and individual actors.</td>
<td>Responsibilities of different organizations and individual actors.</td>
<td>Responsibilities of different organizations and individual actors.</td>
</tr>
</tbody>
</table>

**Federal government**
- Provide Budget
- Ministry UNLV: Politically responsible for the safety and finance of the projects.
- Technical service
  - Landes Umweltamt (LU)
  - Request for budget
  - Pay tax

**Bezirks regierungen**
- Control + divide budget

**Kreis und Kreisfreie Städte**
- Division of budget

**Deichverbande**
- Division of budget

**Untere Wasser Behörde**
- Division of budget

**Oberste Wasser Behörde**
- Division of budget

**Obere Wasser Behörde**
- Division of budget

**Wasserverbande & Wasser- und Boden- Verbande**
- Division of budget

**Civils**
floods. RWS is the executive branch of the ministry. The waterdienst supports the ministry and RWS with technical input. The Netherlands is divided in several (Waterschappen) waterboards. The waterboards are responsible for the maintenance of the main water works in their waterboard. The waterschappen are controlled by the provinces. The waterboards get budget to perform the tasks by the ministry of V&W and by collecting tax of the civilians.

Annex 4 elaborates more on the responsibilities of the two countries.

3.1.1 WATER INSTITUTIONS

In this paragraph, all the institutions that are categorized as water will be described. This category discusses the aspects that have direct influence on water policies for flood management of the Rhine.

Values and norms water policy

The values and norms in this paragraph are the underlying drivers for policies since; they are strongly related to the strategies that are set out by the governments. First will be described how these have evolved in time and then they will be compared.

Germany

In Germany in the period after 1950, the federal government was only empowered by a legal framework that the states could interpret and enact. This resulted in decentralized water management. Priority at the time was economical development, therefore rivers were to be controlled, and dikes completed (G. Becker, 2007). In the period after 1970, disadvantages of human intervention in rivers became obvious and ecological values and biodiversity became more important. In the period between 1990 and 2006 water management included more social ecological effects in the prevention plans. Next to that after the floods of 1993 and 1995 they emphasized the importance of reducing damage by building restrictions, warning systems, public awareness programs, and insurances (Environmental minister conference, 1999). This made citizens more responsible for their own safety. The additional effects of the floods were that coordination between the States was established (G. Becker, 20007). Climate change and long-term impacts are up to this moment not included in the policies.

The Netherlands

In the Netherlands water management, has a long history of fighting against water. In the period after the disaster of 1953, the main priority was ‘keeping the feet dry’. The Delta
committee made the Delta plan that enforced the technocratic, top down approach of having control over the water and preventing flooding. This policy in the period 1970-1985 became more democratic and environmental values gained more importance. Rijkswaterstaat detached itself from the technocratic safety philosophy and had to accept societal and ecological values (Disco, 2002; Meijerink, 200). Later in the period of 1985 -1995, cost efficiency and sustainability became important factors in water management (Saeijs, 2006). After the Rhine floods of 1993 and 1995 again a technocratic approach was chosen by higher and strengthen the dikes however, new policies where added such as room for the river. These measures have a more long term perspective and effect the water levels. Additional parameters where included like the impact of climate change and transboundary effects. (G. Becker et al, 2007). The room for the river policy came to stand with a strong influence of public participation.

The previous mentioned development in changing perspectives and emphasis in flood management comes about in different safety levels as is shown in the following table 3.1.

<table>
<thead>
<tr>
<th>1950</th>
<th>1970</th>
<th>1990</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany (NRWF)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy emphasis</td>
<td>Economical development</td>
<td>Ecological values</td>
<td>Social and ecological values</td>
</tr>
<tr>
<td>Discharge (m³/s)</td>
<td>14600</td>
<td>14600</td>
<td>14600 Min 1/100</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>ecological issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy emphasis</td>
<td>technocratic Keeping feet dry</td>
<td>More democratic and environmental issues</td>
<td>Technocratic Efficiency and sustainability, tec</td>
</tr>
<tr>
<td>Discharge (m³/s)</td>
<td>18000</td>
<td>16500</td>
<td>15000</td>
</tr>
</tbody>
</table>


The previous explanation about the developments of different strategies show that events like the floods of 1953 and 1993-1995 intensify the activities undertaken by the governments concerning flood prevention.

**Differences between values and norms in water policy**

The differences in the present norms and values of German and Dutch can be found in the following:

**Attitude towards citizens.** Where in Germany citizens can be insured for flood risk, this is impossible in the Netherlands. It is common in Germany to surround industrial areas or private properties by separate dikes (Lourens, 2008; Verhoeff, 2008). This is an uncommon policy in the Netherlands, where flood prevention is a governmental responsibility.

**Climate change:** The Netherlands policies and strategies are being developed in order to be prepared for effects of climate change. This is not the case in Germany also adaptation in design discharge for the future are not announced and known yet (Surink, 2008).

**Discharge:** the design discharge of the Netherlands is higher in Germany also the safety levels of the Netherlands are higher. The Netherlands accepts less risks then Germany
Values and Norms influence the way politics think about water management. There is thus a relation between the institutional pillar and the political pillar. How these are related can be explained by the cognitive factor.

The study of G. Becker et al. (2007) shows that between Germany and the Netherlands there are several factors that determined differences between Germany and the Netherlands in flood management. With the use of the factors of Dieperink (1997) Becker saw, next to institutional and political differences, cognitive differences in the history of cooperation between Germany and the Netherlands.

The cognitive factor determines how serious the problem is perceived and what conclusions are drawn towards the cause (Dieperink, 1997). This had influence on the perception of the seriousness of risk and the safety levels of Germany and the Netherlands. This factor determines a lot in flood management. It influences the building methodologies because the safety levels can determine the design height of dikes, the moment a retention area is flooded, the amount of space given to a river, the amount of square meter that is reserved for detention, etc.

There is also a relation between the sense of urgency of flood management and the safety level. When the safety levels are higher, more investments are needed to comply with them and thus it must be higher on the political agenda in order to come about with these investments (Vrijling, 2000). Consequently it underlies the rules and agreements that are made among the partners and has influence on the institutional framework. The origin of this can be found in the different effects due to higher risks.

In the Netherlands 50% of the population lives in the surrounding of the river basins. In Germany only 3% of the populations lives in these risky area’s. The material damage that floods can cause is in the Netherlands 120 billion euro; this is very high compared to the 3 billion that Germany will suffer. Different acceptance levels of risks are the effect (B. Steenhuisen et al., 2006)

The cognitive factor seems to relate the institutional pillar to the political pillar.

Laws and regulation in water policy

In this paragraph the laws and regulation that have to do with water policies but also with the decision making process in water policies are given. When Germany and the Netherlands cooperate national law of both countries and European law needs to be taken into account.

In the illustration below (Illustration 3.1) shows the relevant laws and regulations. These are related to the time path of a project that has several phases. In the Netherlands these phases are formally recognized, in Germany they are not formally prescribed as such.
The Flood Directive (DIRECTIVE 2007/60/EC, 2007) is a European Directive and therefore superior to national law. This directive orders the Member States to make the flood risks apparent and make plans to adverse these risks. A more detailed description of DIRECTIVE 2007/60/EC, 2007 can be found in Annex 8.

In the Netherlands 9 laws are dealing with aspects of flood management. These will be integrated in the water law from 2009 (waterwet, 2008). During the process of realizing flood prevention projects related regulation should be taken into account. These are shown in illustration 3.1.

In Germany there is federal law and state law. Flood prevention is delegated to the states. The federal government lays down in framework law of water (Wasserhaushaltsgesetz):

- Who has which responsibility
- What minimum safety levels are obligated.

In NRWF the water law (Wassergesetz für das Land Nordrhein-Westfalen Landeswassergesetz) is most important. This law is not only about high water but also regulates the water quality and other functions water has, like the transport function of rivers, drinking water supply and recreation.

In several interviews it was pointed out that when a project is executed on a joint basis laws and regulations of both countries, should be warranted in the project. The projects get at risk when regulation is tried to be adapted while doing a project. Because then focus shift from the project to legal problems which are hard to overcome.

**Arrangements in water policy**

In the exploration and plan study, phases are developed and alternatives are generated. Germany and the Netherlands make use of different methodologies in the design and calculations of plans. The following methods where pointed out being important to make arrangements when cooperation takes place. Of course these examples depend on the kind of project that is being investigated:

- Risks calculation in dike failure mechanisms
3.1.2 COOPERATION INSTITUTIONS

Values and norms in cooperation
From interviews, it is concluded that values and norms towards cooperation are different, but these differences would not necessarily make cooperation impossible. In the interviews, the experts were asked to describe the differences between Germany and the Netherlands that are important to understand when they are working together.

Interesting was that people from Germany underlined in all the interviews the importance of a good relationship. Dutch people did not mention this most of the time. When the relationship is stable and trust is mutual, cooperation would be easier. Another point mentioned more by Germans was the need for sufficient time in a project. It was mentioned several times that the Dutch have the tendency to haste, which does not work since it brings pressure on the diplomacy.

All the interviewed Dutch people mentioned the differences in hierarchy between Germany and the Netherlands. Where Germany is very formal in the relation the Dutch feel that being able to have informal contact would work better. Hofstede (1991) confirms Germany having larger power distances and thus being more hierarchical organized.

When the Dutch would take more time for everything then it would become easier to realize a solid relation the cooperation would become easier and we would have more time to coordinate what happened in the hierarchical lines of our organizations” Surink 2008 and confirmed by Nebelung, 2008

Laws and regulation in cooperation
For cooperation between Germany and the Netherlands is the Flood Directive (DIRECTIVE 2007/60/EC, 2007) of importance. Especially due to the following article 7.4:

Article 7.4
In the interests of solidarity, flood risk management plans established in one Member State shall not include measures which, by their extent and impact, significantly increase flood risks upstream or downstream of other countries in the same river basin or sub-basin, unless these measures have been coordinated and an agreed solution has been found among the Member States concerned in the framework of Article 8.

Member states cannot take measures of which the impact will have a significant increase of flood risks in another Member State. When countries speak of a significant increase of flood risk is legally not determined. The term ‘significant’ is also used in the preamble but a
further explanation is not given. Countries have to determine among themselves what is acceptable. It can happen that conflicts arise when there are conflicting interests in implementing the flood management plans. It is legally determined that an agreement needs to be established before plans can be put in practice (article 7.4, Flood Directive). When an agreement cannot be found, Member States can report to the Commission (article 8.5, Flood Directive). When this is done the Court of Justice will judge whether the plans cause a significant increase of flood risk. More detailed information on the Flood Directive can be found in Annex 8.

The respondents do not worry much about the fact that “significant” has not been determined. In contrary, most people see it as an advantage, since it provides space for interpretation and negotiations. This is considered to be necessary because situations will be different in different projects (Sprong, 2008; Nebelung, 2008; Surink, 2008; Verhoef, 2008; Hoppenbrouwer, 2008).

Arrangements in cooperation

The Netherlands and Germany have found several platforms for cooperation. The most important ones can be found in Annex 4. The Netherlands is a leading partner in most of the cooperation platforms. This is typical for a downstream country because their stakes are higher in cross-boundary planning and cooperation. The Netherlands being a downstream country depends on actions upstream (Savenije and van der Zaag, 2000). The platforms the Netherlands works in do supply a solid basis for mutual understanding with upstream countries and stimulates sharing knowledge.

3.1.3 FINANCIAL INSTITUTIONS

Values and norms in transaction for flood prevention

Germany

In Germany flood prevention is lower on the political agenda. This can be indicated by the fact that only 5 people in the Bezirks Regierung of Dusseldorf (see Annex 4) in NRWF are responsible for flood management. To make budget free for flood management it has to compete with many other interests that are perceived just as important (Nebelung, 2008; Surink 2008). On top of that Bezirken that is situated more upstream do not suffer from flood risks this also cause less consideration to the importance of flood management (Becker et al., 2007).

The Netherlands

Projects of flood prevention in the Netherlands are paid for the large share by the ministry of V&W. Since flood prevention is primarily seen as a case of national security of the Netherlands it is less seen as a political consideration. No politician would risk his or her political career because too little is spent on maintaining the main water security works (Silva, 2008; Köbbe, 2008 Goor v., 2008).

Laws and regulation in transaction for flood prevention

The organization of budgeting flood management is organized differently in the two countries. In the Intermezzo at the beginning of this chapter two organizational graphs are given, these graphs are repeated here but now only the monetary flow is visualized (illustration 3.2)
Germany
Tax is paid to the federal government who has to divide it among the federal ministries but also among the states. When the tax incomes are divided among the states the ministries of finance of the particular state divide it among the ministries of state. In this case the state of North Rhine-Westphalia is considered. NRWF has five Bezirken who have financial control over the Kreise, the Wasserverbande and the Deichverbande.
For highwater protection a budget of 1.2 bilion euro is reserved until 2015 by Nordrhine westfalen.

Illustration 3.2

Source Nebelung (2008) who did the control over the Untere Wasserbehorde for the Bezirksregierung Dusseldorf.

The Netherlands
For the high water protection program a budget of 1.6 bilion euro from the national budget is reserved for the period until 2020. This reservation period is longer than the normal 5 year period of budgeting. This is not made apparent in the accounts, however these agreements are made between V&W and the ministry of Finance (Köbbe, 2008). This longer reservation period is related to the long term investments that are needed for the waterworks.

In the Netherlands the ministry of V&W is political as well as financial responsible for the safety of the Netherlands related to flooding. The ministry of finance provides the budget that is requested by the ministry of V&W after considering other requests of ministries. (Goor, 2008; Köbbe, 2008). When a project is in the exploration phase the budget needs to be reserved, projects can only be continued when there is budget to cover the costs (OEI in het besluitvormings proces, ministry of V&W, 2004).

90% of the waterworks (waterkeringen) is under jurisdiction of the water boards. Every five years these waterworks need to be assessed whether they satisfy the norms. (Anonymous, 2006). The ministry of finance is rarely involved in the exploration phase of projects while they have an important role in the decision about implementation (Hooijer et al., 2002)

For the high-water-protection program (Hoogwaterbeschermings programma) waterboards request for budget in order to perform their tasks in maintaining water works. The province has the task to control legitimacy of these requested budgets and advises the ministry of
V&W on the provision. The ministry thus does not have direct control on the way the budget, they provide, is spend. The rule is that when water boards have to intensify maintenance due to changes in norms, the ministry finances 100% of the request. (This is almost always the case) (Köbbe 2008). There is not a fixed budget for these extra costs that need to be made because of the changes in the norms (Köbbe, 2008).

**Financial regulation**

By the interview with M. v. Goor (2008) the importance of coordination about the status of required budgets was stressed. In the interviews with Verhoeff; Sprong; Goor and Köbbe it was pointed out that the differences in cost benefit analysis is of importance because different outcomes will be a result of different CBA’s. This can be even more important when one country benefits more in terms of safety than the other.

It can also be concluded that when two countries make use of a cost benefit analysis, assessment needs to be made on which measures would be optimal. There are different issues to consider:

- Which effects of the measure are taken into account
- Which effects will be expressed in monetary values
- What will be the exchange rate appreciation

**How to compare the different effects**

Germany

The law on budgets (Haushaltgesetz) requires that a Cost Benefit Analysis is performed for any action that is relevant for the budget of the federal government and the States (act. 6). They use the term efficiency analysis, which is a broader term than the cost benefit analysis.

The way the cost benefit analysis is performed is not formally determined, however recently a cost benefit analysis for measures in the coastal area is developed. Some elements are used for river projects (Estner et al., 2005)

In practice these assessments are performed superficial, if at all (Wangenheim, Hofmann, 2001).

The Netherlands

When assigning budgets the Ministry of V&W uses an investment program for Wet Infrastructure Projects, this is called ‘spelregel kader natte infrastructuurprojecten’ (SNIP).
For high water protection projects above 25 million euro, SNIP requires a consistent an integral overview of the social effects. OEI (Overzicht Effecten Infrastructuur) is a guideline used by SNIP, which consists of rules of Social Cost Benefit Analysis (MKBA). In the exploration phase OEI plays a role in finding grounds for the necessity of a project and in the plan study phase it helps in choosing between alternatives. The social effects are formulated in terms of the following aspects (Wooning, 2007):

- Change in expected casualties
- Decrease in risk in damaging infrastructure projects and estate
- Decrease risk on business damage
- Change in high-quality nature (wet/dry) values hectare.
- Change in other nature (wet/dry) values hectare.
- Number of people who suffer nuisance due to the project
- Investment cost
- Maintenance and exploitation cost

When alternative measures can be assessed and one turns out to be more cost effective, the alternative can become most preferable.

German and Dutch partners must come to an agreement on what cost and benefits are to be taken into account in the Cost Benefit Analysis.

**Arrangements**

When projects are performed on a joint basis it is common to make a contract or an arrangement to institutionalize the agreements. In Germany the lowest authority that can sign international arrangements are the ministries of the states. In the Netherlands only ministers or state secretaries can sign international treaties.

### 3.2 CONCLUSION ABOUT THE INSTITUTIONAL PILLAR

This part of the chapter has described which institutions are important when Germany and the Netherlands are cooperating in flood prevention policies. The framework that is showed again in the table 3.2 revealed the differences in institutes on different levels on water policies, cooperation and financing.

<table>
<thead>
<tr>
<th>Table 3.2</th>
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<tbody>
<tr>
<td><strong>Water</strong></td>
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<tr>
<td><strong>Values and norms</strong></td>
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<td><strong>Regulation and laws</strong></td>
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<td></td>
</tr>
</tbody>
</table>

2 The arrows can be expressed in monetary values
The blocks should be expressed in monetary values when it is possible
The circle cannot be expressed in monetary values
3.3 CONCLUSIONS ABOUT THE INSTITUTIONAL PILLAR

3.3.1 CONCLUSIONS ABOUT COOPERATION

Water

Germany and the Netherlands have different safety norms in their water policies. The Netherlands is very unique in the world having such a high protection level and values this strongly. In Germany the potential damage of floods is less which results in lower safety levels. It is not very likely that both countries will change their safety levels when they are cooperating since it is embedded in formal regulation. Both Germany and the Netherlands should understand the reasons and the limitation of different attitudes towards risks.

The new Flood Directives provide new basis for coordination among partners. This directive was based for a large part on the cooperation in the International committee for the protection of the Rhine (ICPR), therefore it merely confirms the status quo. However it has formalized the status quo and therefore there is now a legal basis to coordinate when partners induce effects on each other.

When partners cooperate it is important that there is mutual understanding of the responsibilities of the different actors and the structure of the different organizations. In the Netherlands water boards are large organizations with a lot of manpower and knowledge. In Germany, the water boards are much smaller and mainly occupied with maintenance. This leads to a difference in dominance when partners cooperate on water board level. Understanding where in the different organizations are people with similar backgrounds and responsibilities helps finding equal partners.

Cooperation

Germany and the Netherlands have a different attitude in cooperation; where Germans have a more formal attitude, the Dutch appreciate informal interaction. With some people skills this should not form a problem. More important is the time orientation of the different actors. Realizing that it can take more time to coordinate among the levels of hierarchy can smoothen the process.

Formal laws of countries form a basis of the constraints of cooperation. Within these constraints projects should be developed that adhere to the formal laws and regulations.

The different cooperation platform that are constituted between Germany and the Netherlands form a very solid basis for a good relation. In most of the cooperation platforms, as described in annex 2, mainly an exchange of knowledge and experience take place. The High water work group is now performing a study that could lead to a tangible project.


**Financing**

- As mentioned before in Germany flood prevention has a lower priority than in the Netherlands. This makes it in Germany sometimes harder to find financial means in flood prevention projects. Both countries do have similar long time span on reserving budgets for flood prevention, which makes the financial area quite stable.
- The ministry of finance is rarely involved in the exploration phase of projects while they have an important role in the decision about implementation. It would be better to involve the financial and economic perspective earlier in the process.
- Assessments of projects on their financial effectiveness, done by cost benefit analysis, should be done carefully. In the Netherlands the way of performing a Cost Benefit Analysis (CBA) is formalized therefore partners could choose to perform the Dutch CBA but leaving room for discussion interpretation about the factors that are taken into account.

### 3.3.2 CONCLUSIONS ABOUT THE MODEL

- The framework that is used provides a broad insight on differences and similarities in the institutional pillar. The three levels of formality in institutions give insights in the underlying cultural values towards cooperation in water management and financing projects as well as how the cultural values are translated into formal rules and laws.
- It is pointed out that the cognitive factor relates the institutional pillar with the political pillar. How serious a problem is perceived in this case influences the perception of seriousness of risks and thus the safety levels. The sense of urgency determines the political agenda; Safety levels have consequences on the technical requirements of the protection measures. Thus the institutional pillar influences also the technical pillar.
3.4 POLITICAL PILLAR

The different organizations in Germany and the Netherlands have different views on cooperation. From the interviews can be concluded that the overall view is that cooperation between the countries is definitely valuable, but the different views still need to be taken into account.

The following findings are a result of the interviews, see Annex 1 for an overview of the interviewed people and Annex 9 for the interviews.

3.4.1 GERMANY

On local level (read the border region of Germany and the Netherlands) there is a lot of distrust from the German citizens to the Dutch. Especially the German citizens who are users of rivers have the tension to think that the Dutch are to be mistrusted. The origin of this lays in the fact there is little understanding on how the river system works. The area in Germany next to the Dutch-German border is like a sink; this causes water flowing back from the Netherlands (Surink, 2008). With the flood in 1995 Germany closed the water dam of dike ring 48 as soon as possible so that the water would not flow back from the Netherlands to Germany and create damage.

It is also felt that important knowledge and information is not shared with Germany or held back too long. As H. Surink (2008) puts it: “The only way to take mistrust away is creating support on local level. This can be done by creating plans with a lot of participation of the citizens of both countries from the very start of projects”.

Financial contribution in plans that are realized on German ground is not obvious since it would also mean that the Dutch would have a say about the measure (Nebelung, 2008). When projects are realized together the process should be done very carefully so that both the interests are taken into account (Surink, 2008; Nebelung, 2008).

In Germany after floods in 1993 en 1995 it became policy to intensify coordination among states and cooperation with adjacent countries (Becker et al, 2007). It can be concluded that also events have a major impact in intensifying cooperation. The previous explanation about the developments of different strategies show that events like the floods of 1953 and 1993-1995 intensify the activities undertaken by the governments concerning flood prevention (G. Becker, 2005).
3.4.2 THE NETHERLANDS NATIONAL LEVEL

The Netherlands is responsible for her own safety. But Germany is not allowed to increase the risk in the Netherlands by their actions. Cooperating and co-financing on projects across the border will only be executed when the investments to do so are lower (Nijland and v.d.Wetering, 2008). To assess whether the investments are lower and more practical when performed on a joint basis, it is necessary to agree on the methodology that is used to prioritize issues and solutions (v.d. Wetering, 2008). There is not yet such a joint methodology and it turned out to be difficult to reach agreement on such a methodology.

The willingness to cooperate depends on the efforts a country already made in achieving the mutual goals that were agreed upon in the ICPR. When one country did not fulfill its responsibility and the other did, they will not be willing to co-invest. Therefore cooperation in reaching new goals has a greater chance of success because then there are new challenges that need to be faced, which can be seen as a fresh start with fresh and new financial means (v.d. Wetering, 2008). More about the ICPR is found in Annex 3.

Joint projects can be performed when a river basin approach is further developed (Nijland and v.d.Wetering, 2008) It will have more chance of succeeding on a local level for example between Gelderland and North Rhine-Westphalia (v.d. Wetering, 2008).

For the near future the challenges in cooperation must consider mutual agreements on spatial planning with respect to water management in order to decrease of the runoff speed and increase of the capacity of the groundwater stocks (Hoornstra, 2008).

3.4.3 THE NETHERLANDS PROVINCIAL LEVEL

Since the province of Gelderland borders to Germany the safety level is directly influenced by the water discharges from Germany. When projects in Germany make the border region of the Netherlands safer, it is the opinion of Gelderland that the Netherlands should contribute. Also compensation can make it easier to make these projects possible. However, the Provinces of the Netherlands are for the main part financed by the national government, so they do not have their own budget to contribute (Feddes, 2004). Therefore, Gelderland is quite depending on the willingness to pay on the national government in this matter.

“Until now Germany has never asked for financial contribution of the Netherlands, but it could become a discussion soon” (Verhoef, 2008).

3.4.4 THE NETHERLANDS WATERBOARDS

The waterboards are in a similar position as Gelderland because the safety is dependent on the discharges in Germany. However, for the waterboards it is even of more importance because the effort they have to make for realizing the safety norms that are imposed by Rijkswaterstaat, depends on it. When the threat from Germany is less, it becomes easier for the waterboards to reach the safety levels (Lourens, 2008). The basis of cooperation with Germany is solidarity; the same mechanisms that play a role in the Netherlands between the waterboards (Lourens, 2008).
## 3.5 The Driving Forces for Cooperation

The driving forces as described above are summarized in the table below Table 3.3.

<table>
<thead>
<tr>
<th>Actor</th>
<th>Drive to contribute financially</th>
<th>Resource to influence</th>
</tr>
</thead>
</table>
| Ministry of Transport and water affairs | Keep self sufficient in achieving safety level.  
|                               | Lower investments  
| Rijkswaterstaat East Netherlands | The efforts of both countries in flood prevention should be comparable effort.  
|                               | Start cooperating on local levels                                                               | Influence in the IDPR  
|                               |                                                                                                 | Making international policy  
|                               |                                                                                                 | Budget for flooding |
| Province of Gelderland         | Dependency on the discharges of Germany  
|                               | Easier to reach safety level  
|                               | Incentive to reach joint approach                                                              | Influence in workgroup high water  
|                               |                                                                                                 | Influence on ministry by negotiations  
|                               |                                                                                                 | Providing expertise in different cooperation platforms |
| Water Boards                   | Dependency on the discharges of Germany  
|                               | Easier to reach safety level  
|                               | Lower budget is needed  
|                               | Solidarity among adjacent countries                                                             | Budget of Water Boards |

### About Cooperation

Some comments made during interviews with stakeholders are given special attention below. These comments give insight on what hurdles are felt at the moment considering financial cooperation:

“The Netherlands will only agree on contributing in German projects when it is beneficiary”
RWS East Netherlands about the Dutch Government

“The Netherlands will only agree to contribute when Germany and the Netherlands have already contributed equally in order to prevent floods. The starting point of financial cooperation needs to be achieving new goals”
ICPR Secretary about the Dutch government

“It is important for the Netherlands to keep in control over their own safety”
Province of Gelderland about the Dutch Government

“The process of cooperation should be done with making small steps, it is important to take that time in order to realize both interests”
Nebelung about the process of cooperation with the Netherlands.
3.6 CONCLUSIONS ABOUT THE POLITICAL PILLAR

3.6.1 CONCLUSIONS ABOUT COOPERATION

The viewpoints of Germany and the Netherlands are studied, what makes them cooperate and what requirements do both parties have before they consider mutual contribution.

eneral

Finanzierung

Im Rahmen der Kooperation ist es von Bedeutung, dass beide Parteien sich über eine ausreichende finanzielle Basis verständigen und dass sie bereit sind, an der Lösung des Problems zu partizipieren. Darüber hinaus ist es wichtig, dass beide Parteien eine transparente und verantwortungsbewusste Zusammenarbeit aufbauen.

3.6.2 CONCLUSIONS ABOUT THE MODEL

By studying this pillar it shows that several elements can be added to this pillar to give the political pillar more concrete content.

First, in this part of the case study partners turned out to have different driving forces to cooperate and contribute in cooperation. Micko (1999) argues that in international cooperation theories, three driving forces for collaboration can be identified being; interest, mutual understanding of the necessity to solve a problem, dependencies along with power differences. These driving forces are compared to the driving forces that were distinguished in this part of the case.

1. The precondition of interest explains that collaboration takes place among partners who are ‘self-interested utility maximizers’, by collaboration partners strive to achieve a higher utility. The utility is maximized when the benefits exceeds the costs. Actors find it in their own interest to co-ordinate the policy with others (Rowlands, 1995).

2. The knowledge based precondition points out that a shared understanding of a problem is necessary and that partners must agree on the necessity of a cooperative response in order to come to collaboration (Micko, 1999).

3. Collaboration on the basis of power emphasizes the importance of dependencies of the actors as a driver for cooperation.
These dependencies are obvious due to the upstream and downstream dependencies in a river basin.

Second, the case showed that an event can speed up the process of cooperation. A disaster after which the urgency to cooperate is felt very strongly can create a window of opportunity for cooperation. Also an ambition of a politician that is made public boosts the cooperation and creates a window of opportunity (this was the case in Bislicher Insel).

Third partners can have certain demands before they choose to contribute to cooperation. These demands have been described in the first part of this paragraph.

The window of opportunity created by a flood or otherwise, the demands and the driving forces are added elements to the model. This is shown in the following illustration (illustration 3.4).
3.7 TECHNICAL PILLAR

This case is about operational management in flood prevention. First it will be discussed what the upstream downstream relation is between Germany and the Netherlands. Then it will be studied what flood prevention measures are suitable for cooperation.

While river basins can be considered as an entity on hydrological terms, for the most part their boundaries do not coincide with the political boundaries of nation states. The mismatch between hydrological and political administrative boundaries is particularly apparent in international river basins, where river basin boundaries cross administrative boundaries (Moellenkamp, 2007). In international river basins such as the Rhine there are upstream, downstream relations and interdependencies related to the morphology of the river.

Not all projects that prevent flooding are suitable for the purpose of this research. For partners to cooperate in flood prevention projects, there must be mutual benefits to gain. As stated in the political pillar. Especially, when partners commit to financial contributions in upstream and downstream relations. This part of the case study describes measures with a mutual benefit that can be taken for flood prevention.

This benefit can be reached when the upstream - downstream relation is as such that flood prevention can be done either upstream and having a positive effect on the safety levels downstream and having a positive effect upstream. It is most preferably when measures make the upstream area safer as well as the downstream area. Compensation can be valuable when measures that are taken upstream have a negative effect on safety levels downstream, or the other way around, when downstream measures have a negative effect upstream.

This part explains the upstream - downstream relations in the Rhine basin for the area between Germany and the Netherlands. Then it lists measures that are possible options for future financial cooperation and explains why certain measures are effective and others are not.

3.7.1 UPSTREAM DOWNSTREAM RELATIONS IN THE RHINE

The Rhine basin can be divided into six areas on the basis of slope and landscape (see Illustration below). The Alpenrhein is the area between Chur and the Bodensee on which the most important water sources drain into the Rhine. The Aarde is the first big side river to flows into the Rhine in the Hochrhein area which ends at Rheinfelden near Basel. The Oberrhein is captured between Rheinfelden and Bingen where first the Neckar and then the
Main is added to the Rhine. The river continues through the Leistenplatform on its way to Koln. This part is called the Mittelrhein where the Rhine is captured between high side walls which have a canalizing effect. Important rivers that flow into the Rhine are the Moezel and the Lahn. After Koln the Rhine enters the Niederrhine, where the Rhine crosses the German-Dutch lowlands. The Ruhr and the Lippe are added to the River. The last route of the Rhine starts at Lobith where it crosses the Dutch border and enters the Deltarheine.

Illustration 3.5 shows the slope of the surface of the Rhine basin. The slope of the flow is a factor for the speed of the water and therefore determines erosion (waterbouwkunde CT3020). Speed of water flows is an important factor in the impact that floods have. The Illustration shows that the slope after Koln is quite horizontal. In Germany Nordrhine west Fahlen is considered the Downstream States. Therefore it is depending on the water discharges coming from the upstream States Hessen and Baden-Würtenberg. The Netherlands is the Delta and depending on the discharges from North Rhine-Westphalia NRW.

Illustration 3.6 shows what the contribution of water is from the separate river areas. This illustration shows:

- Discharges do not have the same size.
- The contribution of water per area differs every time.
- At Lobith a large part of the water has its source from the middle Rhine and the more upstream areas. The major part does not come from North Rhine-Westphalia.
- Because floods arise already upstream of Lobith early warning systems can predict floods four days in advance (Ruimte voor de rivier taken).
The fact that upstream from NRWF the water is collected but not flooded causes between the states in Germany a different perspective on the importance of flood management. (Nebelung, 2008; Rita Lammersen.)

3.7.2 OPERATIONAL MANAGEMENT IN THE TECHNICAL PILLAR

Floods are typical high consequences, low probability events (Vrijling, 2000). The consequence multiplied by the probability is flood risk. In order to minimize flood risk actions can be taken on both factors in the multiplication function. In order to reduce the probability of flood events risk control is performed. This entails risk analysis maintenance, improvement of the current structures (Plate, 2002) and creating new structures when necessary. To minimize the consequences, risks are controlled by being prepared for the flood event and being able to quickly respond to the disaster. To be prepared, early warning systems and evacuation plans need to be in place. Disaster relief takes place during a flood. After the flood events post flood measures can be taken to get over the flood (Plate 2002, Irma -sponge (Hooier et al., 2002)).

Measurements can be taken prior, during and after the flood to minimize the consequences. The following Illustration shows the measures that can be taken to minimize flood risks. As mentioned in the introduction the research focuses on the measures in the blue box.
Minimize flood risks

Reducing the flood Probability

Reducing the (potential) damage = Effect

Warning systems

prevented: Actions during a flood

Phase 1: Preparation

Post flood measurements

Crisis management

Post flood measures

Compensation

Evacuation

After care

Preparedness

Local emergency solutions

Insurances

Risk reducing

Prevention

Land use

Spatial planning

Control high water

Retention

Creating awareness flood risks

Technical measures

Regulating measures

Communicative

Financial measures

Measures for flood prevention

The measures from the blue box are described below. It is studied whether these projects are suitable measures to do on a joint basis with Germany and the Netherlands.

Land Use

Land Use changes can be done for example by bringing back forests in order to increase the ‘sponge (spons)’ capacity of the land and in this way decrease high water discharges. However effects occur only after the structure of the ground is completely restored. This will take decades if not centuries; therefore it is not a suitable solution because the Netherlands wants to be able to have a safety level for floods that occur once in 1250 years (this means a discharge of 16,000 m³/s) at 2015 (ruimte voor de rijn takken). On top of that, the effects of land use changes are very local (IRMA–Sponge (Hooier et al., 2002)) which makes it also unlikely that there will be contribution from the adjacent partners.

Giving space

Giving space to the river (Ruimte voor de rivier) is a measure that increases the capacity of the river. The ‘uiterwaarden’/ winterbed are deepened so that it can store more water at moments of high discharges and it is no longer allowed to build within the winter bed. This measure is often taken when building higher dikes is no longer the preferred option. Since the water level difference outside the dike and within the dike is becoming too large and along with that the effect at times of failure. In the IRMA–sponge (2002) report a distinction is made between several ways to create more space for rivers:

- Resituating the dikes by making the river broader
- Detention inside the levee area
- Redirect the high water discharge
- Cyclical renewal of the summer and winter beds
- Lowering the Kribs

source IRMA – sponge (Hooier et al., 2002)
Since the same amount of water is going through a broader ‘canal’ it lowers the water level but it does not affect the discharge. It has therefore no effect downstream however it does have effect on the water height upstream. Illustration 3.8 shows the effect a room for the river measure in Lohward has on the upstream area. It takes 100 km to damp out the lower water height of 35 cm.

This effect is caused by: look up IRMA-spronge

When there are upstream effects and they are significant enough it might be possible to cooperate in order to realize them.

Retention and detention
Retention and detention areas can temporarily store water to reduce the peak of the high water wave. Retention is short term storage and detention is most of the time used for a longer period. Calculations show that a retention area of 8 ha at the border of Germany and the Netherlands already lower the water height with 35 cm up to the Cullemborg. (See Annex 5 for more explanation). This shows that the downstream effect is significant. But there are drawbacks to be noted. Detention and retention areas can have controllable inlets, there should be control over the moment it is used. This is very important, because when a high water wave comes by and the retention area is used before the peak passes then the retention will have less effect. The retention area is already full and cannot ‘shave off’ the top of the wave anymore. The following illustration (illustration 3.9) shows this mechanism.
Timing difficulties, local interests, technical drawbacks of retention

The fact that timing of the use of the retention area is a very complicated matter makes the use of this solution even harder. With bad timing sometimes lowering the high waves in a side river can cause a larger discharge in the main river which is the opposite effect of the objective set (IRMA – sponge (Hooier et al., 2002)).

Next to that it is sometimes difficult to predict the length of time, place and duration of the rain that is causing the flood (IRMA – sponge (Hooier et al., 2002)).

The reliability decreases when they are situated further upstream because less affinity may be felt towards the (far away) downstream area.

It is also complicated because local interest can become an important factor when the decision needs to be made about when to use the inlet. There is the risk that overall or downstream interests are disregarded in order to protect the area locally.

Another factor is uncertainties about the flood development after the retention area. As mentioned before the Netherlands plans their flood prevention for floods that occur once in 1250 years. Germany plans their flood prevention for floods that occur once in 100 years or once in 200 years. This means that in Germany retention areas are likely to fill the retention areas earlier than when they would have a higher safety level.

This all can make retention area less reliable, unless strict rules are imposed and good models are made that predict the behavior and the development of the flood. Retention areas do have an effect on the water discharge and therefore have a downstream effect. Thus although there are drawbacks, retention and detention could be suitable for cooperation projects when you consider solely the technical aspects.

Next to the technical drawbacks it also is hard to find support from local citizens for retention. Since, they are not the ones to benefit from retention. The lower risks will be effectuated downstream not where the retention is situated. In the Netherlands retention is not a popular measure and therefore hard to realize (H. Zomerdijk, 2002). Although it is an effective measure citizens protest because they are not willing to give up space to favor others (Surink 2008, Silva 2008).
From the different measures several requirements follow for projects to be suitable for a joint approach and eventual financial contribution of both partners:

- There must be positive transboundary effects: The projects should have an effect on water discharges in order to have a downstream effect. The other way to create transboundary effects is giving the river more space this will lower the water upstream.
- Projects should be able to be effective within an agreed time scope that fits the time scope that parties hold on to, for reaching their ambitions.
- There should be control in the effectuation of the measures.

The uncertainty on the control over the project depends on the type of project. This can become an issue when human factors play a larger role in maintenance and usage.

3.8 THE FINANCIAL ASSESSMENT OF PROJECTS

When alternative measures are assessed both Germany and the Netherlands make use of cost benefit analysis (as is described in paragraph 3.1.2). When different alternatives are compared costs of a project (building as well as operational and maintenance costs) are included as well as the benefits. The above mentioned measures (retention, room for the river, and change the land-use) do not always serve the same purpose and it cannot be said that they are always interchangeable. Therefore it is hard to compare them to their financial merits. This is further complicated by the fact that making a dike does not say anything about the length of a dike or the construction method that is used. Applying retention does not say anything about the amount of people that need to be sold out or the number of square meters that are going to be reserved. Nor does it say anything about the additional costs that are necessary for the opening devise.

In general, it is difficult to make comments about the comparison of costs. It is possible to compare costs when more is known about the projects conditions and the different alternatives.

3.9 CONCLUSIONS ABOUT THE TECHNICAL PILLAR

3.9.1 CONCLUSIONS ABOUT COOPERATION

Throughout the technical part of this case study upstream and downstream relations in the Rhine have been studied. Next to that measures that could be taken in order to prevent floods have been explored in order to see whether they are suitable for cooperation. It showed that the source of floods originates most of the time from the Middle Rhine area. This implicates that the floods can already be mitigated after that ‘point’. It also means that early warning systems can forecast floods about four days in advance.

Measures that have been studied differ in the degree of upstream or downstream effects. Room for the river projects and retention measures have upstream respectively downstream effects. There are thus technical arguments to support these measures when it is considered to perform such a project together. However, not only technical arguments are relevant for measures. Whether a project can get support can also depend on the fact that safety levels are effectuated elsewhere. Political arguments count thus as well, depending on the degree of acceptance by citizens (Silva, 2008; Surink, 2008). Alternatives that affect citizens may not be easy to choose for. In the Netherlands it has been hard to realize project for which people needed to move. Perceptions about measures are thus as important because they influence the feasibility.
The fact that Germany and the Netherlands have different safety levels also has impact on the effectiveness of technical options. When a measure as retention is taken in Germany where lower safety levels count the retention will be used before it can help the Netherlands. Lower waves will be shaved off and fill the retention area before the higher waves will come. These higher waves will continue the journey to the Netherlands undampened. Therefore, the retention area does not have an effect on the Netherlands when these lower safety levels are hold on to. With dikes it is the other way around, since Germany has lower safety levels the area will flood. When they increase the safety levels less flooding would happen in Germany and more water would come to the Netherlands.

### 3.9.2 CONCLUSIONS ABOUT THE MODEL

By studying this pillar it shows that several elements can be added to this pillar to give the technical pillar more concrete content. First, the upstream and downstream characteristics of a river are important; they form a basis for the dependencies in the regions where cooperation takes place. In the model, these characteristics are called river features. Second, the effects of measures are be added to the model. But, measures should not only be assessed on their technical merits, also social and ecological effects should be taken into account in order to address the feasibility of a project. Feasibility is thus the third element added to the model. Last, the financial picture of measures should be addressed. Although in this chapter no general conclusions can be drawn towards financial characteristics, the costs remain important because it will play an important role in the cost benefit assessment.

River features, upstream and downstream effects of measures in terms of safety, the feasibility of a project and the costs of a project are added elements in the model as illustrated in illustration 3.10.

The end choices about technical measures remain in the end a political responsibility therefore the technical pillar is strongly related to the political pillar. The fact that measures
should comply with national and international institutions shows that there is also a relation between the technical pillar and the institutional pillar.
CHAPTER

4 Case 2: International Dike rings 48 and 42

4.1 INTRODUCTION TO CASE 2

This case study is about the risk analysis in the transboundary dike rings in the Niederrhine region. These dike rings are located on the border region of Germany and the Netherlands. Illustration 4.11 below shows the international dike rings that will be studied. The upper dike ring is dike ring 48 and the lower is dike ring 42.

Illustration 4.11

Source: Projektbericht, risikoanalyse für die ländübergreifenden Deichringe am Niederrhein.

The previous case of Chapter 3 had a very general character; this case is more concrete because it is based on an actual research project. This case study is performed to achieve insights about project-based cooperation. In this context, “project based” means that the cooperation is done with the aim to realize tangible results. Cooperation platforms as described in annex 2 are focused on exchanging experience and knowledge and on
coordinating strategies in the river basin. Studying this project-based cooperation provides insight in the question if and how parties are able to realize a common methodology in a project that aims at flood prevention.

**About the Use Of The model.**

The model of van der Zaag and Savenije is used to structure this case study. The three pillars of the model are made operational in this chapter, meaning that the three pillars are equipped with elements that play an important role in this case. These elements have to contribute in understanding how a project is realized when two different countries cooperate.

### 4.1.1 INTRODUCTION TO THE PROJECT.

This study is performed on dike ring 42 and 48 by the German Dutch workgroup high water (Hochwasser Gruppe/ Werkgroep Hoogwater). The workgroup high water is an collaboration platform between the Ministry of environmental protection, agriculture and consumer protection of North Rhine-Westphalia (UNLV NRWF), the province of Gelderland and the ministry of transport, public works and water management (Ministry of V&W). The High water working group commissioned the study assignment. The studies are financed by V&W and ULNV both contribute half of the budget.

In 2007 the partners involved in the High water Workgroup established a common declaration that acknowledged the increased challenges due to climate change and the importance of cooperation in order to deal with this. In the declaration, it is agreed that a common strategy for high water protection will be formulated and joint research in the border area will be performed to identify sustainable highwater protection solutions and their effects (Gemeenschappelijke verklaring, 2007)

The declaration has resulted in a research assignment that will be performed by the High water working group (Hoogwater werkgroep/Abeits Gruppe Hochwasser). The partners in the study are the University of Aachen along with their research institutes, Gelderland, water board of Rijn en IJssel, water board of Rivierenland und RIZA.

The study has three phases.

- In phase 1 is an assessment of the different measures of both countries in order to come to an shared methodology (by Germany and the Netherlands)
- In phase 2 this shared methodology will be applied on dike ring 48 (mainly by the Netherlands)
- In phase 3 the shared methodology will be applied on dike ring 42 (mainly by Germany)

The study goals are defined by the following research questions:

- What are the used methodologies to assess risks of the previous mentioned institutes? What are the advantages and disadvantages of these methods and how can they be enhanced so that they can benefit from each other. Can there be one uniform methodology? (phase 1)

- What dike sections play an important role when extreme high water occurs and what locations with above average risks can be identified? What and where will be the damage? (phase 2, 3)
§ What measures can be taken to protect the area for extreme high waters. These measures can have impact upstream and downstream? The protection levels of both countries should be considered individually (phase 2, 3).

Presently phase 1 is completed and published, phase 2 is under revision, phase 3 is being finalized. Because phase two is under revision and phase 3 is not completed yet the findings of these are not published and thus not available yet.

4.2 THE POLITICAL PILLAR

In interviews with key players for this casus it became clear that the motivation of the partners has a big impact on the results, secondly the political aspects that had an influence on the results were identified with the help of the interviews.

4.2.1 MOTIVATION OF GERMANY TO COOPERATE

The political motivation of Germany to get involved in the risk analysis study of the transboundary dike rings was for largely determined by the floods of 1993, 1995 and of the Elbe in 2002. Citizens objected to the risks they were facing. After these floods more awareness arose about the lack of control there was in risk mitigation. This was for a large part determined by the lack of knowledge to assess the risk and to forecast the events. The joint research with the Netherlands about the risks assessments provided the opportunity to build up experience and knowledge for this matter. The Dutch are far more experienced in risk mitigation and their risk calculation methodologies are more extended (Hubbe 2008; Silva, 2008).

4.2.2 MOTIVATION OF THE NETHERLANDS TO COOPERATE

The fact that high waters in 1993 and 1995 almost resulted in dike failures also reminded the Netherlands of their vulnerability. On top of that, the disaster caused by Katrina showed the devastating effects of floods. The cabinet of the Government therefore formed the ambition to study compartmentalization of dike rings. Taken into account that despite all the efforts, which are taken in the Netherlands to prevent floods, there will always be residual risks. By splitting up dikes at least the effects of floods will be limited (Kabinetsstandpunt rampenbeheersing overstromingen, 2007). Den Bosch, along the Amsterdam Rhine canal in the Betuwe and the border area of Gelderland and Germany where selected to perform compartmentalization studies.

To study compartmentalization in the border area a shared information system, and risk assessment should be performed first (Kabinetsstandpunt, 2007). This research provided thus the opportunity to study possibilities to compartmentalize the international dike rings in order to limit the flood effects.

Compartmentalization is in a political sensitive issue since, water of floods remain captured in the compartment. This results in a smaller affected area but at the same time more nuisance in the compartment where the water is captured (Silva, 2008).

Another advantage of this research assignment is that it makes the cooperation in the High water Working Group tangible. This is important for the cooperation that already existed. (Silva, 2008)
4.2.3 MUTUAL DEPENDENCIES IN THE RHINE

In the border area of Germany and the Netherlands there are mutual dependencies with regard to high water flows in Rhine:
Floods in the North Niederrhine can reach parts of the Netherlands because the water can flow from dike ring 48 to the old Ijssel into the Ijssel. The other way around cannot be excluded; when the left dike (42) fails in at the upper Rhine and Waal then the area up to Kleve will flood (Silva, 2002; Silva, Reuter et. al., 2006).

4.3 TECHNICAL PILLAR

The cooperation to accomplish the research assignment is done in mixed study groups in with engineers from both countries.
In phase 1 different methodologies were reviewed and when possible, combined. From the report (Risico-analyse voor de grensoverschrijdende dijkringen langs de Niederrhein) and the interview can be concluded that a very pragmatic approach has been used.
§ Failure probability of dikes: Some aspects of the method did not differ significantly German methods and Dutch methods where subsequently applied on Germany and Dutch parts of the dike ring. Other aspects of dike failure are going extended and compared to the original methods.
§ Determination of floods: the existing (Dutch) Delft SLF model is going to be used because this model has been calibrated already. For selected part, which need more detail, the German model Breflow is used.
§ Potential Damage Analysis: the Dutch method is going to be used and the damage categories and formulas of both countries are going to be implemented.
§ Cost benefit analysis: In Germany a cost benefit analysis is not formalized and therefore the Dutch method (which is formalized) is applied. The benefits in the cost benefit contains the lower risks, considering that lower risks decreases the potential damages. NOTE: The report does not mention how to deal with differences between benefits that are effectuated in Germany and the Netherlands considering the reduction in damage. However Silva (2008) mentioned that the differences in risks will become apparent due to the studies. These differences in can form a basis for the division of the costs.
Phase 1 has been a very fruitful cooperation and from the interviews it can be concluded that it was a very good experience for both sides.

In phase 2 the study has been performed on different alternatives that lower the flood risk in dike ring 48. The alternatives to study are:
§ Second dike line
§ Protect objects
§ Secure existing dikes
§ Compartmentalization
It will also be studied what can be improved in the emergency plans and what the possibilities and limitations are for evacuation plans.
Following the cost benefit analysis the compartmentalization study performs best (Huber, 2008).
Little can be said about phase 3 because there is no report yet and the interviewed people did not want to talk about it\(^1\).

How the cooperation in the technical pillar was experienced is illustrated by the following comments of the interviewed people.

- **Hoppenbrouwers**: We had the opportunity to pick best of both countries. It took time though; to get passed each other jargon but in the end we have achieved a lot.
- **Silva**: Because of these studies we have a closer relation than before. Because we developed the strategies together both countries support the methodologies. In the Future there will be less confusion because we speak the same language now. We will have a more complete idea of the river basin.
- **Huber**: The cooperation works well, we knew what to do and it happens smoothly. Exchange in methods has been nice because we could choose the best of both countries. We do notice that the Dutch have more routine due to the experience they have. This is also the reason that our process internally is slower because we have to convince our superiors of the new findings and developed methods. This takes time.

### 4.4 INSTITUTIONAL PILLAR

In chapter 3 institutional elements between Germany and the Netherlands are described. These elements are also applicable to this case, since the same countries cooperate. The institutions that are similar in this case to the previous will not be repeated in this chapter.

Important institutions in this case are

- **Arrangement**: A common declaration of intent was ratified by the partners of this cooperation which was the kick off of the joint study to transboundary dike rings.
- **Formal institutions**: the workgroup high-water is the formal institution in which the cooperation takes place.
- **Formal rules**: New institutions are formed in this cooperation in the form of new methodologies. This process happened in the technical pillar.

### 4.5 PHASES

From the interviews it can be concluded that this case should take the time path of a project into account to generate a full picture. Therefore, the phases of a project will be discussed in this paragraph.

This study phase that has been studied in this case is in known in the Netherlands as the exploration phase of a project. The exploration phase is part of the developing process on wet infrastructure projects such as flood prevention measures that is formalized in Dutch decision making. In this project the exploration phase consists of three phases as described in the introduction to the project (paragraph X). The exploration phase is followed by the plan study phase. When this phase is finished, the project is be executed and followed by the maintenance of the project (OEI in het besluitvormingsprocess, 2004). These phases are shown in Illustration 4.12. and explained in more detail below this illustration. From the

\(^1\) The project was not finished yet and the matters are political sensitive, the interviewed did not want to talk about issues that were not formally agreed upon.
interviews these phases appeared to be important since the cooperation has a different character in the different phases.

1. Exploration phase: After recognizing that a certain problem needs to be solved the parties involved will start studying the problem and indicate the possible solutions. The output of this phase are several alternative solutions to the problem with insight in the effects and costs. At the end of the exploration phase it is decided whether or not the next phase will be followed.

2. Plan study phase: In this phase first a choice will be made between the different alternatives. When the ‘best’ solution is chosen, with the help of the Cost benefit analysis, it will be further developed and financial means need to be found. Preparation will start in order to make execution possible. The phase is ended when financial means are sufficient and the decision on execution can be taken.

3. Execution phase: The realization of the project starts until the project is finalized then the project can be completed. When subsidies are requested, they normally will be paid at the completion of the project (verkeer en waterstaat, 2007).

4. Maintenance phase: Added to these phases is the maintenance phase since in international cooperation also here transactions could be of importance.

4.5.1 EXPLORATION PHASE

This project (phase 1, 2 and 3) belongs to the exploration phase. To enter this phase political motivation of both countries was necessary. Although these motivations differ per country, they led to the shared agreement to start this study. The cooperation in this phase is mainly technology driven and done by engineers. In the end of the phase a choice between the alternative measures needs was made. Although a cost benefit analysis is used, the choice will be a political one. The cost benefit analysis showed that compartmentalization performs better than the other alternatives; however this is a sensitive decision. Because the expectation is that citizens will object to the proposed measure. The compartmentalization keeps the water in Germany and due to the new dike water cannot flow away to the Netherlands anymore. The other way around can also happen but is less likely. The question is thus; to what extent is solidarity reasonable (Huber, 2008).

4.5.2 CONTINUATION OF THE PROJECT AFTER THE EXPLORATION PHASE

After the exploration phase the chosen alternative is going to be studied in more detail in the plan study phase. In this phase, public participation is important; in this phase, citizens in Germany can oppose using the plan procedure (Planfeststellungsverfahren)

When the compartmentalization dike is pursued different options for locations and of situating the dikes should be assessed in the plan study phase. The expectation now is that the dike will be situated on German territory. When this will be so, then Germany will execute the project. This means that the project will be executed using German building and design methods. The interviewed people expect that the Netherlands will not be able to
influence the process in the execution phase when the project is situated on German territory. The last moment of interference of the Dutch will be in the beginning of plan study phase. After the project is realized cooperation will be continued again in the form of studying the effectuation of the measure. Then it can be assessed if the dike performs as it was intended.

Cooperation in the maintenance phase will be important because it means continuation of tangible cooperation on the long run.

4.6 FINANCIAL INCENTIVES

In the interviews, the question was posed whether financial contribution could overcome the political sensitiveness of the issue. Below a summary of opinions on this topic:

**Hoppenbrouwers:** Extra contribution may convince politicians to make a positive choice the question is how much is needed?

**Silva:** By doing the flood studies it becomes apparent what the overall increase in safety will be due to compartmentalization but also what the total benefits in terms of safety will be for Germany and the Netherlands separately. A division of cost can be according the proportional distribution of benefit. This will not be done to convince Germany, this will just be fair. To convince, something needs to be done about the proportional distribution of safety. Therefore more measures, to make exchange in safety possible, should be on the agenda.

**Huber:** Financial means may convince some politicians but it will not convince people on local level. This kind of measure has a community aspect and an individual aspect. People who will be affected will not be convinced by money. Communication and providing information will be much more important to avoid long processes of appeal.

In our project there was no discussion on how to divide the benefits. As we calculated risk with respect to the dike rings (distinguishing between Germany and The Netherlands) from the engineering point of view we only give numbers and results to the contractors and funding organizations. They have to make the interpretation and decisions on the political level. We just deliver the list of possible and feasible (from the engineering point of view) measures. Therefore, we did not talk about a division of costs or benefits.

In fact, we even not calculated costs of the measures but only the benefits in terms of risk.”

4.7 CONCLUSIONS CASE 2

First conclusions will be drawn on the basis of this case towards project based cooperation. In the second part it will be discussed what conclusions can be drawn towards the elements that should be added to the model to describe the project based cooperation. In project based cooperation it turned out to be important to distinguish the different phases. What this means for the model will also be explained in the second part of the conclusions.

4.7.1 CONCLUSIONS ABOUT COOPERATION

**The Political pillar**

Ger Many and the Netherlands have different motivations to be involved in the research. In Germany, the learning opportunities for mitigating risks are most
important. For the Dutch it provides the opportunity to look into the possibilities of compartmentalize the international dike rings 42 and 48.

The differences in motivation should be considered because it can lead to different expectations towards realizing measures like compartmentalization in the Dike rings. It is important to acknowledge the political sensitiveness of such a measure therefore public participation and informing the public is important.

The Technical pillar

In this case study the technical pillar was dominated by coordination on different calculation and assessments methods between the two countries. This coordination between engineers results in a common ‘language’ that the engineers can use. By discussing these methods and creating new methods that have aspects of both countries generates general support of the outcome of the research.

The study group took different approaches in developing a share methodology:

1. when possible and preferred the countries could apply their own method on their own territory
2. When one country had a more extended developed method they choose to apply the extended one.
3. One countries’ method was adopted with data of the other county.
4. When a method was formalized in one country and not in the other country this was respected and the formalized method was used.

Per method it was considered what the preferred option was. Which turned out to be a very fruitful approach.

Huber commented that their work is not influenced by the political decisions, which enables the collaboration. However, it should be acknowledged that their work is critical for politicians, because the outcome of the research is the basis of their decisions.

The Institutional pillar.

The important institutions in this case were firstly the cooperation organization of the Highwater group which provide a platform for partners to coordinate and cooperate. The second important institution was the declaration of the partners that formed a basis for this research. In this declaration it is not explicitly arranged that from the findings of the research measures follow. However, it is mentioned that identified measures should be aimed at applicability in the region and that new insights should be used to protect against high water nuisance. There is thus no guaranty that the study will lead to measures.

Financial aspects in the cooperation process

From the interviews, it can be concluded that it is believed that negotiations about financial contribution would affect the relationship at this stage of the project. However, it became clear that financial contribution in a future project could become important and should be done on the basis of safety gains. In addition, it became clear that financial contribution alone would not provide sufficient public support. It was pointed out that public support for a measure could better be established by stimulating public awareness of the necessity of a measure secondary consideration can then be financial contribution to a project or compensation of the affected region.
In the previous case, it has been pointed out that the economic aspects of a measure could be included earlier in the process since it is an important issue when decisions are made. In this case financial aspects of measures and the economic effects of reducing risk are not taken into account. There is thus a balance to be found in keeping the relation as such that financial issues do not harm the relation and on the other hand, avoid deadlocks or disappointments when financial issues are included late in the decision making process.

Silva suggested that package deals are possible in terms of exchanging downstream to upstream effects of measures. This way of thinking could contribute in the decision making process. When package deals are formed both parties can benefit which helps in the negotiation process.

4.7.2 CONCLUSIONS ABOUT THE MODEL

**Political Pillar**

In the previous case it was determined that driving forces for cooperation, demands partners have before they consider contribution and making use of windows of opportunities are elements that are important in the political pillar. In this case it showed that motivation for partners to start cooperating can be different. The different motivations of partners could result in different expectations with respect to implementing the outcomes of the research. Thus, a difference in motivation is an important element to be added to the political pillar. Because it provides insights in the expectation of cooperating partners.

From the common declaration in this case, it became clear that there is a mutual understanding of a shared problem that partners will phase. This driving force was also already identified in the previous case.

Demands towards contribution could not be identified since, at the moment of this writing financial negotiations have not been started yet.

Germany and the Netherlands saw a window of opportunity in cooperation which was in this case the increased awareness for risks after the threats in 1993 and 1995. This event increased awareness of threats and made partners realize again the importance of cooperation.

**Technical Pillar**

In the previous case it was determined that river features, upstream downstream relations and effects of measures, feasibility of measures and costs of a project are important elements in this pillar.

For the technical pillar developing a set of workable methodologies that are supported by both countries turned out to be an important in this case. Because a shared methodology will help the countries in accepting the findings. Therefore this element is added to the model.

This case showed that the relationship of the engineers that was established is an non political one, creating a solid basis for cooperation. This relation enabled a practical and pragmatic way of dealing with complicated matters. This non political relation of engineers in the technical cooperation is thus a important element to have to ensure long lasting relations.
The features of a project that makes it political sensitive is again established to be important for the feasibility of a measure. Feasibility with respect to the political sensitiveness was already captured in the previous case.

The scale on which the partners cooperated in this case upstream and downstream effects are apparent. Since the measures have a direct impact on this region being North Rhine-Westphalia and Gelderland. The studied compartmentalization dike has a direct effect on the safety of the dike ring. In addition, measures that create room for the river that can be taken downstream also affect the upstream border region with respect to lower water heights. There for the scale and scope of cooperation should be considered. these elements are added to the model.

Costs of projects have not been studied yet and were not a part of the research assignment. However, it is expected that costs will become important in the plan study phase.

**Institutional pillar**

In the previous case institutes on the three levels for water policy, cooperation and financing projects have been studied. Many aspects are similar in this case compared to the previous case since the formal laws and informal value system remain the same when the studied countries are the same. This case study did provide a new insight in the institutions since the time factor became apparent in studying the phases. This will be explained later in this part of the conclusions.

<table>
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<tr>
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<th>cooperation</th>
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<td></td>
<td>The priority water management has compared to other policies</td>
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<td>Regulation and laws</td>
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<td>Responsibilities of different organizations and individual actors Cooperation platform: Highwater group Declaration of intent</td>
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</tbody>
</table>

**Relations**

In the previous case (case one), several relations between the pillars turned out to be important.

Again it can be pointed out that relations between the pillars exists and that they are important for to understand the cooperation. For example, political considerations are strongly related to the technical implications of a project and they determine whether a technical solution is feasible. It has also pointed out that the political motivation
resulted in institutionalized arrangements that lead to technical cooperation and the outcome of the technical cooperation forms again a basis for decisions of politicians.

**Phases.**

This case showed that the political, institutional and the technical pillar play a different role in the different phases of a project.

Before the exploration phase political motivation is needed to be able to start a cooperation project. This motivation, together with the existing cooperation platform and the events in 1993 and 1995 form a window of opportunity for the common declaration and the start of this research.

In the exploration phase, the political issues get more on the background and the cooperation is dominated by technical interaction between the two countries. This means that the main cooperation is between engineers and researchers.

When a decision must be made at the end of the exploration phase political considerations are again important. When partners chose to continue to the next phase several financial arrangements should be made. Because perusing after the exploration phase is done with the intention to realizing a project for which financial means need to be reserved.

The plan study phase is characterized by studying the best option for an alternative which will be done in the technical pillar. In the scenario as is described in this case where compartmentalization will executed on German territory it is also important to make arrangements. These arrangements should provide certainty about the division of responsibilities of the execution of the project and about the division of costs. The arrangements should also provide certainty so that the project fulfills the requirements as is intended in the previous phases.

The execution phase will most probably be done by one of the countries, in the scenario of this case this will be Germany. Feedback about the course of the project can be helpful to have a certain control over the execution of the project with respect of the potential exceeding of budgets.

After the execution of a project institutional arrangements take care of the responsibilities in the maintenance phase. The cooperation in the technical pillar becomes again important since new insights about the river basin can be developed.

The relation of the model to the phases of a project turns out to give more insight in when pillars are more or less active.
5.1 INTRODUCTION TO CASE 3

This case study is about the Western Scheldt and cooperation between the Netherlands and Belgium in this estuary. In this cooperation process, major international issues were dealt with in the negotiations. These negotiations were characterized by complicated issue linkage (Meijerink, 2008). Issue linkage means that more problems are put on the agenda in order to involve different interests of the parties that are negotiating. This makes it possible to exchange interests and it gives incentives for cooperative behavior (Bruijn and ten Heuvelhof, 2007).

This case study is performed to get more insight in the negotiations that take place when countries cooperate. This case study will give insight in the political process that happened but also shows how institutions and technical aspects influenced this process.

The model of van der Zaag and Savenije is used to structure this case study. The three pillars of the model are made operational in this chapter, meaning that the three pillars are equipped with elements that play an important role in this case. These elements have to contribute in understanding negotiations when two different countries cooperate.
The Negotiations about the Scheldt estuary started already in 1967 and issues are still being discussed. Because the period of these negotiations is relatively long, for this thesis the scope is narrowed down to the period in which the negotiations about the water treaty came to a solution. This period is demarcated by the moment that G. Blom and J. Strubbe took charge of the negotiations in 1993, until the moment that an agreement was reached in 1995. This demarcation is deviated from when necessary for explanatory value this is important for the period before 1993.

5.1.1 TECHNICAL PILLAR

The Western Scheldt is an estuary, which means that it is a water body where the River Scheldt flows into the North sea mixing the salt water from the sea with the fresh rain water from the river. The estuary has channels with varying water depths that are under influence of tides. Because of the mix of salt and fresh water, it is a special ecological environment with a variety of species living in it. The fragile equilibrium of fresh and salt is unstable and is disturbed when too much fresh water is drained upstream. This happened in the nineties when France and Flanders tapped 65% of the fresh water from the river water.

Another issue is the sediment transport through the estuary. Human interference in the Scheldt estuary caused more sediment transport⁴. Since pollution sticks to the sediment, the estuary has gotten more and more polluted (Saeijs, 1993).

Next to the Scheldt being a fragile ecological equilibrium, the estuary is also the main transport route to the harbor of Antwerp. This harbor is vital for the economy of the Belgium. The ships have been growing over the years, demanding thus a deeper transport route than before (Saeijs, 1993).

5.1.2 THE POLITICAL PILLAR: PART 1

In 1967 the negotiations about the Western Scheldt started, Belgium wanted a better accessibility of the Western Scheldt to improve the maritime assess for the harbor of Antwerp. Plans were made to construct the Baalhoek canal and the Bath canal. The Netherlands wanted in return better water quality in the Meuse and the Scheldt and a better division of the quantity in the Meuse. The negotiators reached an agreement in 1975. However, the deal Belgium did not accept it because the Walloon did not benefit enough according to this agreement. The negotiations continued and in 1977, Belgium launched the idea of deepening the Scheldt for navigation purposes. The Netherlands linked again quality and quantity of the Meuse to the negotiations about the Scheldt. The Walloon opposed again and wanted a construction of storage reservoirs in the Ardennes. No agreements were reached. (Meijerink, 2008)

**Interests of Belgium**

The Belgian harbor of Antwerp is one of the biggest harbors in the world but the main access route to this harbor is on Dutch territory. Flanders is therefore completely dependent on the willingness of the Netherlands to cooperate in the improvement of the maritime

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⁴ The sediment equilibrium is depending on the proportion tidal discharge and river discharge. In the Scheldt the tidal discharge is $1 \times 10^{9}$ m³ to the river discharge of $2.5 \times 10^{6}$ m³ meaning that the tidal volume is dominant. The tidal volume is called the filling volume (vulschil). The sediment transport flow through the trenches. When the filling volume is larger, the canals will grow when they are smaller the sediment will land . The proportion of the tidal discharge and the river discharge is affected by making dikes and polders because the komberging decreases (Saeijs, 1993)
access of the Western Scheldt (Mijerink, 2008). According to the separation treaty of 1839, buoying, politage and conservation of navigable channels in the Scheldt estuary were subjected to joint superintendence (Panhuys, 1978). After 1839, more treaties have been signed to secure the interest of Belgium however the negotiations about deepening the Scheldt did not bear its fruits for long. Because of the separation treaty of 1839, Belgium interprets the Scheldt estuary as an international waterway of which the Netherlands should provide access (Strubbe, 2008; Blom, 2008; Gerrits, 2008). Not complying with deepening of the Scheldt would mean violating the separation treaty.

**Contradicting interests**

The Dutch government had not much interest in helping the Flemish prosperity; on the contrary, they had much more interest in keeping the competitive advantage for the harbor of Rotterdam (Meijerink, 2008; Blom, 2008, Strubbe, 2008). This is the reason why they linked Dutch interests to these negotiations (Meijerink, 2008).

**Interest of the Netherlands.**

The sanitation of the Scheldt estuary was one of the main interests in the Netherlands but not an issue of national interest more a provincial interest (Strubbe, 2008). The Netherlands being a downstream country is largely depending on the water quality policies of Belgium and France being the upstream countries. But the Netherlands did not only wanted sanitation of the Scheldt but also for the Meuse. The Netherlands furthermore strived for agreements for the division of the amount of water of the Meuse that the Netherlands needs for drinking water purposes.

The division of the amount of water from the Meuse and the quality of the Meuse water became linked to the negotiations about the Scheldt (Blom, 2008; Saeijs, 2008; Strubbe, 2008, Meijerink, 2008).

### 5.1.3 INSTITUTIONAL PILLAR

**Institutional changes**

Belgium and the Netherlands were negotiating about three issues; the maritime access of the Scheldt, the Quality of the Scheldt and the quality of the Meuse water and quantity division of the Meuse. When one looks into the institutional organization of Belgium it shows why this caused an impasse. Belgium consist of three districts; Flanders, Walloon and Brussels. These districts where at the time not authorized to sign international treaties. The Meuse is mainly on territory of Walloon; the Scheldt only on the Flemish and Dutch territory. The Netherlands wanted in return of the maritime access the sanitation of the polluted Meuse and agreements on the distribution. The Netherlands was thus the asking party for Walloon and the giving party for the Flemish as is shown in Illustration 5.14. This was a major the reason for an impasse.
Because it turned out to be impossible to reach agreements institutional change was organized in Belgium. The constitution was adapted in 1993 for this reason; making it possible for the districts to sign international treaties (Strubbe, 2008).

From now on, the Netherlands only negotiated with the Flemish delegation which would mean a breakthrough in the negotiations (Meijerink, 2008). The question arose whether to pursue the negotiations on ministry level or on provincial level, because the Flanders is not a national authority. The fact that the Dutch chose to pursue at the highest level was important for the Flanders and an important reason for the success in the end (Strubbe, 2008).

**Norms and Values**

Cultural differences between Flanders and the Dutch are smaller than between the Dutch and the Walloons (Strubbe, 2008). In Walloon less priority was given to water quality issues of river the in the Flemish part of Belgium. On top of that, the Flemish and the Dutch have a greater trust in bureaucratic procedures than the Walloon. This means that they are more likely to adhere to treaties when there is consent and ratification (Strubbe, 2008). The fact that Dutch and the Flemish speak the same language also helps (Blom, 2008; Saeïjs, 2008; Strubbe, 2008).

**International treaties.**

In Helsinki in 1992 treaties for transboundary effects in International Rivers was ratified by the European Union countries and some east European countries. This treaty acknowledges the transboundary effects and the need for international cooperation. Because of this treaty international river commissions were set up for the Scheldt and the Meuse new platforms for cooperation were created. This new platform was a boost for the international relationship between the Netherlands and Belgium (Blom, 2008; ).

Due to the Helsinki treaty (1993) cooperation on water quality became an international obligation. In consequence, it was not a negotiation issue anymore; the question was only how to solve the quality problem (audit report of the deepening of the Scheldt, Flemish parliament, 2000).

**5.1.4 POLITICAL PILLAR: PART 2**

The negotiations became easier due to the above-mentioned institutional changes. Next to that, there were personnel changes in the delegations. The delegation was made smaller on both sides and other people took over.

Also very important to the success of the negotiation process was that the negotiations were prepared on a high civil servant level and not any more on political level. This had the effect the commission Biesheuvel was dissolved in 199X? Blom being Director General of RWS took over when new negotiations started.
that sensitive topics could be discussed on a more rational and technical level; this turned out to be easier compared to the political discussion of the past. When conflicts arose or mistakes were made it would not immediately affect the political relations and could be solved easier by the politicians.

This new configuration of negotiators followed a new strategy. A new list was made with only conflicting issues. The rest was considered to be agreed. This caused a reduction in the negotiating agenda. The parties had the intention to come to an agreement. This agenda was:

- What would be the division of the dredging costs?
- What would be done with the VAT on the dredging works?
- How to Compensate for recovery of the natural environment due the dredging activities?
- How to solve the water quality issues in the Scheldt?
- How to solve the water division of the water in the Meuse?

The outcome of the technical negotiations would be reported to the ministers of Flanders and the Netherlands they would have the final decision.

The first three issues were agreed upon in the form of a package deal the last two were technical issues that were also dealt with in a technical fashion.

### 5.1.5 PACKAGE DEAL

In principle the Flanders’ opinion was that the Netherlands should pay for the dredging costs of the Scheldt. They recall this principle from the separation treaty of 1839 however, a more pragmatic approach was chosen because the Dutch did not share this interpretation of the treaty (Strubbe, 2008). In the end a distinction was made between dredging costs, cost for removing wrecks, bank protection works and cost for recovering the natural environment.

For bank protection works Flanders contributes 75% and the Netherlands 25%.

The cost that are involved to enhance the accessibility of the canals in the Scheldt consist of cost for dredging activities and cost for removing wrecks.

VAT is calculated over the dredging works, which Flanders should also pay to the Netherlands. Flanders had difficulty in accepting this. A solution was found in which the Dutch would pay extra in the cost for removing wrecks to compensate the Flanders who eventually agreed on paying VAT. In the end, Flanders paid for 90% of the dredging cost and the Netherlands 10%. This was proportional to the economic activities in the harbor of Antwerp compared to the harbor of Terneuzen and Vlissingen. (Blom, 2008, Saeijs, 2008; Strubbe, 2008).

The cost for the recovery of the natural environment were estimated on twice 880 million francs. The Dutch would carry all the risks.

The division of the cost are shown in table 5.2; the amounts are expressed in millions of francs of 1995:

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*Value of 1995*
Purpose | Flanders | The Netherlands | Total
--- | --- | --- | ---
Enlarging the maritime channel | 4,271 | 649 | 4,920
Dredging | | | 2,620
Removing Wrecks | | | 2,300
Oevers | 1,77,5 | 392,5 | 1,570
Ecological recovery | 880 | 880 | 1,760
Total | 6,328,5 | 1,921,5 | 8,250

Source: audit report of the deepening of the Scheldt, Flemish parliament, 2000

Technical Solutions were found as followed:
A review commission was founded to study the pollution issue. In this commission Flemish and Dutch engineers worked on a solution. The findings of this review study would form a basis of the advise to the ministers considering the pollution in the Scheldt estuary. From this study follows, that enlarging the basin storage (komberging) and dredging more eastwards in the estuary would solve a great deal of the sedimentation pollution. (Rapport: Beheer en onderhoud Wester Schelde).

Technical solution water division of the Meuse water
The Flemish had waited for a long time to get an agreement on deepening the maritime waterway to the harbor of Antwerp. They were therefore willing to solve the distribution issue by surpassing Walloon. The chosen solution was found on Flemish territory just pass the border with Walloon. This solution entailed three regulation works that enabled regulating the division of the water in the Meuse (Strubbe, 2008).

This advise of the before mentioned issue was given to the politicians. The Netherlands would not sign immediately. When it came to the point ratifying the water treaty a new linkage was made with the trace choice of the HSL (High Speed Line). The Dutch wanted a trace to Roosendaal instead to Breda. This linkage of the HSL to this treaty has always been there unofficial but was now brought up at the very end of the deal (Strubbe, 2008; Vanfreachem).
At the same time the Dutch were in negotiation with another treaty in Charleville Mezière about the water quality in the Meuse. The fact that the water treaty and the treaty of Charleville Mezière were signed on the same day could show that an exchange had taken place there (Strubbe, 2008, Gedachtewisseling, 2000).

5.2 AGREEMENTS CONSIDERED
During the period from December 1998 to the end of April 1999, the Belgian Audit Office and the Netherlands Court of Audit conducted a joint regularity and performance audit in relation to the preparation and implementation of the water treaty. The work performed on Belgian territory was also included in the audit.
This resulted in several insights in the financial agreements that were made in the water treaty.
• The usefulness and need of the accessibility of the Scheldt was not established beforehand and a cost benefit analysis was not performed.
When the water treaty was signed, insufficient insight was established on the scale and cost of the wreck removal. Since the contribution of the Netherlands was restricted to a financial ceiling of 988 million Belgian Franks. Any increase of costs would result in the Netherlands receiving more VAT paid by Flanders. No institution was accounted to monitor the increase of cost.

The treaty did not provide in guaranties about the permits that would be needed to perform maintenance work of the dredge activities in the future.

The Flemish regional government did not have sufficient resources to check how much volumes were dredged nor did they have the resources to monitor the wreck clearance activities.

The budget for the wreck activities were open ended which means that there is no ceiling to the expenditures on top of that the supervision on overshooting the costs was weak.

### 5.3 CONCLUSIONS ABOUT COOPERATION

In the Scheldt case, it was hard to reach agreements about the water treaties. There are several reasons why it was such a complex issue.

**Politically** it was complex because the Belgium and the Netherlands had different interests and contradicting interests. Both parties wanted their interests being served as optimal as possible and used their tactics to achieve this. These tactics involved among others, issue linkage and delaying the decision making process.

**Technically** it was complex because partners had to agree on solutions that solved problems of access and the environment.

**Institutionally** it was complex because the institutional organization of Belgium made it impossible to untangle the interests until 1993.

A solution came about when an answer was found for most of these issues. The institutional change made it possible to untangle the interests. In addition, an adequate political answer to these institutional changes was found by starting new negotiations with a Dutch delegation of high national rank.

Therefore, it became possible to reduce the negotiation agenda to several financial division issues and technical problems. By preparing these negotiations on a non political level, but technical level, it became easier to put conflicts aside. Package deals were closed in order to reach an agreement in which the interests of both Belgium and the Netherlands were met.

The agreements have been considered in paragraph 5.2, which showed that there were several drawbacks in the implementation of the treaty. This had to do with the fact that the agreements did not provide sufficient guaranties about the implementation and monitoring the cost developments. On top of that, the treaty did not provide in many guaranties about the future. Another important issue was the fact that Flanders paid VAT to the Netherlands. This was a principle in which the Flanders opposed to since it would result in paying tax to an other government. The VAT had also an other negative outcome for Flanders. Because increase in cost would result in more VAT -income for the Netherlands which, does not stimulate saving cost on measures. Moreover, it creates a perverse incentive to let the costs exceed.

Institutional arrangement can resolve some of these issues. Not all, because there is always the risk that estimations about cost can turn out to be too positive or too negative; In making agreements a, certain level of uncertainty about best estimates will remain. It could have been possible to create more guaranties about the development of the costs and to safeguard
these developments by creating monitoring institutions. The question is whether an agreement would still be achieved when these issues were negotiated on even longer. There is thus a dilemma in choosing between a ‘perfect’ treaty that provides all the guaranties with the risk that there will not be a treaty at all, or accepting a less ‘perfect’ treaty.

It was also mentioned that the need and necessity was not confirmed by a cost benefit analysis. This was criticized some years after signing the treaty. However, at the moment of the negotiations it was believed that performing a cost benefit analysis would weaken the position of the Flanders towards the Dutch. Since, it could raise the idea that deepening the Scheldt was not so important to the Flanders after all (report of Flemish parliament, piece 37, 2000). On top of that the scope of the cost benefit analysis would be hard to determine because of the economic impact of an increased accessibility of the harbor of Antwerp is quite difficult to determine. On the other hand when these calculations would have been performed it could prove the benefits for the economy of Flanders and it would have provided more insight in the financial risks.

5.4 CONCLUSION ABOUT THE MODEL

Political Pillar
In the previous cases it was determined that driving forces for cooperation, demands partners have before they consider contribution, making use of windows of opportunities and different motivations are important elements in the political pillar.

In the previous cases, the interest of partners came about in the driving forces and in the different motivations. In this case, the interests of the partners had a different character since some interests were contradicting and some interests were unrelated to each other but became linked in the negotiations. To untangle these different types of interests they are defined again.

Utility maximizing: interest of partners are maximized, not necessarily at expense of the other. Utility maximizing is achieved by a higher level of efficiency.

Motivation: is the reason to participate in a cooperation and says something about the agenda of partners. The agenda of partners do not have to contradict.

Stakes: are issues that can be contradicting and unrelated; these are the issues that eventually will be negotiated. Creating package deals a way to involve stakes of different countries in order to reach agreement.

Dealing with stakes is thus a new element to add to the political pillar.

The demands Belgium had before they were willing to contribute are more complicated in this case. In the end it showed that they were willing to pay for the dredging costs because their stakes in the harbor of Antwerp were high. However, the Netherlands did not approve unless their interest were warranted. The way a financial agreements was reached and the cost were divided in the end, will be discussed late in these conclusions when institutional arrangements are discussed.

Again, in this case a window of opportunity was used to reach an agreement. This window was open when Belgium reformed their constitution. In addition the Helsinki treaties created a new opportunity since it stimulated cooperation platforms and measures against polluted rivers were accepted and acknowledged broadly.
**Technical Pillar**

In the previous cases it was determined that river features, upstream downstream relations and effects of measures, feasibility of measures, costs of a project, sharing common methodologies and a non political relation between engineers are important elements in this pillar. This case was not about flood prevention therefore the elements have a different character.

- The Western Scheldt estuary has particular features due to the salt water coming from the sea mixing with the fresh water coming from the Scheldt.
- There are upstream downstream dependencies since pollution moves downstream.
- Feasibility of measures was important since a solution needed to be found to deepen the Scheldt while protecting the ecological values of the estuary.
- Cost of the project was very important in this case since it was part of the negotiations.
- Also in this case a joint research group was set up with Belgian and Dutch engineers which created support for the suggested measures.
- In this case it became even more clear that the apolitical relation between engineers can help being pragmatic in cooperation. the fact that the negotiations were prepared by high placed technical civil servants made the interaction less susceptible to political games that could harm the negotiations.

**Institutional Pillar**

The framework of the institutions is filled in, in the table 5.6 below. The arrangements in the last column of financing needs more explanation.

<table>
<thead>
<tr>
<th>Values and norms</th>
<th>Water cooperation</th>
<th>financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority for pollution control</td>
<td>Cultural differences: Trust in bureaucracy, Speaking the same language</td>
<td>Economic stakes in the negotiations, Willingness to resolve the issue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Belgium was not willing to pay VAT to the Dutch government</td>
</tr>
<tr>
<td>Regulation and laws</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpretation of Separation act of 1839 Helsinki treaties</td>
<td>Institutional change in Belgium Helsinki treaties</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrangements</td>
<td>Negotiate on high political level.</td>
<td>Divide costs proportionally to economic stake in measure. Compensate paying VAT with lower compensation costs. Monitoring implementation Monitoring cost exceeds Perverse incentives of agreements</td>
</tr>
</tbody>
</table>
In this case institutional arrangements resolved the division of financial contribution in the negotiations. The Dutch calculates VAT on the activities like dredging. In principle Belgium was not willing to pay VAT to the Dutch government. To solve this issue Flanders paid VAT and in return, they were compensated in the cost that are involved in clearing wrecks in the estuary. This created perverse incentives of the VAT hindered efficient execution of projects.
The total dredging cost were divided proportionally to the economic stakes in better access of the Scheldt estuary. This solution for the division is also suggested in the second case, where cost could be divided proportionally to the gains in terms of safety.
From the conclusions of cooperation, it follows also that institutions that safeguard the implementation and monitoring exceeding of costs are also important elements for the institutional pillar.

Relations
Again, in this case there are relations between pillars apparent. Relations particularly of importance in this case where the relation between the institutional pillar and the political pillar and between the technical pillar and the political pillar. The first relation came about when the interpretation of the separation treaty of 1839 became a political issue. Another example of this relation is the fact that new institutions such as the international Western Scheldt commission improved the political relation between the two parties (Gerrits, 2008).
In this case the improved political relation due to technical cooperation can be confirmed again.

Phases.
This case takes place before the formal phases transpire since it agreements needed to be reached on if the Scheldt would actually be deepened.
The aftermath in which the treaties were implementation of the treaties turned out to be also very important. In this case the implementation has been studied by the audit offices of Flanders and the Netherlands. The feedback on the implementations provided new lessons learned which could result in improvements for the future. In this case both countries were represented in the performance audit which can create trust on both sides about the findings of the audit.
CHAPTER 6: Synthesis with the model and the cases.

This chapter covers what is learned from the cases with respect to the initial model from van der Zaag and Savenije. First, the lessons learned from the cases for the original model as described in Chapter 2 are implemented in the model. The original model contains three aspects that needed to be taken into account in order to create cooperation being the Institutional, Political and the Technical aspects. In this chapter, these aspects are made operational meaning that they are equipped with content that is more tangible. Next to that, supplements are designed in order to complete the missing elements to fully support describing the cross border cooperation process. These supplements follow from insights of the cases that the three elements (Institutional, Political, and Technical) interact, which is not made clear in the original model. Another insight from the cases is that the cooperation can be under influence of a certain time path, which needs to be considered in order to describe the cooperation in more detail. Last, the cases have shown financial aspects of cooperation. These aspects will be included using the adapted model.

6.1 THE POLITICAL PILLAR

In case one it was pointed out that the political pillar could be equipped with the following elements.

- The first important element seems quite evident but nevertheless important to mention. It is element that supports the fact that decisions are made in the political pillar. These decisions are supported by the other pillars but made in this one. The first element is therefore decision making.

- Driving forces; make partners cooperate. From literature studies, three different driving forces can be distinguished. It has been confirmed that these driving forces also played a role in the cooperation that have been studied.
  - Utility maximizing: by collaboration partners strive to achieve a higher utility (Rowlands, 1995). This came about in the interviews were it was pointed out that realizing a project together based on a higher efficiency, in terms of needed investment to achieve the safety levels, would create willingness to cooperate.
  - Common problem; a shared understanding of a problem is necessary and that partners must agree on the necessity of a cooperative response in order to come to collaboration (Micko, 1999). This driving force became real due to the recognition that climate change would challenge the safety along rivers.
  - Dependencies; Collaboration on the basis of power emphasizes the importance of dependencies of the actors in as a driver for cooperation. this driving force is especially at hand on the smaller scale, such as the border region of the
Netherlands and Germany. On this scale mutual dependencies are acknowledged. At greater scale these dependencies are questioned (Veerman, 2008)

- **Window of opportunity;** that countries see windows of opportunity is shown in all three cases. Windows that have been identified are realization of the threat of floods after 1993, 1995 and Katrina, change in constitution in Belgium and the Helsinki treaties that stimulated new cooperation platforms.

- **Demands towards contributing;** that have been identified in case one and three are the following: the project should create a higher efficiency in terms of the investment that are needed to acquire a certain safety level, there must be trust between the partners who cooperate that the safety is guaranteed also in the long run. Last, a solution should be found about the co-determination/participation that is a result of financial contribution.

In case two it was pointed out that the political pillar could be equipped with the following element

- **Motivation:** It is the reason to participate in a cooperation and says something about the agenda of partners. The agenda of partners do not have to contradict. The different motivation of partners could result in different expectation with respect of implementing the outcomes of the research. The different motivation became obvious in case two where Germany was motivated to cooperate mainly by the learning effects. the Netherlands was motivated by the possibility of realizing measures in the dike rings. The future will tell whether these different motivations will result in disappointment or in fulfillment.

In case three it was pointed out that the political pillar could be equipped with the following elements

- **Stakes;** Are issues that can be contradicting and unrelated; the stakes will be the issues that eventually will be negotiated on.

- **Negotiation strategies.** An identified strategy to come to an agreement is creating package deals. These can entail a deal in which unrelated stakes are involved such as happened in case 3. Another mentioned package deal was the exchange of upstream to downstream effects that are caused by flood prevention measures. Another was the compensation strategies such as the exchange of paying VAT in return of a fixed amount of money.

The elements that have been mentioned are illustrated in the following picture:
6.2 THE TECHNICAL PILLAR

In case one it was pointed out that the Technical pillar could be equipped with the following elements:

- **Physical aspects** of the river Rhine was studied and the upstream downstream relations.

- **The upstream and downstream effects of measures**; Possible measures where assessed on their potential for activation in cooperation. From this case followed the conclusion that projects should have downstream or upstream effects. But that this is at the same time immediately a hurdle because the effects are geographically elsewhere than where the measures are taken. Therefore ideally an exchange (or package deal) in effects of measurements should be strived for. Another limitations that was found had to do with projects with small control over the effectuation. These can be hard to realize.

- **Cost of a project** the financial picture of measures should be addressed because it will play an important role in the cost benefit assessment.

In case two it was pointed out that the political pillar could be equipped with the following element

- Case two teaches us that technical cooperation offers the possibility of exchange important data on the physical aspects of the river. A **mutual methodology** was developed which was a difficult but fruitful process. Difficult, because both countries have their own jargon and it takes time to understand each other’s technical system. It was a fruitful investment of time because it became possible for the two parties to take the best of both countries by combining the methodologies.

- **Apolitical relation** of cooperation in the technical pillar because it enables a practical and pragmatic way of dealing with complicated matters. This non political relation of engineers in the technical cooperation is thus a important element to have for long lasting relations. Case three showed this also: that after a long time of political negotiations a breakthrough was realized, for an important part, due to the fact that engineers coordinated the advise before the politicians interfered. As Strubbe puts it; when you can talk about solutions with engineers it becomes more objective. Because engineering is about the best solution you do not have to walk on eggs.
The elements that have been mentioned are illustrated in the following picture:

Illustration 6.16

6.3 THE INSTITUTIONAL PILLAR

In the first case institutions of three levels were discussed on water policies, cooperation and financing. This gave insight in the differences in the two countries which are important to know and understand because it provides an explanation why cooperation can be hard sometimes. Differences in norms could lead to different priorities.

The following framework is used to describe the elements that are added to the institutional pillar.

<table>
<thead>
<tr>
<th>Water</th>
<th>cooperation</th>
<th>financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values and norms</td>
<td>Priority given to safety, ecology, climate change determined by physical or cultural aspects</td>
<td>Cultural differences</td>
</tr>
<tr>
<td>Regulation and laws</td>
<td>National water policies</td>
<td>National policies</td>
</tr>
<tr>
<td></td>
<td>European water policies</td>
<td>Responsibilities of different organizations and individual actors</td>
</tr>
<tr>
<td></td>
<td>Policies that are related to water policies</td>
<td>European policies: Flood directive</td>
</tr>
<tr>
<td>Arrangements</td>
<td>Responsibilities of different organizations and individual actors</td>
<td>On what level negotiations take place</td>
</tr>
<tr>
<td></td>
<td>Methods</td>
<td>Cooperation platform</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contracts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.4 RELATIONS BETWEEN THE PILLARS

The cases showed that there are clear and important relations between the technical, institutional and the political pillar. These relations can mean that they are influenced by each other but also that there is communication between the pillars.

In the following description are the Political, technical and institutional pillar subsequently represented by P, T, I. A relation PI means that P influences I.

6.4.1 FLOOR MAP

A floor map of the temple is designed to show these relations (illustration 6.19). In this floor map there are two parties. These parties represent the cooperating countries. Both parties have their own three pillars, which are interacting. The interaction is represented by the arrows. Between these two parties, the pillars also interact. The interactions between the pillars of the two parties are influenced by the process of interaction that happens within a party.
The mechanisms of influence can happen in both countries but because of the differences of the two countries, it works out differently. This can result in a confrontation in the arrows that connect the pillars of the two countries.

**6.4.2 EXAMPLE OF RELATIONS: PRIORITIZING**

In this paragraph the first example of the interaction is given. Illustration 6.20 shows how the following paragraph can be captured in the floor plan of the model. The numbers illustrate the order of the mechanisms of the relations. It must be mentioned however that the numbers are indicative of a possible sequence and should not be interpret very strictly (It is no rocked science).

Illustration 6.20
The Netherlands gives flood defense a high priority because it is a downstream country with a long history of fighting against the water. The technical system of the river influences thus the mindset of the country and therefore influences the institutional and the political pillars.

In case one it was found that the political priority that flood defense has in the Netherlands is higher than in Germany which correlates with higher safety levels. These higher safety levels have impact on the political agenda: When the safety levels are not reached or the safety levels do not keep up with the demands of citizens new political ambitions can be formed. Plus safety levels put a demand on the technical solutions for example, higher safety levels means higher dikes.

The political priority also correlates with the amount of effort it takes to reserve budget for flood defense. The level of priority correlates with the willingness to cooperate and the pressure a country induces to convince the other country of the importance. This priority also shows in the eagerness of the Netherlands to take initiative in starting and leading cooperation platforms. These issues show the influence politics have on institutions. From the third case it was the fact that Flanders had so high stakes that the deepening the Scheldt had such high priority which showed in their willingness to negotiate.

### 6.4.3 Relations between Institutional Pillar and Political Pillar

The following paragraph explains examples of the relations that are identified in this research between the Institutional pillar and the other two.

The relation between institutional systems and technical systems is complex. They can not be separated from each other. Institutional systems follow from, to a large extent to technological characteristics but the institutional solutions that are chosen may vary.

From interviews and the cases followed that the Germany is more hierarchical organized. To make a decision in Germany the lines of hierarchy need to be followed whereas in the Netherlands people lower in the organization have more authority. This can cause a situation where the German party need to go back with findings before a decision could be made while the Dutch party already can give with quite an amount of certainty an indication what the decision would be. Due to this mismatch in the two organizations there can be a discrepancy in the speed of decision making. This example is shown in the following illustration:
When the people of the same level or with the same authority are dealing with each other it can show trust or a feeling that the problem is taken seriously. This can have a positive effect on the cooperation which was shown in case 3: Where the choice of the Netherlands to negotiate on ministry level with Flanders fulfilled the Flanders expectations. From case 3 (the Scheldt case) also followed that institutional changes are sometimes needed to require to this demand. As described Belgium even has changed their constitution in order get out of the deadlock (Meijerink, 2008, Strubbe, 2008). This example is shown in the following illustration (illustration 6.22):

The Scheldt case (case 3) showed that interpretation of institutional arrangements can harm the relations. The Netherlands interpret their responsibility, followed from the separation treaty (1839), different than the Flanders, at least they did not see deepening the Scheldt as an international obligation. Because the Flanders chose a pragmatic approach they were able to reach an agreement in the end. The Flanders still see this as unjust; due to the water treaties the principle proposition towards free maritime access is weakened (Gedachtewisseling, 2000, Srubbe, 2008). However the interpretation of treaty may have been different, due to shared norms and language the negotiations became easier. The fact that the Netherlands held on to a different interpretation than Flanders may have it origins in the importance of the stakes at hand (competitive advantage of the Port of Rotterdam) than with deep-rooted cultural values. This example is shown in the following illustration (illustration 6.23):
According to Desbordes and Vicard (2001), who studied bilateral investment treaties, the qualities of institutions in home and host countries and good interstate political relations have a positive impact on signing international treaties. This example is shown in the following illustration (illustration 6.24):

6.4.4 RELATIONS BETWEEN THE TECHNICAL PILLAR AND THE POLITICAL PILLAR

When countries cooperate between the Technical pillars a shared norm system is built, this became very apparent in case 2. The actors experienced this process to be important as well as pleasant. The cherry picking from both countries methods was lifting the quality of the work and the understanding of each other. The interviewed people stressed the importance of this process for the political decision making.

From the interviews became very clear that the relation that is built by cooperation in the technical pillar has an important impact on the political relation. The study of Savenije and van der Zaag (2000 (2)) showed that in times of crisis many times professionals continued working together to enhance the benefit of the riparian countries. The relation between engineers is less political and more stable than the other relations. (therefore Savenije and van der Zaag put the technical pillar in the middle). This relation forms a basis to build up
trust, but fairness in sharing knowledge should be warranted. These mechanisms are shown in the following illustration (illustration 6.25)

Another example of these relations is the kind of technical solutions that are suggested by the engineers, who cooperate between the technical pillars, influence the feasibility of the political decision. For example retention is politically less feasible than deepening a river: No one is affected when the last measure is taken while for the first people might need to move or give up land. Projects with a lot of uncertainty in the operational control and thus uncertainty of the effectiveness of the measures can also influence the way politicians view this alternative. When projects have only upstream or only a downstream effect it could be hard to realize a political decision. This would already become easier when an upstream - downstream package deal could be closed.

6.5

FINANCIAL RELATIONS.

Throughout the cases it has also been studied how financial contribution of countries in cooperation influence the process of cooperation. The model is not a financial model but the cases showed that financial contribution can be related to the political, technical and institutional aspects of cooperation. Therefore the floor map of the model is now used to describe what happens in the relations between the pillars with respect to financial contribution. The following examples show in two examples of how the financial issues are resolved in the interaction of the political, technical and institutional pillars.

6.5.1

EXAMPLE

In the political pillars decisions are made. With this in mind, the interaction between the political pillar will be about negotiations, coordination of the (financial) decisions. From the cases it can be concluded that coordination about financial agreements entail agreements on what the implications are of financial contribution. This means the following:

- To what degree it will also mean influence on the effectuation of a measure as a result of financial contributions.
- One of the driving forces to cooperate was the fact that partners are utility maximizers. Between the pillars decisions makers will strive for a way on how to achieve a maximum utility. Solutions can be found in the institutions, by making agreements on
the division of investments, or when possible in the technical pillar by making an exchange in effect of measures. This is shown in the next illustration 6.26.

Illustration 6.26

6.5.2 EXAMPLE OF RELATIONS: CBA

The cost benefit analysis (CBA) can show the best solution considering criteria that have been assessed in the analysis. Which alternative is scores best depends on the technical and financial aspects of a measure. The outcome of the CBA is input for the choice between alternatives. This is shown in the next illustration 6.27.
6.6 **RELATION MODEL WITH PHASES**

The cooperation as in case 2 is very substantial. In this case, a common goal is formed, common strategy is agreed upon, and the project may be realized with substantial coordination in the plan study phase. The execution phase will probably be done by one partner but cooperation will continue in the maintenance phase. The second case showed that when cooperation is as close and tangible, as it is in the second case, then the model can be combined with the cycle of the project from exploration to maintenance. The combination of the phases and the model is shown in Illustration 6.28. In this Illustration a distinction is made between the actions that are related to the project and the actions that are related to financing the project.
6.6.1 EXAMPLE RELATION WITH PHASES FROM CASE 2

In this paragraph the relations that the floor map has with the phases of the project is shown in illustration X. The arrows that are active are highlighted. The text explains what these highlighted arrows entail (the colors of the arrows correspond with the color of the phases). Illustration 6.29 provides insight that the pillars and the relations between the pillars are different per phase. This example is based on case 2.

Exploration phase
From the case it followed that Germany and the Netherlands had a different motivation to enter the project. But apparently the motivations were for both countries important enough to be able to form a common objective.

The exploration phase is very technical orientated and dominated by cooperation between engineers. The same mechanism that play a role in prioritizing a project, as described in Illustration 6.19, play a role in this phase. Therefore coordination between the institutional pillar and the technical pillar is needed (remember that the technical system of a river determines the value system of a country which results in safety levels and a higher priority on the political agenda). To continue towards the next phase a choice needs to be made about what alternative is going to be developed. The choice that politicians make should be based on political and on technical arguments. Therefore it is important to have good communication between the technical pillar of a country and the political pillar in this phase.

Plans study phase
In the plan study phase institutions of the countries (such as: building methods, design restrictions and safety levels) determine the technical design of the project. The choice that politicians make can be founded on political and on technical arguments. Therefore it is important to have good communication between the technical pillar of a country and the political pillar. In this phase arrangements should already be made about the execution of the project. These arrangements should provide certainty about the division of responsibilities of the execution of the project and about the division of costs. The arrangements should also provide certainty so that the project fulfills the requirements as is intended in the previous phases.
Execution phase
In the second case it was forecasted by the interviewed people that no cooperation will take place in the execution phase.

Maintenance phase
In the maintenance phase cooperation will be continued because new findings about the river system can be studied and information exchange about the new required safety level can take place.

Financial floor plan related to the phases
In the case that has been studied for this research no financial agreements considering the project have been made. From the interviews can be collected that this can become important when it is decided that a project will actually be executed. This will be done in the plan study phase. Agreements need to be made about the division of costs. Silva (2008) suggested that the division of cost could be divided from the proportional distribution of benefits. Hoppenbrouwers suggested that it could be possible to form a price to convince the other party to start executing a project. Whatever happens negotiation will take place between the decision makers and an agreement need to be established. This agreement should also entail what will be done in the future of the project when maintenance is necessary.
The aim of this research was to answer two questions that as posed in the beginning of the report. The first question that is related to cooperation:

What Political, Technical and Institutional conditions are necessary in cooperation between the Netherlands and her adjacent countries in cross border water management to overcome the challenges international river basin management, how does financial contribution influence this process of cooperation?

The second research question is related to the model of van der Zaag and Savenije (2002)

How can the model of van der Zaag and Savenije (2002) be equipped in such a way that it provides better insight in cooperation and the financial aspects of cooperation and how to equip the model to enhance the usability?

In the previous chapters several elements were distinguished that are important for cooperation. These elements contribute in the explanatory value of the model. The elements were chosen because they provide insight in the conditions required to overcome challenges in cooperation between the Netherlands and her adjacent countries in cross border water management projects. In addition, they provide insight in how financial contribution influences the process of cooperation.

The conclusions will be drawn on how the elements in the pillar do this. The structure of this part of the conclusions will follow the structure of the model.

The second part of the conclusions will be about the usability of the model. The model has been equipped with new elements being the floor map and the relation with the time path. Next to the fact that these elements are designed to enhance the usability of the model, these new elements provide also insights in the conditions of cooperation. The conclusions will be drawn on how these new elements enhance the insight in the process of cooperation.

7.1 POLITICAL PILLAR

There are different starting points for countries to cooperate. These different starting points affect the way partners who cooperate position themselves in the cooperation. the following starting points were distinguished in the cases:

Partners can face common problem

Partners can realize that they face a common problem, which would be easier to solve when they cooperate. In this case, there will be a common goal to realize. How intensive the cooperation will be depends on how serious this problem is perceived. There can also be a difference in this perception because one country will suffer more than the other.
Partners who cooperate strive to achieve a higher utility.

In flood managements as indicated in the first two cases the utility that partners strive for is creating more efficiently a higher safety level. In case 3 the utility had a economic character for the Flanders since deepening the Scheldt was strived for, which would contribute in the competitive advantage of the harbor of Antwerp.

Partners can have different motivations for cooperating

When the motivations for cooperation differ too much, it can lead to different expectations towards the outcome of the cooperation. When the motivation of one partner is learning from the other while the other partner is motivated by the expectation that the cooperation will lead to the realization of a project, then there is a gab in expectations to fill. When partners are not aware of this gab the cooperation can result in a disappointment of at least one of the partners.

Partners can have different stakes in cooperation

The stakes partners have can be contradicting or unlinked as was shown in the third case. The higher the stakes the more willing partners are to reach an agreement. When the stakes are both high and contradicting, it becomes harder to realize agreements.

Partners are dependent on each other

In river basin management the dependencies in river basins are acknowledged. For flood prevention these dependencies are especially relevant on smaller scales, such as in the border region of Germany and the Netherlands. The scale depends on the reach of effects of measures. The further the effects reach upstream or downstream the larger the scale will be. When countries cooperate to clean polluted rivers then the downstream countries are the dependent partner since the flow of pollution has the same direction as the flow of the river.

There are windows of opportunity for cooperation

These windows of opportunity can create a greater sense of urgency or better circumstances for cooperation. In the cases several events were identified that created new windows of opportunity. After the threats of high water in 1993 and 1995 the ties between Germany and the Netherlands were strengthened. The Helsinki treaties made countries acknowledge the importance of pollution measures and the fact that cooperation was needed in international river basins. Afterwards it became unethical to let pollution be an issue of discussion.

When partners passed the starting point of cooperation there are other issues of importance to consider.

Partners have demands prior to contribution

When partners decide to contribute financially in the cooperation they have several demands. These demands need to be considered and answers need to be found to fulfill these demands. The project should create a higher efficiency in terms of investments needed to acquire a certain safety level; there must be trust between the partners who cooperate that the safety is guarantied also in the long run. Finally, a solution needs to be found on the co-determination/participation that is a result of financial contribution.

Partners have negotiating strategies to fulfill their own motivation, to maximize their utility and to warrant their stakes.

Several strategies have been identified in the case studies. One of the strategies was the creation of package deals. In these deals different stakes are combined in order to reach an agreement in which all partners benefit. In both case 1 and 2 the exchange of upstream and downstream effects is an option of combined stakes. This is important since measures in
COOPERATION BETWEEN THE NETHERLANDS AND ITS NEIGHBORING COUNTRIES IN WATER MANAGEMENT

flood management have effects elsewhere than the location of the measure. An exchange could then create more support by more partners. In case 3, unrelated issues were linked in the package deal. This was needed because partners did not profit from the stakes that were put forward by the other partner. Another strategy to reach agreements is compensation. Flanders agreed on paying VAT and was compensated by the contribution of the Netherlands in the wreck clearance. This had the side effect that it did not stimulate efficiency since higher cost for wreck clearance activities would result in higher VAT incomes. Partners can have a ceiling of their willingness to contribute. The question is whether an agreement would still be achieved when these issues were negotiated on even longer. There is thus a dilemma in choosing between a ‘perfect’ treaty that provides all the guaranties with the risk that there will not be a treaty at all, or accepting a less ‘perfect’ treaty.

7.2 TECHNICAL PILLAR

The technical conditions have been studied to identify what is important in the cooperation process. The technical pillar contains technical aspects as well as aspects for cooperation between the engineers that function in this pillar.

The physical features of the river in a country determines the position and the attitude in cooperation.

The Technical aspects are related to the physical features of the river and the effects of measures. There are different levels of scales to consider in the downstream and upstream relations. Germany as a whole is the upstream country on which the Netherlands is very dependant. On a smaller scale between Nordrhine Westfalen and Gelderland there are mutual dependencies. This can create more understanding on smaller scales and thus more opportunity for cooperation. The basin scale of the river should however be considered to understand what happens in the whole river basin. Therefore the phrase “Think basin wide act watershed specific” is a good one to hold on to (Savenije and van der Zaag, 1998). This is in line with the Subsidiary principle of the EU.

Measures are suitable for cooperation when they have upstream or downstream effects but they are only feasible when the scale of the effects is in line with the institutional scale in which partners cooperate. Partners who cooperate should aim at gains for both partners to enhance the social acceptance of measures. From the measures that are studied, it can be concluded that most measures have their pros and cons; retention is technically a suitable solution because it causes downstream effects but retention is less feasible when the affected people are considered. Giving space for the river is feasible because of its upstream effect in lowering the water level but these effects damp out sooner. Changing the land use, to enhance the absorbing capacity of the surface can be effective but it takes a long time for this measure to become effective.

When parties rely on the safety levels that are achieved by the measures there should be certainty about that safety for the future.

Transboundary measures can be taken because it is more efficient, this can mean that the potential measures in one country are replaced by the measure in the other country. This can only be safe when there is certainty about the effectuation of these transboundary measures (so that it works as intended at all times).

From the different measures, several requirements follow for measures to be suitable for a joint approach and eventual financial contribution of both partners:
There must be positive transboundary effects
Projects should be able to be effective within an agreed time scope that fits the time scope that parties hold on to, for reaching their ambitions.
There must be control over the effectuation of the measures if possible, this should be achieved technically otherwise it should be arranged in institutions.

The cooperation between the engineers in the technical pillar is very important to the political relations of a country
Technical co-operation involving the collection and dissemination of information promotes the acceptance of this information by all basin states and stimulates mutual understanding and trust. In times of international conflicts, at least technical co-operation should be maintained (anonymous, 1999).

Cost of measures play a role in the assessment of solutions
The Need and necessity of a projects is assessed with help of a cost benefit analysis. In the Netherlands it is formally obligated to perform such an analysis in “wet infrastructure projects”. The cost will be compared with the benefits. These benefits include the economic value and the number of people that are protected.

7.3 INSTITUTIONAL PILLAR

Taking into account the institutions of water policies, cooperation and financing on informal, formal and arrangement level provides insights in the vital institutions that play a role in cooperation

Water policies
Mutual understanding of the differences in water policies and the origin of these differences helps countries to make better policies together
Germany and the Netherlands have different safety norms in their water policies. The Netherlands is unique in the world having such a high protection level and the Netherlands values this strongly. In Germany, the potential damage of floods is less, which results in lower safety levels. It is not likely that both countries will change their safety levels when they are cooperating since it is embedded in formal regulation. Therefore, countries will have to find a way to overcome these differences.

Flood directive stimulates coordination between countries.
The flood directive stimulates coordination among partners when new policies will affect other countries. The flood directive does not make explicit when these effects are significant enough to demand coordination. The responsibility of this interpretation remains with countries. There are now reasons to believe that Germany will take actions in the near future that will increase the flood risks for the Netherlands. However, this research showed also that water policies change over time.

Cooperation
Cultural differences play a role when countries cooperate
Germany, Belgium and the Netherlands have different cultures resulting in different behavior. Where Dutch appreciate informal contact Germany holds on to formal relations and formal contacts. In Belgium the different districts have different cultural values. These differences play role when countries cooperate.
Understanding each others’ organizations makes cooperation easier.
Countries have different organization and different constitutional characters. This can cause misunderstanding about responsibilities and authorization of actors who are involved in the cooperation. When these differences are understood and known, it helps finding the right partners and it helps creating realistic expectations of involved partners.

Cooperation platforms form a basis for a good relation between countries
When countries have a platform where they meet on a regular basis, problems can be discussed and new initiatives can be taken. These platforms avoids that adjacent countries alienate from each other. The platforms create a solid basis which also helps quick coordination when disasters occur.

Financial institutions
Priority of the issue correlates with the financial constraints countries feel to contribute or to do concessions about contribution.
The Netherlands gives flood prevention a higher priority than Germany. Therefore, it is easier to find financial means for flood prevention projects in the Netherlands. It also results in the fact that the Netherlands has a greater focus on the economic advantage of cooperation in flood prevention than Germany. For Belgium, the access of the harbor of Antwerp had a great priority. This resulted in arrangements in which Belgium did a lot of concessions.

Timing of making financial agreements is important in making financial agreements.
When the ministry of finance or the Account guard the economical feasibility of a projects can be different per country. The Dutch ministry of finance is rarely involved in the exploration phase. No financial arrangement were in the research project of the international dike rings because it was felt that this could harm the relation. There is thus a balance to be found in keeping the relation as such that financial issues do not harm the relation and on the other hand, guarding economic feasibility of a project.

Financial agreements can have perverse incentives.
Agreements that indulge cost exceeds discourage efficiency. The agreement on paying VAT had this effect.
7.4 FINANCIAL MEANS

The second part of the first research question is how does financial contribution influence the process of cooperation. To answer this question, first to the question; does financial contribution influence the process of cooperation should be answered.

Financial contributions do influence the cooperation. Talking about it can only be done when concrete issues are on the table and therefore it demands that the issues are made concrete. In addition when countries are negotiating it is necessary to find a way of dividing the costs that is fair and in equilibrium with the stakes that partners have. But this does not prevent that governments use besides that more strategies.

Case two teaches us that partners have avoided the negotiations about costs in the beginning. It is formally arranged that there will be research but it has not been formally arranged that there will be an execution of a project. Moreover, partners have different perceptions about this. Not talking about money influences the cooperation in this case. Because by not talking about it, partners avoid confirming in what the cooperation will result in.

Case three teaches that the negotiations in the end were for a large part on the division of financial contribution. Which evokes the impression that end the end it was “all about the money”. Because when the partners were satisfied about the fairness of the division, an agreement could be reached. The interviewed people (Saeijs, Blom and Strubbe) however all stated that the negotiations were not about the money but about greater stakes. That there is
more to it, is also underlined by fact that after the agreement was designed on the division of costs there was not an immediate ratification of the treaty. The Netherlands started the discussion about the HSL because they wanted to get more out of the negotiations. In the end, the treaty was ratified when agreements on other issues were confirmed. Thus the financial division was necessary for this treaty but this division of costs alone was not enough to confirm the agreement.

Financial contribution does lead to more acceptance and solidarity on governmental level but not necessarily on citizen level.

In the introduction, it was mentioned that financial contribution could lead to more solidarity and acceptance of the measures. The previous conclusion showed that the division of cost was necessary to come to an agreement on governmental level. Citizens of different countries do not directly benefit from the contribution of another country. They are confronted with measures that are not in their interests. Because most flood prevention measures lower the risks elsewhere. Therefore, financial contribution might not create solidarity among citizens of the adjacent countries. Creating understanding of the dependencies in the river of both countries among citizens and making them participate in the process of cooperation would create more acceptances. In addition to this participation process, it would create more solidarity when solutions are put forward that exchange upstream and downstream effects.

Long-term arrangements about the mutual dependencies and about the sovereignty of the countries are needed when partners contribute financially in cooperation.

When financial contribution does also mean influence in water management in the paid country and when the contribution does affect the autonomy of a country it will hardly be accepted. This could be avoided by clear arrangements that guaranty the sovereignty on one hand and safety on the long term on the other hand.

When a project is realized outside the borders, the safety level becomes dependant on that measure which can be a risk when that measure does not function as intended. A country would have more control over this risk when the measure would have been taken on their own territory. Measures can only be taken when there is certainty that agreements will guaranty safety on the long run.

A fair way to divide costs is finding a division according the benefits of countries due to the measure this can happen in terms of safety or otherwise. These benefits can be expressed in terms of safety in which protected people, environment and economic assets are taken into account.

7.5 RELATIONS

An important conclusion in this research is that there is interaction of influence between the pillars. The relations were apparent in all three cases and they are important in describing the process of cooperation. To enhance the usability of the model a floor map has been designed to show these relations.

The relations have two dimensions. The first dimension refers to the relations between the political, technical, and institutional pillars within a country. These relations affect the second dimension. The second dimension refers to the interaction between pillars of the cooperating countries. The interactions between the pillars of countries are only interactions of pillars of the same kind (Political pillar of one country to Political pillar of the other etc.). The Illustration below shows the relations between the pillars.
The cases showed that the norm and value system from the institutional pillar have a great influence on the decision making process and arguments prior to the decision making process. This decision making process and the outcome of the negotiations result in arrangements.

Laws and regulation from the institutional pillar are founded in the physical aspects of a river from the technical pillar. But the other way around the law and regulation from the institutional pillar form constraints for technical measures. These technical measures are again decided on. There is thus a loop of interaction between these pillars influencing the way partners between countries interact.

For a more detailed description of more of these the relations I refer to chapter 6

### 7.6 RELATIONS TO THE PHASES

When cooperation has as objective to realize a project, the model can be combined with the cycle of the project from exploration to maintenance. The phases are shown in Illustration 7.28. Relating the model to the time path of a project, provides the opportunity to follow the process and distinct different mechanisms throughout the process.

In the beginning of the cooperation reason to cooperate and the arrangements that are made in the beginning are important. The cooperation is dominated by the technical pillar when the partners start exploring the problem and the possible solutions. At the end of this phase the political pillar becomes more important again since decisions need to be made about the continuation of the project. After that new arrangements are made that claims the continuation. In addition arrangements should be made that provides answers about the financial division, the responsibilities of the partners and the guaranties about the demands that partners have with respect of the functionality of the solutions. In the plan study phase it is again the technical pillar that dominates the cooperation. at the end of this phase again choices are made by the decision makers from the political pillar.
From this study followed that no cooperation takes place in the execution phase because the project will be realized at one of the partners’ territory and then building and design rules of that country need to be respected. After realizing the project cooperation will be continued again to share new insight about the river basin etc.

### 7.7 COMPLIED TO THE CHALLENGES OF CHAPTER 2

In chapter 2, several challenges were posed in international and integrated water management. The question is whether the model with the adaptations can address the challenges sufficiently:

In integrated water management the challenges were:

- **Addressing the geographic situation:**
  - By coordination between the technical pillar and taking into account the upstream and downstream relations of the River and of the measures the model addresses this challenge. The model allows looking into the differences of the physical system in different regions and show that it results in different mechanisms within a country that affects the cooperation.

- **Addressing the interdisciplinary background of involved people:**
  - The model does not explicitly address different disciplinary backgrounds. The pillars are defined in a very general way. Between the technical pillars, people from different backgrounds could cooperate. But the model does not provide insight how this should be done.

- **Addressing the different levels of government:**
  - In the institutional pillar, the model does address different levels of government and the fact that countries can be organized differently.

In international water management the challenges are:

- **Addressing the cross border effects**
  - The model does address cross border effects (see the above-mentioned explanation given about the different geographical situation).

- **Coordinate between institutional border**
  - The relation between the pillars of the cooperating countries makes the coordination between the institutional, political and technical borders apparent.

- **Respect sovereignty of countries**
  - Because the model makes explicit that coordination between the pillars in the First dimension is affecting the cooperation shows that countries are sovereign and have their own processes. The fact that countries want to be sovereign is also explained in the paragraph 7.5.

- **Respond to the possible different interpretation of equity and fairness.**
  - By providing insight in the different value and norm, systems in the institutional pillar parties can get more insight in the reason for different interpretations of what is fair.
CHAPTER 8

Recommendations

This recommendation chapter contains four parts. Firstly, steps of high importance for cooperation are discussed. Followed by a reflection on the research with recommendations resulting from this reflection. Then some concerns are posed with respect to the future. Finally, I will close this chapter with a recommendation for successful cooperation.

8.1 HOW TO COOPERATE

After the three cases the discussion about the model and the conclusions, the question arises which of the identified elements countries need to consider when they cooperate. Therefore several steps are designed that can help to find this answer. The floor map is used to illustrate the process.

Step 1: Determining why to cooperate

When countries cooperate the starting points of the different partners should be considered at the very beginning. Questions to be answered are: What are the stakes of your country and what are the stakes of the country you want to cooperate with? What is the motivation to cooperate and are these motivations compatible? Is there a common goal to achieve and how important is this goal for both countries? How to express the utility of the cooperation? When these questions are answered there is a better understanding what countries strive for and it becomes easier to estimate whether the goals of the cooperation are easy or hard to achieve. It also draws the attention to the hurdles actors which can be expected to be confronted with. This first step will form the basis for the agenda of the cooperation.

Before countries really start cooperating they should have an idea on how much this cooperation is worth and whether they also want to contribute financially. The following statements should be considered in order to realize whether the planned cooperation should involve financial contribution.

- Only pay for projects in another country when it is more efficient to do so, thus when joint action results in lower investments to reach you safety level.
- Only pay for projects in another country when there is enough trust in the partners on whether they respect and implement the agreements on the long run.

When a country decides to contribute financially, it is advised to determine the way to assess the economic value of the outcome of cooperation. In addition, it should be considered when to start negotiating about the financial issues and who will be involved in these negotiations. This is important because arguments about finance can harm the relation when done too early but when these discussions are started too late, there is less control over the financial aspects of the solutions throughout the process. It is also important to have an idea on who will be involved in the negotiations. The case studied showed that
preparing the negotiations by engineers will make this process less political and more pragmatic. On the other hand the engineers are building on a non political relation that stabilized the political relation. The role of the engineers should be considered so that the cooperation benefits from the advantage of a pragmatic approach of engineers and from their involvement in the political game.

**Step 2 understanding each other**

When countries start cooperating understanding of each other’s organization structure is recommended. The question that needs to be answered is: Who has what responsibility at what time in the process. Because of cultural and organizational differences, the hierarchical structures of the countries and parties involved need to be clarified together with the authorization rights of the individual participants. When the cooperation is dealing with flood prevention, it is important to know whether there are differences in perception of safety and how important safety is for the two countries in the various regions. Whether they want to protect themselves at all cost or if they accept larger risks? The matrix that I have designed (showed in table 8.8 ) helps to illustrate this process to understand each other.

### Table 8.8

<table>
<thead>
<tr>
<th>Values and norms</th>
<th>Water</th>
<th>Cooperation</th>
<th>Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority given to safety, ecology, climate change determined by physical or cultural aspects</td>
<td>Cultural differences</td>
<td>Solidarity</td>
<td>The priority water management has compared to other policies. Willingness to resolve the issue</td>
</tr>
<tr>
<td>Regulation and laws</td>
<td>National water policies</td>
<td>National policies</td>
<td>Available Budget</td>
</tr>
<tr>
<td>European water policies</td>
<td>Policies that are related to water policies</td>
<td>Responsibilities of different organizations and individual actors</td>
<td>Budgetary regulation Assessment of budget</td>
</tr>
<tr>
<td>Arrangements</td>
<td>Responsibilities of different organizations and individual actors</td>
<td>On what level negotiations take place</td>
<td>Responsibilities of different organizations and individual actors</td>
</tr>
<tr>
<td>Methods</td>
<td>Cooperation platform Contracts</td>
<td></td>
<td>Contracts: How to monitor the implementation How to avoid perverse incentives</td>
</tr>
</tbody>
</table>

**Step 3: Exploring the possibilities of the river**

The behavior of the river across the border needs to be studied. Countries tent to know and understand in detail the river from the border where it enters their country until it leaves their country. What happens before or after the borders is most of the time unknown. (Only recently, models were developed that describe the behavior of the Rhine over the border). Limitations and possibilities of measures depend on the character of the river, which changes along its course. What works in a delta does not work in an area with a steep slope. The different physical characteristics of the river along the river, needs to be understood in order to have a realistic expectations of the possibilities of flood prevention measures.
**Step 4: Making a common language**

Because of differences in terminology miscommunication can easily appear. In Germany, for example, the air site of a dike is the area what the Dutch call inner dike area. It is therefore important to take time in understanding what the other means. The development of a common ‘language’ is therefore part of phase 4. This common language can be developed so extendedly that it evolves into a common methodology for calculating risks and assessing possible measures. The further this common language is developed the higher the level of understanding and more support on the outcome of calculations can be expected.

Using a common language and methodologies are agreed upon the design of alternative solutions can start. This needs to be done, respecting each other formal laws that are applicable to these measures. This can entail the safety standards but also what standards there are considering the environment. These alternatives should be in line with the motivations, stakes or common goals that were identified in step one. In order to achieve as much gains for both countries as possible.

**Step 5: Making choices**

When alternatives solutions are designed choices need to be made. These choices are political but must be supported by the technical ‘pillar’. The choices are especially political when the (economic and social) stakes are high or when motivations are not aligned. In these negotiations some creativity in finding solutions in which both countries benefit is important. This creativity can be supported by a better understanding of the features of a river that is gained in step 3. Creativity can also be gained by help from the institutions like agreements and treaties that are focused on the long term relation of cooperating countries.

**Step 6: Designing institutions**

In the design of institutions that consider at least the following.

- Try to divide the cost compared to the benefits the project creates in terms of safety. It would also help to create package deals in which upstream and downstream safety are exchanged
- Arrange how to deal with the equilibrium of sovereignty on the one hand and the expectations of safety on the other.
- Avoid perverse incentives and focus on efficient implementation and execution
- Monitor the execution and maintenance of the project
- Evaluate the cooperation are the goals achieved and is there still a good relation between the partners.

**Step 7: Continue cooperating**

Continue cooperating after the project is realized. Continue the relations that are build up and keep monitoring what the effects are of the measures. This will help effectuating the made agreements on the long run.

### 8.2 REFLECTION OF THE RESEARCH RESULTING IN RECOMMENDATIONS

The reflection of the research provides insight in the limitations of this research which is the bases for recommendations for further research and the applicability of the findings

This reflection contains four parts. First, the added value of this research is described. Followed by a reflection on the research, methodology and the approach. After that I will reflect on the usability of the model. Finally, I will reflect on the personal learning throughout this research.
8.2.1 ADDED VALUE OF THE RESEARCH

The fact that cooperation is important is acknowledged by several researchers. How to really do it is a less studied field (Mostert, 2003; De Moel and Aerts, 2006; Becker et al., 2007). This research has therefore an added value since this research zooms into tangible elements that should be considered when countries cooperate. The model of van der Zaag and Savenije has considerably been adapted and its applicability has enhanced due to the elements that are added and the relations between these elements have been clarified.

The fact that financial contribution will help creating support for cooperation has been pointed out in the literature. This research has determined what drawbacks and considerations are important when countries cooperate. The fact that autonomy and sovereignty are important for the giving and receiving countries are important insights that need to be considered. The timing of considering and discussing financial contribution have turned out to be of importance. Next to that it is made clear that the arrangement should consider the long term character of flood prevention policies.

8.2.2 REFLECTION ON METHODOLOGY AND APPROACH

Reflection on the methodology
Three case studies have been performed in this research. These three cases are very different form each other. Of these three cases the last two were based on real time projects and the first one was about cooperation between Germany and the Netherlands in general. This has an advantage and a disadvantage. The advantage is that it provides a broad idea on the aspects of cooperation. The same structure was used throughout the case studies allowing studying the same aspects under different conditions. The disadvantage is that the way actors interact in similar circumstances could not compared. Therefore the insight were case specific.

I recommend to enhance the validity of this research further comparable cases should be studied.

Type and number of interviews
19 Interviews are conducted of which 4 were done abroad. The interviews done in the Netherlands are conducted with people from various organizational levels and different professional fields. The professional fields varied from legal to financial to water management. I have conducted the interviews abroad after doing all he interviews in the Netherlands. There fore a good understanding of the context of the topic was already established. More over it was clearer which counterparts of the Dutch should be interviewed abroad. This made it possible to get with less interviews similar output. Still the spectrum of fields studied abroad was not as broad as done in the Netherlands.

I recommend to conduct additional interviews abroad with experts in legal and financial fields.

The point of view of decision makers would have real added value to understand when Because of limitations in scope for this thesis the point of view of decision makers was not
taken into account for this research. It is interesting to evaluate this angle to understand when governments decide to contribute.

*I recommend to study in more depth the viewpoints and the political considerations of decision makers*

### 8.2.3 REFLECTION ON THE MODEL

The model provides, after being equipped with more concrete elements, a good and general idea on the process of cooperation. However, the model is limited because it is very internally orientated; which means that it does not really describe interaction with affected actors to the cooperation process like citizens. The model looks into the organizations that are directly involved in the cooperation. By reading more about the Scheldt case, especially the promotion dissertation of Gerrits (2008) it became clear that many organizations such as environmental organizations had great influence on the delay of the negotiations. This is not taken into account in the model. I consider this as a great lack of the model.

*I recommend to use this model combination with an actor analysis in cooperation projects to fill this gap of the model.*

The model is not a financial model, it does provide insight in the process behind financial consideration, but it does not explain when cooperation is financially efficient

*I recommend to study the financial mechanisms and effectiveness more in depth using models that are financially orientated.*

The model was very simple in its initial state, three pillars a roof and a foundation. The adaptations of the model made it more complex like the added floor map which is more abstract. During the interviews, I have shown the adapted model and I have encountered that this abstract level is initially hard for people to understand. Only by explaining what the pillars represented and what the interrelations can stand for, people were able to understand and use the model.

*When this model is used, the complexity and the fact that it considerably abstract, should be taken into account thus effort and time should be taken for understanding the model.*

People who are involved in cooperation in water management can use this model in different ways. It can be used to describe the process but also to prepare the cooperation. When it is used to prepare the cooperation, the model could help showing the challenges to overcome. It can also become more apparent what differences can occur which can create more understanding. This can provide a strategic advantage.

No research has been done on risks of measures and how actors in cooperation deal with risks.

*Studying financial risks and other risks together with an advise on how to assess these risks is left for further research.*

Principles such as “the polluter pays” can be compared to other principles. The polluter pays principle is a principle used in pollution control. In flood management you compare the area or the country where the rain falls with the polluter.
I recommend to study the applicability of the polluter pays and related principles

8.2.4 REFLECTION ON THE PROCESS

Looking back on how I have done this research I realize that there are issues to be improved. I started this research with a very nervous feeling because I did not know anything about the topic and also that I was clueless on how to contribute in this field. Impatient as I am I immediately started doing interviews to get a better grasp of what I should study. Therefore I did get an strong idea on what was felt to be important in the practice but on the other hand I did not have a strong theoretical foundation. This foundation came about later when I came across the model of van der Zaag and Savenije. This model was in the same line of reasoning as I had gained by the interviews. Due to the fact that this model combined ‘soft political and institutional issues’ with ‘hard’ technical issues I felt confident that the model could help me. However, I did not compare this model with other models about international cooperation. The choice of the model was based on gut feeling not necessarily on scientific proof. Luckily, the interviews, which I pursued doing until the very end, and the articles I read, confirmed my gut feeling. Almost all the interviewed people acknowledged the line of reasoning that for cooperation you need political will, technical possibilities and institutions to back up the agreements. In addition, in several dissertation reports and articles the usability of this model was confirmed.

Therefore, I feel some confidence that this model with its attributes is helpful when partners cooperate. However, the model does not provide the whole picture of cooperation. In the recommendations it has already been pointed out that the model is very internally orientated. It misses therefore the interaction cooperation has with actors who are affected and actors who can influence the process. These actors are not included in this research. Which is a shame because in my master I have been taught that this is such an important issue in policy analysis and I have not studied it in depth?

Only very late, I determined what the end result of this research should be. Questions about the applicability were hard for me to answer and I was uncertain about drawing conclusions about the things I found during this research.

8.3 CONCERNS

In the introduction, several reasons are given why it is important to know more about cooperation and why cooperation needs to be done. There are still some concerns towards these motivations.

Concerns towards climate change and the flood directive.

With respect of climate change more challenges are to be faced: Due to climate change flood risks are going to be larger and discharges of the rivers will change. Cooperation in modeling these effects is becoming more important. Now there is no reason to think that Germany will change its policies in flood management in the near future. But, we have seen that events such as floods can intensify the ambitions towards protecting the citizens. Policies in water management are not stable and change over time. Good communication and coordination will therefore remain important. It cannot be excluded that Germany will want to have higher safety levels in the future (and in my opinion, they are entitled to do so). Although in the flood directive it is established that no significant increase of risks can be imposed to an other country there is not yet jurisprudence on when risks have increased significantly. The measures that Germany will take will have to be coordinated when they have effect on the Netherlands. It will be very important to resolve issues concerning new
initiatives and policies. Therefore, the Netherlands should also keep strong ties with German policy makers and keep up to date with developments in Germany, so they can act on the developments.

8.4 WHEN IS COOPERATION SUCCESSFUL

The last question that rises is the question on when the cooperation can be identified as successful. This question implicates that it is determined what successful cooperation is. Different approaches can be used to understand what successful cooperation is. When a project approach is used, successful means that the objectives have been reached. When a process approach is used, successful means that every one is satisfied, problems have been solved, and relations can be endured and the process was fair (Bruijn and Heuvelhof, 2007). Assessing whether a cooperation have been a success can also be done by studying whether the results the institution actors have created actually resulted in changed behavior toward helping solving the problem at hand (Bernauer, 2002).

This research is mainly focused on the conditions and less on the question when it will be a successful cooperation. Whether this model will help making cooperation successful should be studied when it is applied during the cooperation process.

I think that cooperation is successful when partners treat each other fair and when they strive for mutual benefits and safety at both sides of the border. And I recommend that any country that is involved in cooperation will try to do this.
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Inventarisatie en vergelijking van het beleid inzake veiligheid tegen overstromen in het Schelde-estuarium op Nederlands en Vlaams grondgebied IMDC and Arcadis, januari 2008, I/RA11300/07.010/bnd


ACTS


**INTERVIEWS**

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<th>Interviews</th>
<th>General cooperation</th>
<th>Model</th>
<th>Case Germany the Netherlands</th>
<th>Case Risk analysis study</th>
<th>Case Belgium the Netherlands</th>
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<td>Verhoeff and Hoppenbrouwer</td>
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<td>Weteringen</td>
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</table>

Ast J.A. van, teacher at the Erasmus University who is specialized in the institutional aspects of environmental policies and water management. His dissertation was about interactive water management in transboundary river management.

Blom G. (former Director General of RWS) is interviewed to create insight in the cooperation with Belgium.

Hoornstra S. (Ministry Verkeer en Waterstaat in the Directorate general), is interviewed to create insight on cooperation at the national level.

Huber N.P.: German project manager of study of international dike rings

Goor M. v. (Ministry finance) is interviewed to create insight on the financial cooperation and on the position of the ministry of finance in flood management

Gosselink (Manager van de unit Waterkeringen and Waterways) is interviewed to create insight on cooperation on the water board level
Köbbe M (Financial management and Control V&W) is interviewed to create insight to create insight on the financial cooperation and on the financial position of the ministry of V&W.

Lourens J. (Directeur Middelen en Planvorming Waterschap Rijn en IJssel) is interviewed to create insight on cooperation on the water board level.

Mosterd E. (Professor legal affairs Civil Engineering) is interviewed to create insight in the legal aspects of the Flood directive.

Nebelung (Former supervisor of the Bezirksregierung in North Rhine-Westphalia) is interviewed the position of the bezirksregierung of Germany in cooperation.

Nijland H. (RWS East Netherlands), is interviewed to create insight on cooperation at the national level.

Saeijs H. Head of engineers-Director of board of Zeeland of Rijkswaterstaat; Senior advisor; Governmental, Water Authority (Rijkswaterstaat); Professor Water quality policy and Sustainability, Erasmus University, Rotterdam; Chairman NETHCOLD; Chairman Committee 'The role of dams in the development of riverbasins. Henk Saeijs is interviewed to create insights on the negotiations of the water treaties in the Scheldt estuary.

Savenije: Professor Hydrology; co designer of the initial model (Temple) about international cooperation.

Silva W.: German project manger of study of international dike rings

Sprong v; (Ministry Verkeer en Waterstaat in the Directorate general) has been involved in several cooperation projects with Germany.

Strubbe J.

Surink H. (Former supervisor of the Kreise and Deichverbände in North Rhine-Westphalia) is interviewed to create insight on the vision on cooperation with the Netherlands and on the Flood directive on the level of the Untere Wasser behorde.

Verhoef(Chairmen of Hochwasser Gruppe) and N. Hoppebrouwers are interviewed to create insight on the vision on cooperation on the Provincial level and on the case dike ring 48.

Weteringen B. v.d. (Secretary of the International Rhine Commission) is interviewed to create insight on cooperation at the national level and on European level.
International cooperation platforms

There are several cooperation forms on water management between Germany and the Netherlands. Each of them has different goals and different partners are involved. The ones of most importance for flood management are described in short in this intermezzo.

**ICPR**: International Commission for the Protection for the Rhine. In this commission Switzerland, France, Germany, Luxemburg, Netherlands and the European Commission successfully co-operate with Austria, Liechtenstein, the Belgian region of Wallonia and Italy. Focal points of this co-operation are the sustainable development of the Rhine, its floodplains and the good state of all waters in its watershed ([http://www.iksr.org](http://www.iksr.org), 2008). Partners commit themselves to mutual goals in this cooperation association.

**Hochwasser Gruppe / Werkgroep hoogwater**

This is a bilateral connection between the Provence of Gelderland, the Ministry of V&W and the Ministry of Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz des Landes Nordrhein-Westfalen. In the Hochwasser Gruppe partners coordinate water policies in order to come to a more sustainable protection against high water levels in the Rhine Basin (de Rijn kent geen grenzen).
INTERREG III B: INTERREG III is a European Committee Community Initiative to promote transnational co-operation on spatial planning by encouraging harmonious and balanced development of the European territory. The overall aim is to ensure that national borders are not a barrier to balanced development and the integration of Europe and to strengthen co-operation of areas to their mutual advantage. (http://www.interregiii.org.uk/) Germany and the Netherlands are at the moment involved in Freude am fluss, SAN, FLIWAS and SDF

Freude am Fluss: The European project Freude am Fluss stands for a new approach to flood risk management this is done by developing innovative techniques for the adaptation of housing, land use and human activity on the floodplain. Next to that the joint planning approach is develop. In freude am fluss mainly research institutes and universities from France, Germany and the Netherlands are involved. It is financed by the ministry of LNV, VROM the province of Gelderland and the Innovation Network Rural areas and Agricultural systems (http://www.freudeamfluss.eu/eng).

The international cooperation contains exchange of knowledge and experience

FLIWAS is a Flood Information and Warning system it is developed in cooperation mainly between Germany and the Netherlands but also experts and supervisors are involved from Ireland, Poland, France England and Scotland.
SDF stands for Sustainable development of flood plains. It is a cooperation between the Netherlands and Germany in which the partners cooperate on the basis of exchange of experience and knowledge about solutions (application form SDF).

SAND stands for Spatial quality enhancement, Alleviation of flood damage and Nature enlargement through (re)Development of mineral extraction sites along rivers. Partners in this cooperation are The Netherlands, France and Germany.
In order to see if the ICPR forms a basis for further cooperation it is necessary to comprehend the type of organization that the ICPR and how it functions.

**ICPR**

- **Minister conference**
- **IRC** (chairman, financial mandate, benoeming medewerkers, neutral from delegation)
- **Strategic group** (Delegatie leider is voorzitter strategie groep (bob dekker))
- **Biology**, **harbors**, **Chemistry**
- Experts (Doelstelling vast leggen Resultaten van onderzoek wordt beproken)

For the benefit of the Rhine and of all of its tributaries the members of the International Commission for the Protection of the Rhine (ICPR) Switzerland, France, Germany, Luxemburg, Netherlands and the European Commission successfully co-operate with Austria, Liechtenstein, the Belgian region of Wallonia and Italy. Focal points of this cooperation are the sustainable development of the Rhine, its floodplains and the good state of all waters in its watershed ([http://www.iksr.org](http://www.iksr.org), 2008).

Since 1950 representatives coordinate the management plans for the river Rhine in order to reduce the pollution of the Rhine. This has been very successful and due to this cooperation Salmons can live in the river again. After the floods of 1993 and 1995 there has also been coordination about flood prevention plans. In 1995 the declaration of Arles formulated the following goals. (UITZOEKEN)

**Organization**

The Secretary of the ICPR facilitates the coordination between the Member States. Delegates from the countries are represented in the different commissions (Strategy, workgroups etc) Every three years a conference is organized where ministers of the different member states come together to set new goals and strategies when necessary. In between representatives of the Member States come together to coordinate the work in between. These
representatives are from governmental organizations. The Dutch delegation are civil servants from the ‘Waterdienst and from the Directoraat water’. The German delegation is represented by civil servants from the Landern and from XXXXX

**FINANCIAL CONTRIBUTION TO THE ICPR**

The Member States contribute to the ICPR in order to facilitate the cooperation the total budget contains about 1.3 million euro’s. Switzerland does not contribute to the budget that is necessary to facilitate the coordination for the kaderrichtlijn water.

Each country contributes according to the interest that they have in the cooperation. It is divided as followed:

- The Netherlands, Germany and France contribute 24.5% of the total budget
- Switzerland and Europe contribute 2.25%
- Luxemburg contributes the rest percentage of 1.5%

**INSTITUTIONAL CHANGES**

In Germany responsibilities of pollution and flood prevention have been delegated to the States since the kaderrichtlijn water. Before these were responsibilities of the federal state. Along with the responsibilities also the budget for flood prevention is delegated. In The Netherlands the budget for flood prevention is still centralized and remains at the Rijkswaterstaat. The coordination between the States is organized in DEUKO. However, differences among the interests of the States are not always fully solved there (Wetering, 2008).

This new situation brings a new dynamic in the cooperation in the ICPR. Since the interests are discussed in the workgroups now delegation from several States are represented.
For the Netherlands the state secretary of V&W is represented for Germany the minister for Umwelt Naturschultz und Reaktorsicherheid.

The Economic commission
The French delegation has initiated the economic workgroup of the ICPR. It is founded to realize a harmonious system that could determine the economic benefits that occur when the Rhine is obstacle free for fishes. The workgroup for Chemistry and for ecology are working together to achieve such a model. The French wish is to make the elements that determine the decisions and the priorities rational.

Success and Failure
The effectiveness of this commission was problematic and its existence is under discussion at the moment of this writing. B. van der Wetering (Secretary General of the ICPR) has several reasons for the problems of this workgroup. There are political reasons and practical reasons.

Political reasons:
- The Netherlands does not want to give up their own decision making method
- There was no wish to assess the decisions about making the Rhine obstacle free for fish on economic grounds because there was already political motivation declared in order to achieve it.

Practical reasons:
- The goals of the economic workgroup are ill defined and not well communicated
- Member States did not provide in the information that was requested by the economic workgroup

Driving forces to cooperate

Assessment
Organization of flood management in Germany and the Netherlands

GERMANY

The formal chart of the Government of Germany is as followed:

Due to the federal character of Germany, legal and administrative powers are divided between the government of the federal republic (Bund) and the States (States). The legislative power is divided among federal parliament, the second federal chamber, the parliament of the sixteen States and respectively the federal government and the governments and authorities of the sixteen States. The German constitution recognizes the autonomy of the States.

The federal government distinguishes three types of law of which only competitive and framework law are applicable to the water management;

- Excluding law concern the country (military, foreign policy and immigration)
- Competitive law: With these laws the States maintain their legislation competence. The competitive legislation extends up to the Binnenwasserstrasse (Grundgesetz für die Bundesrepublik Deutschland)
- Framework law: The Bund sets out norms or frameworks for the States to keep within.

In the area of water management, the federal government can only enact framework law, while the States are free the actual structure and essence of their water management within...
the limits that are set out by the legislation. Water policy is, therefore, one area where the authority of the States are most pronounced (Kampa E. et al., 2003). The states are divided up in Provinces (Bezirken) they have their own governmental structure. The regions are again divided in Kreise and Kreise freie Stadte, these districts are conglomerates of municipalities. On the same level of the districts you have the Wasserverbande and the Deichverbande.

**WHO TAKES CARE OF WHAT WATER?**

The water bodies in Germany are divided into first second and third order water bodies and. The first order bodies are the federal water ways /Bundeswasserstrassen and the state water ways/ Landesgewässer. The Federal water ways are administered by the federation / Bund. The Federation can transfer the administration to the states as far as they lie in areas of a state. When the water affects the several states, then the federation can assign one state for which the countries involved request it. (Grundgesetz für die Bundesrepublik Deutschland). The Bezirksregierung has the supervision on construction and provides permits for projects.
BUND
Taking care of floods and water levels is the responsibility of the States. The Bund cannot provide financial means for flooding programs. (http://www.umweltbundesamt.de, 2008). In the Act for improvement of the prevention of high water/flood control act (Gesetz zur Verbesserung des vorbeugenden Hochwasserschutzes) lays down the legal framework for the responsibilities of the States and the citizens. For this research it is important to notice that the following is arranged by this Act:
- The States have to prevent floods where possible and limit the damage.
- Every person (read citizens/ Jeder Man) who can be endangered by floods is obligated to take precautions.
- States need to inform about the measures to prevent floods, and the risks of flooding and warn them for floods in time.
- The States have to provide a minimum safety level for floods that occur once in 100 years.
- The policies of the States need to be coordinated and when conflicts cannot be solved among the States then the Bund will mediate.

OBERE WASSERBEHÖRDE
The Higher water authorities (Obere Wasserbehörde) are the government – presidents (Bezirksregierung). They are responsible for the regional water management, planning, permitting licensing and other water management functions that have a regional impact (Kampa E. et al., 2003). In North Rhine-Westphalia the government presidents of Arnsberg, Dusseldorf, Detmold, Koln and Munster are responsible (Francisco Carlos da Graça Nunes, 1997). The bezirksregierung has supervision over the Deichverbande, the Kreise and Kreisfreie städte and the wasserverbande.

UNTERE WASSERBEHÖRDE
The lower water authorities (Untere Wasserbehörde) contains three authorities. The kreise and kreisfreie Städte, the Wasserverbande and the Deich verbande. The Kreise und Kreisfreie Städte are usually cities, city districts and rural districts are responsible for permitting and licensing (small uses), monitoring, technical advice and other enforcement functions. The Municipalities are responsible for the sewer system (Kampa et al., 2003). They are only heard when plans are made there influence is do not have influence on international cooperation (Surink)

The regional water management associations (Wasserverbande und Wasserboden Verbände) are non-govermental, not-for-profit associations that carry out water management tasks on behalf of the public authorities. Different user groups are represented in these associations such as, farmers and industry. The water associations are in charge of implementing policies on regional level (Kampa E. et al., 2003). The deichverbande perform the maintenance of the dikes.

In the Netherlands water management is controlled by three levels of Governments. At national level Regulation and Norms are made. The national level controls the Provincial level who perform control over the Water boards and the Municipalities as shown in the Illustration below (Feddes, 2004)
COOPERATION BETWEEN THE NETHERLANDS AND ITS NEIGHBORING COUNTRIES IN WATER MANAGEMENT

National government

Province

Municipality

Waterschappen

WHO TAKES CARE OF WHAT WATER?
In the Netherlands a differentiation is made between active and passive water management. In active water management we include maintenance of the levees and dredging the waterways. Passive water management is the regulatory management and supervision. The active and passive management of the main water structures are controlled by the Rijkswaterstaat (RWS), this is the executive service of the Ministry of transport, public works and water management (‘Verkeer en Waterstaat’ V&W). The main rivers, the IJsselmeer, the Wadden Sea and the North Sea are called the state waters (rijkswateren). The levees and other structures are controlled by the Water boards (Mostert, 2007). The Provinces have responsibility in spatial planning. Provinces in the Netherlands make the rules for the water management plans of the water boards (Mostert, 2007). The Water boards control the water level in the regional surface water. Water boards maintain the water pace, locks and gemalen. Municipalities are responsible for the sewer systems.

NATIONAL LEVEL
At national level three ministries are concerned with water management.

- Ministry of V&W: has the main responsibility for water management policies. RWS is the executive service of V&W. RWS builds controls and develops the main structures of the main water structures. The main responsibility of RWS is protection against flood from rivers, canals, lakes and the sea (www.rijkswaterstaat.nl). RWS is supervised by the Directorate General Water. The Water service (Waterdienst) keeps the overview on the current state and usage of the main water system. The waterdienst is the research and advisory body of the Rijkswaterstaat.
- Ministry of housing, spatial planning and Environment (VROM): is involved in water management from the perspective of spatial planning and the environment. They also set norms about the water quality.
- Ministry of agriculture, nature and food quality (LNV): their policies have influence on water. With policies about the green space and recreation water management is affected.
- Ministry Of Finance decides whether to provide budget to the ministry.

WATER BOARDS
The water boards that are of most importance in the cooperation between Germany and the Netherlands are Rijn and IJssel and Rivierenland.
The Water boards Rijn en IJssel deals with the water that flows from the Rhine into the Pannerdse Kanaal and from there into the IJssel and the Neder-Rhine.
The Water board Rivierenland deals with the water that flows into the Waal (see Illustration at the right)
Calculation of retention with the planning KIT

The planning kit is used to give insight in the size of the impact and on the ‘duration’ of the affect along the river.

Delft Hydraulics and Rijkswaterstaat developed the “Planning Kit” (Blokkendoos) to be able to see what combination of measurements is most effective for preventing floods. The “planning Kit” allows the user to make a selection of measures and immediately it shows the effect on the water level at a certain discharge. Next to the water level change it contains additional information for each proposed combination of measures, including a situation sketch, aerial photographs, cost estimates, ecological effects, amounts of material to be excavated for various soil types, etc.

This “Planning Kit” can also show what the impact of measures are when they take place at the border of the Netherlands. For this research the Planning Kit is used to see what can be done in the border region and what the impact is on the water level of the Rhine and other rivers in the Dutch Delta. The constraint of the model is that it can only show measures taken in the Netherlands and only measures that are put in the planning kit by the model makers. There is for these reasons little room for own creations nevertheless it is a powerful tool to show that in Germany detention areas can be an option for the water problems in the Netherlands.

A retention area is ‘created’ or switched on in the planning kit at the Oberrhine at Tolkamer the location is shown in the Illustration below.

Important actors in this pillars are the engineers that make the plans in the different organizations and involved research institutes.
The Illustrations demonstrate that when a detention area of 79240m² (this is +/- 280m x 280m) is created it lowers the water height with 0.35m. The effect of this measure can be seen in the second Illustration. The impact continues through different rivers:

- The Ijssel will have a lower water level of 35 cm. up to Kampen
- The Waal will have a lower water level of 35 cm. up to Werkendam
- The Nederhine will have a lower water level of 35 cm. up to Cullemborg

The figures of the water level changes can be found in

This model has shown that there is significant impact on the water level possible when retention is done upstream. Although this is not direct proof for retention even more upstream for example in Germany, it makes it possible to imagine that also in NRW retention is technical a possible option for cooperation.
Effect downstream on upstream

Source: Eindrapport

The Left Illustration shows the effect of measures of ‘ruimte voor de rivier’ that are taken in the Netherlands upstream. At the right the Illustration shows impact op retention measures downstream.
## Annex 7: Actors

<table>
<thead>
<tr>
<th>Actor</th>
<th>Primary national Responsibility in flood prevention</th>
<th>International cooperation</th>
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<tr>
<td><strong>The Netherlands</strong></td>
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<tr>
<td>Ministry of V&amp;W</td>
<td>Formulate safety level</td>
<td>European Council ICPR: Attending Minister Conference Werkgroep hoogwater/Hochwasser Gruppe</td>
</tr>
<tr>
<td>Rijkswaterstaat East Netherlands</td>
<td>Execute the flood prevention plans Control budget for flood projects Maintenance levees</td>
<td>ICPR: Representing the Netherlands in ICPR expertise groups</td>
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<tr>
<td>Waterdienst</td>
<td>Overall control of the main water system in the Netherlands</td>
<td>Freude am Fluss? SDF? SAND?</td>
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<td>Province of Gelderland</td>
<td>Spatial planning</td>
<td>Werkgroep hoogwater/Hochwasser Gruppe Freude am Fluss</td>
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<tr>
<td>Water board Rijn en IJssel</td>
<td>Peilbeheer in the secondary water system of the water boards</td>
<td>Grenswaarde commissions RBSO</td>
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<td><strong>Germany</strong></td>
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<td>Bundesstaat: ministry for the environment, nature conservation and Nuclear safety</td>
<td>Administration of the federal waterways Representing Germany on an international level</td>
<td>Transpose European law ICPR: Attending Minister Conference</td>
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<td>States treaties</td>
<td>Transboundary water supply, sewerage, and water resources management</td>
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<td>States cooperation</td>
<td>Harmonizing the legislation and implementation</td>
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<td>States Institutions</td>
<td>Water management, in future river basin management</td>
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<tr>
<td>States Parliaments and Governments</td>
<td>Transposition of European laws States legislation</td>
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<tr>
<td>North Rhine-Westphalia: Ministerium für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz</td>
<td>Budget of flood prevention</td>
<td>ICPR: representing the States in workgroups of ICPR Werkgroep hoogwater/Hochwasser Gruppe</td>
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<td>Legislator Funding cooperation</td>
<td>ICPR Werkgroep hoogwater/Hochwasser Gruppe</td>
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<td>International Rhine commission</td>
<td>Hochwasser Gruppe</td>
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<tr>
<td>Facilitate cooperation between countries that share the Rhine Basin</td>
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</table>
Flood directive (directive 2007/60/ec, 2007)

The aim of the flood directive (DIRECTIVE 2007/60/EC, 2007) is to set up a framework for the assessment and management of flood risks. Therefor Member States shall undertake a preliminary flood risk assessment. This assessment has to include:

- Maps of the river basin districts, sub-basins and where existing coastal areas, showing topography and land use.
- A description of the floods which have occurred in the past with the impact they had entailed.
- A description of potential floods with their adverse consequences.

The preliminary flood risk assessment needs to be ready 22 December 2011.

Member states will have to make flood hazard maps and flood risk maps for the area’s where there is potential flood risk. These flood maps need to include information on the consequences of the floods in terms of number of potential affected inhabitants, the type of economic damage and possible pollution due to floods. The maps need to be completed and published at 22 December 2013.

On the basis of these flood maps member states will have to make flood management plans. These plans need to be aimed at reducing flood risk. These plans need to take into account relevant aspect such as costs and benefits, flood extent and area’s have potential to retain flood water. The flood management plans should be focussing on the full chain of flood management which entails:

- Prevention
- Protection
- Preparedness.

The flood management plans need to be completed 22 December 2015.

Where an international river basin district falls completely within the community, Member States will coordinate to make one single flood management plan. When such plan cannot be produced; the member state will make a flood management plan for the part of the river basin that fall within their territory. The coordination take place at a international river basin district level.

The plans will be made with active involvement of interested parties. And the assessment, maps and plans will be made public.

LEGAL STATUS OF DIRECTIVES IN GENERAL

Directives of the European Union are binding considering the purpose of the directive. How the Member States accomplish the purposes of the directive is left for the Member States themselves, however there are regulations that need to be followed. (Mostert; 2007)

The regulations are formulated in the articles but these are sometimes open for interpretations. The preamble explains the intention of the directive and provides a way out when it is not clear how the directive should be interpreted.

When a country does not act in accordance with the directive the disadvantage country can file a complaint with the European Commission.

The Commission will make estimation on how the court of Justice will judge according to the misbehaviour. When this is this is not warning enough for the country at stake and the problem is not solved then the step to the court of Justice can be made. The court of justice will judge whether the directive is lived by as is intended. When they come to the
conclusion that the Member State disobeyed the directive a fine or a penalty payment can be imposed.

8.6 LEGAL ISSUES OF THE FLOOD DIRECTIVE

For international cooperation two legal issues are especially important. The first is the article 7.4 is about solidarity. The second legal issue is about the area’s will where coordination is obligatory. First article 7.4 will be clarified according to the explanation of E. Mostert. Below the text of the article and preamble about article is given. (DIRECTIVE 2007/60/EC, 2007)

**Article 7.4**

In the interests of solidarity, flood risk management plans established in one Member State shall not include measures which, by their extent and impact, **significantly** increase flood risks upstream or downstream of other countries in the same river basin or sub-basin, unless these measures have been coordinated and an agreed solution has been found among the Member States concerned in the framework of Article 8.

The preamble.

With a view to avoiding and reducing the adverse impacts of floods in the area concerned it is appropriate to provide for flood risk management plans. The causes and consequences of flood events vary across the countries and regions of the Community. Flood risk management plans should therefore take into account the particular characteristics of the areas they cover and provide for tailored solutions according to the needs and priorities of those areas, whilst ensuring relevant coordination within river basin districts and promoting the achievement of environmental objectives laid down in Community legislation. In particular, Member States should refrain from taking measures or engaging in actions which **significantly** increase the risk of flooding in other Member States, unless these measures have been coordinated and an agreed solution has been found among the Member States concerned. (DIRECTIVE 2007/60/EC, 2007)

First it is important to mention that this article is about the **flood risk management plans** that are made to satisfy the flood directive. Other plans do not fall under the same obligations. The second issue is determined by the word **significantly**. Member states cannot take measures of which the impact will have a significant increase of flood risks in another Member State. When countries speak of a significant increase of flood risk is legally not determined. Significant is also mentioned in the preamble but a further explanation is not given. Countries have to determine among themselves what is acceptable. It can happen that conflicts arise when there are conflicting interests in implementing the flood management plans. It is legally determined that an agreement needs to be established before plans can be put in practice (article 7.4, Flood Directive). When an agreement cannot be found, Member States can report to the Commission (article 8.5, Flood Directive). When this is done the Court of Justice will judge whether the plans cause a significant increase of flood risk.

8.7 ADVANTAGES OF NOT GOING TO COURT.

E. Mostert reasoned that countries will try to prevent to let it come to that. There are several drawbacks in solving a conflict with intervention by the Court of Justice.

- It can hurt the relationship between the Member States.
• It shows that solidarity between countries respected. This can harm the image of the country that did not respect solidarity because it is one of the foundations and core values of the European Union (Treaty of Lisbon, 2007/C 306/01)
• There is less control about the outcome since the court of law will come up with a legal solution for a non legal- but technical problem.
• A win-win situation is more difficult to reach after this conflict.

Since the relation between Germany and the Netherlands is long lasting it is preferable to sustain a good relation for future cooperation (de Bruin, 2007).

It is preferable to decide to resolve the conflict among the partners and negotiate about the interests they have in flood risk management there are several advantages. When countries are on speaking terms and negotiate about their conflicts it is possible to create package deals (de Bruin, 2007). These package deals create space to exchange in a direct form like compensating the loss, or exchange in future developments.
When the verdict of the court of justice is that a fee needs to be paid. There is actually not a ideal win situation created for the winning party, since the fee is going to EU. Compensation of loss would have been a more profitable situation.

Actor visions

NEGOTIATIONS
The Netherlands was along with France the initiator of the flood directive. The initial idea was to create a more binding basis for a joint approach in flood management. Until then cooperation was without engagement and occurred on a basis of mutual understanding. With the directive, flood management is secured on an international level and therefore less depending on political changes of governments (Hoornstra).
In the negotiating process Member States included the whole chain of flood risk management in the flood directive. This means that next to prevention also protection and preparedness where incorporated. For the Netherlands this meant an addition to their initial plans.
For the Netherlands it was important to include the fact that plans of one Member State are not allowed to have a negative impact on the other Member State. As mentioned before this issue is included in article 7.4. Although significant increase of risk is not specified, this article provides sufficient guaranties because there is commitment to coordinate when problems will occur between adjacent countries (Hoornstra, Nijland).

IMPLEMENTATION
There are different views on to which extent the whole water system should be included in the implementation of the flood directive. Some only want to include the main water system; others also want to include polders and the ‘storage basin’. This is for V&W a choice between keeping autonomy of control and integral/ Nmplete management.
Source Wikipedia: North Rhine-Westphalia and the Bezirksregierung Düsseldorf