Master's Thesis

Understanding the Performance of an International Flood Management Regime – the case of dike ring 48

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Abstract

This research reviews the performance of an existing transnational flood risk management regime, in which dike ring 48 is the specific case. By reviewing the performance of this regime, a better understanding of which variables add positively or negatively to international collaborations on flood risk management. By using regime theory, an analysis of the different interactions between two countries that both benefit from successful flood prevention is provided. The second theory that is discussed is the Multi Layered Safety Strategy (MLS). This strategy divides flood risk management in three layers: Prevention, Spatial Solutions, and Crisis Management. The general assumption is that the Netherlands are in a way dependent on the performance of Germany, which can alter the dynamics of the collaboration. By using six variables that explain and influence the performance, barriers and ways to overcome those barriers will be identified.

The results of this research are that the regime is performing as it is set out to do. However, there are several barriers in play that negatively influence the performance of the regime, such as language, different organizational structures, and different expectations and ambitions. The general conception after this research is that the regime could achieve a lot more than it currently aims to. With the recent flooding of July 2021 possibly acting as a window of opportunity to enhance the collaboration, the coming years can prove to be a key-moment in the further development of this regime.

Keywords

River management, International Collaboration, Flooding, Regime Theory, Governance, Dike Ring 48, Transboundary water government, Netherlands, Germany.

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1. Introduction

1.1 Research Problem

As early as the first settlements on the banks of rivers, the danger of flooding has been around. Throughout the centuries, new methods of mitigating flood damage were constantly created and updated in order to stay ahead of the threat, and as of today, our society is at its most advanced point in history. We are, however, still very susceptible to major floods, with dozens of examples all over the planet each year, be it fluvial (river-flooding), pluvial (flash-flooding), or coastal flooding (storms). Recent reports show that 2020 saw a total of 980 natural catastrophes, adding up to a total of 210 billion dollars of damage (Munich RE, 2021). When comparing these figures to the year prior, 2020 saw more catastrophes (980 vs. 820) and an increase in damage of 60 billion dollars (210 billion vs 150 billion) (Munich RE, 2020). In both these years, the top 5 of most fatal catastrophes were either floods (8) or hurricanes (2) (Munich RE, 2020, 2021). This data is an indication of the severity of the threat humankind is facing, but the increase in catastrophes only becomes really clear when looking at the mean annual number of catastrophes in the last 30 years: 520 (Munich RE, 2020). Through this data, a growing trend of the number of disasters each year is becoming increasingly more visible, meaning that our society has to keep developing new ways and techniques of flood prevention, and mitigation if there is no way of preventing these disasters.

One of the current developments that is oftentimes linked to an increase in the total number of disasters, let alone the severity of those disasters, is the changing climate. In the first decade of this century, a lot has been written about how the changing climate might influence the number and severity of natural disasters (Sperling, Szekely, 2005; O'Brien et al, 2006; Van Aalst, 2006). One of the larger recurrent side-notes in a great deal of these papers is the degree of uncertainty concerning the actual effects of climate change on this planet. Over the past decade, a great deal of these uncertainties has been taken away following the publications of several key researches. Two of these researches came from the hand of the IPCC, the Intergovernmental Panel on Climate Change. Their 2013 report *'Climate Change 2013'* shed a light on the expectation that the risk of major environmental disasters had increased sharply over the past few decades (IPCC, 2013), but it was not until recently that the true extent of what this would mean for specific parts of the planet was disclosed. In the 2021 report '*Global Warming of 1,5 C'*, the effects of the (almost) certain increase of the mean global temperature by 1,5 degrees Celsius are explained. The main projection of this report is that '*climate related risks will increase in comparison to the current situation'* (IPCC, 2021), and '*the gravity of these impacts will differ according to geographical location, levels of development, and choices and implementation of adaptation and mitigation options'* (IPCC, 2021). This report provides undeniable proof of what is bound to happen, and urges policy-makers around the world to act on these new insights.

The embodiment of such natural disasters will vary depending on different parts of the world, but it is already becoming visible in the Netherlands. A major insurance company, Interpolis, revealed that over the course of the past three years, an increase of 77% in damage caused by extreme precipitation has been seen (Interpolis, 2020). Most of the time the consequences were within handling capacity, but in July 2021, it became clear what happens when the consequences were outside of the handling capacity. Due to days of extreme precipitation, large scale flooding occurred in parts of Germany, Belgium, and the Netherlands. These floods led to billions of euros worth of damage, and cost over 180 people their lives (Brock, 2021). However tragic and devastating these floods were, the damage has remained limited in the Netherlands, as larger parts of the flooded areas were not so densely populated. For a city like Rotterdam, the combination between a rising sea level and an increase in peak discharge of the river might prove fatal in the future (Katsman, 2011). Such an event is not unlikely, as research has shown that the heavy rainfall events in July were caused by climate change (World Weather Attribution, 2021), and the temperature is only expected to increase in the coming decades. These recent events have shaken up policy-makers in the affected countries, and might lead to an increased attention to flood prevention and mitigation.

But it is not only on domestic grounds that proper river management is getting more and more important. For larger rivers, like the Rhine, international collaboration is necessary to ensure a proper management of the river. The international characteristics of rivers can bring new challenges, as neighbouring countries might have different agendas. Rivers can also be a source of conflict in time of crisis, as became clear during the July 2021 floods. During these floods, the municipality of Wassenberger was hit by the breaching of a dam. In a first response, the major of Wassenberger, Marcel Maurer, pointed the finger to the Netherlands, saying that the closing of flood gates further downstream was the cause of the breaching of the dam (Backhaus, A. & Heckers, M., 2021). This is a clear example of why rivers are the responsibility of multiple governments and all involved in managing rivers benefit from proper river management. Successful collaboration is therefore a welcome, if not necessary, element. As a result, multiple international initiatives have been launched. In 1950, the International Commission for the protection of the Rhine was founded. This commission has the aim to *'harmonize the many interests of use and protection in the Rhine area*' (ICPR, 2021). Working together to ensure the sustainable development of the Rhine, the ICPR has been an example for other shared river initiatives in Europe. Another initiative on international collaboration to prevent flooding is the EU floods directive. This directive consists of three major elements; (1) preliminary flood risk assessment; (2) flood risk maps; and (3) flood risk management plans. This directive aims at *'reducing and managing the risks that floods pose to human health, the environment, cultural heritage and economic activity'* (EU, 2007). These two initiatives are clear examples of cross-border collaboration, but this does not mean that this collaboration is always perfect. There is a possibility that barriers could arise due to cultural differences, differences in governance, or differences in safety standards. The latter is the case in dike ring 48 in the Netherlands (van Eerd et al., 2014).

Situated in the east of the Netherlands, dike ring 48 protects an area that is situated in both the Netherlands and Germany. The shared dike is the first point of interest in this area, the geographical characteristics form the second part. The dike in this area is situated in both the Netherlands and Germany, but this does not mean that the dike is of the same quality in both countries. Germany is using different safety standards than the Netherlands (HKV, 2019), meaning that the chance of a flood is allowed to be higher in Germany than in the Netherlands. This is also visible in the quality of the weirs in the German part of the Rhine, when compared to weirs in the Dutch part of the Rhine. In 2014, research showed that 15 kilometres of German weirs were not reaching the desired levels of safety. In the Dutch part, this was only 0.5 kilometres (van Eerd et al., 2014). This is a first characteristic that can put a strain on the safety of this area. The second characteristic lies in the geographical properties of the area. The Dutch part of dike ring 48 is situated on a slope that runs from the south-east to the north-west, with an elevation of around 10 meters (van Eerd et al., 2014). This gives the area the shape of a 'bathtub'. A flood further upstream, in the German part of the Rhine, would cause this bathtub to fill, creating a far worse problem than a flood in the Dutch part of the Rhine. Due to these two characteristics, the area protected by this dike ring fails to reach the Dutch safety standards (HKV, 2019).

With the rapidly changing climate that this earth is suffering from, the expectation is that more and more areas will suffer from the dangers of extreme weather (IPCC, 2013). It is therefore important to understand the potential dangers of the rivers that flow through the Netherlands, and optimize the international collaboration on managing these rivers. In order to optimize international collaboration, it is necessary to understand both the thresholds that hamper collaboration as well as the elements that encourage collaboration. To make the rich variety of ideas and concepts that come into play when discussing international (river) management a bit more comprehensible, this research will make use of the Regime Theory. Regime Theory tries to explain '*the occurrence of co-operation among states by focusing on the role that regimes play in mitigating international anarchy'* (Bradford, 2007). Being used in prior research, regime theory gives an idea of the interdependence between different countries on e.g., river management (Renner, 2017). Prior research on international river management, conducted in the Deltarhine regime, made use of this theory as well. This research concluded, amongst other things, that the Deltarhine water regime '*has displayed an impressive continuity over the course of five decades, demonstrating a remarkable resilience and adaptive capacity',* but that *'the impact of the cross-border water regime (...) is limited and has not resulted, as yet, in joint policies or specific projects'* (Renner, Meijerink & van der Zaag, 2017). In this research, the regime theory will be the main theory that will be used to try and explain how the international collaboration between the Netherlands and Germany is working. By looking at differences in governmental structures, interdependencies, and strategies, an assessment of the current state of international collaboration will be created. The main point of focus is the international collaboration on river management between the Netherlands and Germany, with dike ring 48 as a specific case. This research will take a closer look at the current state of international river management, what aspects add positively to this, what aspects hamper successful river management, and eventually what possibly can be done to improve international river management. This research will discuss the existing literature on flood risk management, international collaboration and regime theory. Through an analysis of existing literature paired with in-depth interviews with relevant respondents, an assessment of the current situation concerning international collaboration on dike ring 48 will be given. This overview will consist of the most relevant differences, the most important positive additions, the different strategies, and the main thresholds in collaboration. After this overview, recommendations for improving the current situation will be given.

The combination of an expected increase in extraordinary weather and a significant difference in safety standards between two countries through which the same river flows demands a specific approach. Because there is a dependency between different countries, precise collaboration is important. Despite the efforts that have been made over the past two decades, the situation still remains that a flood in the German part of dike ring 48 is more likely to occur than in the Dutch part (HKV, 2019). When this is paired with the fact that a flood further upstream will cause more damage than a flood downstream, the problem becomes evident. The problem in this research is therefore the dependency of the Dutch on the German performance of maintaining the quality of their part of the dike. Due to the shared nature of the dike, and a certain dependency of the Dutch on the Germans, this situation asks for clear collaboration. But is this situation perceived the same way by the German government? How do they approach this problem? What kind of collaboration is already in place? How good is this collaboration? These are all questions that can arise when thinking about this problem. In order to talk about improving a situation, a clear understanding of the problem is required. Without the entire picture, conclusions are futile. But even though these neighbouring countries might have different views on the situation, the urgency is still there.

1.2 Research Aim & Research Questions

The aim of this research consists of two aspects. The first aspect is to provide an analysis of the current situation in international river management in the area of dike ring 48. This analysis will provide an insight into the differences in flood risk management strategies between the Netherlands and Germany, and the current state of international collaboration. The second aspect focuses on identifying the elements that either add positively to international collaboration on flood risk management, or hamper the process of international river management. In order to achieve this aim, several questions need to be answered. The main research question in this thesis will be:

'How can we understand the performance of the international collaboration on flood risk management between the Netherlands and Germany, and can this situation be improved?'

Next to this main research question, several sub-questions need to be answered to create a full understanding of the different aspects that are in play. These sub-questions will be:

- *'What forms of international collaboration are currently in play between the Netherlands and Germany concerning the protection against the Rhine?'*
- *'How can the performance of the current international collaboration be assessed?'*
- *'Which factors influence the performance of the current international collaboration?'*
- *'What can be done to improve the current international collaboration between the Netherlands and Germany concerning the protection against the Rhine?'*

By answering these sub-questions, a clear image of the current status of the different aspects that are of relevance in identifying the current status of international collaboration between the Netherlands and Germany will be drawn. These individual answers will together add up to an answer to the main research question in this thesis.

1.3 Scientific and Societal Relevance

Scientific Relevance

The existing international literature currently provides different views on flood risk management, international collaboration, flooding, and regime theory. Oftentimes, these different theories are discussed separately, leaving a gap in the literature where these topics overlap. There is, however, a part of the existing literature that focuses on the Deltarhine region. This area is comparable to the case in this research, as it involves international collaboration between the Netherlands and Germany. In this part of the literature, the different elements that are mentioned above have been used to create an image of the situation in this specific region (Renner et al., 2017; Renner & Meijerink, 2018; Renner et al., 2018; Renner et al., 2020). However, there is not so much literature that focuses on a shared, international dike ring. The Netherlands knows only two international dikes: dike ring 48, which will be discussed in this research, and dike ring 42, on the southern bank of the Rhine. These two dikes protect the easternmost part of the Netherlands of the Rhine, and are vital in the protection of a large area. There is little to no specific knowledge on the collaboration concerning a shared, international, dike ring. Having to share the responsibility for the maintenance and upkeep of a dike, in order to protect your own citizens, is a unique feat. This is an important difference between the existing literature, and what this research aims to add to the existing literature.

The second aspect of scientific relevance lies in the addition to the discussion concerning regime theory. Regime theory forms the core of the theoretical framework in which this research will be discussed. There is already a lot of literature on both the general regime theory, but there are two aspects that seem to be underlit in the existing literature. The first aspect is that little research on regime theory is in connection to international river management. The concept of regime theory can be very relevant for policy makers that are working with international colleagues on the topic of water safety, and this will most likely only become more relevant in the coming decades, as proper river management will most likely become a challenge over the coming decades. The second aspect that seems to be underlit in the existing literature on regime theory is how regime theory holds up in times of crisis. Regime theory is oftentimes discussed as an idea or concept that is capable of preventing international anarchy (Bradford, 2007), or as an idea that can exist during times of international anarchy (Drezner, 2009). There is, however, little existing literature on regime theory in times of a crisis, or in the preparation of a crisis. This research will be investigating the current situation on flood risk management, and will include the recent flooding in the Netherlands and Germany. By doing so, this research aims to add to a niche sector inside regime theory.

Societal Relevance

The societal relevance for this research lies in the direct applicability of the gathered knowledge. The case study in this research is dike ring 48. The biggest threat on the Dutch part of this area comes from a possible breach in the German part. This means that a proper collaboration between these two countries is of utmost importance in order to protect the area. The identification of the most important barriers gives a central starting point to work towards overcoming these barriers. At the same time, dike ring 48 is not the only river that is shared between Germany and the Netherlands. This research can provide new insights that can be used by different waterboards along the border, not just by the waterboards that are responsible for the safety of dike ring 48. This will add to the level of safety for both German and Dutch inhabitants of the areas near the shared rivers. This research will help create a better understanding of the different processes on both sides of the border, and will aid in knowing how to work together with specific international colleagues. This knowledge will help ease international collaboration between the Netherlands and Germany for several different actors, giving the research a broad societal relevance.

On the other hand, the urgency of successful international river management has become clear during the flooding in July 2021. Three countries that may have believed themselves to be safe from imminent danger caused by excessive precipitation were hit by a devastating force of nature. This research focuses on the entirety of the collaboration, not just on how the Dutch are dependent on the Germans, but on what the Germans can possibly learn from the Dutch as well (and vice versa). One of the elements of the German safety network that was heavily criticized after the July 2021 flooding, was its early warning system (Oltermann, 2021). This system is very different from the Dutch early warning system, the LCMS. Through this research, different elements of how these countries can cooperate will be sought. Exchange of information, or advice on techniques is a part of that. Through this assessment, new information will be gathered that can be used to improve the situation on both sides of the border, increasing the overall safety of the respective inhabitants.

2. Literature and Theoretical Framework

This section will provide an in-depth analysis of the major theories that will form the backbone of this research. In the introduction, these different theories were already briefly addressed. Here, these theories will be discussed more in depth. In order to shape and define this research, it is important to understand the relevant concepts that will be used in this research. These leading theories that will be used in this research are the Regime Theory and Flood Risk Management theories (Plate, 2002). This chapter will discuss the most relevant elements, developments, and points of critique concerning these theories. This chapter will begin with a discussion of regime theory, and how the performance of the regime can be measured and influenced. The second part of this chapter will discuss the theory of flood risk management as discussed by Plate (2002), as well as focus more on international flood regimes. These elements will form the backbone of this research, and will be visualised in a conceptual model at the end of this chapter.

2.1 Regime Theory

2.1.1 Grand theory

Over the course of the past decades, several theories have emerged that try to explain the different dynamics that come into play with international collaboration. As the speed at which economic, social, and political conditions changed started to threaten the ability of humankind to respond to these changes, managerial structures were being created (Evans & Wilson, 1992). Two of these leading lines of thought were the English School and the Regime Theory. These two share some similarities, but also have distinctive features which makes them easy to distinguish one from another. As this research will make use of Regime Theory, the English School will not be discussed in great depth. Instead, the following paragraph will discuss a brief overview of those similarities and differences.

Regime theory

Regime Theory aims to simplify the different, sometimes wicked set of changing relations and connections in the societal world. The main aim of regime theory lies in explaining why cooperation between different states occurs, in order to prevent international anarchy (Bradford, 2007). The regime theory builds on how the currently existing power relations between the different states cause a form of social control, meaning that it is very difficult for a country to fall out of line, or follow a path that differs too much from the existing social constructs (Bradford, 2007). One of the most renowned authors on the topic of regime theory is Robert Keohane. In his 1982 paper *The Demand for International Regimes*, Keohane distinguishes regimes from international agreements. His argument for the creation of regimes comes from the desire that governments have to make their expectations of different subjects consistent with those of a different government, or in his words '*regimes are valuable to governments* *where certain mutually beneficial agreements would be impossible to consummate'* (Keohane, 1982). A second relevant distinction that has to be made is between a regime and a (formal) international organisation. The difference between these two is marginal, and both often share some characteristics. However, regimes can exist out of looser norms, principles, and procedures than organisations can (Bradford, 2007). Within the overarching idea of international regime theory, three main lines of thought can be distinguished (Krasner, 1982):

1. Structuralist/realist;
2. Modified structuralist/modified realist;
3. Grotian.

The first model, the realist model, looks at regimes as a structure existing in a world where all state actors are engaged in power maximization. The followers of this belief see a world where regimes are no more than formally constituted structures, arenas for acting out power relationships (Evans & Wilson, 1992). These realists feel that regimes have little to offer over what can be achieved through traditional ways. They feel that regimes are neither autonomous nor intervening variables, and hence are not capable of applying significant pressure on international collaborations (Evans & Wilson, 1992).

The second model, the modified realists, revolves around the idea that regimes constitute the general obligations and rights that are a guide to states' behaviour (Krasner, 1982). As opposed to the traditional realists, the modified realists stress the effects of international regimes on state behaviour. This comes from the idea that states are 'self-interested utility maximisers engaged in a continuous process of maximizing their own welfare', but that this single-minded pursuit often leads to suboptimal outcomes on an international level (Evans & Wilson, 1992). Because of this, entering into a regime is a rational choice.

The third model, the Grotian model, leans most heavily towards the inevitability of regimes. Those who follow the Grotian way see regimes as something that is inherent to international collaborations (Evans & Wilson, 1992), and as something that is embedded in human behaviour (Krasner, 1982). An important addition to the perception of the Grotians is that they still see the state as the central actor on an international level, but that it is important to take in account the role of domestic and transnational actors (Evans & Wilson, 1992).

As becomes visible from this brief overview, Regime theory is used to explain why actors are working together. Even though the three major lines of thought within the concept of Regime Theory might differ from one another, the baseline is still that international actors oftentimes need to cooperate to ensure the best possible outcome for both parties involved in the interaction. Before the factors that contribute to regime creation and regime complexity are discussed, a brief overview of the English School and its differences with Regime Theory will be provided.

The English School

A similar, albeit slightly different, line of thought concerning international collaborations developed almost at the same time as the Regime Theory. As the main point of focus in this research will be the Regime Theory, the different details concerning the English School will be left out. This section will provide a short overview of the most important elements, as to help create an understanding of the key differences between Regime Theory and the English School and why Regime Theory will be the main theory in this research.

The English School arose during the second half of the previous century and consisted of four different major phases. In the first two phases, from 1959 up to 1977, the British School focused on international society as the main starting point of approaching international relations. During the third phase, from 1977 to 1992, the British School mainly concerned itself with keeping its ideas intact, and creating a new generation of like-minded people. This period knows little new ground-breaking ideas. In the fourth phase, which started in 1992 and runs up to today, the British School opened up more and added broader approaches in the context of International Relations, such as globalization (Buzan, 2001). To summarize this, the English School consists of three main criteria that approaches have to consist of, namely (1) a given tradition of enquiry; (2) a broadly interpretive approach to the study of International Relations; and (3) an explicit concern with the normative dimension of IR theory (Buzan, 2001). One of the major critiques on the English School however, is that these three conditions may be too harsh for a lot of theories and approaches to fall under the English School.

As with Regime Theory, the English School exists of three major lines of thought: The International System (with thinkers like Hobbes and Machiavelli); the International Society (Grotius); and the World Society (Kant) (Cutler, 1991). Within these three lines of thought, there are some visible similarities with Regime Theory. The first line of thought is the International system, which focuses on power politics amongst states, and how international anarchy is at the centre of International Relations. The second line of thought is the International Society, which focuses on the institutionalization of shared interest and identity amongst states. This discourse has the creation and maintenance of shared norms, rules and institutions at its core. The final discourse is the World Society, which focuses on individuals, NGOs, and the global population as a whole. This discourse uses transcendence of the state system as the core of International Relations (Cutler, 1991).

Similarities and Differences

As discussed in the previous section, both Regime Theory and the English School consider power and (personal) interest as core concepts in understanding the international scene. There are, however, some key differences between the perception of the role power plays in creating international regimes between the two different lines of thought. In short, *regime theory* tends to see power as the main causal factor of international collaboration. The three different lines within regime theory all have slightly different emphasises concerning the precise role of power, but the general attitude is that power is more important in the creation of a regime than in the upkeep of it, and that dominant states use power to force 'lesser' states into cooperation (Evans & Wilson, 1992). For the *English school*, the view on the role of power differs slightly. Firstly, power tends to be encapsuled in certain institutions rather than being 'just there'. These institutions are used to harness power and to create a degree of order. Secondly, and this is a major difference with regime theory, the English school believes that states are concerned about their power, but are not constantly pursuing power (Evans & Wilson, 1992). For the English school, states are concerned about several other affairs, such as honour and obligations.

Another crucial difference between regime theory and the English school, and the reason why regime theory has been chosen as central theory in this research, is the way interdependence is perceived. Interdependence discusses to what extent different actors need each other. This can be on a personal scale, or on a nationwide scale. Regime theory sees interdependence as a growing element on a global scale, with less and less room for the traditional idea of self-help. Nations get more and more entangled with one another, thus creating a degree of interdependence. The concept of interdependence in fact makes the creation of regimes possible and desirable (Evans & Wilson, 1992). The perception of the English school on interdependence is slightly different. The English school accepts the concept of interdependence, or rather takes it for granted. The English school acknowledges that there must be some sort of interdependence between different actors in achieving basic human goals (Mayall, 1990). The main difference in the perception of interdependence can be found in how important interdependence is deemed to be by the two different lines of thought. As discussed above, regime theory sees interdependence as a growing element in society, whereas the English school is more sceptical of the idea that interdependence really had that much of an impact on international society (Evans & Wilson, 1992). They see interdependence, and transnationalism, more as a declining phenomenon in our society, rather than as an important and vibrant aspect of international relations.

2.1.2 Regime Creation

In this paragraph, the process of emerging of regimes will be discussed. Over the decades, a great deal of literature has been written on the emergence of regimes. Within this existing literature, several different approaches or nuances to how and why regimes emerge are portrayed. However, there seems to be a consensus on five key variables that stand at the basis of regime emergence (Rothstein, 1984). These five key variables are; self-interest; political power; norms and principles; usage and custom; and new knowledge (Krasner, 1982). In his 1982 paper, Krasner provides a clear overview of what is meant precisely with these five different variables. A brief overview of those five variables will be discussed:

- *Self-interest:* In the eyes of Krasner, (egoistic) self-interest is perceived as the main reason why international regimes exist (Krasner, 1982). Krasner sees this self-interest as the *desire to maximize one's own utility function where that function does not include the utility of another party.*

- *Political power*: This second variable is split in two. Political power as a causal variable consists of *Power in the service of the common good* and *Power in the service of particular interests*. The first form of power focusses the system as a whole. Think of public works, defence systems, minimum levels of welfare (Krasner, 1982). The second form focusses on enhancement of specific actors within the system. These can be specific politicians, but can also be states within a system (like the EU).

- *Norms and Principles*: Norms and Principles are seen as the core of a regime. Without certain norms and principles, formation of regimes is often unlikely (Krasner, 1982). One of the major examples he discusses is one of Max Weber, who argued that the rise of capitalism is linked to the evolution of Calvinistic doctrines. In those doctrines, hard work in combination with egregious consumption is promoted as something good (or as we now know it: *Work hard, Play hard*). These norms and principles could have been a causal factor for the emergence of capitalism.

- *Usage and Custom*: Usage and Custom is seen as a somewhat less powerful, but nevertheless important variable. This variable, together with knowledge, are not capable of creating regimes on their own. Rather, they aid and enforce the previous variables. Usage, for instance, is about regular patterns which aid in creating shared expectations (Krasner, 1982).

- *Knowledge*: The last variable that Krasner discusses is Knowledge. As with the variable above, knowledge is more of an intervening variable. As some of the previous variables could have a slightly 'hostile' edge to them, this last variable is more of a cooperative nature. Knowledge can be a crucial variable in teaching new information about topics that were not understood previously. By showing people new ways of working, cooperation would be possible, thus creating a regime.

2.1.3 Assessing Regime performance

In this chapter, a method of assessing the success of regimes will be discussed. In order to judge whether or not the regime of this thesis, the Dutch-German regime, is successful, an understanding of different ways of judging a regime has to be discussed. This chapter begins with five variables that will be used to assess the current performance of the regime. These five variables have been combined and used in prior literature (Renner et al., 2018), and will be used to measure the current performance of the regime in this research. In the next chapter, the six variables that influence the performance of the regime are discussed. The five variables that are used to assess the performance are *Range of Collaboration, Resilience of Collaboration, Strength of Interaction, Intensity of Collaboration,* and *Effectiveness of Collaboration.* An explanation of the different variables is provided below:

Range of Collaboration: What is the scope of the regime? This indicator covers the extent to which the collaboration regime works on different aspects within the collaboration. A regime that covers too much might lose its focus, but a regime that is focused on a too niche subject might not have the power to implement anything at all (Haggard & Simmons, 1987). What is interesting here as well is to review whether this regime is mainly active in one of the layers in the Multiple Layer Safety strategy, or in multiple (for the explanation about the MLS, see chapter 2.2).

Resilience of Collaboration: How sensitive is the collaboration to changes in political climate, or to certain shock events? Is the collaboration something that keeps going despite actors changing, or is the collaboration easily decreased if certain elements of the organization of the regime change? (Hasenclever, Mayer & Rittberger, 2000).

Strength of Interaction: Are the actual interactions between the countries in a regime embedded in joint structures? Has the regime caused any new cooperative structures to be created? These can be working groups, but also cross-border institutions (Haggard & Simmons, 1987).

Intensity of Collaboration: How lively is the regime? Is it still a collaboration that reaches goals, is there frequent contact? Or is it a collaboration that primarily exists on paper, in treaties that have been created a long time ago but are now almost forgotten. Is the regime still seen as important by high-ranking officials, or is it something that has been handed down to the less important or powerful actors within a system? (Levy, Young & Zürn, 1995).

Effectiveness of Collaboration: The last indicator might be the most obvious one. What is actually achieved through the collaboration? Has the collaboration led to the implementation of new laws and policies, has the protection of certain areas improved over the period of collaboration? This last indicator can also aid in answering the question of *what if there was no regime?* If all is taken out of the equation, what would be left? (Renner, Meijerink & van der Zaag, 2018).

2.1.4 Factors Influencing Regime performance

Now that the five variables that can be used to assess the performance of the regime have been discussed, it is time to look at the variables that may influence the performance of the regime. This research will make use of a framework created by Tobias Renner (Renner et al., 2020), and will apply this framework to the case of dike ring 48. This framework drew out six different variables that can influence the performance of a regime. The six dimensions that have been identified are (Renner et al., 2020): *Objectives, Policy Instruments, Structures, Actors, Resources, Leadership and Entrepreneurship.* In order to understand how these different variables will look like in this research, they need to be operationalized. The definitions of these variables are provided by Renner's 2020 paper on his assessment framework of actor strategies (Renner et al., 2020). A specific operationalization of the different variables can be found after the conceptual framework.

Objectives: The most important element of any cooperation is a common goal, an objective. For this research, objectives is about what the actors want to achieve with the collaboration. It also includes different elements that aid or hamper this. Some examples of this are certain treaties or policies that were implemented as a result of the interaction, but also whether or not the different actors had own agendas coming into the collaboration. When reviewing the in-depth interviews with the respondents, these are the factors that will be sought.

Policy Instruments: This variable is closely linked to the objectives, in the sense that it aids in fulfilling said objectives. Policy instruments is about the means that can be used to achieve the desired objectives. These are the elements that make the collaboration legally binding, or that can aid in funding certain projects and initiatives.

Structures: Structures is about understanding the design of the regime. Three aspects are in the centre of this variable: The design of the international institutions, how the different actors from the different institutions can be involved, and to what extent external stakeholder involvement is organised.

Actors: As the name of this variable suggests, actors is about the people that are working inside this regime. This variable can be quite broad and contain elements such as language barriers and cultural background. For this research, actors will be about cultural differences and having the right actors on the right positions. One of the questions that is at the centre of this variable is whether or not the right actors are involved in order to achieve the goals set.

Resources: With every collaboration or project, resources are a variable that is undeniably of importance. Without proper funding or fitting human resources, the majority of projects is deemed to be unsuccessful. Resources can be very concrete, in the form of direct financial compensation, or vaguer, for instance in the form of an information exchange system.

Leadership and Entrepreneurship: The last variable on which the NL-Germany regime will be assessed is that of leadership. Renner discusses the importance of key individuals that can streamline international cooperation. He also states that the existing literature is largely silent on the subject of key individuals, so this will be an interesting variable. This research will look into the presence of such actors, and the opinion of other actors on the importance of such key individuals.

During the interviews with respondents, these six variables will be discussed to uncover their influence on the performance of the international regime in the dike ring 48 area. However, these will not be the only variables that can be discussed. If, upon reviewing the interviews, other elements of interest come forward, they will be reviewed and discussed as well. If one of the variables mentioned above turns out to be not as relevant as expected prior to the research, this will be discussed as well. During the interviews the respondents have been asked about the different variables that are used in assessing the regime, as well as their personal opinion on the performance of the regime and what elements they think the regime could still improve on. By doing this, the door remained open for potentially new variables that can be used to assess the success of a regime.

A visual representation of the assessment of a regime is provided in figure 3 in the form of a conceptual framework, which can be found on page 21. In this framework, the six variables that influence the performance of a regime can be seen on the left-hand side, with the actual performance of the regime on the right-hand side. Within the performance of the regime, five other variables can be seen. These five variables are the variables that are used to measure the performance.

2.2 Regimes in Flood Risk Management

At the basis of this research lie the strategies concerning flood risk management. According to Plate (2002), Flood risk management is a process that consists of three different sets of actions; (1) actions which are needed to operate an existing system; (2) the planning for a new or revised system; and (3) the process of obtaining an optimum design for and constructing a project (Plate, 2002). Oftentimes, the actors that operate within the separate sets of actions tend to see only their own action, with the risk that a misunderstanding can arise between the different actors, leading to a less optimal outcome of these processes. When looking at flood risk management in an existing system, Plate offers a useful framework for risk management. This framework helps to conceptualize the different steps of flood risk management. This framework, as portrayed in figure X, lies in line with the strategy that the Dutch government has adopted over the past decade; the multi-layered safety strategy (MLS) (Ministry of Infrastructure and Water, 2009).

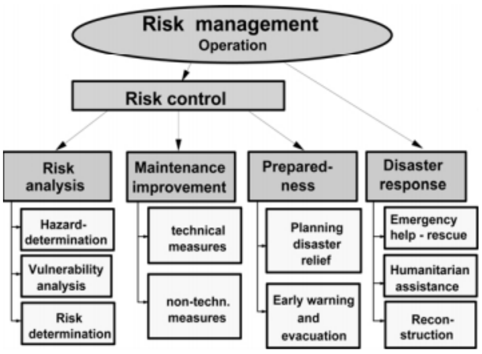

Figure 1. Stages of operational risk management. Retrieved from Plate, 2002.

The strategy consists of three different layers: 1) Prevention; 2) Spatial Solutions; and 3) Crisis Management (Rijksoverheid, 2009). The first layer, *prevention*, focuses on implementations that directly stop a coming flood. The most common example of this are the dikes, but can also be found in dunes or storm surge barriers. The second layer, *spatial solutions,* can be elevated roads in certain areas, but can also be about the decision not to build new houses in specific flood-prone areas. The third layer, *Crisis Management,* looks at the different elements that are needed in case of a flood, such as evacuation strategies, or early warning systems (Rijksoverheid, 2009). The Netherlands have mainly been working, although rather successfully, on the first layer (Leskens et al., 2013). The second and third layer are still lacking attention slightly, although layer 3 has received more and more attention over the past years (Leskens, 2013). A clear example of an improvement in the third layer is the nationwide application of the LCMS (National Crisis-Management System). This real-time information system is used to share information between the different crisis-management organizations in the Netherlands, and has proven effective during the floods in Limburg in July 2021 (Grapperhaus, 2021). The MLS is portrayed above in figure X. As the focus of this research is aimed at the entirety of flood risk management, the different layers will be connected to the different implementations that happen within the international collaboration between the Netherlands and Germany. With the national strategies on the MLS dating back to 2009, and

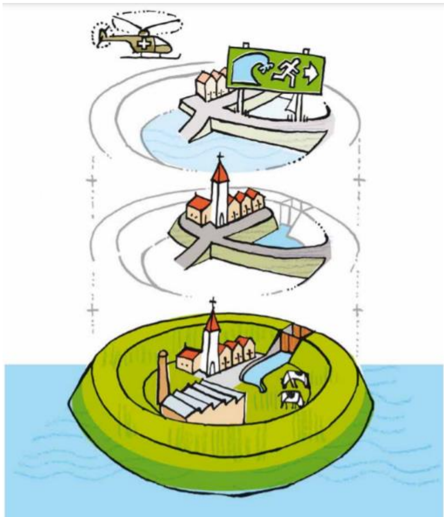
Figure 2: Multi Layered Safety Strategy. Retrieved from: Rijksoverheid (2009)

research from 2013 indicating a main focus on the first layer, it will be interesting to review whether the current collaboration between the Netherlands and Germany also includes elements from the second or third layer.

When focusing on the collaboration between the Netherlands and Germany, a great amount of literature is available. Most of this literature focuses on the Deltarhine region (Renner et al., 2020; Renner et al., 2018; Renner et al., 2018; Renner et al., 2017). This research will make use of these prior sources of information, borrowing the previously gathered knowledge and applying it to the dike ring 48 case.

One of the relevant frameworks that will be used in this research can be found in the 2012 article '*Limits and Borders: Stages of Transboundary Water Management'* (Wiering & Verwijmeren, 2012). This framework is used to categorize the current status of transboundary water management cases, including the Rhine River basin, which was categorized in phase 2: Problem structuring. This 2012 article can be seen as the second period in time which reviews the status of the international collaboration. The first one dates back to 2007, when the same authors reviewed the international collaboration between the Netherlands and Germany. One of the main conclusions of that research was that the collaboration between the Netherlands and Germany on flood protection was able to deliver *'considerable output'*, albeit that the collaboration was aimed at *'relatively modest objectives'* (Verwijmeren & Wiering, 2007). By reviewing the existing literature and combining this with the data gathered from the interviews with relevant actors in the area of dike ring 48, a new categorization of where the international collaboration currently is can be provided. It will be interesting to attempt such a same categorization 11 years later and see if there has been a change in the international collaboration between the Netherlands and Germany.

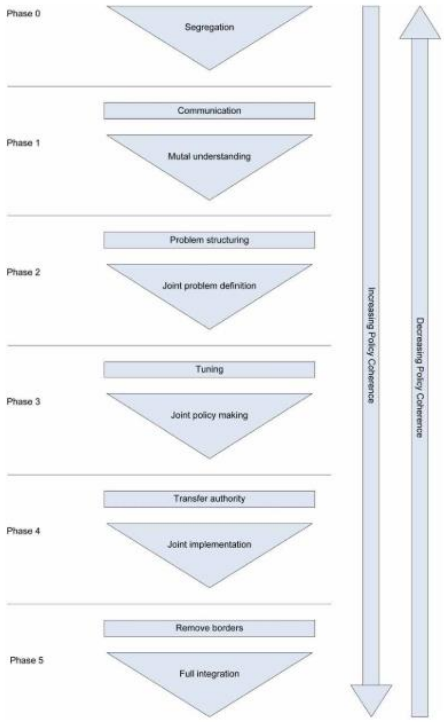

Figure 3: Stages model of Transboundary Governance. Retrieved from: Wiering, M., Verwijmeren, J. (2012).

2.3 Conceptual Framework

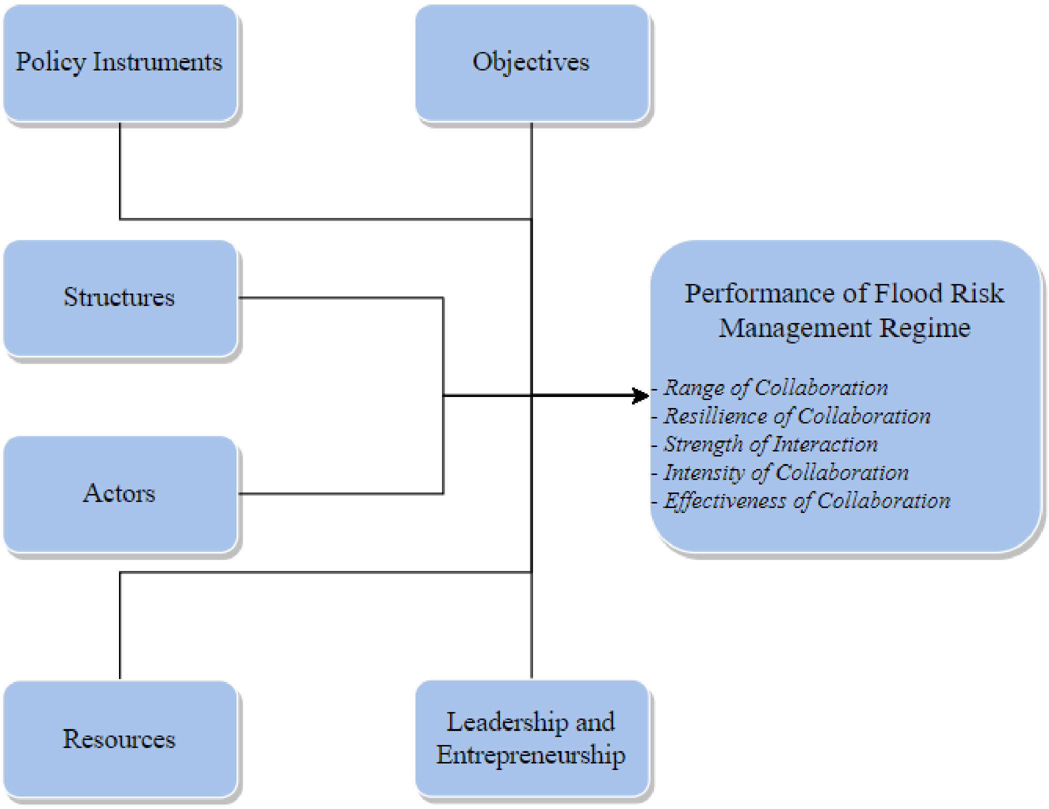

Figure 4: Conceptual Framework, own work.

In the framework portrayed above, the different variables that influence the performance of the regime are graphically shown. The six variables all add to the performance of the regime, hence the single arrow. The performance of the regime can also be measured or defined. This is done by the five variables that are shown in the textbox to the right of the scheme. The definition of these eleven variables is provided in the previous sub-chapter. Below, a scheme with the further operationalization of these variables is provided. For the operationalization of these variables, inspiration has been drawn from previous work by Renner (2020).

Variable	Operationalization
Actors	- Are there barriers caused by language. - Are there cultural differences that hamper the collaboration. - Are there differences in hierarchical background that influence the collaboration. - Are the correct actors and counterparts involved so that the determined objectives can be achieved. - Is there contact besides the professional contact. - Is the perception of necessity in line with another.
Objectives	- Are there clear goals in the collaboration. - What is currently done in the collaboration. - Is the scope of the collaboration the right size to make a difference. - Is the collaboration aimed at a long term alliance. - Did the collaboration result in joint policies.
Policy Instruments	- Is the collaboration grounded in (inter-) national laws. - Are there signed documents that ensure the collaboration. - Are there other laws that affect the collaboration.
Structures	- Are there international institutions (such as EU or WHO) active in the area of collaboration. - Are different governmental authorities from different levels of importance involved. - Are other actors/stakeholders besides governmental actors involved in the collaboration. - Are organizations shaped in the same way.
Resources	- Are there financing programmes for the projects that fall under the collaboration. - Are the actors prepared to invest across the border. - Are the actors involved skilled enough to make an impact. (human resources) - Are there shared information systems.
Leadership and Entrepreneurship	- Are national governments committed to the cause. - Are there central figures who take responsibility in initiating collaboration. - Is there a defined division of tasks within the different international structures. - Are actors willing to take risks.

As with the variables that directly influence the performance of a regime, the five variables that can be used to measure the performance of a regime need to be operationalized a well. In the table below, the five variables are operationalized. The explanation on what the variables are about can be found in paragraph 2.1.3.

Variable	Operationalization
Range of collaboration	- Does the collaboration only focus on one of the layers in the MLS, or multiple. - Is the collaboration only focused on water-safety, or does it cover other elements of international collaboration. - Is the scope wide enough to be able to make an impact. - Are actors from different backgrounds involved.
Resilience of collaboration	- Do changes in political systems influence the performance of the regime. - Do changes in actors influence the performance of the regime.
Strength of interaction	- Is the basis of the collaboration embedded in laws. - Is the basis of the collaboration embedded in other informal documents. - Has the collaboration reached goals that were set. - Has the collaboration led to new collaborative structures. - Are the actors true and open to each other.
Intensity of collaboration	- How frequently is there contact between the actors (How lively is the regime). - Is the contact only digital or physical. - Is the regime seen as important by national governments. - Has the number of actors involved increased or decreased.
Effectiveness of collaboration	- Has the collaboration led to new laws or norms. - Has the collaboration been able to fix certain issues. - Has water-safety been improved in specific areas. - How would the area of the regime look like if the regime would not be there.

With this operationalization of variables, a more guided approach of reviewing the gathered data will be ensured. In chapter 4, the case study, the results of the research will be discussed.

3. Methodology

In this chapter, the methodological choices to answer the research questions for this research will be discussed. As a guiding light, this research will make use of the 'Research-Onion' as created by Saunders, Lewis and Thornhill (2008). This frame gives guidance in organizing the research. Starting off at the broadest possible point of a research, the overarching philosophies, and working down to the actual data collection, the different layers will be discussed and substantiated. At the end of this chapter, the methods to ensure research quality, as well as limitations to the chosen methods, will be discussed.

3.1 Research philosophy

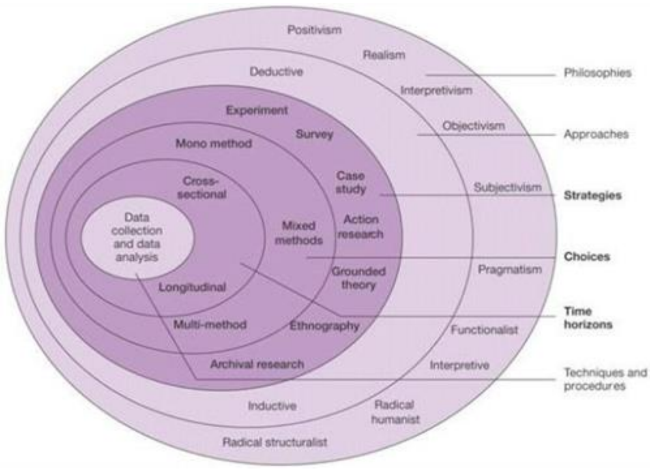

Figure 5. Research Onion. Retrieved from: Saunders, M., Lewis, P. & Thornhill, A. (2008).

As a main starting point, this research will follow an interpretivist epistemology. Interpretivism is about understanding human behaviour, from the viewpoint of a human researcher (Saunders et al, 2008). Interpretivists believe that it is impossible to conduct fully objective research when researching human behaviour. Human behaviour is not as predictable as maths or the laws of physics, and therefore requires a different approach (Saunders et al, 2008). The approach in this research will be an empathic one, where an effort will be made to understand the different norms and values of those subject to research. The decision for this type of research philosophy comes from the belief that, in order to understand the full complexity of the dynamics in international collaboration, the experiences of those directly involved in such collaborations are leading in assessing whether or not the collaborations are working as intended. By understanding what moves those that are involved in international collaboration, or what actions may cause a negative reaction, this research will aim to provide accurate recommendations as to where to improve in the process of international collaboration.

3.2 Research approach

The next layer of the onion refers to an inductive or a deductive approach. When conducting (qualitative) research, there are three major pathways of reasoning to follow: deduction, induction, and abduction. Deduction takes logical conclusions based on true premises (Woo et al., 2017), so if all employees of company A own car X, and person B works for said company, then the deductive method will determine that person B also owns car X. Inductive reasoning will focus more on generalizing the results beyond the available observations (Woo et al., 2017), so if everyone with a job in a specific area owns a car, then the inductive method will conclude that all employees at a company in that area will also own a car (without having used data that actually proves that). The last method is the abductive method. This method has similarities with the inductive reasoning, but takes it a step further and tries to explain why certain observed phenomena are there (Woo et al., 2017). So, again with the example of having a car, the abductive method will try to explain that everybody owns a car *because* they have to travel to work. The abductive method is more about the explanatory value of a conclusion than the creation of new theories (such as inductive). This research will make use of an inductive approach, as this research assess the current performance, and will generate knowledge that could be generally applicable to other areas of international collaboration.

3.3 Research strategy

The third layer of the onion consists of the research strategy. This research will be an in-depth case study, meaning that new knowledge will be created through an intensive exploration of this case (Cunningham, 1997). A case study is defined as ‘an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used’ (Yin, 1984). Yin identifies four different types of case study: 1) single holistic, 2) single embedded, 3) multiple holistic, and 4) multiple embedded (Yin, 1984). The difference between holistic and embedded is that holistic focus on one unit of analysis, where embedded cases have multiple units of analysis (Scholtz & Tietje, 2002). The case study in this research will be a single embedded case study. Single embedded designs for a case study focus on one specific case (dike ring 48), but study multiple units of analysis (Yazan, 2015). As this research make use of interviews with different types of actors (waterboards, municipalities, ‘*veiligheidsregio’s*’, ‘*Bundesländer*’), this design is deemed most fitting. Another reason why the decision has been made for a single embedded case study, is because researching multiple units of analysis allows for a more detailed level of inquiry (Bell, Bryman & Harley, 2019). International river management is a topic that affects multiple areas in the Netherlands, as well as other regions on the planet. By conducting a case study, the scope will be narrowed down and the expectation is that this will add to the achievability of the research.

The decision for the specific area of dike ring 48 comes from several characteristics. The original idea for this research was aimed at international relations regarding water safety. This subject is quite broad and can cover several elements, so in order to narrow it down to a more framed portion, the decision was made to focus on dikes. This idea was first brought to light during an internship at the Ministry of Infrastructure and Water, during which this subject was discussed at several given moments, sparking an interest in international cooperation concerning dike safety. When looking at the dikes in the Netherlands, the majority of them are situated solemnly on Dutch territorial grounds. There are, however, two dikes that lie in both Dutch, as well as German territory: dike ring 48 and dike ring 42.

This gives these two dikes an extra managerial challenge, as the two different countries both share a responsibility for this dike. The final decision as to why dike ring 48 is the subject in this research, and not dike ring 42, comes from the potential damage that would be caused by a breach in the dike. As was discussed in the introduction, the area protected by dike ring 48 is shaped like a bathtub. A flood in this area would hit several cities and towns, as well as an international highway and several other infrastructural points of interest. The shape of the area would also make it extremely difficult to get the water out of this area after a flood, causing long-lasting problems in this area. A flood in dike ring 42 would, however devastating for those who would be hit by such a flood, cause less damage, as there are less inhabitants and points of interest (railways, highways, airports etc.) in this area. This has led to the author's opinion that dike ring 48 would be more fitting as a case in this research.

3.4 Research choice

The fourth layer discusses the type of method that will be used in data gathering. This research will be qualitative research, consisting of a multi-method approach. Qualitative research is 'any form of research that uses data that does not indicate ordinal values' (Nkwi, Nyamongo & Ryan, 2001). Qualitative research seeks to investigate and understand the meaning that individuals or groups give to social problems (Creswell & Creswell, 2017). The data will be gathered through interviews and desk research. Both are qualitative methods, and by combining these two methods, the expectation is that a clear and sufficient overview of the current state of international river management can be generated. When looking at the decision between cross-sectional and longitudinal, a clear answer cannot be easily provided. This research will most likely position itself somewhere in the middle.

3.5 Research period

There are two types of research periods; longitudinal and cross-sectional. Longitudinal refers to research that has been conducted over a period of time, cross-sectional refers to research that focuses on a specific point in time (Saunders, Lewis & Thornhill, 2008). This research will focus on just one period of time, namely the current situation. This current situation can be compared to a previous situation several years, or even decades, ago, but due to the focus being solemnly on the current situation, this research will be of a cross-sectional character.

3.6 Data collection

The data collection and analysis will make up the largest part of the research. In order to conduct viable case study research, the research should be based on multiple sources of evidence in order to enable cross-checking, and to increase the validity of the findings (Yin, 1984). In research, a division can be made between primary and secondary data. Primary data is data that has been collected first hand by the researcher, an example of this is an interview. Secondary data can be found in publicly accessible information, such as reports or other interviews (Hox & Boeije, 2005).

The research starts with a review of the existing literature to create a clear framework in which the research can be conducted. This data makes up the secondary data of this research. The literature that was used as secondary data consists of scientific publications, policy-reports, (annual) reports, and visual data. Using secondary data helps with increasing the internal validity of this research. The combination of secondary and primary data will make the coverage more complete, and aid in creating a more holistic image of the situation (Carter, Bryant-Lukosius, Dicenso & Blythe, 2014). As secondary data can include a wide variety of sources, it is important to stay critical of which sources might be fit to use in research. Secondary data is all data that was 'originally collected for a different purpose and reused for another research question' (Hox & Boeije, 2005). This research uses data that was created by scholars, and thus contains a certain level of validity, as well as data that is not originally intended for research. By using these types of data, the risk appears that sources are not as valid as they should be. During this research, a lot of attention has been paid to who wrote what, and in which context.

The second part of this research consists of semi-structured in-depth interviews with respondents, and the analysis of relevant documents that explain the regime (such as international agreements). An in-depth interview is described as 'a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspective on a particular idea, program or situation (Boyce & Associate, 2006). Semi-structured interviews are interviews that follow a certain guideline, but are open to unexpected input (Longhurst, 2003). In this research, actors from the Netherlands and Germany have been interviewed. This was done through critical case sampling, which allows logical generalization and possibly the application to other cases (Miles & Huberman, 1994). By interviewing respondents from the different countries, the results would not be biased towards the ideas of one of those countries.

3.7 Data analysis

After the interviews have been conducted, they were analysed using coding. There are multiple ways of approaching the analysis of such data, with open coding being one of the more common ways (Gioia et al., 2012). However, this research approached the analysis of the data through a different way. As was discussed during the previous chapters, several variables have been determined that either assess or influence the performance of the regime. This process is called *a priori* (beforehand) coding (Stuckey, 2015). Instead of looking for groups of codes and creating variables, these specific variables were discussed during the interviews. By asking the respondents questions about those variables, categorized in specific themes, answers and insights have been collected on how these variables influence the regime. The interview guide that was used as a rough guideline can be found under Appendix I.

A total of 13 respondents have been interviewed on the topic of Dutch-German collaboration on flood protection. In order to assure privacy, and to let the respondents speak freely, all interviews have been anonymised. They will be referred to as *Respondent X* (Rx). An overview of these respondents can be found in appendix II. All these respondents were linked to international collaboration between the Netherlands and Germany. Most of the respondents were directly involved in water safety on the Rhine, while some others were able to share their expertise on international collaboration between the Netherlands and Germany as a whole. An effort has been made to ensure that both sides of the border were involved in the interviews. This has led to the inclusion of three native Germans, and two Dutch respondents who were working in Germany and were therefore able to provide an insight in the German systems. They have been interviewed about their personal experiences with international collaboration, and where and how they believe these forms of collaboration can be improved.

3.8 Validity & Reliability

The final elements that need to be discussed are those of reliability and validity. Reliability refers to whether or not the same results will be achieved by using the same methods under the same circumstances. Validity refers to how accurately the chosen method measures what it was intended to measure (Roberts & Priest, 2006). In qualitative research, reliability can be difficult. Humans change over time; their behaviour depends on several factors. Therefore, the chance that the outcome of the research will be different if the same research is conducted in 10 years is there. But as this research is a snapshot of the current situation, with a foundation of relevant articles and theories, this research can be seen as currently reliable. This is an important difference between quantitative research and qualitative research. The goal of qualitative research is often to provide an in-depth understanding of a certain phenomenon (Bell & Harley, 2019), meaning that if the research is conducted in a precise manner, it is valid. It is therefore important to adhere to a consistent application of the chosen methods.

In order to ensure the internal validity and robustness of this qualitative research, it is important to adhere to certain levels of trustworthiness, credibility, applicability, and consistency (Hammarberg et al., 2016). In this research, a certain level of trustworthiness was persuaded by clearly stating why this research will be conducted, how this research has been conducted, and why the decisions for certain methods of conducting research have been taken. The credibility in research involves the results of this research. At the end of the research, a reflection on the process of the research is provided. This reflection aims to discuss potential shortcomings and can act as a warning or a tip for future researchers. Applicability concerns the external validity of this research, it's 'generalizability'. This means that, in order to be seen valid, it should be possible to conduct the same research in other parts of the world. The final element of testing the validity of this research can be found in its consistency. What is meant with this is whether or not other researchers, if they were to follow the same steps as were done by the researcher, would come to the same conclusions as the researcher (Hammarberg et al., 2016). An attempt to generate consistency has been done by reflecting on the existing literature, and to test the results coming from the interviews to the existing literature. If there is too much difference between the existing literature, and the gathered knowledge, a re-assessment of this research is necessary.

3.9 Limitations

One of the main 'problems' in qualitative research is researcher bias. Researcher bias comes in all forms and shapes, for instance selection bias in sampling of people, or the affinity of the researcher with certain kinds of people or designs (Norris, 2007). One of the problems with bias is that there is no specific procedure to follow to prevent bias. A lot of the responsibility of preventing researcher bias lies with the researcher. Reflecting on the process of the research, as well as on the gathered data and the procedures followed, all aid in minimizing possible researcher bias (Norris, 2007).

Another element of limitation can be found in the Gioia methodology. The main risk of this methodology lies close to researcher bias and can be found in a researcher losing its higher-level perspective of the situation (Cornelissen, 2017). By losing this 'birds-eye' view of the case, it might become difficult to generate new theories out of the gathered data. Another risk of this methodology, as it relies heavily on the experiences of the respondents, is that choice of words might influence the answers of the respondents. By referring to prior frameworks or certain grand theories in the interviews, the risk arises that the respondents alter their personal answers to something they seem more fit (Gioia et al., 2012).

A final element of limitation lies in the lack of physical meetings. Due to the global pandemic, all interviews have been held through digital communicative methods. This eliminates the possibility for registering subtle non-verbal communicative aspects of the respondents, such as a frown or a small sigh. Interviews held with video allow for more registration of these non-verbal forms of communication, but still make it very difficult to capture the entirety of all communication. The flow of the interview is also likely to be less fluent than it would be in face-to-face contact. This might also obstruct the naturalness of the interview, as the respondent might feel uneased. This can also lead to less fitting answers, or altered answers. During the phase of interviews, a close eye will be kept on this possible problem.

4. The Study of a cross-border dike area

In this chapter, the specific case of dike ring 48 will be discussed. This chapter will start with a description of the geographical characteristics of this area. After this, an explanation and overview of the organizational structures in both Germany and the Netherlands will be provided, as to help create a better understanding of the different dynamics and structures that are in play.

4.1 The River

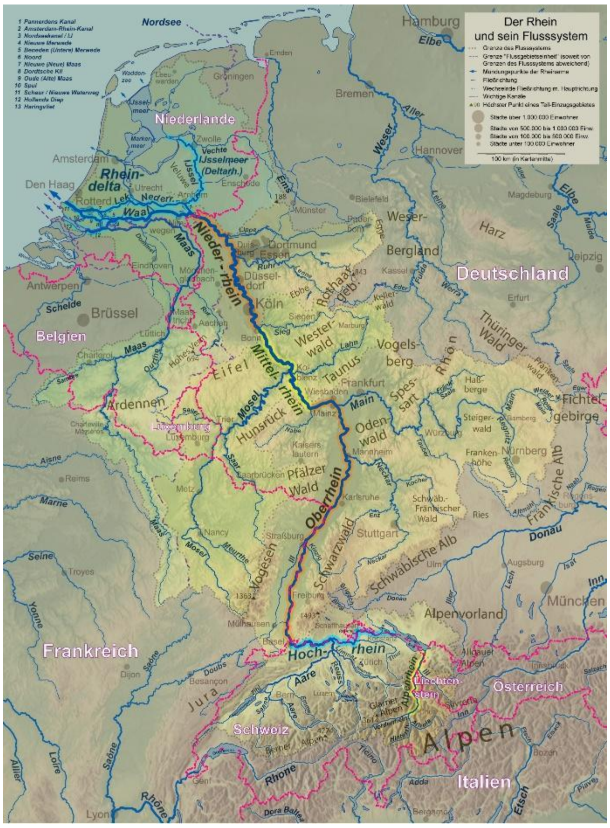

Figure 6. Rhine course and river system, author unknown, 2021

The Rhine is one of the major rivers in Europe, running over a length of around 1250 kilometres. The actual river flows through six different countries (The Netherlands, Germany, France, Austria, Switzerland, and Liechtenstein), but the catchment of the Rhine (the area of land from which precipitation drains off into the river) is situated in nine different countries, adding Belgium, Luxemburg, and Italy (Uehlinger et al., 2009). The Rhine has always been a major element in the history books of Europe. During the time of the Romans, the Rhine, in what is now the Netherlands, formed the northernmost border of their empire, and during the closing stages of World War 2, the Rhine was a bridge too far for the allied troops in their march to Berlin. But it's not only due to conquest and power that the Rhine has been an important element in Europe. Being a large waterway deep into the inlands of Europe, the Rhine has historically been a major element in international trade. As of today, an approximate of 6900 vessels traverse the waters of the Rhine, adding up to a total of 310 million tonnes of cargo being shipped (Central Commission for the Navigation of the Rhine, 2021), making the Rhine one of the most important waterways in the world. With its catchment spanning nine countries, it is estimated that around 60 million people live in the basin (Uehlinger et al., 2009), and that, at the beginning of this millennium, over 25 million people were dependent on the Rhine for their drinking water (Cioc, 2002). The Rhine is a mixed river, meaning that its water comes from both melted snow and glaciers, as well as rainfall. The upper stream of the Rhine is more characterised by melting water, whereas the lower stream of the Rhine is more defined by rainfall. The result of this mix of sources is that the flow of the

Rhine is quite continuous, but with peak discharges after the winter, or after prolonged periods of rainfall.

4.2 The Dike ring

Dike ring 48 is an international dike ring situated in the eastern part of the Netherlands, running along the northern shores of the Rhine, the eastern shores of the IJssel, and the southern shores of the Oude IJssel. The dike starts in Germany, at Bisslich, and ends in the Netherlands, at the city of Doetinchem. The majority of the area that is protected by dike ring 48 consists of agricultural lands, with some larger business parks on the Dutch side of the border (Arends, 2014). The area has around 176.000 inhabitants living in the Dutch part of the dike ring, and somewhere between 60.000 – 80.000 inhabitants in the German part (Arends, 2014). An interesting geographical characteristic of this area is that the area is situated on a slope that’s tilted from the south-east to the north-west, following the direction of the river (van Eerd, 2014). This tilted slope means that, regardless of where the dike breaches, the water will flow towards the IJssel, putting extra pressure on that river. Another point of attention that can be made up from this geographical characteristic, is that a breach in the German part of the dike ring will allow more water to flow into the area than a breach in the Dutch part of the dike ring. When looking at the map of the area above, a green area in the middle of the Dutch part is visible. This area is slightly elevated in comparison to the surrounding area, forming a hill in the landscape. In the event of a flood, this area will not be flooded and will, depending on the location of the breach, push the water southbound or northbound. When creating safety plans, or evacuation plans, this is an important element to add to the equation when deciding the most optimal outcome in such an event. The area of dike ring 48 has several noteworthy infrastructural elements, such as railways (i.e., the Betuwelijn) and some major highways such as the A12 and A18 in the Netherlands, and the German highway 3 to Oberhausen.

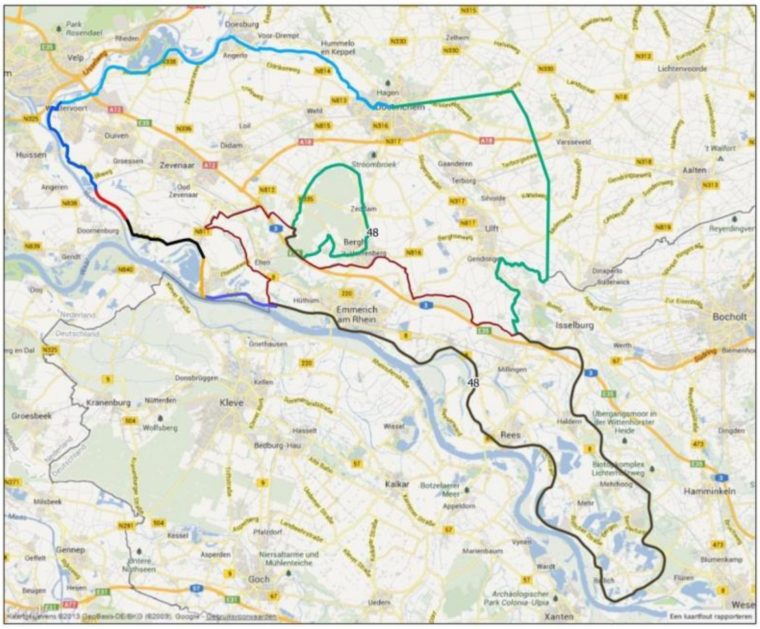

Figure 7. Dike Ring 48. Retrieved from; Ministry of Infrastructure and Water (2013).

4.3 The Actors

In order to understand how the different countries are structured and which institutions are active within the countries, this chapter will firstly provide an overview of the different actors in both countries. After this overview, the leading flood risk management strategies in each country will be discussed.

4.3.1 The Netherlands

The Netherlands is organized as a 'decentralized unitary state', meaning that there is no hard task-definition between the different governmental layers (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2021). These different governmental layers can have different tasks whilst working on the same policy area, where the legislator decides the exact division of labour. A typical characteristic for a decentralized unitary state is that there is no legislated, guaranteed division of labour (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2021), this puts the different actors on 'the same page'. The Dutch government consists of several different ministries, led by a government minister (Government of the Netherlands, 2021). These different ministries are all responsible for a specific element of the Dutch society, such as *foreign affairs; finance;* or *Infrastructure and Water*. The latter is the ministry that is of most relevance for this research. The Ministry of Infrastructure and Water is the ministry in the Netherlands that holds the responsibility for roads, railways, waterways and airways, as well as protection against flooding, and the quality of air, water and soil (Rijksoverheid, 2021). As one of the largest governmental organizations, it is evident that this ministry is one of the major actors when working on a subject like international collaboration on flood protection.

Below the *ministries*, on a scale that goes from nationwide to local, are the *provinces*. There are 12 provinces in the Netherlands, each responsible for a specific part of the Netherlands. Provinces enjoy a degree of autonomy, being able to decide on certain matters without consulting the overarching national government. At the same time provinces are obliged to adhere to certain nationwide policies (Rijksoverheid, 2021). Provinces are responsible for the construction of roads, railways, waterways, and the upkeep of bridges (among many other things). It is clear that there is some overlap between the different governmental layers, demanding collaboration between the different actors. Another relevant responsibility of the provinces is to oversee the *waterschappen (waterboards)*.

The waterboards are a separate administrative layer that focuses solemnly on different elements of water. There are 21 different waterboards in the Netherlands, some of them situated in multiple provinces. The three major responsibilities of the waterboards are; water safety; clean water; and water supply (Waterschappen, 2021). On the topic of water safety, the waterboards are responsible for the upkeep of the dikes. This comes down to somewhere around 18.000 kilometres of dike in the Netherlands (Waterschappen, 2021). The waterboards are the 'final' actor in the ladder of flood protection, starting with the national government that creates nationwide policies and going down to the waterboards who are responsible for the actual protection against flooding on a local level. The waterboards that are most involved in this research are Waterschap Rijn en IJssel, and Waterschap Rivierenland.

A final actor that is of great relevance for this research is the *veiligheidsregio*. The veiligheidsregio's were created in 2010 and consist of a variety of different actors that are responsible for fire safety, disaster control, crisis management, public health, and public safety (veiligheidsregio Gooi en Vechtstreek, 2021). The veiligheidsregio's form an extra administrative layer, again with a level of autonomy, in order to optimize the cooperation between different actors on the subject of safety. There are 25 different veiligheidsregio's, of which 12 are situated on the border with either Germany or Belgium. The veiligheidsregio's that are most involved in this research are the Veiligheidsregio Noord- en Oost-Gelderland, Veiligheidsregio Gelderland-Midden, and Veiligheidsregio Gelderland-Zuid.

4.3.2 Germany

The governmental structure of Germany is slightly different than that of the Netherlands. First of all, Germany is a federal democracy with a central government located in Berlin, with certain ministries located in Bonn. This central government mandates policies that are relevant for all Germans, such as health insurance policies. The central government consists of a total of 14 different ministries that are responsible for a specific element of German society, like in the Netherlands (Expatrio, 2021). Examples of these topics are; Defence, Food and Agriculture; and Environment, Nature conservation and Nuclear safety (German government, 2021). The latter is the most relevant ministry on a nationwide scale.

Besides the nationwide government, Germany is divided into 16 *Bundesländer*. These Länder can be seen as the provinces of Germany, except that they have a lot more authority than the Dutch provinces. Bundesländer can decide on educational systems and upkeep op the dikes, and can form international alliances (albeit with authorization of the national government). When looking at the scale of the Länder, a difference in size between the Dutch provinces becomes very clear. Nordrhein-Westfalen, the largest Bundesland in terms of population, is as big as the Netherlands, harbouring almost 18 million inhabitants (Urbistat, 2021). It might therefore be better to compare the Netherlands and Nordrhein-Westfalen to each other, instead of one of the provinces of the Netherlands and the Bundesländer of Germany. Nordrhein-Westfalen has several own ministries that are responsible for different topics, such as; Finance; Home affairs, Communalities and Building; and Environment, Agriculture, and Nature- and Consumer-protection. The latter of the two ministries are the most relevant ministries when looking at flood protection, where the ministry of Building is responsible for the creation and upkeep of the dikes, and the ministry of Environment and Agriculture is responsible for the more climate change related subjects (NRW, 2021).

Because of the size of a Bundesland like Nordrhein-Westfalen, a further administrative division is made in some of the Bundesländer: the *Bezirksregierung*. The responsibilities of a Bezirksregierung can include several topics, such as education, environment, or healthcare (Bezirksregierung Düsseldorf, 2021). The responsibilities of such a Bezirksregierung are in line with the responsibilities of the Bundesland as a whole, but focus on a specific area (Düsseldorf, Münster, Cologne). The different Bezirksregierung also enjoy a certain degree of authority, allowing them to join collaborations with other countries, such as the Netherlands.

An administrative layer within the Bundesländer is the *Kreis*. The Kreise are a separate governmental layer that carry the responsibility for a specific area inside of a Bundesland. These areas can be compared to the municipalities in the Netherlands. Kreise carry several jurisdictions that mainly concern the daily lives of the inhabitants of that specific region, such as social welfare, upkeep of roads, and waste collection (Kreis Kleve, 2021). The Kreis is led by a chief district administrator, who represents the ministry of Home affairs, creating the direct link between the Bundesland and the Kreise.

A final actor in this case is the *Deichverband*. A Deichverband is comparable to the Dutch waterboards. The main responsibility of a Deichverband is flood protection, combined with water quality and the upkeep of pumping stations (NRW, 2021). Deichverbände are self-governing bodies that rely on membership fees, so they are less obliged to reporting back to the government of the Bundesland (Deichverband Bislich-Landesgrenze, 2021). The Deichverband is burdened with the upkeep of the dikes, and this is where the connection to dike ring 48 becomes visible. The German part of dike ring 48 is situated within the Deichverband Bislich-Landesgrenze, and the current works on the dike are being conducted by the Deichverband. At the end of the 1980s, it was decided that the German part of the dike were to be renovated. This project would consist of 47 kilometres of dike, of which 20 kilometres have been renovated as of today (Deichverband Bislich-Landesgrenze, 2021).

4.3.3 Flood Risk Management Strategies

A recent innovation on the subject of flood protection in the Netherlands is multi-layered safety (Ministry of Infrastructure and Water, 2009). Presented in 2009, the policy notes on multi-layered water-safety discuss a new strategy on protecting the Netherlands against water. The multi-layered safety consists of three elements; (1) prevention; (2) spatial solutions; and (3) crisis management (Ministry of Infrastructure and Water, 2009). The main priority of the Dutch government is still the prevention of a disaster, but with this multi-layered safety strategy, there is a slight shift in emphasis towards anticipation rather than reaction. An important element of this strategy is that it still relies (too) heavily on situational characteristics. The need to evacuate might be easier to predict in certain areas than in other areas. The flooding of a river is something that can be seen coming a couple days prior, whereas the flooding of the sea is more difficult to predict. Another important note to the implementation of multi-layered safety is that research has shown that it is only cost-effective in areas that already have a high(er) safety standard (Hoss, Jonkman & Maaskant, 2011). This indicates that multi-layered safety currently only has the potential to supplement the existing flood protection, rather than replace it.

This specific type of flood protection is most common in the Netherlands, but this is not the only example of a successful defence mechanism. There are significant differences between the different countries of the European Union (EU) when it comes to flood defence. The Netherlands is the only country in the EU that knows a system that relies on the government for protection, with ex post compensation in the event of a disaster (the government will financially aid you in case of damage caused by a flooding) (Bouwer, Huitema & Aerts, 2007). Other countries in Europe usually rely on private insurance, with either >50% market penetration (e.g., France, UK, Spain), or <50% market penetration (e.g., Germany, Italy, Poland) (Bouwer et al., 2007). The difference between the Netherlands and for instance Germany is very interesting, as the approach which the governments take concerning the maintenance of the dikes might vary.

When looking at the flood protection policies in Germany, a major difference between the Netherlands and Germany is visible. Where the Netherlands has a centralized strategy, which is largely the responsibility of the national government in collaboration with local actors, Germany has a decentralized system where flood protection is mainly the responsibility of the Bundesländer (Schuh & Hatz, 2018). The communication between the different Bundesländer goes through the *Länder-Arbeitsgemeinschaft Wasser* (LAWA). The LAWA is a working group that '*discusses actual questions in water management, and aims to formulate solutions and recommendations for their implementation*' (LAWA, 2021). The LAWA consists of four permanent working groups that work on the different aspects that come into play when working with water, such as; flood prevention; groundwater quality; sewage; and water pollution (LAWA, 2021). After Germany was struck by major flooding in 2013, a nationwide flood protection programme was installed. This program, the *Nationalen Hochwasserschutzprogramm* (NHWSP), was aimed at the fast implementation and realization of flood protection measures that would affect multiple regions at once. It had proven to be difficult to realize such projects in the past due to the massive amounts of land required, and a potential mismatch in local interests (Bundesministerium, 2017; Schuh & Hatz, 2018), so a nationwide program to overcome these difficulties was necessary. When comparing the German strategy to the Dutch MLS, it becomes clear that Germany is heavily investing in measures that affect the first layer, the actual protection through dikes, but not so much in the other layers. With a strategy that revolves around flood protection measures, the other layers seem to be underlit. This opens up opportunities for improvement, for example in early warning systems or spatial adaptations. After the major floods in July 2021, the early warning system of Germany was heavily criticised (Oltermann, 2021). This, older, system was shown not to be flawless during a test in 2020 (Connoly, 2020), and raised questions about how safe citizens would be in case of an emergency. It seems like this layer of flood risk management is an area that could be heavily improved on in Germany, especially when comparing it to the Dutch LCMS.

When looking at the overall development of flood risk management in Germany, there seems to be evidence that Germany is shifting more and more towards an anticipatory system. However, the overarching focus still seems to be pointed at maintaining current standards rather than realizing a wider resilience (Surminski, Roezer & Golnaraghi, 2020). When looking at compensation through insurance after a flood, Germany fully relies on private market insurances with voluntary uptake. State funding has been decreased and there are no mandating laws to force (local) authorities to engage in flood protection insurance, causing low levels of uptake under local authorities (Surminski, Roezer & Golnaraghi, 2020). This is a key difference between the Netherlands and Germany, where damage caused by flooding will be reimbursed by the government in the Netherlands, and damage caused by flooding will be covered by private insurance companies in Germany, but only if you are insured. No insurance means no financial aid, potentially causing a different risk-approach in Germany than in the Netherlands.

4.4 The Regime

Now that the different actors have been discussed, it is important to understand what the regime that is being discussed in this research looks like. By focusing on the areas where the two countries collaborate on, and by looking at the international structures, an understanding of the regime can be created. A common definition of a regime is '*a set of principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area of international relations'* (Krasner, 1982). After major floods in 2002, the need for a centralized flood directive was proven. In 2006, the EU agreed on this new directive to battle the threat of flooding. It consists of three major elements:

1. Preliminary flood risk assessment
2. Flood risk maps
3. Flood risk management plans (European Union, 2006)

These three elements are all focusing on mapping the potential risks and developing strategies to mitigate the effects of a flood. One important aspect that is not taken up in this directive is the actual implementation of preventing measures. This was deemed to be the responsibility of the member states. In 2009, a critical review of this directive stated that a lot of the necessary data is still lacking (Tsakiris et al., 2009). Without the complete sets of data for all river basins in the EU, even a general directive will not aid greatly in preventing floods. Another important point of critique in this paper was that '*the standard approach of constructing technical works for flood protection frequently in the downstream part of a river basin has proven to be very expensive, environmentally unfriendly, and inefficient'* (Tsakiris et al., 2009). This remark calls for a different approach of river management and flood protection, especially for countries downstream, indicating the importance of the Arbeitsgruppe Hochwasser as a vital organ in the communication between the Netherlands and Germany on flood prevention. This Arbeitsgruppe forms the core of the international flood management regime. The Arbeitsgruppe contains actors from both German and Dutch side. On German side, the Department of

Environment of Nordrhein-Westfalen and the Arbeitskreis Hochwasserschutz take place in this Arbeitsgruppe. On Dutch side, the Ministry of Infrastructure and Water, the province of Gelderland, the Waterschap Rijn-IJssel, and the Waterschap Rivierenland take place (Waterschap Rivierenland, 2019). By signing an agreement, the two countries pledged to continue their collaboration on flood protection. In the past, this Arbeitsgruppe had worked on a shared study into the safety of shared international dikes (Rijksoverheid, 2015), of which the results were presented on a conference that led to the renewal of the collaboration. The results of this study showed that both countries are dependent on one another, enforcing some of the suspicions earlier in this research (Waterschap Rivierenland, 2019). This Arbeitsgruppe Hochwasser has been active since the 90's and has been a successful collaboration in the past (Verwijmeren & Wiering, 2007). It has been mentioned how this regime had known '*relatively modest'* objectives (Verwijmeren & Wiering, 2007) in the past, although it had been able to deliver considerable output over the years. With the regime being scaled in a phase where the main goal was to exchange information back in 2012 (Wiering, 2012), it is now interesting to review if the regime has moved up into a next scale of collaborative intensity. The aim of the collaboration has recently been described as '*focused on the exchange of information, having shared studies, and coordinate policies'* (Rijkswaterstaat, 2019), indicating that the element of exchanging information is still present in the collaboration. New elements have been added in the form of shared studies and the coordination of (inter-)national policies. Collaborating on shared policies would place the regime in tier 3, one tier higher than it had been placed in 2012. It will be worth reviewing whether those ambitions have been reached, and if the regime has indeed developed into a more intense and entangled collaboration.

Both countries are working on their own national projects, which influence the topics of collaboration within the Arbeitsgruppe. Following the 2007 EU flood directive, the Netherlands has adopted several strategies to limit the risk of a flood, the so called '*Richtlijn Overstromingsrisico's*' (Guideline Flood risks). The Netherlands is currently working on its second cycle, which will run from 2016-2021. Even though this guideline focuses on Dutch parts of the major rivers it provides a lot of valuable information for the Arbeidsgruppe, as this contains actors from both countries. This guideline helped identify the potential damage, and possible causalities, along the shores of the Rhine (Ministerie van Infrastructuur en Water, 2018). Using this knowledge, the Arbeitsgruppe can point their focus more towards specific elements along the river. Simultaneously, this guideline helps the Dutch national government to identify possible weaknesses in its flood protection. Germany is currently working on a large scale dike renovation project, their *Deichsanierung*. The goal of this project is to get the safety-levels of the dike on par with the currently leading technical rules (Bezirksregierung Düsseldorf, 2014). As of 2020, 41% of the project has been completed (Bezirksregierung Düsseldorf, 2020). This indicates that the project will most likely take longer to finalize than initially expected. With the next cycle of the Dutch guideline running from 2021-2026, some overlap between the new guidelines for flood safety in the Netherlands, and the finalization of the Deichsanierung will probably take place. However, the expectation in 2019 was that, with 2050 as base-year, the risk of floods would only increase due to the changing climate and an increase in economical welfare (Vereniging Nederlandse Rivierengemeenten, 2019). This concern was backed by research following the floods of July 2021, which brought large-scale destruction and several casualties to the Netherlands and Germany. These floods were caused by extreme precipitation. Said research explained how the odds of such a flood event happening have increased by 1,2 to 9 times (World Weather Attribution, 2021).

When looking back at the Multi Layered Safety strategy that has been discussed in chapter 2, it seems like the main focus of Germany is on the first layer, the factual flood prevention. The Netherlands is mainly focused on the first layer as well, although different programmes and elements are more aimed at the third layer, disaster management. When looking at the regime as a whole, it seems to be aimed at the third layer as well. Both countries are working on their own dike safety projects, but this is not part of the regime. What is part of the regime is best categorizable under the third layer. Strategies concerning disasters, and the exchange of information on the respective strategies are at the core of the regime. In the next chapter, the results of the interviews and analysed documents will be discussed. The categorisation within the different layers will be part of the results as well.

As was discussed in the introduction of this research, there are large differences between the different countries of the EU on the topic of disaster protection. But it is not only in the preparation of, or prevention of, a disaster. There are some differences in the way the damage after a flood event is mitigated. In the majority of the EU, private insurances are responsible for paying for damage caused by flooding. In the Netherlands (and e.g., Belgium), the responsibility lies with the national government (Bouwer et al., 2007). This difference in responsibility could potentially lead to differences in prioritising flood protection.

5. Explaining the performance of a cross-border Regime

This chapter will discuss the results of the research. This chapter is divided in two parts. The first part discusses the five variables that are used to measure the performance of the regime. These variables are *Range of Collaboration, Resilience of Collaboration, Strength of Interaction, Intensity of Collaboration,* and *Effectiveness of Collaboration.* The second part of this chapter will discuss the six variables that influence the performance of the regime. These variables are *Actors, Objectives, Policy Instruments, Resources, Structures,* and *Leadership* After the results of the interviews have been discussed, answers to the research questions that were asked in the introduction are formulated.

5.1 Assessing the Performance of the Regime

Before a review of which variables influence the performance of the regime can be provided, it is important to understand how the performance itself can be measured. This can be done through reviewing several indicators. The variables that can be used to assess the performance of the regime are *Range of Collaboration, Resilience of Collaboration, Strength of Interaction, Intensity of Collaboration,* and *Effectiveness of Collaboration.*

5.1.1 Range of Collaboration

One of the indicators that can be used to measure the performance of a regime is its range. A regime/collaboration that is focused on too many different topics might lose its ability to effectively impact, whereas a regime that has a scope that is too narrow might not be able to influence larger processes. As was discussed in the previous chapter, the regime in this research is specifically on international flood risk management. However, it would be a loss to ignore all other collaborations that influence the border area in which dike ring 48 is situated. In the next sub-chapter, the objectives will be discussed elaborately. However, in order to understand the range of the collaboration, it is important to understand the main objectives in the regime as well. According to the majority of the respondents, the current objectives of the regime are focused on the exchange of information (‘*It’s now mainly the exchange of information’* (R5)). When asked which topics are being discussed in the different collaborative structures, an often-heard answer was that ‘*They talk about every topic that has to do with cross-border interests’* (R10), and that ‘*There is no topic on which there is no international collaboration’* (R11). This indicates that the scope of the entire international collaboration is quite broad, covering several different topics that are all important to the borderlands. Remarkably, this does not seem to lead to a loss of impact due to the scope being too broad. The only mention of an instance where goals could not be achieved had to do with the human capacity being reached due to COVID, so it seems like the range of the collaboration is fitting.

When further exploring the different topics of the regime in this area, a wide variety of topics were discussed. The main topic that the international *Arbeitsgruppe Hochwasser* focuses on is flood prevention/protection. This seems like an obvious statement, but there is more to the Arbeitsgruppe than meets the eye. Within the Arbeitsgruppe, there is a variety of topics that is being discussed besides flood protection. An example of this is a coming symposium on drought on the Rhine (‘*we are currently working on a symposium on drought’* (R6)), or specifically in the Achterhoek (R10). Drought is a topic that requires collaboration between the two countries as well, given that it is not bound by borders. The different actors involved in the different collaborative structures work together on topics that might not be directly related to flood protection as well. One of the respondents talked about his experience with co-funding fire boats, something that was discussed with the same colleagues that were working on flood safety as well. The different topics within dike ring 48 seem to be intertwined, making it difficult to clearly define where one collaboration begins, and the other ends. A lot of the actors have multiple topics that are being discussed, so the range of the collaboration includes a diverse variety of topics. However, despite the boundaries being overlapping, the collaboration does not seem to be affected negatively by the wide variety of topics that are included in the regime. A careful remark that part of the strength of the regime seems to be coming from the possibility to discuss several different topics with your (inter-)national colleagues might even be in place.

With the Multi Layered Safety strategy explained in chapter 2, it is interesting to see which layers are most in place in this regime. Both countries are working on their own on different improvements that can be placed under the first layer, the physical implementations (Bezirksregierung Düsseldorf, 2020; Rijkswaterstaat 2021; HKV 2019). However, this is something that is mainly worked on by the countries themselves, and not an element that is actively worked on in the collaboration. The exchange of information on the different dike-improvement programmes is one of the relevant topics, so it might be fair to state that the first layer does have some embedding in the international collaboration. The second layer, spatial solutions, does not seem to be a relevant topic that falls under the international collaboration. There have not been any mentions of this during the interviews, nor are there documents that state that the collaboration is aimed at such spatial solutions. The third layer, crisis management, also finds its way back to the international collaboration. As the main objective of the collaboration is the exchange of information (see chapter 5.2), it is difficult to pinpoint which actions and processes specifically are active in the third layer. One of the topics that fits within this layer is the usage of the LCMS, which is the Dutch crisis communication system. Germany is not attached to this system, which can make communication in the event of a crisis difficult. There have been projects in the past in which the possibilities of having a shared information system have been reviewed (see chapter 5.2). Another example of how this collaboration fits layer three is the communication about how and when the decision for evacuating an area is taken (see chapter 5.2). In order to prevent chaos or because sometimes the quickest way to evacuate is to cross the border, this information is essential for the regime.

5.1.2 Resilience of Collaboration

Resilience of collaboration is about how the regime is affected by changes in personnel or in governmental structures. Regimes that are not easily affected by said changes tend to be stronger than those that suffer easily from changes in contact. For the case of dike ring 48, it seems like the regime is easily affected by said changes. Over the course of the different interviews, several mentions of how the collaboration was affected negatively by changes in governmental structures, like the creation of the Dutch Veiligheidsregio's (Wet op Veiligheidsregio's, 2010), or by changing actors which caused a loss of personal contact between other actors. The creation of the Veiligheidsregio's was mentioned by several of the respondents as a moment where the collaboration was negatively influenced: '*When I'm talking to my German colleagues, you feel that they find it difficult that they can no longer communicate with the province'* (R5). Another respondent added how, instead of one contact, there are now three contacts '*Which makes it more difficult for them'* (R3). These are indications of how one side of the collaboration has a hard time adapting to a new structure, with remarks like '*I think that the collaboration is sensitive to those changes'* (R6) not rarely heard. The change that came with the creation of the Veiligheidsregio's is the most drastic change the regime has seen in the past years, so it might still be difficult to predict how subtle changes in structures might affect the regime. What is sure however, is that the regime is influenced by such changes, as seen above, and that '*It took quite a lot of energy to rebuild the contact'* (R10). This remark brings forward the impression that the regime is vulnerable to structural changes, and that it takes a while to rebuild the relation after such changes.

It is not only in structural changes where one can find elements that alter the functioning of the regime. This can be found in changes in personnel as well. There is a clear difference between the Netherlands and Germany when it comes to the length of stay in the same function. The Dutch are more used to a system that knows a lot of job-changes, whereas the Germans are more used to staying longer in the same position. This will be elaborated on in chapter 5.2.1. However, it is important to state here, as the rate at which actors change might lead to a deficit in knowledge on the specific case. What became clear during the interviews is that, as was with changes in structures, the regime is very susceptible to changes in actors. The importance of the right people in the right function had already been discussed several times during the interviews, and upon asking what would happen to the collaboration were those people to change function, a lot of respondents replied that they saw it happening in the past and that it impacted the collaboration negatively: ('*That person left (...) and what you see is that the entire collaboration is instantly more difficult'* (R2); '*Dutch change functions more often (...) this gives the Germans the idea that they constantly have to start over with their relations, which can be tiring'* (R11)). These two remarks are but an example of how a change in personnel affects the collaboration negatively. When combining the remarks on structures and personnel, the idea starts to form that the regime is (very) susceptible to changes in structures or actors. At the same time, this challenge might easily be overcome by *'actively introducing new colleagues, including everyone, explaining that said* *person will be your replacement'* (R10). Communication is in the centre of this topic, where misunderstandings are at large and have to be prevented in order to keep the collaboration successful.

5.1.3 Strength of Interaction

Strength of Interaction is about how binding the collaborative structures in the regime are. A regime that has an elaborate basis in several (inter-)national laws can be seen as strong, but a regime that contains a lot of personal agreements and non-fixed contracts can also be seen as strong, as this indicates a level of willingness to cooperate. In this case, a combination of laws, letters of intent, and agreements are in place. On a European Union-level, policies and laws such as the EU flood directive (EU, 2006) '*have condemned actors to, aside from wanting to collaborate, legally having to collaborate'* (R8). Such directives create some sort of back-up plan in case states are not willing to cooperate. With the regime that is in play here, there is a great deal of other treaties and letters of intent that ensure collaboration, whilst simultaneously indicating a high degree of willingness to cooperate. There are multiple agreements, as were seen in chapter 4, that were mentioned again during the interviews (R4, R6, R7, R11, R12). The legal underpinning of the regime seems to be fine, but this does not always mean that the collaboration itself is strong, flawless, or not able to improve on. The respondents were asked how they felt that the contact between the different actors was, and this provided some examples of small problems, misunderstandings or frustrations. One of the respondents explained how the idea was forming that, because one of the involved ministries was not qualified to discuss climate, the collaboration was becoming stiffer ('*this has resulted in a very hesitant attitude on the German side'* (R4)). During one of the other interviews, the following remark was made: '*One of the studies showed that the biggest threat to the Netherlands was coming from the German dikes (...) that was something they did not want to talk about'* (R2). Even though the collaboration seems to be fine on paper, these kinds of remarks indicate that there are some subjects or elements that threaten the success of the regime. It is important to make said subjects discussable in order to prevent further friction in the collaboration. Although the previous examples might paint a picture of the problems coming mainly from the German side of the border, it is important to state that it would be unfair to assume this. One of the respondents elaborated on their remark by stating that '*during those studies, the Dutch method was chosen, which caused some bad blood'* (R4), indicating that some of the frustration might be caused by sticking to one of the methods, rather than reviewing the dikes (in this example) by using both methods. Another example was that the project VIKING, during the 00's, has also caused some friction that is still not cleared ('*this created some old grudges, which caused the collaboration to decrease'* (R5)), and that the German parties were not properly informed on the transition to the Dutch Veiligheidsregio's (R10). All these are examples of where frustrations have formed that can, or will, influence the collaboration between the Netherlands and Germany. The regime seems to be sufficiently fixed in international laws and other forms of treaties. However, the collaboration seems to not be performing at the level that it could be, partly because of old frustrations and misunderstandings, but also because of differences in perception of necessity, governmental structures, or miscommunication. These elements will be discussed in chapter 5.2.

5.1.4 Intensity of Collaboration

Intensity of Collaboration is an indicator that focusses on the liveliness of the collaboration. The central question here is if the collaboration is still alive, or if it only exists 'on paper'. It is safe to say that the collaboration between the Netherlands and Germany is still quite alive, with relatively frequent contact between the different actors that are involved in the collaboration. Several of the respondents indicated how they had '*frequent meetings with both the Dutch and German parties'* (R3), '*Two or three times a year'* (R7), and how '*they* (*the secretaries*) *communicate and exchange a lot of information with each other'* (R8). Based on these remarks, a cautious assumption can be made that the collaboration is still lively. There seems to be contact on a fairly regular basis within the regime, with different actors able to find one another. However, several of the respondents spoke about how important a degree of continuity in the communication was, as the regime was quite sensitive to prolonged periods of less contact between the different actors (R1; R2; R5; R7). Actors on both sides of the border seem to be aware of the importance of structural contact in order to keep the ties alive, but sometimes there is not much anyone can do. During the global pandemic, the contact changed more from physical to digital. This made collaborating '*quite difficult the last year'* (R7), with a lot of meetings and plans being cancelled. At the same time, it opened up doors to a new way of collaborating. More and more contact became digital, '*which made getting together a lot easier'* (R3). With an international collaboration, where partners often have to travel great distances in order to physically meet, new solutions in digital communication can be a major addition to keeping the regime alive. Despite being able to collaborate without physically meeting, there is a downside as well: '*I saw that the contacts that were already established could continue easily, but the main difficulty was in creating new contacts'* (R11). In order to maintain a healthy relation with colleagues on the other side of the border *'You really need that personal contact'* (R2). This is definitely an element to keep an eye on in order to keep the regime alive.

A second aspect that determines the liveliness of a regime is how closely involved the national governments are, or if they have moved away from this collaboration. The interviews provided a bit of a two-faced ordeal on whether the corresponding national governments were still involved or not. On the one hand, several respondents indicated how they felt that the Netherlands were investing more time in the collaboration than Germany (R1; R6; R8), something that will be elaborated on in the next chapter. But on the other hand, there is an equal number of respondents indicating that they feel that the Dutch national government has not put enough effort in the collaboration in recent years (R2; R6). This duality of opinions is interesting, as this might indicate an element that could be improved. The general feeling of liveliness of the regime is that a lot is still happening, there is a lot of contact (albeit difficult), actors know each other and are able to find each other, but at the same time a certain unrest is present under some of the actors. These actors feel like the Dutch government has moved its focus away from this collaboration and onto new challenges and topics, causing some loss of validity of this subject. The fact that some respondents feel this way should be enough to raise some bells and instigate a review to the extent of said feelings.

5.1.5 Effectiveness of the Collaboration

The final indicator of success of the regime is its effectiveness. Effectiveness is about actually implementing new policies, fixing problems and organizing exercises. It is also about the question of what the area would look like were there no regime. To begin with: it is not clear what would be so different were there no collaboration at all. What is meant by this is not that the current collaboration does not do anything, there is a lot of work happening, but that most of the current collaboration is currently focused on the exchange of information. 12 of the 13 respondents stated that the exchange of information is currently the most important goal of the collaboration. These remarks strengthen the idea that the collaboration is indeed mainly working on keeping the other country up to date of once's developments. One of the respondents explained how '*The collaboration is currently mainly revolving around exercising with each other'* (R3). When looking for clear examples of actual implementations that came forward from the collaboration, a recent exercise with actors of the Netherlands and Germany on the topic of exchanging information in case of a flood event. Both countries are currently working on getting their own dikes to their desired levels, with a large-scale German renovation project running until 2025. Both countries use their own methods of calculating risks and make their dikes according to those calculations. This sometimes leads to some frustration on either side of the border, something that will be discussed in the coming chapter. The baseline of this situation is that the regime might not reach levels of effectiveness as it could be. One of the respondents said that '*we are actively working on that* (research)*, but that would also be the case were there no Arbeitsgruppe'* (R6). This respondent continued by stating that he expected that '*we won't do any real projects in the coming 5 years, just the exchange of information. Which is a bit disappointing'* (R6). It seems that the regime, despite being alive and well embedded in different laws and structures, does not have any real impact in the area of dike ring 48. Both countries work on their own projects and collaborate on the exchange of information, but there seems to be not too much else. Of course, there are plenty of examples along the Dutch-German border of successful collaborations and projects which have resulted in factual projects, new policies, new structures, but it seems like this is not the case in the regime of dike ring 48. A possible explanation of this could be that '*working internationally always is less efficient than working within your own structures'* (R10). This could be the result of different structures or cultural habits, but those should be able to be overcome. It is uncertain at this point why the regime hasn't resulted in anything feasible. In the coming chapter, different cultural dimensions and viewpoints of the different actors will be discussed. As previously said, both countries have been working on their dike safety projects, so it is fair to assume that water-safety levels have increased within the area of the regime. Then again, it is also safe to assume that this would be the case as well were the two countries not working together: *'We* *are now 2 years further down the line, and we are still discussing how we are going to approach the collaboration. That is not constructive or productive at all'* (R4).

With the five dimensions discussed, an ordeal can be given as to how high this regime scores. Beginning with the range, it is fair to state that this regime covers a medium extent of topics. The first and third layer of the MLS are of relevance, but are still a bit vague as most of the topics are only discussed. The Resilience of the regime also does not score very high, as changes in structures (such as the Veiligheidsregio) or in personnel influence the performance quite heavily, and it takes some time to get back on a previous level. The Strength of the interaction is fine, as the regime is embedded in several documents and treaties, but there remain some grudges or frustrations that hamper the performance. The Intensity is double-sided. The actors that are active in the regime are involved and value the contact and feel as if this is good enough, but the national governments seem to have decreased their attention for this collaboration slightly, giving it a lower rating. The final variable, the effectiveness, is the lowest scoring variable. The idea remains that the flood safety would not be drastically different were there no regime, as both countries focus on their own protection either way. The regime is mainly focused on the exchange of information and keeping ties alive in case of emergency, so there are no real implementations that have come forward from the regime, even though this might still be possible in the future.

5.2 Understanding regime performance

Now that the variables that assess the performance of the regime have been discussed, it is time to take a look at the variables that influence the performance of the regime. The variables that are used are *Actors, Objectives, Policy Instruments, Resources, Structures,* and *Leadership.*

5.2.1 Actors

One of the more obvious core elements of every collaboration is its actors. Without actors, there is no collaboration. When working with others originating from the same country or area as you are, such collaborations are not guaranteed to run smoothly, let alone when working with people from a different country. If the actors within a collaboration are not able to work together properly, this variable will affect the overall regime in a negative way. Even though the Netherlands and Germany may seem like two countries that are quite similar, it turned out that subtle differences in culture can resonate into larger barriers and frustrations when working with one another. One of the themes within the subject of actors was *culture*. During 9 of the interviews, the subject of cultural differences and similarities was addressed as one of the factors that could hamper international collaboration. An important difference according to the respondents, concerning work-ethic, was that the Dutch tend to be more laid-back and looser, whereas the Germans prefer a stricter planning and the well-known German *'Pünktlichkeit'*. Several respondents mentioned how '*We (the Dutch) are more pragmatic in our approach'* (R1); '*We (the Dutch) start and see how things will go'* (R2); '*You (the Dutch) just start and evaluate along the way*' (R10); and '*The Dutch often enter a meeting with an idea and the intention to discuss how the subject will be approached'* (R11). Said respondent continued by stating that '*This is often perceived as bad preparation by the Germans'* (R11). This already indicates a difference in approach of projects, an idea that is strengthened by other respondents who stated that '*It's our (the Germans) culture to plan out everything to 100-120% before we start something*'(R10) and that '*The Germans expect a more concrete plan on which they can give their opinion'* (R11). It is fair to assume that this difference in approach can create some barriers that need to be overcome during such a collaboration, but none of the respondents saw this difference as an insurmountable barrier. Rather, they discussed this difference as something to keep in mind during the collaborations and as something to '*think of as different country, different habits, not wrong intentions'* (R11).

A different element that did cause some tension, or incomprehension, among some of the Dutch respondents, was the difference in degree of *hierarchical power* in workplace between the two countries. This element lies somewhat in line with the previously discussed cultural aspect, but it is a bit more than that. Hierarchy in workplace has more to do with having the authority to work together with higher/lower ranked actors. More hierarchical structures tend to be stiffer in decision making, whereas lesser hierarchical structures could possibly adapt quicker to changing situations. Germany seems to know a more hierarchical structure than the Netherlands, as described by several respondents.

'*Germans find it important to have someone with titles'* (R8); '*In Germany it usually is "I have to discuss this with my chef before I can say something"'* (R1); and '*He was only allowed to join; he was not mandated to say something'* (R5) are different examples of moments where a different approach to hierarchical authority led to frustration and increased stiffness in a collaboration. Being used to certain hierarchical structures and having to work together with someone who has a looser opinion on said structures can also make life difficult. One of the respondents pointed out how German actors can have a hard time with switching to a looser form of addressing your colleagues: '*It can be difficult for a German if the decision is made to call each other by their first name, when they would normally never even think about that. They are then somewhat forced into doing that as well (…) this is something that the Dutch sometimes overlook'* (R11).

Closely linked to the hierarchical structures is the *presence of correct counterparts* of the different institutions and actors that are working together. Again, as with the two elements discussed above, it seems that the German side of the border tends to attach more value to the presence of the correct counterparts than the Dutch side. During the interviews, this factor was not discussed as something that was frustrating or hampering the collaboration, but rather as a given fact. Several respondents stated how '*It is very important on the German side, that the correct counterparts are present'* (R2) and '*The ministry on German side likes to coordinate with their counterpart'* (R6). But despite having slightly different organizational and hierarchical structures, there seems to be an element of missing actors where they could have been relevant. One of the respondents, when asked about the different collaborations in play, commented the following on a recent flood risk study: *'The crisis-experts were not approached, neither in the beginning nor during the study. That is missing out on some interdisciplinary opportunities in my opinion*' (R10), and it was not only in this specific case that the fitting counterparts were not included in a study or project. When asked about what the most common barriers were in international collaboration, one respondent pointed out that '*From time to time, people are still having a hard time finding the correct counterpart, because the structures are slightly different on the other side of the border'* (R13).

Even when the right actors are found, or the hierarchical differences are overcome, solid collaboration is still not a given fact. One of the downsides of international collaboration is that countries often do not speak each other's *language*. Even though Dutch and German are alike in many ways, precise jargon can be a difficulty. Every respondent, both German and Dutch, saw language as a difficulty in the collaboration. A lot of the meetings are held in German (*'All meetings, everything is in German'* (R2)), but this brought forward the difficulty that some respondents felt that they then could not express themselves in the way they wanted to (*'My German, I can manage during the holidays, but jargon is a lot more difficult'* (R3); '*It hinders me completely to not be able to speak freely during a meeting'* (R4); '*You are less able to express yourself and before you know you express yourself in an unfortunate way'* (R6)). For the respondents on the German side of the border, the situation was not very different. Even though a lot of the meetings were held in German, the German respondents indicated that they also felt that the current situation is not ideal: *'Sometimes I also have meetings where we have to know the Dutch language, and sometimes that can be quite difficult'* (R7), and '*Language might be a bit of a barrier (...) Germans unfortunately not so much, there are only a few who speak Dutch'* (R10) are two examples of how this language barrier works both ways. But if this is a difficulty, why not switch to English? It turns out that switching to English also imposes several difficulties, as not every actor involved is able to express themselves in English. It appears that this is mainly the case with German actors, and lesser so with Dutch actors. One reason for this difference was provided by one of the respondents: '*A lot of the elderly Germans have never had English in school. They have had Latin and Greek, but not English'* (R11). This suspicion is enforced by one of the German respondents, who stated that '*Maybe it would be a better way to enhance our English as well'* (R7). Following a survey that was held by one of the organizations active in the international collaboration, the decision to do the majority of meetings in German has been made: '*Around three years ago, we held a survey (...) the conclusion of this survey was that German is the more obvious choice. This has mainly to do with English being quite a barrier for the Germans'* (R6). Following these remarks of the respondents, it seems like language is one of the major barriers in international collaboration between the Netherlands and Germany. It seems like the actors that are currently involved have found a way to manage this situation, but not in an ideal way. There are still a lot of voices indicating their problems with having to work in a different language than their native language, or a second language that they are fluent in.

A final theme concerning actors was *perception of necessity.* If different parties involved in a collaboration do not share the same opinion on the importance of a specific subject, this will oftentimes lead to frustration. As described in the introduction of this research, a certain dependence is present in the case of dike ring 48. As with every river, those situated downstream are vulnerable to actions of those upstream. Nowadays, no real threats or problems are present in the case area. But with the changing conditions around the world, there is a possibility that this can change in the coming decades. In order to understand the approach that the different actors take in the case of dike ring 48, the respondents were asked whether they thought if there were differences in how important, or when safe is safe enough, between the Netherlands and Germany. One of the most evident findings was that there are differences in safety standards between the Netherlands and Germany. This does not necessarily mean that either of the two countries is doing a better job than the other, but mainly that there are in fact some differences. Recent research pointed out how the majority of the dikes that are situated in Germany would not pass the safety standards in the Netherlands ('*If the German dikes were situated in the Netherlands, they would have had to be brought to a higher level than they currently are, and what Germany aims at'* (R6)). Besides this different in safety standard, the general idea of the most respondents was that the Netherlands is feeling a bit more urge to work and improve on water safety. One of the respondents told how '*When they think in Germany "alright, that's it. This is a good level of safety", we usually go a bit further than that in the Netherlands'* (R1), where another one explained how '*Germany tends to say: "we have good levels of safety and we see no reason to raise our minimum* *standards"'* (R6). These examples indicate that there is some difference between at what point actors from the two countries are satisfied with the safety levels. This difference could be explained by the geographical situation of the Netherlands. Water always flows to the lowest point in the vicinity, and in this case the Netherlands are the lowest point. Any breach will eventually end up in the Netherlands, which is why there might be a difference in sense of urgency: '*You feel that there are differences in insight and urgency on some of the underlying problem'* (R6). Understanding, and acknowledging, these differences in sense of urgency might help smoothing out some of the wrinkles in international collaboration, but despite these differences the respondents don't think Germany cares less about the potential threats: '*I don't think that they find it less important and let the Netherlands do all the work'* (R9). A final remark concerning the sense of urgency came from one of the German respondents. During the interview with said respondent, the sense of urgency was discussed. Something that had become less over the past few years according to the respondent. He replied how *'it is almost like we need a disaster in order to get the topic back on the table and increase the sense of urgency'*. A small disclaimer is in place. These interviews were all conducted in May, June and July of 2021, before the flooding disaster of July. The respondent was not referring to this disaster and most likely used it metaphorically. Nevertheless, it is interesting to review a potential change in mindset under the different actors. But as this research had already been conducted before the events, this might be a relevant topic for further research.

5.2.2 Objectives

As with actors, collaborations without objectives will most likely be less successful and less properly guided than collaborations that do have aims. In order to create a better understanding of what the current collaboration is actually doing, the respondents have been asked about the *current and past projects* they are involved in and what the aims of the collaboration are. The cross-border collaboration between Germany and the Netherlands dates back decades, with some institutions like the EUREGIO present for 50 years. The most intensive period of collaborations seems to be 2003-2010, when the cross-border project VIKING was held. VIKING was aimed at the exchange of information in the case of a flood-event ('*The program revolved around improving the exchange of information concerning floods'* (R1)). During the duration of this programme, there was regular contact between the different actors from the Netherlands and Germany, as there was a clear project they could work on. After the finalization of project VIKING, the intensity of the collaboration seems to have decreased a little. Some respondents say that this could have something to do with the way the project was wrapped up, this will be discussed in the paragraph on *intensity of collaboration*. Fact is, the amount of large-scale international exercises reduced in the period after VIKING ('*I think it was around 2011, when we held the last exercise*' (R5)). Following an update of the Dutch safety standards concerning flood protection in 2017, new research on international flood risk was conducted. This period saw an increase in the intensity of collaboration between the two countries, as there was a clearly defined project that could be worked on. In 2021, a new international exercise was held: '*On the first of September, we will be having our first flood-risk exercise in years'* (R5), '*We are working towards an exercise, this should be the start of a new period of intensive collaboration'* (R3). These remarks are an indication of the reappearance of actual projects that will give the collaboration more guidance, as the idea that not everything that could be achieved is achieved starts to grow. This idea is enforced by the following remark of one of the respondents: '*Our Arbeidsgruppe has no operational tasks. In the event of warnings or the exchange of information on urgent matters, this will go through other instances'* (R8). Another respondent added that '*I don't expect us to have any research or projects the coming 5 years'* (R6). The combination of these different remarks might hint at the collaboration not working to its full extent, and might provide opportunities to improve on specific elements to aid in the success of this international regime.

At the same time, it is bold and untrue to state that this regime is lacking content or that it would add nothing to improving the safety in both countries. A lot of the *goals* and current interactions are about exchanging the correct information. The majority of the respondents all pointed out how they personally saw the exchange of information as the most important goal, albeit almost the only goal, of the collaboration. Several of the respondents explained how the collaboration is currently '*Mainly focused on the exchange of information'* (R10), '*At this moment, it's mainly exchanging information'* (R7), and how '*We asked ourselves: what is our main goal? It turns out that the exchange of information is the main goal on both sides of the border'* (R9). Upon asking what the information was about, several topics came forward. Both countries have their own projects and researches, so a lot of the exchange was about the current status of dike improvement programmes. Germany is currently working on a large-scale dike renovation programme (LAWA, 2014), something that should be finished in 2025. The quality of these dikes is important for the safety in the Netherlands, but with the improved safety standards that the Netherlands implemented in 2017 the question whether this would be enough started to come up. This could lead to some friction, as described by one of the respondents: '*What happens is that they finalize their project and then expect to be done for the next couple years. But then the Dutch come and tell them how it would not be enough (...) this led to them feeling like they could be held responsible for potential threats, something they don't want'* (R2). As was discussed in the previous paragraph, different standards do not mean that dikes are less safe. But nevertheless, this idea of having 'faulty' dikes could cause tensions to rise between the two countries, hence the necessity of proper exchange of information between the countries. Another example of why good communication is necessary came from a respondent who painted the following image: '*Imagine that we would have to evacuate an area, it would be very important to communicate this. It would be weird if our side of the street would be evacuated, and the German side of the street would not know anything about evacuating yet.'* (R3). For a collaboration that does not have any large ongoing projects, the exchange of information seems like a key building brick in working together towards a potential larger collaboration.

A final aspect that is of relevance for the success of a collaboration is whether the different actors share the same perception on the *length* of a collaboration. In the case of dike ring 48, it seems like this topic could lead to some barriers as well. Following the interviews, an image of how the Netherlands tends to aim more at long term projects and Germany more at short term projects starts to form. Of course, one could debate when something is considered long term and when something is short term. In the case of dike ring 48, a lot of the projects have a runtime of 4 to 5 years ('*This is a project of 4 years'* (R2); '*Once every five years, when the treaty is renewed'* (R4); '*We are preparing the program for the next 5 years'* (R7)). This way of working together seems to be the right way at the moment. Both parties are happy with the rate of renewal and it almost feels like this is more a formality than a necessity. The short-term projects seem to be arranged, but there are some differences in the long term. The Netherlands has its so called *Deltaprogramma*, a strategy for the protection of the Netherlands against flooding, drought, and extreme weather. This programme already includes 2050 and 2100 in its strategy. Germany does not have such a long-term strategy, and tends to focus more on finalizing current projects rather than the long run: '*On the German side of the border they will say: "we want to finalize our current dike-safety projects, and not focus on the long run" (...) You really feel how the Germans are having trouble with the long run, and that climate change is a less relevant problem than it is to us'* (R6). As far as the respondents are concerned, the collaboration is fine as it is, but this difference in desired planning horizons might be something to keep in mind.

5.2.3 Policy Instruments

In this paragraph, the different laws and treaties that are in play in the area of Dike Ring 48 will be discussed. A distinction between *laws* and *treaties* is made in order to help understand how certain fixed laws can enable collaboration, or make it more difficult to collaborate, and how treaties, that are oftentimes of a looser character, play a role in this. This paragraph begins with fixed laws, both directly involved in dike ring 48, or international laws that are of relevance for the collaboration in dike ring 48. There are not too many (inter-)national laws that force different countries to work together. There is however one directive that is very important in this collaboration: The EU Floods Directive (EU, 2006). This directive has already been discussed during the introductory chapter to this research, and appeared during the interviews as well. This directive states that countries have to work together and keep neighbouring countries in mind when making decisions that can possibly affect them. Furthermore, this directive forces actors to *'Keep an open communication, exchange information, communicate. You have to be able to show how you do this in reports'* (R8). This directive goes as far as saying that '*you have to work together, not just when you want to'* (R8). The presence of this directive is a solid back-up for cases where international collaboration on flood protection would have to be enforced, but it does not seem like this is the case with the Netherlands and Germany. Besides this embedding in international law, there are a lot of treaties and covenants that ensure the collaboration. These are not counted as laws, given the fact that they usually have a runtime of several years.

Besides laws that enforce countries to collaborate on a topic such as water safety, there is also a number of laws that do not directly enforce a collaboration, but do in fact influence the way the collaboration is going. One of the clearer examples of how (a change in) laws can affect the collaboration is the Dutch '*Wet op de Veiligheidsregio*'. This law, dating back to 2010, created the Dutch Veiligheidsregio's, and moved several of the responsibilities concerning water safety from the provinces to these new Veiligheidsregio's. This law influenced the cooperation between the two countries quite heavily, as it became more difficult for the Germans to communicate with the right actors: '*Ever since the new law in 2011, this responsibility lies with the Veiligheidsregio's. There are now multiple contacts that the Germans have to cooperate with. That makes it difficult for them'* (R3). Another Dutch law that has made the collaboration different is the revision of the *Waterwet* (Waterwet, 2021), a Dutch law that combines multiple dimensions of water safety and quality. The 2017 revision of this law brought forward some increased flood safety standards. As was discussed in the previous sub-chapter, this led to some difficulties in the collaboration as German flood barriers would now be seen as 'unsafe'. Following this change in safety standards, new research was conducted (Ministerie van Infrastructuur en Waterstaat, 2014). This research may possibly have made the collaboration more difficult: '*I think that this research might have stirred up some bad blood, because of the decision to measure according to the Dutch methods'* (R4). At the same time, it is not surprising that countries tend to use their own methods during research or when measuring safety standards. However, it is important how this is communicated to the party that one is collaborating with. Different laws therefore do not always mean problems, although they can make life a bit more difficult. An example on the German side of the border lies in their laws concerning the removal of explosives dating back to the Second World War (Kampfmittelverordnung, 2003). One of the respondents explained how '*Germany has to deal with very strict rules concerning explosives. (…) They are not allowed to work before quite a large radius has been cleared'* (R1). Apparently, this problem will take years before everything is safe. The effect of this delay in activities is that the Netherlands will have to deal with a 'dangerous' situation for a longer period of time.

Aside from laws that force countries to cooperate, there are many covenants and treaties that are voluntarily created. The majority of the collaborations between the Netherlands and Germany come from this type of treaty (Rijksoverheid & Nordrhein-Westfalen, 2020), indicating a high level of preparedness to cooperate. One of the main underpinning covenants is the cooperation-deal that gets renewed every five years. This deal includes agreements on for instance the exchange of information, financing, and the topics that will be discussed in the collaboration ('*The deal is signed in 2019 and runs until 2025, so the coming six years'* (R6)). The deal is between the Netherlands and Nordrhein-Westfalen, not with Germany as a whole. This is an interesting element, as it empowers the independent role Nordrhein-Westfalen has, and adds to the idea that these treaties are not nation-wide based laws. Besides these larger deals between the Netherlands and Nordrhein-Westfalen, there are some smaller letters of intent as well. One example of this is a letter of intent between the Dutch Veiligheidsregio's and the German Kreise of Wesel and Kleve. This agreement is one of the more recent developments in the area. One of the respondents that was directly involved in the creation of this agreement commented the following: '*I am very proud that we, with the letter of intent only signed in 2017, have been able to create something where the actors that can actually make a difference are involved and think about the problems'* (R9). This treaty was mentioned by another respondent as well, who stated how '*we helped create the letter of intent between the Kreise and the Veiligheidsregio's. This is not an EU-deal, but it provides the basis for further collaborations'* (R12). It seems like the different actors now how to find each other, and share an intent to collaborate with each other. These collaborations do not necessarily have to be embedded in laws in order to be seen as valid, which could indicate a certain level of trust and willingness to cooperate despite not strictly having to. The range of themes that falls under this collaboration will be discussed in the second part of this chapter.

5.2.4 Structures

In the previous chapter, and at the beginning of this one, the different actors have been discussed. This paragraph will focus on structures. This is closely linked to actors, but there is a slight difference. Structures focuses on (*inter-)national institutions*, which are not necessarily bound to specific actors and can contain multiple actors from multiple backgrounds. As the presence of these kind of institutions can be decisive in the success of a regime, structures are seen as a separate variable. International institutions are seen as either NGO's that operate on an international level, institutions like the European Union, or working groups and committees that are joined by both countries. There are several relevant international institutions operating in the case of dike ring 48. The first, and foremost, international actor that is present is the European Union. As was discussed in the previous sub-chapter on international laws, there are some laws that force the two countries to cooperate on river management. Besides enforcing and enabling laws, the European Union also provides subsidiary funds. One of the examples of such a fund is Interreg Europe. This programme '*Is aimed specifically at border-regions and covers the area that runs from the Waddenzee up to Roermond'* (R11). The aim of this institution is to '*help regional and local governments across Europe to develop and deliver better policy'* (Interreg Europe, 2021). Despite its focus being more on innovation and social-cohesion, and not flood safety or other water related issues, this institution can help with advice on future policies and collaborations, adding expertise to international collaboration. The second institution that is active in multiple countries is the International Commission for the Protection of the Rhine. This institution has been discussed in the introductory chapter of this research and was mentioned during the interviews as one of the collaborations, being a '*Very internationally focused collaboration'* (R10). A third relevant international institution can be found in the Euregio. This cross-border institution is active in several parts of the borderlands, with the Euregio Rhine-Waal being the relevant part of this organisation for the case of dike ring 48. The Euregio helps to bring different actors together, as well as provide subsidies for a variety of different projects and themes. Some of the respondents indicated that they have a certain frequency of contact with the Euregio ('*There is contact on a regular basis with the Euregio* (R3)), and that the Euregio has helped in the past with projects, such as the previously discussed project VIKING. Through these references and mentions of usefulness, the impression that the Euregio adds positively to the collaboration in dike ring 48 rises. All European Euregio's are represented in Brussel, where the Association of European Border Regions vouches for the interests of all border-regions (AEBR, 2021). This shows a fair degree of embedment in European policy making, and empowers the collaboration to a further extent.

Besides European based institutions, there are several national and international structures active in the area as well. One of the most notorious structures on the Dutch side of the border is the so called *Gelderse Commissie – Veiligheid grote rivieren*. This committee focusses on the safety of and on the large rivers in Gelderland and consists of '*The three Veiligheidsregio's, the three Waterschappen, Rijkswaterstaat, and the province'* (R10). The Gelderse Commissie currently does not include German partners on a permanent basis, but there are meetings where the Germans are involved as well ('*We had a meeting three weeks ago (...) and our German counterparts were present as well'* (R3)), indicating that the committee, albeit originally Dutch, extends to beyond the border. Within the larger institution of the Gelderse Commissie, a focus group that is specifically focused on extreme levels of water has been created. The focus groups are working on the preparation of high levels of water, but it currently only consists of Dutch actors, to the shame of one of the respondents: '*The focus group currently does not include the German actors, which is a bit disappointing, as we try to keep the collaboration with the Germans alive'* (R1). Despite the German parties not being involved directly in this focus group, a cross-border liaison with the Kreis Kleve and the Kreis Wesel is in place, ensuring the links to German actors. When looking at institutions on the German side of the border, there seems to be a noteworthy one in Münster and Borken: '*They are well organized, they even have an international coordination office on the topic of water'* (R1). This bureau is linked to the Euregio and is able to provide professional assistance on international collaboration and the exchange of information. The respondent saw this as a useful element in the coordination, as '*contacts water down over the course of time, so you can lose track. Continuity is key, and that's something that we sometimes lack'* (R1).

With the inclusion of different institutions, there is still no guarantee that everything will run smoothly, as different countries can be structured in a different way than actors would expect. The second part of structures focused on how the institutions that are in play are organized. It turns out that there are some significant differences in organizational structures that, if not accounted for properly, could possibly damage the collaboration between the two countries. One of the respondents explained that problems in collaboration are sometimes not '*the cultural differences, but the differences in organizations and structures'* (R11), where another respondent added '*Those differences in organization make collaborating something that takes a lot of time and energy and make the collaboration difficult'* (R1). These respondents were both Dutch, but it is not only this side of the border that recognizes these difficulties: '*It's quite difficult, because the structure in Germany is quite* *different. Sometimes the Deichverbände are responsible, sometimes the Bezirksregierung. It makes it difficult for the Waterschappen because they have to contact both sides'* (R7). The difference in organization seems to be mainly present in what responsibilities lie with which actors, paired with some institutes simply not existing, or not having that much power, in the Netherlands. The example of how some topics were placed under different ministries that were not involved in the collaboration has already been discussed priorly. When asked about where the differences where, one of the respondents explained how '*Germany has totally different key values, methods of calculating, and limits than we have'* (R9). So, besides organizations being different than on the other side of the border, there are different (nation-wide) values that are used in defining e.g., the safety standards that dikes have to pass. Even though it is very unlikely that both countries find a way of perfectly matching their values and methods of calculating risks, it is important to keep the fact that these differences are present in mind. Clear communication on these differences, and what they would potentially mean for the safety of either country is essential in order to keep the collaboration streamlined. This introduces the final significant difference between the Netherlands and Germany: the way national organizations communicate with each other during a disaster. The Netherlands uses the LCMS (Landelijk Crisis Management Systeem), which allows its users to '*Instantly share information digitally with each other'* (R1). This system allows for rapid communication of data and warnings between different actors. Even though this system is praised by Dutch actors, it is only used by the Dutch actors. The system used by the Germans relies on '*Situational reports, so you will have an update once every couple hours'* (R1). Even though this way of sharing information is working fine, as flood related issues usually do not happen in an instance, the risk that actors are not updated regularly enough persists. There have been efforts in the past to try and include Germany in the LCMS, but these have broken down: '*The idea didn't make it, it was too complex. How it should be used and how it should be financed. After this, it has died off slowly'* (R1). When looking at all topics discussed, it becomes apparent that there are some underlying difficulties and misunderstandings at large in the collaboration between the two countries. In order to maintain a successful collaboration, it is important to keep an eye on these differences and communicate what the effects will be for the other country.

5.2.5 Resources

Now that the influence of different actors, goals, and a shared opinion on which topics are of relevance have been discussed, there is another factor that can influence the performance of a regime: *Resources*. Without proper funding, a lot of projects will have a hard time reaching the goals that are set. The same goes for knowledge. Whether or not the right actors are included has already briefly been addressed, so resources will focus on specific examples of human capital. The same goes for other forms of capital, such as financing programmes or information systems. Both have been addressed previously, but a closer look at specific examples will be provided. The biggest financing programme that has been mentioned during the interviews was the INTERREG programme. This EU based programme

'*Focusses specifically on border-regions*' (R11) and cleared a large amount of funds to be used in improving the collaboration between two countries: '*We received 220 million euros the past 7 years, and for the coming 7 years this will be 240 million'* (R11). This indicates that there is a large availability of funds in the border-regions of the Netherlands and Germany, although it has to be used on clearly defined projects. One of the projects that is currently active is called '*Water-resilient cities'*, and is led by Waterschap Rijn-IJssel, one of the actors in this research. This international collaboration focuses on climate-proofing cities on both sides of the border (INTERREG Deutschland – Nederland, 2021) and shows how European funds are used in the collaboration between these two countries. Besides larger European-wide subsidiary funds, the respective national governments invest in the collaboration as well. During the interviews, some examples of projects that are funded by both countries were discussed. One of the examples of this is the pumping station of Kandia, which has to control water flows of both Germany and the Netherlands. One of the respondents explained how '*it is impossible to just do the water management only on your side of the border'*, and that *'because of this the exploitation of this pumping station is partly paid for by the Germans'* (R1). This is a very concrete example of direct fundings in order to maintain water management, but there have also been studies that '*were financed by both ministries'* (R7), indicating a financial involvement of both countries in this case. But when it comes to financing anything, there will almost always be hesitations or difficulties. In the case of dike ring 48, several examples of how either country was hesitant to contribute financially were mentioned. One of the concrete examples was how Emmerich possesses a fire boat which will aid in the Netherlands whenever necessary. However, all this is done on a non-binding basis. The Veiligheidsregio Gelderland-Midden was prepared to make this favour legally binding, so that the financial aspect would be defined as well, but '*That simply is not going to happen. The city of Emmerich is responsible and they don't want to establish anything'* (R9). This has to do with the fire department being on the border of voluntary and professional, with going professional meaning that millions of extra funding would be necessary. But why not, as Dutch governments, invest in projects across the border? It turns out that didn't see this as a real option, with investing across the border being *'Politically very difficult to say that you will invest across the border'* (R1), and how any plans to realize this '*were broken down, mainly because of bureaucratic reasons'* (R10).

With financial resources discussed, a second form of resources is worth noting as well. This second form of resources can be found in human- and intelligence-resources. Experienced actors can contribute to a great extent in international collaboration. As the involved actors might not know all the details of different methods of calculating risks on the other side of the border, it is not uncommon for experts to get involved over the course of a project (*'They included a German expert of the university, who helped during the entirety of the project'* (R2)). By doing this, extra human resources are involved in the collaboration. As this challenge of not having perfectly matching safety standards and customs, it might be an idea to exchange actors to really understand the differences. One of the actors suggested that *'Perhaps we could send some personnel to the Netherlands, and to Germany, for a period of time,* *to look at the water authorities in the Netherlands and Germany'* (R7). This does not sound as a very strange idea, as the differences between the two countries were previously discussed as barriers in the collaboration. A second element as of why this would not be illogical, is the indication that, due to actors changing positions, knowledge is lost: '*In the past six years, you have seen how knowledge goes away when people change functions, or retire'* (R3). The importance of continuity of collaboration has been discussed in the previous sub-chapter, but this remark is an indication of how the collaboration could benefit negatively from changes in personnel, especially if they are not replaced by new actors that have the same level of knowledge. To state that the collaboration between the Netherlands and Germany has to deal with a brain-drain is too rough, but this factor does influence the performance of the regime. With the global pandemic hitting heavily the past few years, the capacity for exercises and other extra collaborations has receded as well: '*The capacity of those responsible for managing disasters is very slim in the Netherlands and Nordrhein-Westfalen'* (R10), and that '*Capacities are definitely a barrier'* (R10). In order to maintain successful levels of collaboration, an increase in capacity, or expertise, might be necessary. At the same time, this shortage of capacity might also be due to the global pandemic, indicating a potential increase in capacity if the global pandemic goes away.

A final form of resources comes with Information systems. As discussed in the previous paragraph, an elaborate information system is in place in the Netherlands: The LCMS. The difficulties of Germany not being included in this system have been drawn out previously, although efforts are made that enable German colleagues to view the updates, but not share own updates. This system is not the only intelligence available for the actors. Previous projects have resulted in '*Shared flood models for all dike rings in Gelderland, including the transnational German dike rings'* (R5) and '*Shared risk-maps and risk-assessments'* (R8). This form of shared capital is very important when collaborating on flood prevention projects, and can streamline decision making, as this provides a shared baseline of knowledge to work on. Finally, the two countries make use of a warning-app in case of emergency. The Netherlands use NL-alert, whilst Germany makes use of the so-called NINA-app (BBK, 2021). Dutch counterparts have started to use this app as well, in order to stay up to date with developments in Germany.

5.2.6 Leadership and Entrepreneurship

The final factor that influences the performance of a regime is the presence of *Leadership*. This factor will look at specific leading actors that ensure fluent collaboration, or are able to restart collaboration after this has broken down. The commitment of national governments to the cause is a second aspect that is of relevance in this case. As was visible in the previous paragraphs, correct counterparts and hierarchical status are important in this case. If the corresponding national governments are not involved enough in this collaboration, this could hamper the process as well. The first mention of how leadership and initiative were important came in the first interview. Whilst discussing how structures and specific actors can change overtime, one of the respondents mentioned that '*You would be surprised how many* *people change function in 2 or 3 years. This requires upkeep of contacts, something that you have to do yourself. This does not come automatically'* (R1). The urgency of being actively involved in keeping up appearances seeps through in this remark. This is a clear general implication of how all actors involved have a shared responsibility of putting effort in actively keeping the collaboration alive. At the same time, this respondent discussed how this, ideally, should be grounded in certain laws, as *'This should not be dependent on people who happen to find it important'* (R1). During several other interviews, the important of specific key actors was discussed. Even though there seems to be a high level of willingness to collaborate within the two countries, the importance of specific key actors is undeniably present. One of the examples was how a specific actor, who had a pivotal role as intermediary between the Arbeitsgruppe and the Ministries, was able to *'filter and frame the topics in an effective way, to know what would add positively'* (R2), but that after the departure of said actor '*the collaboration was slowed down purposefully because new actors were less able to translate the topics effectively'* (R2). This respondent continued by saying that, even though the collaboration was working, '*it depends on the right people at the right places'* (R2), a remark that is in line with the remarks of the previous respondent. But which actors can actively and effectively make an impact in the collaboration? Within the Arbeitsgruppe, '*The two chairs are crucial, as well as the secretariat'* (R6). With a frequency of coming together two or three times a year, it is essential that these meetings are effective. If the meetings are not being led properly, or if the two secretaries have not communicated properly which topics will be discussed, the meetings will not be as useful as they can be. This is something that can be influenced after changes in personnel, as fitting actors for this project can be chosen. The general baseline is still that the collaboration is fine, as '*There are currently some people that are really enthusiastic about international collaboration'* (R10), but that, as discussed priorly, '*This is one of the risks, because those people will eventually retire or get another function'* (R10). This challenge of having the right people in the right function is something that is in play at European level as well. One of the respondents explained how the border-regions benefitted positively from two highly ranked officials within the Dutch government, who were from border-regions themselves, who '*really brought the border-regions to attention of the national government'* (R11). Another example that this respondent provided, was how a member of European parliament of the Netherlands used to be from Zeist, a town in the centre of the Netherlands. She explained how '*This person not naturally thought of the border-regions when working on something'* (R11), and how this changed when '*We now have two members that are from Limburg, who know the needs and wishes of border-regions'* (R11). The different remarks of different respondents tell something about the importance of having actors that are committed to the cause when collaboration internationally.

The second element of leadership has to do with commitment as well, but then on a national scale. This aspect focusses on the commitment of national governments to collaborating internationally, something that lies closely to one of the elements that has been discussed under actors, namely the perception of importance of cross-border collaboration. This aspect focusses specifically on mentions of how governmental institutions are committed to the cause, of whether the respondents believe that either country is trying harder to make the collaboration work. What immediately jumps out, is that a lot of the respondents feel that the Netherlands are trying harder to make the collaboration work, that the Dutch governmental institutions are more committed to the cause than their German counterparts. Some examples of this are: '*I feel that it is the Netherlands that has to enforce the collaboration´* (R1); '*The Germans don't really want to. If we want to move forward, the initiative has to come from the Dutch'* (R2); and '*The urge to take steps is bigger in the Netherlands, and the German partners are a bit more hesitant in this'* (R8). These three remarks give the impression that the Netherlands are more committed to the cause than the German counterparts are. In several other interviews, these remarks were mentioned as well ('*The initiative is coming from us'* (R4), '*You see that the Germans are stepping back a bit'* (R6). On the other hand, it might be too harsh to state that the Netherlands are the ones trying whilst Germany is always the one waiting. There are sounds that tell a story of how the Netherlands have backed out of the collaboration over the past few years, giving the Germans the idea that the current collaboration is not important enough. Two of the respondents told how '*What Rijkswaterstaat currently misses is real commitment from DGWB*' (R2) (DGWB is the part of the Ministry of Infrastructure and Water that is responsible for Water and Soil), and how '*The ministry has had less attention to the NL-Germany collaboration in the past 1,5 years than they had before'* (R6). As of now, the general feeling is not that this is seen as something that is frustrating, rather something that is the status quo. Even though it looks to be fine for now, this definitely is something that might have to be worked on in the future to ensure a fruitful collaboration between the two countries. On the other hand, the collaboration also brings forward plenty of examples of how different institutions from both countries actively try to improve the collaboration by starting different projects. The Kreis Wesel put in a lot of effort to regenerate the contacts between the two countries (R11), and the collaboration with Nordrhein-Westfalen is still very lively due to '*the ambitions of the local parties'* (R6). Even though some differences in effort seem to be in place, the current general understanding is that the two countries are still somewhat aligned.

5.3 Answering the research questions

In the previous sub-chapters, the different variables that are used to a) measure; and b) influence the performance of the regime have been discussed. During these chapters, certain similarities and overlaps were becoming visible. In this paragraph, the sub-questions that were asked in the beginning of this research will be answered.

The first research question that has been asked was '*What forms of international collaboration are currently in play between the Netherlands and Germany concerning the protection against the Rhine?'*. As we have seen in the previous chapters, there is a great ordeal of different collaborations between the Netherlands and Germany. Not all collaborations are connected to protection against the Rhine and flooding, so these will be left out in answering this question. The first and foremost collaborative structure that comes to mind is the *Arbeitsgruppe Hochwasser*. As was discussed in chapter 4, and earlier on in this chapter, this Arbeitsgruppe is the actual regime that was researched and consists of several actors from both countries. For Germany, the Deichverbände, the Ministry of Environment, and the Arbeitskreis Hochwasserschutz are involved in this collaboration. On the Dutch side, the Waterschappen, the province of Gelderland, and the Ministry of Infrastructure and Water are involved. This creates a broad mix of different actors with different specific knowledge to aid in prevention of future floods. As was discussed earlier in this chapter, the collaboration within the Arbeitsgruppe currently mainly focusses on the exchange of information and contacts in order to stay up to date with the developments on either side of the dike. There are currently no real ongoing studies, although there have been some in the past. 2021 also saw the return of a collaborative exercise on the topic of information exchange in event of a flood. This was the first exercise since the VIKING-project had been rounded off in the beginning of the last decade.

Besides this Arbeitsgruppe, several other commissions and structures are involved in different aspects of flood protection. On the Dutch side of the border, the Gelderse Commissie is a structure that consists of the Province, Rijkswaterstaat, the different Veiligheidsregio's, and the Waterschappen. The main aim of this committee is to ensure and enhance water safety on the large rivers in Gelderland, including the Rhine. Another international actor that helps in bringing actors together, as well as providing funds for different projects, is the Euregio Rhine-Waal. Located in Germany, this institution uses EU-funds to financially aid in different projects. With a mix of different nationalities, a second important task of this institution is bringing actors from different regions together if there are difficulties in getting in touch with one another. The range of subjects that the Euregio is working on is quite broad, and not all are of relevance for flood protection/water safety, but the Euregio has an important role in cross-border cooperation nevertheless. An institution that has a little bit less to do with the actual flood defence strategies is the Dutch-German Committee for Spatial Planning. This focus of this commission is projects in the borderlands that will affect both countries. This committee currently does not seem to have an active role in flood safety. A final international collaboration that is in place in the case of dike ring 48 is the overarching Commission for the Protection of the Rhine. This Commission is working on several aspects that concern the safety and ecological health of the Rhine. However, this Commission has not been mentioned often by the different respondents that were interviewed, of who many were working on flood protection in dike ring 48. It seems that this Rhine Commission is focused more on the bigger picture of the entire Rhine-basin, and not so much on dike ring 48 specifically.

The brief answer to the sub-question is that the form of international collaboration that is currently in play is mainly the exchange of information. There has been a shared exercise in 2021, and there have been some shared studies in the past, but at the moment it is safe to say that on the topic of flood prevention the main form of collaboration is focused on the exchange of information. This ordeal is specifically about collaboration on the topic of flood protection, as there are many other examples and forms of collaboration between the Netherlands and Germany, but those are focused on other topics.

The second sub-question of this research was '*How can the performance of the current international collaboration be assessed?'*. In order to assess the performance of the regime, five different variables have been used: *Range of Collaboration; Resilience of Collaboration; Strength of Interaction; Intensity of Collaboration;* and *Effectiveness of Collaboration.* When combined, these five variables tell something about the current status of the collaboration as a whole. It can be concluded that the regime is performing as it is expected, but that there could be more possible. The regime includes different actors from different backgrounds and seems to focus mainly on the first and third layer of the MLS, but the focus ends at the exchange of information and sometimes shared research. There are no current ambitions to enhance the collaboration in the coming five years. The different topics are therefore not very deeply explored and leaves the feeling that more could be obtained from the collaboration. Another important element that influences the performance is that the regime is susceptible to changes in personnel or structures. A clear example of this was the creation of the Veiligheidsregio's, which led to unrest and a less intensive period of collaboration. It is necessary to have regular contact with the international colleagues in order to maintain a certain relation with each other, as a decrease in contact quickly leads to a more frustrated process. The COVID pandemic has a double role in this, as physical contact became impossible for a while, but simultaneously opening new doors to collaborating digitally. This might prove to be a very welcome addition within the regime, as it erases the need to travel and makes it easier to quickly get back on track with the collaboration. All in all, it can be concluded that the regime is performing properly but that there is a lot of room for improvement across the different dimensions within the regime.

The third sub-question of this research was '*Which factors influence the performance of the current international collaboration?'*. For the answer to this question, six variables have been taken from the existing literature and have been reviewed to what extent they influence the performance of the regime. These variables are *Actors, Objectives, Policy Instruments, Structures, Resources*, and *Leadership and*

Entrepreneurship. There is a difference between how heavily the different variables influence the performance. The most important variables seem to be the Actors and Leadership. Within actors, it became clear that language barriers are perceived as one of the major issues whilst collaborating internationally. It was pointed out as a major difficulty to not be able to speak freely, causing subtle elements to be lost in translation or misunderstood. The second factor that influences the collaboration heavily is the presence of certain leaders. As the regime does not have very clear goals besides the exchange of information, it can be easy to 'forget' about the regime. It was pointed out how certain people were able to jumpstart the collaboration through their involvement, and how the collaboration slowed down after those people left. These variables are therefore seen as the strongest influence.

The variables that are seen as less influential are Resources and Policy Instruments. As the regime consists of actors that are working on behalf of governments, financial resources are not factors that can make or break the collaboration. Human knowledge however can be influential, linking closely to the previously mentioned leaders. The Dutch LCMS, and the potential inclusion of the German actors, can be a very interesting subject for the coming years. Policy Instruments are not very influential either, as the intrinsic motivation to collaborate is very much present. Directives such as the EU-floods directive enforce collaborations, but this does not seem necessary in this case, as both countries both see the importance of collaborating. With the letter of intent being renewed every five years, and the specific cooperation on flood safety every two years, it is safe to state that there is a high degree of continuity within the regime. A final hampering variable is part of the objectives. The goals that the regime set out for itself are being obtained, as this is mainly the exchange of information. The lack of larger, more ambitious goals causes the regime to be stalled at a certain level. Some involved actors made their wish for such goals known, making this variable a valuable element for the next periods of collaborating.

With the different variables that influence the performance of the regime discussed, the third question has been answered. The final sub-question of this research was: *'What can be done to improve the current international collaboration between the Netherlands and Germany concerning the protection against the Rhine?'*. The best way to improve the performance of the regime is by removing the elements that influence the performance in a negative way. The answer to this sub-question can therefore be found by reviewing the six variables that influence the performance of the regime.

One of the first barriers in this regime was found whilst reviewing the role of the different actors. It quickly came to light that cultural differences and differences in language were seen as elements that negatively influenced the collaboration. Possible solutions for this previously discussed problem could be better training in understanding the work-related cultural elements of the opposite country. If all actors involved in international collaboration receive such a training as part of their base education, it might help in smoothing out specific bumps in the collaboration. This is closely linked to a second improvement: extra education in English/German. One of the recurring problems was that either the Dutch were not fluent enough in German, or the Germans were not fluent enough in English. There are two options in overcoming this problem, with the first being additional educative programmes in order to enhance the actor's capabilities in either of the languages. If this is not seen as a feasible option, another option would be to include an interpreter more regularly in the meetings. This would also include translating the different written pieces back and forth, in order to let the different actors speak freely. This is a cost-intensive option, so it is imaginable that it would not be the preferred method.

A second barrier could be identified in the two countries having (slightly) different expectations of the collaboration. The currently dominant idea is that the Netherlands tend to expect more from the collaboration than Germany. This might be explained due to the degree of dependency that has been discussed earlier. It is difficult to alter expectations of national governments, as such talks and negotiations often take several years to complete. However, the aftermath of the disastrous flooding in July 2021 can be seen as a window of opportunity in which policymakers can act to structurally alter elements of the collaboration. Leadership and entrepreneurship come into play in this barrier as well, as key actors might influence the collaboration at such moments. The presence of key actors was perceived as crucial in influencing the performance of the regime, so creating fixed functions that specifically aim at fulfilling a communicative role between the different actors might be an addition to the regime as well.

The third barrier seems to be located in resources. It appears to be difficult to invest in projects across the border, even though those projects have a direct impact on the safety in both countries. Several of the respondents saw this difficulty in political objections, as national fundings was not meant to be spent in another country, or that it would be difficult to accept funds coming from another country. This is an interesting topic that could be discussed in the coming five years, simultaneously giving more depth to the collaboration as well. A second element of resources lies in knowledge and information. Due to the rate at which (mainly) Dutch respondents change jobs, it is seen as difficult to build a constructive relationship. Although this is something the regime might not be able to influence, there might be room for improvement in the event of actors being replaced. Some respondents stated how they felt that communication was not always on par, or how new colleagues were not fully up to date with the current processes within the regime. An improvement that could add positively to the performance is a deeper implementation of both countries in each other's/a shared information system. With the base for such an implementation already created during the VIKING-era, there should be possibilities to work on such a shared information system. However, it was mentioned multiple times that this also brought forward some issues with financing, as it would count as cross-border investments.

A final barrier that was discussed was the feeling that some respondents had that the collaboration was not guided properly. The Arbeitsgruppe is a self-governing organization, without any organization above it. This enables the collaboration to create their own topics, but at the same time removes the need to report to an overseer of some sort. A possible solution to this could be the creation of a new agency that solemnly focuses on the performance of said Arbeitsgruppe. Some of the respondents believed that this would help steer the collaboration to meaningful projects, whilst others stated that they believed this only to increase the political mess of responsibilities and ties. However, it might not be a bad idea to look into the different options of implementing such an institution.

6. Conclusion

This research set out to create a better understanding of the current status of the collaboration between the Netherlands and Germany concerning flood protection, and to see what can be done to improve this collaboration. In order to provide such an understanding, several sub-questions have been answered in the previous chapter. The answer to the main research question will be provided in two parts: the assessment, and recommendations for the future.

6.1 The current status of collaboration

It is fair to state that the current collaboration between the Netherlands and Germany seems to be working properly at the moment. The regime is alive, actors know how to find each other, and there is a mutual agreement on the importance of the collaboration. With letters of intent and agreements that get renewed every so often, both countries show that this regime is still seen as important to the respective national governments. But even if the willingness to cooperate was not there, laws like the EU flood directive would have forced both countries together, adding an extra layer of validity to the regime. The different respondents that contributed to this research all felt that the regime was doing what it set out to do, even though said objectives are not very high. The main focus of the collaboration is still the exchange of information on national processes, or projects that can impact the borderlands. In Chapter 2, the Stages model of Transboundary Government has been discussed. This model helps categorize international collaborations on basis of the extent of the collaboration. The regime does not seem to have evolved to a next step in Wiering's *Stages model of Transboundary Government* (Wiering & Verwijmeren. 2012), where it will be placed on step 2 again after 9 years. It was mentioned multiple times how attempts to deepen the collaboration ran into all manner of difficulties time and again, and how processes are at times sluggish, hampering the evolution to the next step of joint policy making. There is a joint problem definition, but as was mentioned during the interviews both countries still mainly focus on their own projects and policies. It is therefore deemed fitting to place the regime on step 2.

When looking back at the Multi Layered Safety strategy, it is clear that the first (protection) and the third (disaster management) are the most important layers within this regime. The topics that are being discussed are linked closest to these layers, albeit that more should be possible. With no real ambition to extend the collaboration beyond the exchange of information, the feeling remains that the regime does not achieve everything that it could achieve. The second layer is not part of the regime at all, while the borderlands can be very interesting areas to implement joint flood safety projects.

After the interviews, it was possible to identify certain barriers in the collaboration between the two countries, with language being the most important one. Whilst Dutch and German are very much alike, the subtle, yet crucial, differences in each other's language have proven difficult in ensuring a fluent collaboration. The same goes for differences in ambition, and differences in organizational structures. Several respondents have indicated that they find it a loss that not more is done within the collaboration. With the collaboration focusing on exchanging information, and having this as its goal for the coming time, the regime might not reach the performance it could have given the mix actors.

In order to identify the performance of the regime and how this could be influence, the six variables that were identified by Renner have been used. These variables have proven to be resourceful in obtaining elements within the collaboration that can influence the performance of the regime. All six variables have delivered interesting results on how the performance could be influenced. These six variables are seen as comprehensive as well, as no new variables that influence the performance have been able to identify. When taking a closer look at the importance of each variable, the variable of *objectives* is seen as the underperforming variable. This has to do with the fact that the current collaboration is focused on exchanging information, and that there seems no real intent of enriching the regime with further cooperative studies and projects at the moment. Objectives therefore loses part of its potence of altering the performance. At the same time, this is an indication that this variable is a variable that can be improved upon if the desire to enhance the collaboration arises.

To summarize: The regime is currently functioning as it is intended to. The main objective of the regime, exchanging information, is achieved, and the contact between the different actors is warm. Therefore, the regime is performing good. However, there seems to be a lot of possibilities, and wishes, to increase the intensity and depth of the interaction, as some respondents cannot help but feel that there is more to be achieved from the collaboration. Barriers such as language definitely hamper the process, and might be seen as an explanatory element as to why the collaboration currently still focuses solemnly on the exchange of information. One of the expectations at the beginning of this research was that the dynamics in the collaboration could be influenced by the degree of dependence that the Netherlands has on German safety. This expectation seems to be true to a certain extent, as both countries feel the importance of proper flood risk management, but the Netherlands seem to be a bit more demanding than Germany. This puts some pressure on the collaboration, but this has not hampered the collaboration to a larger extent so far. It is, however, something to keep in mind in order to maintain the current performance. With the climate changing at a higher pace than expected, and major flood disasters coming to the Netherlands and Germany decades earlier than predicted, the necessity of decisive and constructive collaboration on flood risk management has been proven. This should act as a wakeup call to both governments and be used as a window of opportunity to take the collaboration to the next step.

6.2 Improving the collaboration

Over the course of this research, several elements have been identified that currently act as barriers to the collaboration. As was discussed in the previous paragraph, the differences in language are a very important barrier. Overcoming this barrier can be a time-consuming feat, as getting the actor's skills in a specific language on par might take years. Despite this being a time-costly process, it would help the collaboration if the actors from both countries were able to communicate better with one another, either in German or English. This can also be achieved by investing structurally in translators that are constantly present, or by hiring new personnel that is fluent in either language and can therefore express themselves on a professional level. No matter the means, language is a barrier that should be overcome to improve the performance of the regime.

A second barrier that was often mentioned was a discrepancy in, or lack of, ambition. Both countries say that they believe the collaboration to be important, and happily renew treaties that enable the collaboration, but it is questionable how much the regime has factually added to the safety of the cross-border dike ring area. Earlier in this research, it has been discussed how the international collaboration had been evaluated at two other moments in time (Verwijmeren & Wiering, 2007; Wiering & Verwijmeren, 2012). This research acts as a third moment in time on which the status of the regime is assessed, and for the third time the conclusion is that the focus is still mainly on exchanging information and keeping in touch with the different actors. What seems to be needed is a clear statement of both national governments (or the Bundesland) that the collaboration will be enhanced. This will give the regime more validity and will be a sign to the different actors that the international colleagues are committed as well. This can then lay the base for a more streamlined process in which new shared researches and projects can be formed. The current period after the recent floods is seen as a window of opportunity to act in, making the coming years decisive for the collaboration on the long run.

The final barrier lies in continuity of the collaboration. With actors changing regularly on Dutch side, a level of unrest has crept into the collaboration. It takes time to form a relation with (inter-)national colleagues, and having to start over again every two or three years will obstruct the fluidity of collaboration. It might be an idea to create better guidelines and documents that enable new actors to quickly get back on track with the current status of collaboration, as this was mentioned to be a difficulty several times. A more rigorous, albeit effective, solution would be the creation of new functions that specifically focus on the collaboration and the contact with both countries. Currently, said functions are fulfilled by actors who have several different roles, improving the chance that the collaboration might not get the attention it needs. If the continuity is improved, it is likely that the overall performance of the regime will be improved as well.

6.3 Future research

This research focused on the general assessment of the current status of the international collaboration, and identified several elements that currently obstruct, or enrich, the collaboration. By doing so, the research added to the existing literature by applying several methods to a specific case and identifying elements that are of relevance in the performance of this regime. This knowledge can be used to identify difficulties and successes in other international collaborative processes, thus adding to the general knowledge. This research can also be used as a manual for future collaborative structures. These elements have not been reviewed in depth, as this was not the goal of the research. This does open up several options for further research. For the case of dike ring 48, it might be an interesting follow-up research to review the variable of resources. Knowledge and financial assets contribute greatly to the performance of any collaboration, but it seems to be unthinkable to invest in projects across the border to enhance your own safety. At the same time, it seems difficult to accept foreign funds. Is this perceived as a sign of weakness? International funding has been discussed several times, but the conclusion always was that it 'simply could not be done'. Further researching this can help understand this barrier better.

A second recommendation for future research would be to apply this method of assessing international regimes on flood protection in other areas. The Netherlands has collaborative structures with Belgium and Luxembourg as well, and by reviewing the performance of that regime, new ways of enhancing either collaboration can be discovered, increasing the overall performance of all international flood risk management regimes.

A third recommendation would be to further research what the impact of the creation of a new institution that oversees the performance of the Arbeidsgruppe would have. Such an institution would need to have decisive rights, so that topics which the countries cannot agree upon can still be decided and the collaboration streamlined. The opinions as to how effective this would be are currently divided.

7. Limitations and Reflection

This final chapter reviews some limitations and shortcomings of this research. The master thesis is the final work that rounds up several years of studying, and forms the largest project that has been worked on during this period of time. As it is never too late to learn, a critical reflection on the process of this research will put the cherry on the pie of achieving a master's degree. This reflection will discuss limitations in the chosen theory, as well as limitations that surfaced during the process of this research.

One of the first possible remarks could be that the amount of new knowledge that is added to the existing literature is slim. The nature of this research was that it would use existing literature and frameworks to assess an existing collaboration. This helps understand the dynamics within this specific regime and provides some insights and ideas as to how to improve this collaboration. It also provides some generally applicable ideas of barriers in international collaboration, which can be used in other areas along the border, or even in other areas of the world. The logical consequence of choosing such a strategy however, is that there is no real new theory created by this research.

The second remark is linked to the nature of the research and can be found in the method of analysing data. As this research makes use of a fixed method of assessing variables that influence the performance, the framework that was made by Renner, the interviews were analysed following these variables. This allowed for the targeted searching of factors that fit within the variables, but eliminated some of the possibilities of generating own ideas and new elements that could influence the performance of the regime. By having an interview-guide that follows these variables, the interviews were steered into a specific direction. This helped streamline the interviews, but adding more open variables could have aided in generating new ideas besides the six variables.

The third remark lies in how difficult it proved to be to find fitting information about processes, structures, and policies on the German side of the collaboration. As discussed, one of the barriers in this research was the different language. This proved to be a barrier as well for the researcher. A lot of the necessary information is only available in German, which required some translating in order to be able to use those documents. Simultaneously, German governmental instances have very less accessible websites and online information than Dutch governmental instances. A lot of the Dutch information was easily found, but finding proper information online about German structures turned out to be more difficult than hoped.

The fourth remark continues on language and cultural habits. As the researcher is not fluent in German, interviewing in German was impossible. The expectation at the start of this interview was that English would be no problem for international actors, but it turned out to be more of a hassle than expected. Luckily, some of the German respondents were able to express themselves in Dutch. One of the interviews was held in English, but it was noticeable that said respondent had difficulties with expressing themselves in the way they want to. The second element of cultural habits comes from a very present difference in approachability of German actors. Where it was fairly easy to approach and get in touch with Dutch actors, it turned out to be more difficult than expected to get in touch with the desired German actors. Repeated inquiries about the possibilities of having an interview were often not answered. Luckily, a diverse and very fitting group of respondents has been found in order to help understand the performance of this regime.

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Appendix I: Interview Guide

Interview Guide

1. Introductie
    a. Voorstellen en onderzoek uitleggen
    b. Toestemming vragen om het gesprek op te nemen
    c. Vertellen hoe AVG gewaarborgd wordt
    d. Structuur van interview uitleggen
2. Themavragen

Sectie	Vraag	Sub-vragen		Theme
Introductie	1. Persoonlijke achtergrond/ Personal background	- huidige functie - eerdere loopbaan - welke projecten aan meegewerkt	- current function - previous functions	
	2. Internationale samenwerking persoonlijk/ Personal experiences international collaboration	- op welke momenten internationale samenwerking - hoe zag deze samenwerking er uit - wat was eigen functie	- Experiences with international collaboration - Personal role in these collaborations	- Actors - Objectives
Themavragen	3. Internationale samenwerking landelijk/ international collaboration national scale	- welke samenwerkingsverbanden nu tussen NL en DE - meer focus op veiligheid of meer focus op succesvolle samenwerking	- Which international collaborations exist between NL and DE - more focus on safety or on successful collaboration	- Structures - Policy Instruments - Range of collaboration - Strength of interaction - Resources
	4. Bestuurlijke organisatie NL en DE/ governmental structures NL and DE	- wie draagt verantwoordelijkheden in NL en DE - stijve of soepele overlegcultuur NL vs DE	- who carries which responsibilities - What does the work culture in DE look like	- Leadership and Entrepreneurship - Structures - Actors - Resources
	5. Reikwijdte samenwerking/ how elaborate is the collaboration	- welke onderwerpen vallen allemaal onder de internationale samenwerking tussen NL en DE	- which subjects fall under the international collaboration between NL and DE	- Range of Collaboration - Objectives
	6. Weerbaarheid/ how robust is the collaboration	- Is de samenwerking veel veranderd bij veranderingen in regering of na nieuwe verdragen in de EU?	- Has the collaboration changed after changes in national governments or EU rules?	- Resilience of Collaboration
	7. Institutioneel ontwerp/ institutional design	- Hoe sterk is de interactie? Komen besloten zaken ook echt terug in bestaande systemen?	- How strong is the interaction? Are decided matters implemented in	- Structures - Effectiveness of Collaboration

			existing systems?	
	8. Intensiteit/ intensity	- Hoe effectief is het regime? Is het nog levend of takelt het een beetje af?	- How effective is the regime? Is it still strong or is it declining?	- Intensity of Collaboration - Actors
	9. Effectiviteit/ effectiveness	- Wordt er echt iets bereikt met de internationale samenwerking?	- Are there actual achievements, or is it more focused on contact?	- Effectiveness of Collaboration - Objectives
	10. Belemmeringen/ barriers	- waren er obstakels in de internationale samenwerking - is er een oorzaak voor deze obstakels aan te wijzen - is er een oplossing gevonden voor deze obstakels	- Are there obstacles in place in international collaboration? - What caused these obstacles - Was there a solution for these obstacles	
	11. Verbeteringen / improvements	- persoonlijke mening over verbeteren samenwerking	- personal opinion on improving collaboration	
	12. Afsluiting/ finalising	- uitbranders	- final remarks	

Appendix II: Overview of Respondents

#	Gender	Type of respondent	Date	Duration
1.	M	Waterschappen – Dutch	31-05-2021	56 minutes
2.	M	Consultancy – Dutch	01-06-2021	55 minutes
3.	M	Veiligheidsregio – Dutch	02-06-2021	48 minutes
4.	M	Waterschappen – Dutch	03-06-2021	47 minutes
5.	M	Waterschappen – Dutch	07-06-2021	57 minutes
6.	F	Government – Dutch	09-06-2021	55 minutes
7.	M	Bezirksregierung – German	10-06-2021	37 minutes
8.	M	Veiligheidsregio – Dutch	14-06-2021	50 minutes
9.	M	Consultancy – German	15-06-2021	58 minutes
10.	M	Government – Dutch	30-06-2021	45 minutes
11.	F	Euregio – Dutch, working in Germany	05-07-2021	60 minutes
12.	M	Government – German	06-07-2021	46 minutes
13.	F	Government – Dutch, working in Germany	06-07-2021	46 minutes