



Connecting Delta21 to its stakeholders: The Haringvliet case



Deltamatch

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Disclaimer: As this report will be uploaded on the Delta21 website, some of the experts that were interviewed preferred their transcripts not to be included in this report. Therefore, in the text they will be referred to as a vague description of their expertise. While the experts who did give permission to upload their transcript are referred to in the text as a reference to their respective transcript in the appendix.

Executive summary

The Delta21 plan is a spatial plan meant to improve water safety, whilst also supporting sustainable energy transition and nature restoration. To promote nature restoration within the area of the Delta21 plan, the idea of opening the Haringvliet sluices arose which would restore the connection with the open sea, consequently salinizing part of the Haringvliet. This idea is opposed by several stakeholders, as they require the Haringvliet's fresh water supply. This disagreement could lead to a salt- versus freshwater debate in the Haringvliet. This report aims to identify constraints that could hamper successful cooperation between a large variety of stakeholders, and to find a solution to the issue of decision-making for the future of the Haringvliet in the context of Delta21. The main research question addressed by this study is: 'How does one combat the challenges of decision-making regarding the future of the Haringvliet in the context of the Delta21 plan?'. This report is written with the assumption that the Delta21 plan has the irreversible mandate to be implemented.

To describe and identify this and similar issues, we developed a theoretical framework consisting of two parts. The first part covers the history of the Haringvliet as well as several other historical cases that are relevant to understand the complexity of our case. The historical cases showed that a lack of clear communication and integration of stakeholders played a key role in the challenges of the decision-making process. A more interactive approach among stakeholders often led to more fruitful discussions. The second part covers the theoretical knowledge of scales, levels, governance mismatches, and governance arrangements. Governance mismatches are situations in which the scales and levels of the government bodies and/or sectors and stakeholders proves operationally incapable of addressing the bio-physical attributes of the problem. Governance arrangements are creative solutions that attempt to align these mismatches.

Using the constructed theoretical framework, we developed a 7-step method to define the impacts of governance mismatches within the Haringvliet area based on scientific literature research. Subsequently, we created an additional 3-step method to carry out the identification of the governance arrangements and its rules, processes and instruments. Besides the literature research, we conducted several interviews with relevant stakeholders and experts that are interested in the Haringvliet area. This was done in order to get an overview of the specific interests of different stakeholders, to get insights in the historical cases, and to solidify our theoretical framework based on expert knowledge.

From the interviews, literature research and preliminary advice from Delta21, we decided on the most important stakeholders regarding the future of the Haringvliet. We found the most important actors to be the initiators of Delta21, the Delta commissioner, Rijkswaterstaat, the Province of South Holland, Ministry of Infrastructure and Water Management, Water Board Hollandse Delta, surrounding municipalities, nature organisations, knowledge institutes, drinking water supply sector, tourism sector, and the industry sector. The involvement and opinion of the stakeholders were assessed by reading literature and conducting the interviews.

The most important mismatches were found by identifying the important scales and levels at which the most important stakeholders operate. One of the important mismatches is the difference between the jurisdiction, management and governance scale of government bodies, and the Haringvliet problem. Besides that, the nature organisations and the agricultural sector have a different perception of the future of the Haringvliet. Other important mismatches are: the scales of the actors who should provide financial resources operate on different scales and levels compared to the existing problem; levels of knowledge vary among the stakeholders; and the fragmentation of actors leads to communicative problems.

Governance arrangements are required to fit the stakeholders to the scales and levels of the Haringvliet. We presented three arrangements to tackle the problematic mismatches: workshops, an online science forum and a temporary organization comprised of stakeholders called the Haringvliet Jurisdictional Commission (HJC) which has jurisdiction over the Haringvliet. In the context of the entire Delta21 plan, a larger Delta21service would take on the responsibility of the workshops and the tasks of the HJC.

We have a total of four recommendations for the initiators of Delta21. Firstly, Delta21 can use focus workshops and general workshops to deal with a number of the identified governance mismatches. Secondly, we advise Delta21

to use a Decision Support System (DSS) as a tool in negotiations, similarly to the DSS used in the 'Room for the River' project. Our third recommendation is to work towards the creation of a organisation similar to the 'Delta-dienst' in the creation of the plan for the future of the Eastern Scheldt. Fourthly, the tools to identify governance mismatches and governance arrangements created in this report are designed to solve the problems around the salt-versus freshwater debate, but can be applied to other problems as well.

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1 | Introduction

The geographical location of the Netherlands and the low elevation of the Rhine-Meuse-Scheldt delta have caused the Dutch to guard themselves against the water for centuries. The North Sea flood of 1953, in Dutch called the 'Watersnoodramp', was a catalyst in the process of improving our defence strategies against higher water levels. Today, climate change is affecting water levels in many ways; higher temperatures affect sea-level rise as well as river discharges from the Rhine, Meuse and Scheldt [Pachauri et al., 2014], and precipitation rates become more intense as well as more difficult to predict [Westra et al., 2014]. These climate-related issues are causing increased threats from river floods caused by dike breaches, from overflow due to increased river discharges [Apel et al., 2009], and from sea floods due to sea level rise [Brooks et al., 2006].

Following the previously mentioned North Sea flood, the first Deltacommission was created in 1953 to advise the Netherlands on how to prevent another disaster like that. This commission led to the famous Deltaplan which includes many large technological interventions in the Dutch province of Zeeland. With climate change adding a new threat to Dutch water security, a new Deltacommission was created in 2008. On the advice of this second Deltacommission, the Delta commissioner position was created to form the Deltaplan. The Deltaplan deals with the climate adaptation of water topics in the Netherlands. To collect new ideas, the Delta commissioner has requested other entities to come up with new and creative ideas to protect the Netherlands from the challenges in future flood safety. The Delta21 plan, as initiated by Leen Berke and Huub Lavooij, was an answer to this request. The Delta21 plan is a spatial plan located between the Haringvliet and the North Sea (Figure 1.1) and is meant to improve water safety for future climate change scenarios. It focuses on three main pillars: water safety, sustainable energy and nature restoration. The plan revolves around the construction of a multi-functional energy storage lake which can temporarily store peak river discharge and subsequently improve water safety. A storm surge barrier is implemented at the entrance of the tidal lake to protect against high sea levels. A new range of dunes surrounding the energy storage lake also serves as natural protection from sea. During peak river discharges, river water will be pumped to sea using large capacity pumps to avoid flooding land inward. Other features of this energy storage lake are the generation of sustainable energy through windmills, sea batteries and solar panels; and the storage of energy through turbinating stored water. The Delta21 plan is based on tried-and-tested technology. However, by constructing Delta21, nature that is currently occupying the area is difficult to replace, which is required by Natura2000 [van Dam et al., 2020]. Additionally, acquiring the required legislation for the project and to get approval of relevant stakeholders within the area remains a challenge.



Figure 1.1: Current spatial plan and location of the Delta21 project. Retrieved from: C Concept Design / cconcept-design.com

Problem definition

Improving the quality of life by nature restoration within the nature domain is one of the three pillars of the Delta21 project, but has also proven to be one of the challenges for its implementation. Nature organisations require Delta21 to compensate the amount of natural area that is lost due to construction of the energy storage lake and other infrastructure. The opening of the Haringvliet sluices offers a unique possibility to combine the Delta21 plan with restoration of ecosystems [Advisor nature organisations]. The opening of the Haringvliet sluices allows indigenous plants and saltwater fish species to thrive, which were lost after the Haringvliet was closed off. In 2018, the Haringvliet sluices have been opened slightly to allow for fish migration through the Haringvliet. However, this was not as successful at restoring the ecology as had been hoped. Furthermore, the decision-making process, defined as the general process of coming to an agreement, that resulted in this slight opening of the Haringvliet received a lot of attention. The amount of pushback this small gap in the sluices generated was considerable, mostly caused by the fact that local stakeholders felt left out of this decision-making process and the impact the change could have on their livelihoods [Buitenhuis and Dieperink, 2019]. At the same time, it was celebrated by nature organisations and specifically fish enthusiasts who saw the return of the sturgeon fish species in the Haringvliet and upstream. This shows that there is a mismatch between the stakeholders that have an interest in the Haringvliet. Furthermore, nature organisations would like to see a complete opening of the Haringvliet sluices, in order to restore the original estuarine dynamics of the area. The purpose of the Haringvliet is a sensitive topic as various stakeholders depend on its supply of fresh water for agricultural, industrial and domestic purposes.

Currently, there are several stakeholders in the Haringvliet area that require the availability of freshwater, and therefore disagree with the opening of the Haringvliet sluices, which would lead to higher salinity levels in the Haringvliet. Drinking water companies require fresh water for consumption and farmers need fresh water for the cultivation of their crops. These issues could be resolved through alternative methods of assuring water availability, financial compensation, or buy-outs. In order to find a solution that is agreed upon by all, a key aspect is the decision-making process between all relevant stakeholders, which could be called the governance process of the Haringvliet.

Aim of the project

The aim of the project is to provide advice on the issue of decision-making regarding the future of the Haringvliet in the context of Delta21. The Haringvliet is of great interest to the Delta21 plan, as the Delta21 plan aims to change the ecological state of the Haringvliet significantly, both directly and indirectly. This provides a unique option to discuss potential ecological benefits with the environmental stakeholders. An example of these changes could be the opening of the current Haringvliet sluices in order to return the Haringvliet back to its historical, estuarine state. However, especially the re-salinization of water bodies and former estuarine areas has proven to be a sensitive topic in the Zeeland and South-Holland provinces as the discussions and debates surrounding Lake Volkerak-Zoom, Lake Grevelingen and Lake Veere have shown (see section 2.1). This report will therefore provide Delta21 with advice on how to identify and deal with the issues surrounding the sensitive topic of possible salinization. This is done both from a practical standpoint by looking at examples and from a theoretical standpoint by using the theory of governance mismatches. Afterwards, possible solutions for these historically and theory-based decision-making problems will be identified with the use of governance arrangement theory. Our main research question can be defined as: *How does one combat the challenges of decision-making regarding the future of the Haringvliet in the context of the Delta21 plan?*

The question was chosen based on the different interviews and aims to create a more neutral statement that does not inherently push towards one future scenario for the Haringvliet, like the re-salinization. Furthermore, we formulated the following research sub-questions:

- What lessons can be learned from historical cases of estuary restoration?
- What are the important stakeholders, their interests, objectives and power?
- Which governance mismatches occur in the Haringvliet area?
- What are possible governance arrangements to deal with the governance mismatches?

The research questions are formulated in the context that the other parts of the Delta21 plan have the irreversible mandate to be realised. With a irreversible mandate we mean that the water safety and energy pillars of the Delta21 plan have been granted the political green light in legislation.

Answering the research question is done with the end goal in mind of resolving possible conflicts that could occur between the Delta21 and the stakeholders that have an interest in the Haringvliet. Therefore, this report will provide Delta21 the tools and knowledge needed to reach an agreement about the Haringvliet. The theory and tools used in this report could be used to tackle other decision-making challenges of Delta21.

2 | Theoretical framework

The following chapter will discuss the theoretical framework that is needed to answer the research questions as stated in the aim of the project. The theoretical framework chapter is divided into two main parts. The first part looks at the history of the Haringvliet and other historical cases in order to create an understanding of the context of this report. Furthermore, these historical cases can provide inspiration and knowledge for this report. The second part of this chapter deals with the theory that this report is based on. This includes an introduction to the terms governance, actors, fragmentation and more in depth knowledge regarding governance mismatches, scales, levels and governance arrangements.

2.1 History of the Haringvliet and other historical cases

In the south-western delta of the Netherlands, there have been multiple long-lasting discussions regarding the topic of water management. A prime example of a discussion revolving around the decision-making in the Haringvliet area is the Kierbesluit. Other examples are discussions revolving around the areas of the Lake Grevelingen, Lake Volkerak-Zoom and Lake Veere. These examples will be used to obtain knowledge about the potential bottlenecks and effective techniques in the decision-making process surrounding salt- versus freshwater debate in water basins comparable to the Haringvliet.

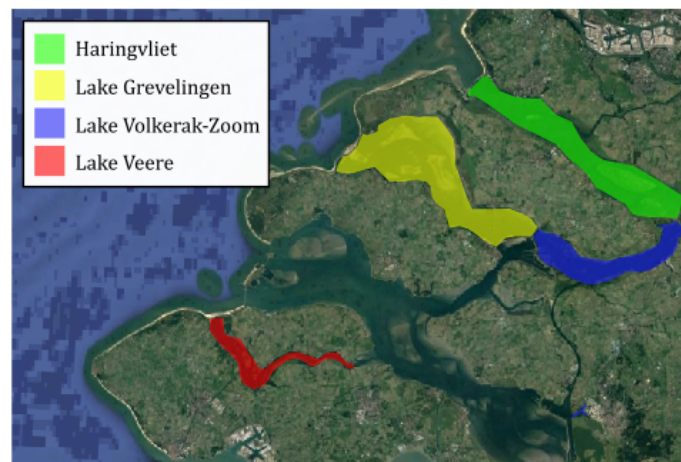


Figure 2.1: Map of Zeeland with the locations of the historical cases discussed in this section.

2.1.1 Kierbesluit

Introduction to the Kierbesluit

An example of a slow policy-making procedure in the Haringvliet area is the process of the Kierbesluit. The Dutch words 'kier' and 'besluit' translate in English respectively to: 'a small opening' and 'decision'. Our Kierbesluit case study is mostly based on the work of Buitenhuis and Dieperink [2019], who made a triangulation of complementary sources to document decision-making in the Haringvliet area: scientific (peer reviewed) literature, policy documents, newspapers and expert interviews. Furthermore, we used a study by Bakker et al. [2009] that analysed what factors influenced the national governments' power and ability to change policies in the south-western delta area.

As a result of the construction of the Haringvliet sluices that were a part of the original Delta Works, the Haringvliet was closed off from the North Sea from 1970 onwards. Because the sluice complex only opened during low tide to discharge the excess river water, the tidal movements and the saltwater intrusion were suppressed [Storm et al., 2006]. The Hollandsch Diep and the Biesbosch areas changed dramatically due to removal of the tidal movements and entire ecosystems changed. Important to note, is that these changes greatly reduced the risk of

saltwater intrusion into the groundwater in many parts of the Netherlands. The Haringvliet slowly evolved into a freshwater source for the regional agriculture and drinking water companies. As a result of all this, the estuarine ecosystem degraded.

As intended, closing the connection between the Haringvliet and the North Sea made the estuarine dynamics disappear: seawater no longer freely flows into the Haringvliet during high tide, the tidal signal has disappeared and the boundary between salt- and freshwater has become distinct. As time evolved, so did the frame of thought; people began to see the loss of the disconnection of the Haringvliet and the paired loss of estuarine dynamics as a short-sighted solution. This might be explained by the shift towards a vision in which nature and ecology are the main elements of society. The disconnected state of the Haringvliet basin was deemed 'unnatural' and the state of the Haringvliet itself was deemed 'undesirable' [Bakker et al., 2009].

In 2000, the key decision was made to slightly open the sluices five years later. As social support for the far-reaching decision was lacking, a step-wise approach was suggested to change the management of the sluices with, as a first step, the alternative of 'Broken Tide' (allowing limited influx of salt water during high tide). Restoration of true estuarine dynamics would be limited, but migratory fish species would be able to pass the dam – which was in line with international agreements made with the rest of the European Union in the Water Framework Directive [Storm et al., 2006, Van Meerkerk et al., 2013, Marks et al., 2014].

Apart from the Dutch government, the Province of South-Holland and several nature organisations favoured the decision. Regional actors (e.g. water authorities, farmers, municipalities, water companies), however, felt that their interests were not seriously considered. In their opinion, the decision would negatively affect the freshwater supply for agriculture and drinking water and would lead to the loss of good arable land. Regional actors, therefore, demanded compensatory measures to safeguard the freshwater supply (such as the construction of a new and adapted regional freshwater infrastructure).

Discontent about the decision and the need to realise compensatory measures led to postponements (2004, 2007) and even the cancellation of the decision in 2010 [Rijkswaterstaat, 2016]. In 2011, following international pressure, the national government decided that the Kierbesluit will be realised by 2018, no matter what. Agreement was found on the realisation of compensatory measures. Although the Delta Nature Programme was discontinued due to the increased resistance by many of the peers involved, six organisations (ARK Natuur Ontwikkeling, Natuurmonumenten, Sportvisserij Nederland, Staatsbosbeheer, Vogelbescherming Nederland and WWF Nederland) pushed through and managed to start a nature project together to further enhance the ecological restoration of the Haringvliet in anticipation of the opening of the sluices. The Droomfonds project Haringvliet was made financially possible through a 13.5 million donation from the Dutch Nationale Postcode Loterij.

From the works of Buitenhuis and Dieperink [2019], numerous lessons from the mismanagement surrounding the Kierbesluit have been distilled.

Clear communication

Overall, communication between the different stakeholders can be characterised as the provision of one-way streams of information instead of a constructive dialogue. Large meetings were held as a moment of communication between the larger stakeholders and the more regional stakeholders. These large meetings on location, however, did not contribute to achieving a constructive interaction process and the atmosphere was mostly characterised by resistance. Also, the large meetings started to serve more as an exchange of information, rather than coming to one solution together. Local stakeholders had the feeling that decisions had already been made and they were only being informed. Moreover, communication developed more towards convincing each other of their perspectives instead of searching for a shared solution. Involved stakeholders were also faced with different project leaders and communication advisors during the information meetings. This meant that they continuously needed to re-explain their perspective on the project. The exact goal and underlying thoughts of the Kierbesluit were lost in the process. It can also be observed that the setting within some involved organisations changed due to changes in directors or representatives.

With the restart of the Kierbesluit, a more interactive approach was chosen, in which more stakeholders were integrated in the communication process and a sense of community was created. This sense of community seems to play a key role in making sure all stakeholders feel included in the decision-making process. Representatives of the

Province and the national government visited the region and the sites of the stakeholders so that they would get a better picture as to why they were being resistant. Communication also started to take place outside of the formal project setting.

Active integration of stakeholders and knowledge

Regional stakeholders were mostly left out of the development and implementation phases of the Kierbesluit process. It was developed at the provincial level and sent to the region as a set of procedures. Therefore, for a long time, the project was mostly based on the vision of the initiating actors without the consensus of the regional stakeholders. This also meant that local knowledge was not incorporated. This is partly the result of the misconception that when the Province of South Holland was integrated into the project, the region would also be integrated. The project can thus be characterised by a top-down construction, and this was also felt by the regional stakeholders. The result was that regional resistance against the restoration project grew.

Sufficient project support

Support for the project was lacking, especially from the regional actors involved in the process. They felt like the project interfered too much with their core interests and ideas about the Haringvliet area. Following from multiple problems such as the mismanagement of communication, the underlying reasons for the ecological restoration were not clear and the regional actors were not able to perceive benefits in the project. They felt that the measure was taken at the expense of their own individual interests. From early in the decision-making process, these regional actors gained the feeling that they were not being heard whilst the intervention directly influenced their personal interests. Support for the project was lacking and it became very hard to turn this around. Future plans like the Delta21 plan should definitely communicate the benefits and drawbacks of their plan to the different stakeholders more effectively and adapt according to their views and opinions, in order to arrive at a well-balanced spatial plan for the Haringvliet area and its front delta. Another issue is that money started playing a role at a political level, eventually leading to a cancellation of the original Kierbesluit plan in 2010. The measure was regarded as too expensive and would not be appropriate in the context of the 2008 economic crisis, that resulted in a large amount of governmental budget cuts. Interestingly, it was also fear of the financial consequences that led to the continuation of the Kierbesluit. It became clear that the Netherlands were threatened with high financial costs due to international claims and loss of credibility in international matters. Here, it seemed as though the politicians had been looking at a too limited set and scope of the possible effects that the Kierbesluit might introduce, which was easy to overcome.

Another solution was reducing the complexity and scope of the plan itself: by abandoning the creation of delta nature, the cost of the project was reduced after continuation of the process in 2011. This increased stakeholder support: not only the national government, but also the water company and regional water authority also decided to contribute financially, as both would receive some benefits from the measures.

From the creation of the Droomfonds project – cooperation, we can conclude that cooperation between a large group of stakeholders with overlapping interests can largely increase their power to make a change to a certain policy. By collaborating, they also gained funding from the Nationale Postcode Loterij, so you could argue that collaboration also increases economic leverage to support such policy.

Key individuals should have a pro-active role in the decision-making process

It is important that key individuals work on the problem in a pro-active way. When the power shifts to too many different individuals, we saw that communication becomes more tedious which hampers the progress of the decision-making. An example of such a key individual who was deeply engaged in the Kierbesluit case from the start is the representative of the Province of South Holland. As a politician, they knew their way in the divided field of stakeholders and was able to communicate and defend the situation from the perspective of the Province. After the restart in 2011, the former Minister of Infrastructure and Environment presented himself as another key individual since he was determined to realise the Kierbesluit and the compensatory measures. The Minister was able to acquire funds for the project and to declare that the Kierbesluit would be implemented in 2018. What seemed to be missing during the development and implementation process of the Kierbesluit was that there were no individu-

als who were able to connect to the stakeholders by bridging the gap between the perspectives of multiple parties. Someone needed to step up, hear what all stakeholders had to say and speak on behalf of all parties that were involved.

Allow for experimentation

For starters, it seemed that the development and implementation process of the Kierbesluit could not take advantage of an experimental approach, as resistance from the stakeholders did not allow the experimentation to take place. From this, we can learn the importance of creating enough room for science to be conducted and to make decisions based on the science that backs up certain claims. Scientific literature also regards experimentation as essential, because it could provide new information and allows the project to progressively change accordingly [Storm et al., 2006, Bakker et al., 2009]. To be able to follow such an approach, there should be room within the project to allow experimentation. In the case of the Haringvliet and the implementation of the Kierbesluit, the idea was to gradually open the sluices more and more, to see what changes would occur in the ecosystem of the Haringvliet. Though, this idea of experimentation was stopped by the stakeholders and hindered further implementation of the Haringvliet and thus opportunity to learn from the effects per step was no longer part of the process.

Other environmental factors as possible causes of the slow Kierbesluit decision-making process

Some major droughts have happened during the Kierbesluit process, which made people question the security of the freshwater supply from the Haringvliet. For this reason, especially the freshwater supply companies like Evides and the agricultural sector started to position themselves more critically when it came to plans that might have a negative effect on freshwater availability like the Kierbesluit at the time. Another factor that might have played a role were the national government elections that happened in the year 2013. During a period of elections, environmental policies like the Kierbesluit prove to be excellent vote-gathering opportunities for certain politicians that address these issues in their campaign. Though, in the process, the attention is often shifted towards the politicians and elections, leaving little attention for the environmental policies themselves. Because the Netherlands had given in with plans that aimed towards increased fish migration, other European countries have put extra diplomatic pressure to open the Haringvliet sluices again. This has certainly influenced the problems surrounding the Kierbesluit implementation. By increasing the scope of the project due to integration of more elements such as the Delta Nature Project, the complexity of the entire Kierbesluit grew because of this integration and so did the resistance against the plan. This was mainly due to the ever-increasing number of stakeholders and their partially overlapping interests for the Haringvliet area. When it was left out again afterwards, stakeholder interests were to a lesser extent affected and room was provided for better supported solutions for the supply of fresh water. Lastly, an important lesson that follows from the Kierbesluit procedure is that the overall timing of an impactful sluice management plan like Delta21 is important. We argued that an ecological restoration project is successful when the project contributes to the recovery of degraded ecosystems and leads to resilient ecosystems. Further changes in the ecosystem will only become visible much later. In order to determine whether an ecological restoration project is successful, timing thus seems important. If you look at the Kierbesluit as a whole, this case can be regarded as a key example of how the development and implementation of ecological restoration projects in estuaries can become problematic. However, when one looks at the process from the restart in 2011 and onwards, one sees an improved development and implementation process leading to a better fish passage.

2.1.2 Lake Grevelingen

Lake Grevelingen is on the border of the Dutch provinces of Zeeland and South Holland (see Figure 2.1) and is dealing with serious water quality problems [Roovers and Van Buuren, 2016]. The lack of mixing caused problems related to stratification and low oxygen levels [Hoeksema, 2002]. The bottom layer of Lake Grevelingen is already dealing with anoxic conditions for a long time [Wijsman, 2002]. However, at the beginning of the century, anoxic conditions appeared at shallower depths as well [Lengkeek et al., 2007]. Lake Grevelingen can be distinguished from the other marine delta estuaries (Eastern and Western Scheldt) because of the absence of tides in the basin. Therefore, it is comparable to the Haringvliet. Lake Grevelingen is separated from the sea by the Brouwersdam, leading to a

significant exchange reduction. The restoration of the connection between the lake and the open sea is a frequently proposed solution, which includes the return of tides [Roovers and Van Buuren, 2016]. This restored connection will increase the oxygen levels and can create novel opportunities for nature conservation. However, there are still several uncertainties regarding this operation, e.g. the effects on organic material, nutrients and sediment [van Wesenbeeck et al., 2009]. Next to these uncertainties, there was another complexity, the variety of actors and demands. In this large area, several stakeholders had different demands. It is not possible to satisfy all demands, hence it is important to come to a compromise regarding the function of the lake. The establishment of this compromise led to a complex discussion.

In several ways the discussion around Lake Grevelingen can be compared to past discussions surrounding the Haringvliet area. They both find their origin in a deterioration of water quality, deal with a complex interrelated set of issues and are both represented by a variety of actors with differences in both interests and values. However, there are also considerable differences in the vitality of the governance system. Lake Grevelingen is less characterised by conflict, as a more constructive dialogue existed between stakeholders in this case compared to the Kierbesluit. Lake Grevelingen proved to be a case with a high but varying level of vitality. Formal moments of consolidation together with lively moments of exploration formed a successful combination [Edelenbos et al., 2015]. From the start, all actors had the possibility to participate in lively discussions, which led to an active exploration of interests and values. Based on these discussions, they decided to enlarge the water exchange at the Brouwersdam. The plan is not realised yet. However, there are plans to create this enlargement in the near future.

2.1.3 Lake Volkerak-Zoom

Lake Volkerak-Zoom is a stagnant freshwater system created in 1987 by isolating a part of the Eastern Scheldt estuary. After this enclosure, the water quality of the lake deteriorated, which led to blue-green algae conditions during summer [Breukers et al., 1997]. These algae affect different sectors [Tosserams, 2004]. Blue-green algae present a hazard to human populations that are exposed through drinking water or recreational activities [Falconer, 1999]. The agricultural sector is also affected, because when blue-green algae are present, the water might become inadequate for irrigation and livestock [Herath, 1997]. The return of a saline-fresh water gradient may improve the water quality and therefore, reduce the occurrence of algae blooms. However, it reduces the fresh water availability for agriculture and drinking water supplies in the region [de Vries and Veraart, 2009]. This transformation is possible by connecting the lake to Lake Grevelingen (see Figure 2.1), which will also restore tidal influence.

This transformation of Lake Volkerak-Zoom would create opportunities for nature restoration and the development of new ecosystems. Besides that, the enhanced water quality would also positively influence the recreation sector. However, the agricultural sector might have to deal with a deficit of fresh water. In the current situation, the freshwater of Lake Volkerak-Zoom is used for irrigation. Possible solutions are increasing the freshwater supply and distribution or land-use and local water-management transitions focusing at a more efficient water use or the introduction of salt-water agriculture [de Vries and Veraart, 2009]. In November 2019, the cabinet stated that there should be a solution for the freshwater demand of the farmers before transforming the lake. However, there are still several uncertainties regarding the annual return of blue-green algae and the ecological development of a saline Lake Volkerak-Zoom. These uncertainties resulted in a long-lasting discussion. Stakeholders want to reduce or quantify the uncertainties, which might increase the support and eventually enhance the decision-making process [Klostermann et al., 2013]. The different demands of the stakeholders using the freshwater of Lake Volkerak-Zoom initiated a tense discussion. Overall, there is frustration among the stakeholders caused by the lack of decisiveness of the national government. Another complexity in this discussion is the fact that some stakeholders expect a financial compensation from the government. Factors that enhanced the decision-making process in this example are active stakeholder participation, creating deadlines in the process and a central process for knowledge collection [de Vries and Veraart, 2009].

2.1.4 Lake Veere

The former tidal inlet Lake Veere was turned into a stagnant brackish system in 1961, which led to a degradation of the water quality. This transformation initiated a deterioration in water quality and caused problems related to algae growth and low oxygen levels. The remediation of the lake was initialised by the restoration of the exchange between the tidal marine Eastern Scheldt and Lake Veere. The restored exchange has increased the salt content, which might have contributed to an increase in the water quality and changes in the existing ecosystems [Wijnhoven et al., 2010]. Besides that, another important aspect of the transformation is the change in processes [Advisor nature organisations].

Several stakeholders are affected by such a transformation, which led to diverse demands. A large coalition of stakeholders was created to discuss the transformation on a wide range of aspects. In this coalition, a large number of stakeholders are represented. This results in a strong support for the implementation. However, the size and composition of the coalition turned out to result in a low effectiveness as there are several contradicting demands. This eventually hampers the decision-making process. A focus group ('klankbordgroep' in Dutch) could have been a better alternative, which was mentioned by [Advisor nature organisations], to create a pleasant atmosphere for discussion. In the former coalition, some stakeholders experienced a lack of leadership. So it would have been better to choose for a separate management group and a leading organisation [rondom het Veerse Meer, 2008].

2.1.5 Room for the River

As reaction to the floods in 1993 and 1995, the 'Room for the River' project (in Dutch the 'Ruimte voor de Rivier' project) was created in a flood risk management sector that is controlled by governmental agencies. However, a number of initiatives in the project came from stakeholders. Lessons from these initiatives include: defensive stakeholders can become pro-active and productive by working on their own solutions; stakeholder knowledge and professional knowledge need to be combined in a way where neither is too dominant; and local stakeholders can effectively lobby either in favour or against plans in the media [Edelenbos et al., 2017]. This shows the possibility of working with stakeholders to reach an agreement. The 'Room for the River' project worked with an approach which included NGOs and private companies from a range of disciplines to actively collaborate in the process [Zevenbergen et al., 2013]. According to Zevenbergen et al. [2013], this approach is both innovative and a best practice for future projects similar to 'Room for the River'. An expert told in its interview the anecdote where government agencies showed up to stakeholder meetings with ideas drawn on maps that were not accurate anymore [Expert governance]. This anecdote could serve as a great example of the importance of including stakeholders in the design and planning stages of a large spatial project like 'Room for the River' and arguably the Delta21 plan. The changes in water management practices, that can be seen in the 'Room for the River' planning stage, are indicative of larger changes in the water management sector. These changes include both: a focus on openness of knowledge and processes and a focus on stakeholder participation where representation of important stakeholders is key to ensure recognition of a broad variety and ever changing values. These two principles are key in building trust and cooperation and stimulate consensus building [Wolsink, 2006].

2.1.6 Lessons from the historical cases

From these examined historical cases, a few lessons can be distilled. For future policy-making, the most prevailing lesson would be to focus on creating an interactive environment where all relevant stakeholders are integrated in the decision-making process and creating a sense of community. From the start, all actors should have the possibility to participate in lively discussions, to create an environment in which active exploration of interests and values is possible. This environment should follow the principles of openness and participation. Though, as was mentioned in the process of salinization of Lake Veere, the size and composition of the coalition should be limited. Otherwise, this could eventually hamper the decision-making process. Besides support from the stakeholders itself, sufficient financial support is vital as well. Though, we believe that gathering enough support from all involved stakeholders is most important, and financial support will be a concern to focus on later. For that reason, we will from now on

focus on the process of connecting the stakeholders, as we believe this is most important in gaining enough support. This connection between stakeholders will cause the building of trust and cooperation towards a consensus.

2.2 Governance arrangements and mismatches

The following section will provide more insight into the topics of governance arrangements and mismatches. First, the key terms that are used in both governance mismatches as well as arrangements will be explained. Afterwards, governance mismatches and arrangements will be explained in more detail. This chapter will be based on both literature research and the interview with an expert in governance.

2.2.1 Actor

In this report the word actor is used as a synonym for stakeholder. Actor/stakeholders refers to organisations or individuals that are either directly or indirectly impacted by changes in the future of the Haringvliet and therefore have an interest in the process [El-Gohary et al., 2006]. Impacted in this case could include lost or increased revenue, changes in management, changes in maintenance, etc. We define government bodies as all actors that act on the jurisdictional scale. Which stakeholders should participate in the process of governing the Haringvliet will be discussed in chapter 4.1.

2.2.2 Scale and level

Scales are defined as dimensions used to analyse patterns or processes, e.g. the spatial, temporal or jurisdictional scale [Gibson et al., 2000]. Levels are the units located at different positions on a scale. Each scale has different levels. The concept of scale is closely linked to hierarchy, lower levels on a scale are generally part of, or subject to, higher levels on a scale [Gibson et al., 2000]. Scales generally consist of levels that range from small to large. The temporal scale for instance has levels divided in different lengths such as seconds (small time unit), hours and years (large time unit), while the jurisdictional scale deals with authority over a hierarchical scale of governmental bodies ranging from municipalities (small jurisdiction) to the European Union (large jurisdiction). Social phenomena happen over various time levels, from daily news updates to elections happening every few years. Interactions happening across scales are called 'cross-scale' interactions, similarly interactions between levels on the same scale are called 'cross-level' interactions. Multi-level and multi-scale are used to indicate phenomena affecting multiple levels and/or scales, without indicating strong cross-scale or cross-level interactions [Cash et al., 2006].

Mismatches may occur when human and ecological systems do not fit in terms of space or time. For example, migration of species spanning multiple jurisdictional institutions causes a mismatch on the spatial and jurisdictional scale in terms of habitat protection. Temporal mismatches may arise when decision-making bodies change every few years due to elections, despite ecological systems requiring long-term planning. Many cross-level interactions occur on the jurisdictional scale among institutions at higher or lower levels which are adjacent on the scale. These cross-level interactions between resource managing institutions generally result in five different patterns based on Young [2006]:

- Dominance, where one institution becomes dominant in the sense that whenever friction due to scale-mismatches occurs it has authority over other levels.
- Separation, where boundaries between spheres of influence are established to separate those that take decisions over what area.
- Merger, where cross-level conflicts are tackled by placing two institutions under joint management in order to internalise the conflicts.
- Negotiated agreement, where roles are provided for multiple institutions at different levels stressing the need for agreeable rules for all regimes.
- System change, where the cross-level problems cause a change in institutional setting.

Different driving forces cause different patterns to emerge. Real-world situations are highly complex; thus, these forces are identifiable factors which occur frequently in generating the previously mentioned patterns. Decentralisation of power or transfer of authority from national to regional or local governments has highlighted the dominance of higher-level actors as they hold the funding for regional/local government. Differing discourses between local and international actors can generally lead to separation of spheres of influence. Take the example of migratory fish where transnational stakeholders aim to protect the fish from harvest at the delta inlet, while local fisheries who depend on the harvest aim to keep their livelihoods intact. Situations like these have opportunities to transition to a system in which knowledge from one group is incorporated in the decision-making of another group, leading to a merging of knowledge. These mergers require a mutual amount of trust between higher level managers and local stakeholders. When authority lies with an actor who has little control over what is actually happening, often local stakeholders are involved and given certain decision-making roles through a negotiated agreement. When actors in cross-level interactions are not willing to find mutually beneficial agreements and they have enough power to veto the decisions of the others they form a blocking coalition. This generally leads to institutional breakdown, and drives a change in the jurisdictional system [Young, 2006].

The scales and levels used in this report are based on Figure 2.2 by Cash et al. [2006]. Cash et al. collected the scales that are important in the analysis of scales. Each scale is divided into different levels (see Figure 2.2).



Figure 2.2: Scales and levels chosen for this report. Figure based on Cash et al. [2006]

The spatial and temporal scale as explained before are key in identifying mismatches. The spatial scale is divided into five levels ranging from local to international. Where either the problem, actor or sectors fall on the spatial scale depends on where it is located. A village is local, and a province is spatially located at the provincial level. The temporal scale on the other hand is more complex. It looks at whether the problem, actor and sectors plans ahead short term, medium or long term. This is based on the understanding of the ecological processes of the problem, and the interest, plans and vision of the actor and sectors. The jurisdictional scale refers to the scale at which an actor or sector has the legal responsibility to make decisions. The clearest examples on the jurisdictional scale are hierarchical government agencies where the municipality has municipal jurisdiction, provinces provincial, national governments national and international organisations like the European Union international. However, this scale becomes more complicated when government agencies as water boards are introduced as they have jurisdiction of a scale that falls outside of the hierarchical structure present before. In this case the size and the overlap with the problem area are important factors to judge their level on the jurisdictional scale. The institutional scale looks at the level of rules that an actor or sectors can change or create. The constitutional level is the highest level of change and rule creation as it pertains to the fundamental rules of society. The medium level are changes to rules and regulations which can change important aspects of society however they have to meet the standards of the constitutions. The lowest level on the institutional scale are the operating rules which are the rules created to meet the requirements and implementation of laws and regulations. The management scale deals with the level of management activities that is being performed by an actor. Ranging from creation of the strategies to managing the projects to the performance of the management tasks as described in the projects that fit the strategy. The network scale is one of the more complex scales to define, as it requires an understanding of networks. In its most simple definition, the network scale deals with the links an

actor or sector has with other actors or sectors. A local organisation could have an international network who work together on projects and share knowledge. The final scale is the knowledge scale, this scale deals with the level of the knowledge, not the amount of knowledge. The level of the knowledge refers to whether the knowledge is based on general assumptions or based directly in the context of the problem. The knowledge level of indigenous knowledge deals with knowledge of local actors through living and acting in the area. The specific knowledge level deals with knowledge specifically about the problem that is created through research. The general knowledge level focuses on more general knowledge of more meta principles that are a part of the problem.

It is important to understand that similar to the problem, only having a spatial and temporal scale, actors and sectors do not necessarily have to be on a specific scale. Nature organisations for example do not have any jurisdiction, this is a scale in which government bodies can be analysed.

2.2.3 Governance

Governance is the term used to describe governing through collaboration and coordination between actors in society in order to solve collective action problems inherent to government and the act of governing. Governing involves a basic set of relationships between government and citizens and create interaction between public and private actors in order to realise a collective goal [Howlett and Ramesh, 2014]. From a government's perspective, governance is the process of coming to an agreement through negotiations that will create the most beneficial outcome. It is key that this agreement is binding and implemented collaboratively by all actors involved. If this is not the case, implementation of governance will not have the desired effects. More simply put, the process of governance is the process of interaction between actors with conflicting interests as they are often interdependent of each other and need each other to find a uniform solution. However, these actors do not have to be equal, as they need to be able to impact each other both positively and negatively. The process of governance is also based on the idea that throughout negotiations on one topic, trust and mutual accommodation of each other is formed which will help governance of different topics in the future [Schmitter, 2002].

2.2.4 Fragmentation

Fragmentation in the context of governance means that there are different interests, norms and support for different solutions by the actors in the governance process. In reality, all types of governance deal with fragmentation as there is never a practical situation in which all actors in the governance process view the problem the same, want to achieve the same thing and support the same solution [Biermann et al., 2009]. However, in contrast to this fragmented state of actors and government bodies, the physical and even social systems of for example the Haringvliet are very much interconnected [Expert governance]. The latter can make the governance process more challenging but there are more challenges to governance which can make it difficult to come to a collective agreement. These challenges are also called 'governance failures'. Howlett and Ramesh [2014] state that the most commonly explored type of governance failure is the situation when a certain scale of the actor is not in line with the problem it is trying to solve. So, then the question becomes: What is not in line? There are two schools of thought regarding this question in the field of governance mismatches. The first school of thought is that management, jurisdictional, institutional, network and knowledge scales and their levels do not match the biophysical spatial and temporal scale of the problem and that this is caused by the actors and sectors being fragmented [Expert governance]. As they are fragmented, they work on different governance scales and therefore they mismatch when trying to negotiate a solution for a common problem. The second school of thought is that fragmentation in actors, sectors, and the scales they work on cause mismatches between these actors, sectors and scales. The difference being that the first school of thought sees the governance scales as the main problem being influenced by other fragmentation while the second school of thought sees fragmentation as the main problem that causes mismatches [Expert governance].

For a number of reasons, in this report we will focus on and follow the first school of thought. Firstly, much more studies in the past have focused on scale mismatches instead of other mismatches, which makes it more feasible

to study. Secondly, because actors and sectors are going to be fragmented, we don't see a possibility to create cohesion between the many and sometimes directly conflicting interests of actors and sectors in the Haringvliet. Researching these mismatches in the Haringvliet can provide the foundation for a solution that will kick-start fruitful negotiations about the future of the Haringvliet. For the problem at hand, this is far more useful than discussing fragmentation in actors and sectors themselves, since this has not worked out in the past (see section 2.1). Therefore, we believe it is more useful to focus on scale mismatches. To reiterate, this does not mean that fragmentation in actors and sectors is not key to this report, because this fragmentation will be seen as the cause of scale mismatches.

2.2.5 Governance mismatches

Wu and Ramesh [2014] define the impacts of governance mismatches from the perspective of market imperfection. They state that governance mismatches can lead to: 'limited capability in accessing, necessary information, principal-agent problems, power of organised interests, administrative costs, strategic responses, lack of competition and problems with financial sustainability' [Wu and Ramesh, 2014]. Even though these terms might not be directly related to the case of the Haringvliet, they provide an insight into the problems of a governance mismatch. It shows that governance mismatches can lead to information, power and financial issues and increase the cost of coming to a solution. Cash et al. [2003] state in their research that governance mismatches can lead to the creation of scientific and technological knowledge that is lacking in salience, credibility and/or legitimacy in the eyes of the key actors. Learning from the field of ecological management and according to Schultz et al. [2019], governance mismatches can lead to:

- failures to recognize long term and short term impacts, challenges to coordinate across jurisdictions
- failure to coordinate actions that could complement other actors actions
- difficulty to make agreements, tension between the assessment of the problem between different spatial scales
- lack of collective action to proactively address uncertain risks
- failure to invest in long term gathering of knowledge
- gathering fragmented knowledge

This list shows that mismatches can create issues at every corner of the process of finding a solution for the future of the Haringvliet in the context of the Delta21 plan. From creating knowledge, to recognizing climate change impacts to the basic requirement of coming to an agreement. Therefore, you can state that dealing with mismatches can lead to more successful and sustainable assessment of the problem and of the process of finding solutions [Cash et al., 2006]. The tools to deal with governance mismatches are governance arrangements.

2.2.6 Governance arrangements

Before diving deeper into the theory of governance arrangements, it is key to understand what they are. Firstly, governance arrangements are not the solution to a disagreement. They should be seen as bridge which allows for the necessary steps to be taken that would solve a disagreement. Governance arrangements are neither top-down, which can be blunt and blind to the local context, or bottom-up, which can be blind to the larger impact of local actions. It can be viewed as the difficult but required middle road [Cash et al., 2006].

Governance arrangements consist of rules, processes and instruments used to create a structure that is capable of bridging the governance mismatches to allow for a collective solution. Rules refers to written, transparent en informal rules. These rules can discuss who is allowed to participate, who is in charge, what the end product is and how the governance arrangement is organised regarding jurisdiction etc. Processes are the way the actors interact as they try to create a collective interpretation and understanding of both the problem and the solution. It also includes the processes of political negotiations. The processes are formed through the rules that are established and the processes of negotiation are part of the rule formation. The instruments are tools which can help reach the collective goal,

this can include a very wide range of instruments including financial resources, information, legislation, subsidies, etc. There are instruments that focus on the procedure of creating a collective goal and instruments that provide the means to achieve the collective goal [Biesbroek, 2020].

A well-known example of governance arrangements is the Public Private Partnerships (PPP or P3) which provide a structured cooperation between public and private actors to implement a collective goal. There are many other examples of governance arrangements in the world, many of them not specifically specified as being a governance arrangement. Creativity in finding the right governance arrangement fitting of the governance mismatch of the problem is therefore very important. However, to provide some guidelines to creating a governance arrangement we can look at previously performed research. This research can provide us with a number of topics, principles and requirements to ensure that the Haringvliet governance arrangement will have a higher chance of succeeding. The following paragraphs will summarise those in the form of a list. Regarding participation there are number of important principles based on Schmitter [2002]:

- All actors participating in a governance arrangement should have an interest or a 'stake' in the problem . Stakes include the rights to property that will be affected by changes. Furthermore, any government agency with jurisdiction should be included.
- The governance arrangement should not have more active participants than necessary to cover all significant interests.
- Participants in the governance arrangement should have different and preferably opposing interest. This is to prevent the governance arrangements from having too many participants which will make decision-making more difficult.
- Actors must ensure a shared understanding of the problem and the system in which the problem operates. This is necessary to understand how different actions and solutions might impact the system and other actors. The basic shared understanding of the problem could be seen as a requirement while full shared understanding could be seen as a goal of a governance arrangement.

Regarding knowledge:

1. Knowledge-holders, both local, specific knowledge and scientific knowledge from knowledge institutes like universities should be included. They provide the scientific foundation and are able to test whether local knowledge can hold up to scientific rigour. Furthermore, they can provide answers to questions of participants in the arrangement which can provide a common understanding of aspects of both the problem and impacts of proposed solutions [Expert governance; Expert
2. Inviting knowledge-holders in practice can be based on the familiarity of the organiser with different knowledge institutes and the people working at these institutes. Different institutes provide different fields of knowledge and a combination can be very valuable [Expert knowledge and strategy Dutch water management].

Regarding the arrangements structure based on Schmitter [2002]:

1. The governance arrangement needs a mandate which clearly defines in what it is entitled to do and what its boundaries are. Furthermore, there need to be checks in place to ensure these boundaries are not surpassed.
2. The governance arrangement should not have an infinite mandate. There should be a limitation that is not connected to the success of the arrangement.
3. The governance arrangement needs to deal with a problem that is sufficiently different from the tasks of other arrangements. Furthermore, an arrangement should never duplicate the work of an existing arrangement.
4. Visual aids in the form of maps or decision-making support programs that provide a way for participants in the arrangement to experiment with different solutions [Expert knowledge and strategy Dutch water management].

3 | Methodology

The following chapter will discuss the methodology used in this report to identify governance mismatches and arrangements. Afterwards, it will explain how expert interviews were conducted. The methodology is based on three main pillars: the theoretical framework of governance mismatches, the lessons from dr. Robbert Biesbroek at Wageningen University and Research [Biesbroek, 2020] and the interview with an expert in governance mismatches. These studies also form the foundation for the practical tool, of which the tutorial can be found in Appendix 9. This tutorial will be used to identify the governance mismatches and arrangements for the Haringvliet decision-making problem.

3.1 Methodology of identifying governance mismatches

Before we start discussing the process, it is key to understand the main findings of the theoretical framework. Firstly, a governance mismatch will be defined as follows: A situation in which the scales and levels of the governance agencies and/or sectors and/or stakeholders proves operationally incapable of addressing the bio-physical (spatial and temporal) attributes of the problem [Wu and Ramesh, 2014, Biesbroek, 2020]. By combining the definition from dr. Robbert Biesbroek and Wu and Ramesh [2014] it becomes clear that governance mismatches are between the physical scales of the Haringvliet and the scales at which actors, sectors and governance agencies act. By identifying the governance mismatches of the Haringvliet, this report attempts to address the failure to recognize the differences between all involved actors and sectors in the Haringvliet area.

Furthermore, it is beneficial to quickly return to the topic of scales which is discussed in more detail in chapter 2.2. Scales are defined as the dimensions used to analyse patterns or processes. Any dimension used to separate something creates a scale. Levels are the units located at different positions on a scale. Generally speaking, levels on the higher end of a scale encompass lower levels, e.g. the annual level on the temporal scale is at a higher end of the scale compared to days. Looking at the theory from Robbert Biesbroek & Cash et al. [2006], these are the scales used to analyse governance mismatches adapted to the Haringvliet case that is the problem of this report (Figure 2.2).

The spatial and temporal scales are mostly arbitrary, as external forces almost always impact these levels of these scales. This can very easily be observed in ecology. For example: the Haringvliet, the surrounding islands and the lower river area can be viewed as one ecological area. However, this area is still impacted by upper river pollution, tides etc. Therefore, the only option is to first choose the most appropriate scale for this specific situation which can be used to compare the other scales. This is the chosen method of identifying governance mismatches as explained in Chapter 2.2. This method is visualised in the figure below, which shows the seven steps towards the identification of the most important governance mismatches (Figure 3.1).

The first step in the process of identifying governance mismatches is: Identifying the spatial and temporal scale of the problem, with the problem being the future of the Haringvliet. Choosing the proper spatial and temporal scale is based on both the knowledge of the area, and understanding of the ecosystem and the time it takes the ecosystem to react to changes. Throughout the process of identifying mismatches it is important to keep in mind why the spatial and temporal scale of the problem was chosen.

The second step focuses on recognizing the scale and their respective levels of the actors, sectors and governance agencies. This ties directly into the third step, which is the identification of the scales these actors, sectors and governance agencies act on and their respective levels. With the scales being: spatial, temporal, jurisdictional, institutional, management, networks and knowledge. Examples of important actors, sectors and governance agencies include the hierarchical government institutes, other government institutes and any stakeholder that has interest and power surrounding the problem.

The third step is the identification of the actors, sectors and governance agencies scales and their respective levels. This step is key in finding mismatches between the actors, sectors and governance agencies, and the scales

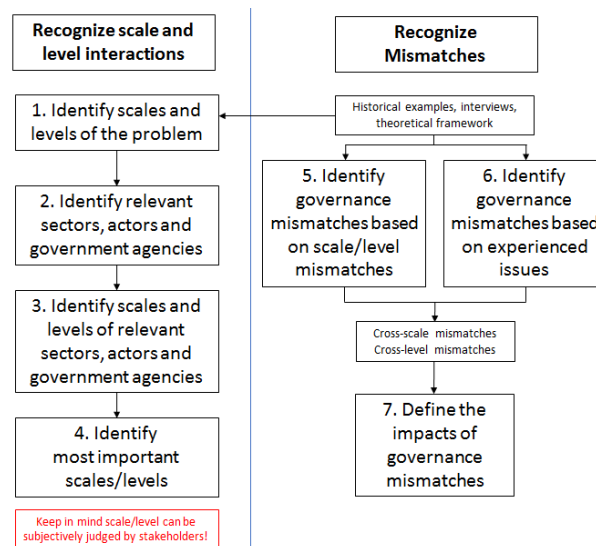


Figure 3.1: Visualisation of the method towards the identification of the mismatches.

and levels of the problem. First, the scale at which an actor or sector acts has to be identified. For example, water boards have a very specific jurisdiction while representative organisations do not have a jurisdiction. This means that water boards would be on the jurisdiction scale while representative organisations are not. By identifying the scales that certain stakeholders operate in (and are important to the problem at hand), their level can be defined. Municipalities, for example, have jurisdiction at the local level while national ministries work on national level. This process also must be done for all actors that have interest and power, sectors that are active in the problem area such as the agriculture sector and governance agencies.

Judging at which scale and levels the actors, sectors and governance institutes work is not an empirical process. It is based on theoretical knowledge of the actors, sectors and governance institutes, the expertise of the people performing the identification, and reasonable judgements based on knowledge of existing problems that could have possibly been caused by governance mismatches. The process of identifying governance mismatches is visualised as a linear process in this methodology. However, in real life the process is far more complicated, as mismatches found in the preparation for the identification of mismatches can already show governance mismatches which will impact how scales and levels are judged by the experts. However, it can help to try to stay focused on identifying scales and levels without already moving too fast towards the mismatches. To avoid this, one member of our group had the task of focusing on keeping an overview on the larger picture of the identification process.

After identifying the spatial and temporal scale levels of the problem, the scales and levels of the actors, government institutes, and sectors, the fourth step is to discuss which scales are most important. We define importance in this instance as: likely to have a large impact on the problem at hand. This helps focusing the process of identifying mismatches to the most important mismatches, or most in need of addressing. Similarly, to the issues of defining the scales of the problem where one can always go farther and more in depth, there will always be some kind of governance mismatch. However, at a certain point the mismatches are so small that they do not matter anymore. By discussing which scales are most important to deal with the problem, it narrows the field for the final part of identifying the governance mismatches.

The fifth step is the identification of the mismatches between the scales and levels of the actors, sectors and governance agencies and the scales and levels of the problem. This can be divided into three parts: the identification of mismatches between actors and the problem, the identification of mismatches between the sectors and the problem, and the identification of the mismatches between the governance agencies and the problem. Identification as explained before takes two forms, the first form is when you look at the scales and levels identified in the previous steps and seeing how they match or mismatch with the problem. This is very straight forward; the problem has the spatial scale of regional however the ministry has national jurisdiction. The second way mismatches can be identified (step

six) is by looking where things went wrong. In a way, you are looking at the symptoms and using your previous work in this process to identify the underlying ailment. According to Wu and Ramesh [2014], common symptoms are:

- Limited capability in accessing necessary information
- Principal–agent problems
- Administrative costs
- Strategic responses
- Lack of competition
- Financial sustainability

After identifying all governance mismatches in steps five and six, the final step (step seven) of the identification of mismatches is to define how mismatches impact the problem. In other words, the negative impacts of the governance mismatches. This will be important in the identification of the governance arrangements.

Identifying scales and levels is not a simple task, it is very complex which already starts at the step of defining the spatial and temporal scales of the problem. Thereafter, it is important to keep in mind that governance mismatches are not per definition the cause of a conflict, they are the reason, a conflict cannot be resolved. Governance mismatches are not solely responsible for causing the different interest and demands between agriculture and nature organisations. However, they do impact the reasons why they have issues coming to an arrangement and why they might view the issue and the solutions differently.

3.2 Methodology of identifying arrangements

Following the identification of the mismatches, this chapter will focus on the identification of the governance arrangements used to align the governance mismatches. The process of identification is visualised in the figure below (see Figure 3.2) and based on the theoretical framework and interview with experts [Expert governance] and lessons from dr. Robbert Biesbroek [Biesbroek, 2020].

As the previous chapter discusses, the identification of the mismatches starts with defining the spatial and temporal scale of the problem and ends with a list of the mismatches, a list of the most important scales and a list of results from the mismatches that could impact the problem.

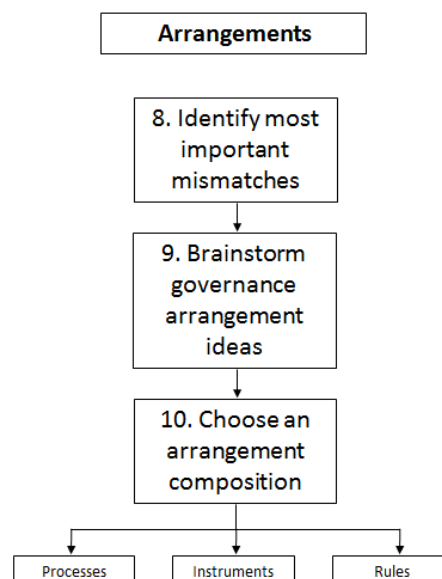


Figure 3.2: Visualisation of the method towards the design of the arrangements.

These three lists are key to step eight: deciding which mismatches are most important. This is important as the theory states: there will always be a governance mismatch. Therefore, the aim is to remove the most important and

damaging mismatches. This list should contain the most important mismatches in the eyes of the experts that are performing the identification process and should be connected to the impacts caused by these mismatches.

Following this identification of the most important mismatches, the next step (step nine) is to brainstorm governance arrangement ideas. There are multiple rules and principles that can be used to create a governance arrangement and even the structure of rules, process and instruments is well defined. However, the process of creating a fitting governance arrangement is still a creative process. Inspiration can be found in governance arrangements from similar cases and in the negative impacts of the mismatches. This part of the process consists of coming up with creative ideas; it is in essence a brainstorming exercise. The results of this brainstorming exercise can be used to move to the next step (step ten): selecting the governance arrangement that, in the expert's opinion, will align the mismatch best in order to deal with the specific challenges of the problem. It is very important to dive into far more detail than the previous steps in order to properly flesh out the arrangement and ensure everybody is on the same page. Furthermore, the governance arrangement chosen in this step can be a combination of multiple arrangements mentioned in the previous step. As there are multiple mismatches there can also be multiple arrangements. Following the choice which arrangement will be chosen, the next and one of the most important steps is defining the rules, processes and instruments. The rules pertain to who should be part of the arrangement, how the arrangement should be structured, the boundaries of the arrangement and its mandate. The rules are the requirements the arrangement has to meet in order to be effective in aligning the governance mismatch. The process consists of the actions taken to ensure the effective aligning of the governance mismatches. These include simple questions, such as (I) how many times participants should meet and (II) who should lead meetings? The process can include very practical actions; however, these can be vital in ensuring an effective arrangement. Processes should be created that predict possible issues in the future and should be clear to every participant of the arrangement. There are many instruments available, which are very much dependent on the context. Inspiration for instruments can be gained from other arrangements. Examples can include information and knowledge creation systems or financial instruments used to come to an agreement. Clarity in the goal of the instrument and the way it works can be very important in creating legitimacy.

After defining the arrangement itself and its rules, processes and instruments you have come to the end of the process of identifying the governance arrangement.

3.3 Expert interviews

Part of our research includes interviewing experts, who can give us insight in one of the three following topics. Firstly, experts of a key stakeholder group in the Haringvliet that can give us insight in their vision for the future of the Haringvliet and their opinion of the process to create a vision of the Haringvliet. Secondly, experts in the field of decision-making who have knowledge on a specific topic regarding either the Haringvliet or similar cases. Thirdly, an expert on the topics of governance mismatches and governance arrangements. The first type of expert interviews include stakeholders from the agriculture sector, the nature sector and the government. It is important to take into account that the stakeholder's background might impact the information they provide. This includes the scales and levels on which these experts act. Each interview was held digitally because of the prevailing COVID-19 pandemic. Each interview was recorded and transcribed. Before being included in the report, feedback on these transcripts was given by the interviewed experts. Whenever an interviewee chose to not

4 | Results

The following chapter will discuss the most important results. In the first section, the most important stakeholders and their demands will be discussed. The second section will discuss the identification of governance mismatches. To tackle these mismatches, the last section will describe the required governance arrangements, instruments, and rules.

4.1 Most important stakeholders

There are several stakeholders involved in the Haringvliet study area. The earlier described Kierbesluit is a case which played around the Haringvliet as well. Therefore, besides some preliminary stakeholder advice from Delta21, we used this case to find the most important stakeholders and gain insights into the involvement of the different stakeholders. The involvement and opinion of the stakeholders were assessed by reviewing literature and conducting expert interviews. In the discussion around the Haringvliet, the stakeholders will hold position to different opinions. This makes it complicated to fulfil all needs of the different stakeholders.

The most important actors and sectors are the initiators of Delta21, the Delta commissioner, Rijkswaterstaat, Province of South Holland, Ministry of Infrastructure and Water Management, Water Board Hollandse Delta, surrounding municipalities, several nature organisations, knowledge institutes, drinking water supply sector, agricultural sector, tourism sector, and the industry sector.

The initiators of the Delta21 plan are especially important stakeholders, as their goal is to implement the concept. In order to reach successful implementation, they want to decrease the resistance, increase the support and build trust between stakeholders. Therefore, they have an important task in the decision-making process.

In the Netherlands, different (governmental) organisations collaborate in the Delta Programme. The additional value of the Delta Programme is that the national government is working together with water boards, provinces and municipalities. All organisations have their own tasks and the Delta commissioner is coordinating this collaboration [Employee Ministry of Infrastructure and Water management]. The Delta commissioner is assisted by a small group of employees, who stay in contact with smaller regions and make sure the research of knowledge institutes connects to the Delta Programme [Expert knowledge and strategy Dutch water management]. The Delta Programme consists of an annual proposal formulated by the Delta Commission regarding water safety and freshwater supply. There is a re-calibration of policy and plans of the Delta Programme every six years (Delta Programme 2020). Therefore, it is possible that policies and plans have to wait for this re-calibration, before implementation is possible. This might lead to a delay in the implementation process.

Rijkswaterstaat is responsible for the plans and projects regarding the future development of the Haringvliet. Rijkswaterstaat could take the leadership in the implementation of Delta21 (see Appendix 8.1). However, they do not have the jurisdiction to make the final decision. During both the implementation of Delta21 and managing of the Haringvliet, it is important to understand and mind the environment (see Appendix 8.1). For example, it is vital to understand the morphological processes, which affect shipping, recreation and nature conservation. Since this knowledge more often than not comes from knowledge institutes, for example the Ministry of Infrastructure and Water Management or local stakeholders, it should be assured that Rijkswaterstaat is aware of this knowledge too. It is important to consider that Rijkswaterstaat will only be responsible for part of the financial costs. In the current state of the Delta21 plan, they might bear approximately 10% of the costs. However, if the Delta21 plan and the changes to the Haringvliet are linked to an improvement in Kader Richtlijn Water, the financial contribution can be increased to approximately 30% (see Appendix 8.1). Therefore, the Delta21 plan has much to gain by connecting to the visions of Rijkswaterstaat and the province of South Holland, as this will improve the odds of successful implementation of the Delta21 plan. Nevertheless, financial contribution of more sectors and actors such as the energy sector is required to finance the complete project. Within Rijkswaterstaat, there are different branches, some are more conservative than others. This might lead to difficulties in the decision-making process, because some

explanation regarding the reasons behind the implementation of certain innovative projects is required (see Appendix 8.1).

In collaboration with Rijkswaterstaat, the Province of South Holland was one of the initiating stakeholders during the Kierbesluit. The province supported the Kierbesluit because of the ecological benefits of the project [Buitenhuis and Dieperink, 2019]. Furthermore, the Province took control during the Kierbesluit as a contractor of Rijkswaterstaat, meaning they were given responsibility for the final implementation of the plan. However, the province could not fully fulfil the tasks they were set out to do. The province was held accountable for not creating a fruitful collaboration between the different regional stakeholders [van Rijswick, 2010], which is essential for a smooth decision-making process. Therefore, it is vital to employ a contractor that is fully responsible. Hence, it might be better to choose another contractor in future projects, e.g. Delta21.

The Ministry of Infrastructure and Water Management is primarily responsible for decisions regarding large projects (e.g. Delta21 and Kierbesluit). The Ministry controls the larger picture of the project [Employee Ministry of Infrastructure and Water management]. However, they might for example give the administrative responsibility to the province of South Holland. The aim of the Ministry of Infrastructure and Water Management is to solve all problems within the current and future water systems by addressing the supply and demand of water. The Ministry aims to enhance the collaboration process between all stakeholders to create joint water management [Employee Ministry of Infrastructure and Water management]. During the decision-making process of the Kierbesluit, a lot of money, time and energy has been invested in defining boundaries of this project, as there were many stakeholders involved.

The water board Hollandse Delta was responsible for the implementation process of the Kierbesluit together with Rijkswaterstaat. This water board strives for sufficient freshwater [Waterschap Hollandse Delta, 2018]. Therefore, they are responsible for implementing compensatory measures. During the Kierbesluit, there was a collaboration between Evides, Rijkswaterstaat and the water board Hollandse Delta working on the compensatory measures [Zuidwestelikedelta, 2018]. Moreover, the water board is responsible for monitoring the increase in chloride and nutrients of surface- and groundwater of the surrounding areas [Kierharingvliet, 2015].

Surrounding municipalities represent the diversity of demands of the local citizens, farmers and entrepreneurs. The municipality of Goeree is against an open connection between the Haringvliet and the sea as it might negatively affect local stakeholders, specifically farmers. The municipality of Hellevoetsluis seems opposed to the change as well, as concerns surrounding the Kierbesluit were raised in the past. Most of the possibly affected municipalities do not have a clear stance in the matter. However, it is safe to assume that there are internally conflicting visions for the future of the Haringvliet, many of which oppose the opening of the Haringvliet sluices.

The nature organisations strive for the restoration of an estuarine environment in the Haringvliet. This return to the original nature would mean a re-connection between the Haringvliet and the open sea [Advisor nature organisations]. The restored connection will result in the re-introduction of a saline-fresh water gradient, which creates opportunities for nature conservation and restoration [Employee Ministry of Infrastructure and Water management]. In addition, fish migration is promoted by creating an open connection to the open sea. Therefore, certain fish species might return into the Haringvliet and in areas further upstream. Nature organisations are searching for alternative options to fulfil the freshwater demands, in order to enable the restoration of estuarine dynamics [Advisor nature organisations]. There are several nature organisations active in the Haringvliet area: Staatsbosbeheer, Natuurmonumenten, WWF, ARK Natuurontwikkeling, and Vogelbescherming Nederland. These five nature organisations and the Royal Dutch Angling Association have been collaborating in the 'Droomfonds Haringvliet'-project. In this collaboration, the organisations have promoted various plans which focus on the restoration of the unique estuarine environment. The collective of these plans may eventually create an important area for fish and bird species. They also want to make the area more attractive for visitors and foster the connection between the planned nature restoration and tourists. Nature organisations often collaborate as they are all relatively small. The government prefers to communicate with one representative for all organisations. Therefore, a representative for all nature organisations is chosen at a larger scale. At a local scale, the spokesman of that specific area will be representative [Advisor nature organisations].

Knowledge institutes play an important role in the case study as well. Experts specialising in the case study should

be considered as having a stake, even if they do not represent the interests of any particular stakeholder [Gbikpi and Grote, 2002]. Knowledge institutes investigate the feasibility of adaptation measures and need to communicate this with the other stakeholders [Expert knowledge and strategy Dutch water management]. There are different knowledge institutes that might be considered in the Delta21 project; TU Delft for knowledge of the technical details; Deltares for knowledge of hydrological modelling and morphology; Wageningen University for knowledge of environment and ecology; and Radboud University for the connection of different stakeholders [Expert knowledge and strategy Dutch water management]. Communication of knowledge between knowledge institutes and locals is important because knowledge institutes have general knowledge, whereas local inhabitants and farmers have indigenous knowledge.

Evides is the largest public water provider in the southwestern Delta, which concerns the areas surrounding the Haringvliet. The opinion within the drinking water supply sector is distinct. This sector depends on fresh water for drinking water production; hence, they want to maintain a fresh Haringvliet. If the Haringvliet were to return to its original, brackish state, they would have to relocate several of their extraction points or might even have to stop their extraction from the Haringvliet altogether. Consequently, a new supply of fresh water is required, which also requires a new pumping station and auxiliary infrastructure. During the Kierbesluit, Evides had to relocate one pumping station, which still enabled fresh water extraction from the Haringvliet [Evides, 2019]. Compensatory measures are therefore essential in case of a restored connection between the Haringvliet and the open sea. These measures can require years of preparation, as the measures for the Kierbesluit took four years to realise as well.

The stakeholders within the agricultural sector have the opposite demand compared to nature organisations. LTO North is a representative stakeholder for all farmers in this area, which represents the collective opinion of the farmers. However, the collective opinion might be different from the individual opinion of farmers [Expert governance]. Their collective opinion is clear and concise, they want to maintain the Haringvliet fresh (see Appendix 8.2 and [Employee Ministry of Infrastructure and Water management]). A saline Haringvliet would mean the end to a large part of the agricultural sector on Goeree-Overflakkee (see Appendix 8.2). Another possibility is saline farming. However, this requires adaptation from the farmers, and they eventually need to deal with the saline conditions (see Appendix 8.1). These adaptation options are being investigated. However, the question is whether all farmers want to invest and alter their land use, when the viability maintains questionable (see Appendix 8.2). In case of salinization of the Haringvliet, the agricultural sector needs to be satisfied with the result. Therefore, compensatory measures are required, which was also the case with the Kierbesluit [Employee Ministry of Infrastructure and Water management]. Here, another fresh water supply was created to ensure the farmers of enough fresh water (see Appendix 8.2). Also, a border was established to establish the boundary up to which the saline water could reach.

Tourism is another important sector in the Haringvliet area. Droomfonds Haringvliet wants to attract more tourists to this area by creating viewpoints and jetties. This sector is probably not causing complications in the decision-making process, as there is only a small impact on tourism (see Appendix 8.1). The position of the tourism sector is unclear, as various activities have differing needs and visions for the Haringvliet. This fragmentation of the sector makes the influence it has diminished. Among the fragments, there are a few interwoven with the Droomfonds Haringvliet project, which assert the most power through this project. These are in favour of restoring the connection between sea and river.

Some companies within the industry sector require high quality fresh water, e.g. for cooling systems. The Haringvliet is a source for water abstraction for factories around the Haringvliet, but also for the industry located near the Nieuwe Waterweg. If this source becomes too saline or the water deteriorates in the future, the water might affect and corrode the pipelines of the industrial infrastructure [Employee Ministry of Infrastructure and Water management]. There is a pipeline construction connecting the Haringvliet to the other side of the Nieuwe Waterweg, because it is not possible to abstract fresh water from the Nieuwe Waterweg (see Appendix 8.2). Therefore, it is important to come up with compensatory measures and design alternative freshwater points to meet the demands of the industry sector.

4.2 Identification of governance mismatches

4.2.1 Identifying the important scales and levels

To determine the governance mismatches that are most relevant to the uncertainties regarding the future of the Haringvliet, we first have to examine differences between the scales and levels at which the most important stakeholders and sectors – as defined in section 4.1 – operate. As with the stakeholders and sectors relevant for interventions in the Haringvliet area, the scales and levels at which these stakeholders and sectors operate can also be found in Appendix 9. We have defined the following scales and levels as the most important ones to address:

- The spatial scale at a regional level is the most influential. Both the biophysical processes that play a role in context of the future of the Haringvliet area and many important actors operate at the regional level. When actors operate at other scales, there is a need to connect these actors in some way.
- The knowledge scale at both the general and specific levels. The levels of knowledge are tightly bound to all other scales, but also the types of interest the actors themselves have in the Haringvliet area. Because there are many different scales at which the future of the Haringvliet is examined, there is a combination of both general and more local knowledge available, all divided over the different actors. This poses the need to bridge the gap between these different levels of knowledge.
- The jurisdictional scale is important in decision-making, because actors that play a role in the jurisdictional process have more power than those who do not have a say in the jurisdiction. An actor can be very passionate and confident about their beliefs, but without the jurisdictional ability to make a change according to those interests, you will need to work together with other actors and possibly convince these actors of your ideas to make a change. Again, since the spatial scale is tightly bound to the jurisdictional scale, the local authorities mostly have municipal jurisdictional power and the national or intergovernmental authorities have jurisdictional power at a much higher scale.
- The institutional scale is important in decision-making, because it is vital to consider the role that actors have in the context of a certain problem. These roles can be: creating laws or regulations to solve a certain problem; creating operating rules to govern the execution of these laws or regulations; or preserving a constitution to govern these laws or regulations in conjunction to each other.

4.2.2 Identifying the governance mismatches

Since we identified the most relevant scales and levels with respect to our research question, we can continue to examine the most important governance mismatches for this case study. All governance mismatches that were identified in the process can be found in Appendix 9. From these governance mismatches, we selected the most important ones to address. We separated the governance mismatches into different sections: the mismatches where spatial and temporal scales of the actors are misaligned; the mismatches where existing government bodies are misaligned with the spatial and temporal scales; and other problems that can be defined as a mismatch in the area.

Spatial and temporal scale mismatches

The differences between the agricultural sector that has mostly local, specific and somewhat empirical knowledge and the large knowledge institutes, like Wageningen University & Research, which have more large-scale, general and scientific knowledge is a well-recorded problem that affects policy-making around the whole world [Cash et al., 2006]. The Dutch are so acquainted with this local, specific, and somewhat empirical knowledge that it led to the creation of a specific term. They call it 'boerenverstand', which roughly translates to 'farmers knowledge'. These differences manifest themselves in different ways, but mostly lead to the locals feeling like their empirical knowledge is not being considered enough when making laws and regulations. The agricultural sector experienced a continuous struggle in the decision-making of the historical cases (see Appendix 8.2).

This also shapes the most relevant spatial governance mismatch that we experienced: whilst the agricultural sector focuses on a more local scale and is predominantly interested in the Haringvliet purely because it is a freshwater

basin, the nature organisations and knowledge institutes look at the Haringvliet area as part of a larger, complex ecosystem that is affected by many different processes. Important to note here, is that there is not clear moral right or wrong in this case, as it is merely a debate between nature and economy. In fact, both the agricultural sector and the nature organisations have needs that should be valued and considered in the same way in policy-making. Still, the differences within the spatial and knowledge scales create different depths of knowledge and boundaries that should be accounted for in research.

A possible reason for this could be explained by an important temporal governance mismatch: the difference in the short-term timescale at which the agriculture operates compared to the medium-to-long-term timescale at which the national government (in this case mainly the Ministry of Infrastructure and Water Management) makes laws and regulations for the Haringvliet area. Most farmers on the island of Goeree-Overflakkee have not experienced a (partially) salt Haringvliet – as it was before the instalment of the Haringvliet sluices - in their lives and thus most of them only see the negative effects of the altered sluice management plans like the Kierbesluit or Delta21. From the Kierbesluit process can also be concluded that the temporal scale mismatch is also visible when comparing the nature organisations to the agricultural sector (see section 2.1).

Mismatches between existing government bodies, and spatial and temporal scales

An important governance mismatch arises when examining the jurisdiction of existing governance agencies. The jurisdiction of the Haringvliet and the jurisdiction of the interconnected land surrounding the Haringvliet is done at different levels, and again reflects the correlation between spatial and jurisdictional scale. The Ministry of Infrastructure and Water Management has a national jurisdiction, but it should make the final decision for waterbodies that spatially occupy local or at most regional areas just like the Haringvliet [Employee Ministry of Infrastructure and Water management]. Though, the land that surrounds the Haringvliet area – which is heavily impacted by course of the Haringvliet in the future – is private or municipally owned land.

On top of that, a governance mismatch at the institutional scale contributes to the already complex policy-making procedures in the Haringvliet area. The Ministry of Infrastructure and Water Management is not responsible for carrying out the tasks and projects designed for the Haringvliet area but are solely responsible for the making and managing strategies in the area. It is Rijkswaterstaat that makes sure the laws and regulations are preserved, and thus Rijkswaterstaat also plays a big role in the future development of the Haringvliet.

Other possible mismatches

It must be considered that the plan of opening the Haringvliet sluices is not a climate adaptation measure, but rather a trade-off that has been made in order to exchange areas with a high natural value in the Voordelta area with an energy storage lake. From a consultancy report by van Dam et al. [2020] it becomes clear that in the process of building such an energy storage lake, large areas that are now regarded as having a large natural value will decrease in natural value considerably. It is also mentioned that Delta21 must avoid impacting these areas and otherwise generously compensate for any loss. A question that arises is: 'Is the decision-making revolving around the entire Delta21 plan designed as objectively as possible as everything could happen to this area, or does it solely consider positives from salinizing the Haringvliet?'. When Delta21 sees the salinization of the Haringvliet basin as the only possible measure, and considers this measure as having only beneficial effects, the problem is not being treated objectively. This could cause communication issues between Delta21 and peers and further hinder the overall policy-making process.

Communication issues might also arise within the organisations of the actors themselves. Organisations such as Rijkswaterstaat have multiple institutional scales that act on the same problem. This could cause knowledge gaps about the problem within an organisation itself. All historical cases also showed that clear communication and involvement by all relevant stakeholders is key in the decision-making process (see section 2.1).

The Dutch are renowned to find the middle ground when solving problems and focus on the end-product of negotiations, a governance model which they call 'poldering' [Expert governance]. As defined earlier, the act of finding an arrangement is the act of finding a middle ground, and thus this approach seems to fit the Dutch pretty well. The term stems from a period of centuries in which consensus found through negotiation was the cornerstone of

legitimate collective action in heterogenic polder communities fighting unpredictable events with large uncertainties like sea level rise [Vink et al., 2013]. At the heart of the decision-making process were the local water authorities called 'water boards', and they had to make decisions together with the public to combat these largely uncertain, ill-defined, ill-structured and wicked dilemmas [Warner, 2008]. The inevitable problem that arises from a governance model like 'poldering' is the lack of uniform jurisdiction and a fair share in policy-making by all institutions involved. The jurisdiction becomes even more problematic when considering the uncertainties regarding climate change in the Haringvliet area.

4.3 Identification of governance arrangements

Important mismatches

To help narrow the field of mismatches and weed out the inconsequential ones, we looked at the effects of the mismatches. Among them, there are a few that are especially tricky to deal with. These mismatches are considered to be most in need of a governance arrangement. We identified the following mismatches as important:

- The jurisdiction, management and institutional scales of government agencies do not align with the level of the Haringvliet problem.
- Differences between two important actors: the nature organisations and agricultural sector regarding the temporal, spatial and knowledge scales; and their difference in perception of the future of the Haringvliet.
- The scales of the actors who must provide the financial resources operate on different scales and levels than the scales of the defined problem.
- Levels of knowledge vary among stakeholders, ranging from scientific, general knowledge to contextual, experience-based knowledge. This is amplified when considering the uncertainties regarding the effects of climate change, that are highly reviewed by present-day science but sometimes still have to become known at a local knowledge scale.
- Communicative problems due to how fragmented the actors are across various sectors, government structures and networks.

Considering these mismatches, arrangements are required to fit the stakeholders to the scales and levels of the Haringvliet. After analysis of the historical cases, our literature review and the conducted interviews we recognize the importance of bringing the stakeholders together in an effort to constructively address the problem. Currently, ideas on how the Haringvliet should be viewed vary severely between freshwater basin and ecosystem depending on the stakeholder. The levels on the important scales vary among the stakeholders, and generally misalign with the levels impacted by the Haringvliet. Knowledge on the Haringvliet is generally also extremely contextual depending on the stakeholders' point of view. Constructing a platform which incentivises the communication perceived knowledge between the stakeholders can help create new knowledge, build trust among stakeholders, bring 'traditional' (local) knowledge into the fold, better define the problems boundaries, and ensure the local context is not lost. However, it is important to take into account the rest of the Delta21 plan to ensure that the vision for the future of the Haringvliet area does not interfere with the implementation of the rest of the plan. Three arrangements are presented to tackle the problematic mismatches. Firstly, workshops, as an effective way to create a shared vision and inventorise the stakeholders' needs. Secondly, an online science forum, where knowledge can be exchanged between knowledge institutions, local stakeholders, government bodies, and the initiators of the plan. Thirdly, the Haringvliet Jurisdictional Commission (HJC), an organisation comprised of stakeholders which has jurisdiction over the Haringvliet.

Workshops

We propose two types of workshops. In the first workshops, the so-called 'focus workshops', individual stakeholder groups are invited to discuss the impacts of the Delta21 plan. An independent advisory group could lead the workshops. The principle of the independent advisory group is based on the historical case of the Eastern scheldt where the RAND cooperation was the independent advisor. This included advice on large question regarding strategy where there was distrust between the stakeholders (See Appendix 8.3). These workshops should be invitee-only and the stakeholders

invited should come from one background. Multiple focus workshops could give a voice to the nature organisations, farmers, representative government bodies such as municipalities and many more. Open workshops and symposia settings generally cause opposition between different stakeholders, deteriorating the constructive negotiations into needless wrangle. These open discussions were a huge contribution to the mismanagement around the Kierbesluit, as described in section 2.1. Delta21 will be present at these workshops since they have gathered the means to propose solutions and nurture trust over the past few years of focusing on the subject matter. They can use this expertise in the workshops to mediate any possible conflicts and speed up the decision-making process. Also, they have built many connections to many parties and resources that might be helpful to bridge the gap from the Haringvliet to the other parts of the Delta21 plan. The goal is to work toward a common vision for the future of the Haringvliet in which each stakeholder's needs are heard and adequately met. These workshops are day/morning/afternoon events where invited members of a stakeholder-group come together.

The second type of workshop, the so-called 'general workshop', includes representatives of the most important stakeholders. In this workshop the stakeholders can build trust by experimenting and creating a shared understanding of the Haringvliet through knowledge creation and negotiation. Through these workshops a vision for the Haringvliet will be created. An instrument that could be key in this process is a Decision Support System (DSS). A DSS can help participants negotiate and speculate through experimental decision outcomes [Expert governance]. The DSS models the (simplified) outcome and requirements of various decision inputs, e.g. moving the current salt-water boundaries, increasing the opening of the Haringvliet sluices, or improving the water retention of the surrounding areas. A decision support system consists of three main phases: information phase, definition phase and the testing phase. A DSS will have to be tailored to the Haringvliet. However, because the DSS approach has been used in the past, the approach for the Haringvliet might be based on these past practices. The 'Room for the River' project is a prime example where the implementation of a constructive DSS helped speed up the decision-making process [Stuyt et al., 2000]. Here, the DSS was constructed as a simple model described as a combination of 'building blocks', of which the involved actors and government bodies could try out different combinations in order to see what the effects of their actions would be [DeBruijn and Werner, 2000]. With the combination of different model structures from different fields, a DSS similar to the approach used in the 'Room for the River' project could prove beneficial for the progress of Delta21, especially in the early stages (see Appendix 8.3).

Both the playful manner of negotiating and the presence of Delta21 as mediator ensures the constructive nature of the workshops. The goal of this exercise is to build towards a shared and agreed upon vision and improve future cooperation between the different sectors and actors.

A few things should be kept in mind when organising such workshops, these are the so-called rules of engagement. It is important that the crucial stakeholders are present or represented, these are the stakeholders who are directly or indirectly affected by changes in the state of the Haringvliet and those who have the power to influence the decision-making process. However, the workshops should not include more stakeholders than deemed necessary, in other words they are invitation based. Over time, new workshops with other stakeholder-groups can be added to the curriculum if deemed necessary. They have to fit the bill of the previously mentioned criteria. The participants have to be recognized by the Ministry of Infrastructure and Water Management, as this is the final decision maker [Employee Ministry of Infrastructure and Water management]. Again, it is important to ensure the presence of Delta21 at all workshops and discussions, since they have had contact with many stakeholders from the year 2016 onward and already formed some possible solutions to problems that might arise during these meetings. This past communication might prove beneficial to help in mediating any possible conflict between the parties that are present, and thus Delta21 is the right party to do so. Important to note is that Delta21 should not lead and organise the meetings by themselves, as they are not an independent party regarding the matter at hand. The whole process should be transparent. It is up to the independent advisory group to ensure every stakeholder is heard. Smaller stakeholders may contribute to the discussion at a more general meeting, where they can voice their concerns and needs. This can take the form of for example an open forum. Because these open meetings have proven inefficient during the aforementioned past cases (see section 2.1), they should be held in a formal and well-organised setting as a means to increase efficiency. The goal should always be a clear, shared realistic vision.

As stated, the process of these workshops should include regular interaction between the participants and the

third party advisory group, for which a quarterly meeting seems adequate. This helps in communication and builds trust. The workshop leader can cooperate with experts in for example Rijkswaterstaat to ensure the right actors or persons are invited. The participants firstly have to create a common understanding of the Haringvliet as a system, and secondly create clear definitions and terms which can be used throughout the process of knowledge creation and negotiation. Knowledge institutes can gather independent scientific knowledge and answer questions regarding their findings. Having experts from knowledge institutes present allows for questions to be resolved surrounding the physical outcomes of scenarios. The acquired knowledge (from literature and new research) on the impacts of climate change on the Haringvliet serves as a knowledge foundation on which the rest can be built.

Online science forum

The previously generated knowledge should be available to the public. An online science forum can create the bridge between the variety of levels of knowledge among stakeholders. On this platform a visualisation of the project, new research results, and the outcomes of the previously mentioned workshops can be shared. Posts should be moderated to ensure effective and constructive knowledge creation. This forum can be moderated by a knowledge institute or by Delta21, and can be hosted on the Delta21 website. It should be easy to access and use. Taking into account both general, scientific knowledge and highly contextual, experience-based knowledge increases the chance of coming to a solution that local actors support.

Haringvliet Jurisdictional Commission

The Haringvliet Jurisdictional Commission (HJC) is a governance arrangement which provides a temporary platform consisting of representatives of relevant stakeholders. The HJC should consist of at least Delta21 and a representative of the Ministry of Infrastructure and Water Management. It receives the jurisdiction to present the plan for the Haringvliet to the final decision makers which is assumed to be the House of Representatives (in Dutch: 'Tweede Kamer') as the Haringvliet is a complex topic with many interests regarding a government owned water body. Its inception requires a vote in the House of Representatives, as it would break part of the spheres of influence of the various government agencies currently having say over the Haringvliet area. This should happen alongside the consideration of the overall Delta21 plan by the national government. This organisation then has the jurisdictional power to make decisions regarding the vision which was created during the workshops. The HJC also has to abide by some rules:

- The HJC should have a clear mandate and not exceed its originally delegated tasks.
- The HJC should have a time limit for which it is mandated. This limit should be irrespective of the work it is doing but can apply for extensions which the House of Representatives can give; upon completion of the project it should be disbanded.
- The HJC is made up of representatives of parties which are decided upon at its start and should not change during its lifetime.

This arrangement hinges on the Delta21 plan being chosen over the current water safety strategy and having been given the green light by the relevant stakeholders outside the Haringvliet, such as the energy sector. Without backing from the energy and water safety sector, an organisation like HJC is likely to have insufficient support to realistically come to fruition. A failure at this stage can set back the goodwill created from among the stakeholders.

Instruments required for the governance arrangements

Several instruments are required to organise and realise the mentioned arrangements. Finance is one of the instruments. There are several expenses; e.g. administrative costs, funding an independent advisory group, costs surrounding the software development, and costs for renting locations. Workshops are instruments for creating the shared vision, these are preferably held close to the project area, i.e. near the Haringvliet. The workshops should also allow for informal opportunities for stakeholders to network during e.g. catered lunches. For the workshops a new DSS has to be developed. It would allow for experimentation with different ideas in order to see how they would impact the research area. The DSS should also take the other aspects of the Delta21 plan into consideration. An online

science forum created for easy use which visualises the vision for the Haringvliet can help with the transparency of the process. There is also need of instruments to legitimise the HJC such as the blessings of many key government bodies.

Delta21-Service as an arrangement for the entire Delta21 plan

The HJC is an important governance arrangement when only looking at the Haringvliet problem. However, in the context of the complete Delta21 plan, it might not meet all requirements to make Delta21 plan a success. This section will take a step back and frame the governance arrangement in a larger picture. To realise the entire Delta21 plan you could be inspired by the Eastern Scheldt storm surge barrier decision-making process and create a Delta21-Service, as described in the interview in Appendix 8.3. This party would take on the responsibility of the arrangement as it can look at the larger picture of Delta21. The Delta21-Service would take over the tasks of the Delta21 organisation as described in the workshops. However, that does not mean that the resources from the Delta21 organisation are not key in the Delta21-Service.

As an organisation, the Delta21-Service should have experts in all required fields, to provide itself with the necessary expertise to lead the discussions. Similarly to the HJC, the Delta21-Service would have temporary jurisdiction to complete the entire Delta21 plan and send this to the House of Representatives. The Delta21-Service could consist of an independent advisory group, Rijkswaterstaat and other key stakeholders. The independent advisory group needs to be a trusted organisation with the expertise to create a conceptual solution. The key stakeholders would be the stakeholders of the entire Delta21 plan, not restricted to the Haringvliet. It is important to note here that the resources that Delta21 has built up over time should be available to the Delta21-Service, be it either by the inclusion of Delta21 within the service itself or by transferring these resources over to the Delta21-Service. This Delta21-Service takes the leadership and focuses on trying to create consensus. For the Haringvliet-part of Delta21, creating a vision, as is the goal of the workshops, would act as a consensus for the Haringvliet. This is important to ensure that the discussions, revolving around the future of the Haringvliet, will not be a showstopper for the entire Delta21 plan. This would mean that both the general and focused workshops would be led by this Delta21-Service. The HJC would in this case not be necessary as the vision from the workshops would be implemented by the Delta21-Service. The benefit of this would be a maintained focus on water safety as the core of any outcome, as tackling future sea level rise is at the heart of the Delta21 plan.

5 | Discussion

The following chapter will discuss some of the limitations of this research that might have affected our study.

Firstly, the project had a limited scope as far as the entire Delta21 project goes, by only focusing on the discussion surrounding the opening of the Haringvliet sluices. The project is also limited to theoretical structures of governance, because the actual legalities of arrangements and governing bodies were not explored. This project only focused on the Haringvliet, the link between the Haringvliet and other parts of the Delta21 plan is not explored any further than the fact that the Haringvliet is important for the implementation of Delta21.

Secondly, there was a limited time scope with a schedule of eight weeks of half days and four weeks of full time work. We had limited time to perform literature research and to perform interviews. This definitely impacted the identification of mismatches as our assessments of stakeholders we interviewed have more merit and foundation of proof than stakeholders and sectors we were unable to interview. Furthermore, a number of the stakeholders we interviewed were suggested by Delta21, which might have impacted their view on the Delta21 project and its consequences. It might be coincidental, but one of the stakeholders we contacted ourselves was also one of the most critical stakeholders. However, this would be in line with expectations, as this stakeholders perceived interest are at some points in direct conflict with Delta21 project plans for the Haringvliet. Because of the time limit, we were also not always able to check and confirm information that certain stakeholders provided, and we had to use our gained knowledge from literature research to judge this.

Thirdly, the framing of the problem definition changed in the course of our research, as we learned that our framing was already politically loaded. The decision was made to change the problem definition from 'the salinization of the Haringvliet' to 'the future of the Haringvliet'. This change in tone may still be reflected in some parts of this report. This could have impacted the information gained from our interviews, as earlier interviews focused on salinization while later interviews focused on the future of the Haringvliet.

Fourthly, in this research we took the position that the water safety and energy pillars of the Delta had the mandate to be realized. After talking to the stakeholders regarding the Haringvliet, we gained the insight that the Haringvliets' future is very important to the future of the Delta21 plan. However, these stakeholders are ofcourse mainly interested in the Haringvliet which could explain this bias. For example, the Eastern Scheldt case, which was part of the inspiration for the Delta21-Service, showed clear top-down governance where legislation to create the Delta Works was accepted, before a number of key decisions were made. This included the decision whether the Eastern Scheldt would be open, closed or partly closed by a storm surge barrier. However, the 'Room for the River' project showed that this top-down structure has its faults as the responsible government bodies did not even have the correct maps. For Delta21 it can be interesting to discuss what role the Haringvliet has in the entire Delta21 plan and whether a vision for the Haringvliet needs to be created before or after an attempt is made to receive the mandate for the entire Delta21 plan. This study puts a strong emphasis on the importance of the Haringvliet in the Delta21 plans, as we took into account that the Haringvliet could have large positive and negative impacts on the Delta21 plan in our research process. However, whether this topic is as central to the Delta21 plan as we as researchers considered it to be, can be dependent on the perceived demand for the entire Delta21 plan to deal with water safety and the financial resources created through the energy pillar of the Delta21 plan. We as researchers looked at the Haringvliet and therefore we might have been biased towards the importance of the Haringvliet. This could have impacted the design of our governance arrangements.

Finally, the theory used in this research on governance is based on a wide literature study. However, this also means that it is somewhat removed from the regional nature of the Haringvliet. Some aspects of the report will therefore need to be checked with experts on the Dutch legal context of our governance arrangements for example. Despite these limitations, much is to be gained from researching the governance mismatches and exploring the governance arrangements to tackle them.

6 | Conclusion

The following chapter will conclude our research by restating the most important findings. This research dealt with the problem of decision-making of the Haringvliet in the context of the Delta21 plan. It is conducted with the idea in mind that the Delta21 plan has the irreversible mandate to happen. However, important topics like the future of the Haringvliet still have to be decided. From the historical cases it can be stated that communication is a key issue that needs to be taken into account to prevent stakeholders from taking a position and digging in. This means active stakeholder participation is important and successful participation leads to easier decision-making. Furthermore, historical cases show a need for active leadership.

In order to create an even better understanding of the Haringvliet, it is important to know and understand the most important stakeholders in the study area. These include the initiators of Delta21, the Delta commissioner, Rijkswaterstaat, the Province of South Holland, the Ministry of Infrastructure and Water Management, Water Board Hollandse Delta, surrounding municipalities, several nature organisations, knowledge institutes, the drinking water supply sector, the agricultural sector, the tourism sector, and the industry sector. All these actors are important and need to be taken into account when making an important decision that could impact the Haringvliet.

Knowing the most important lessons from historical cases and understanding the stakeholders in the Haringvliet area is not enough to deal with the decision-making problems. This will require an understanding of the governance mismatches that exist in the Haringvliet as well. These mismatches exist on a number of scales; firstly, the spatial scale, where actors act and think on different spatial scales and therefore view the Haringvliet and its future in different ways. For example, the nature organisations view the Haringvliet as a part of a very complex and valuable ecosystem, while the agricultural organisations view the Haringvliet as a local freshwater body. Secondly, the temporal scale causes mismatches as actors act on different time scales. Thirdly, there are a number of important governmental bodies with jurisdiction over the Haringvliet that act at different jurisdictional scales, ranging from a local to the national jurisdictional scale. Fourthly, the lack of a single, matching jurisdictional actor for the Haringvliet means that decisions have to be made with many different policy-making institutes. Finally, the large range of actors also means that there are many different forms of knowledge, both on the local and specific level and on the more general level. All these mismatches can make it more complicated to make a decision regarding the future of the Haringvliet in the context of the Delta21 plan.

In order to deal with these mismatches, governance arrangements were created. The first arrangement consists of two parts. The first part of the arrangement includes focus workshops, where small groups of stakeholders with a similar background communicate their demands, needs and interests. Furthermore, the focus workshops aim to create an understanding of the situation. The second part of the arrangement are general workshops. These workshops only include the most important stakeholders and are meant to build trust, experiment together, and create a shared vision through negotiation. Afterwards, a second governance arrangement can be implemented. A Haringvliet Jurisdictional Commission (HJC) should be created to make decisions regarding the Haringvliet and implement the vision that is created. This HJC needs to meet a number of strict requirements including a very clear mandate, a time limit for which it holds jurisdiction and fair representation. Both of these governance arrangements require instruments to function. Key instruments are financial instruments in the process of negotiating, networking to create understanding, and a Decision Support System, which will allow for experimentation with different solutions of the Haringvliet. In the context of the complete Delta21 plan, instead of the HJC, a Delta21-Service should be created to take the lead in the governance arrangement. This service consisting of the decision-makers and an independent organisation should oversee the larger picture to ensure all aspects of the Delta21 plan, including the Haringvliet, become reality.

With this report we attempt to create a situation which should lead to a favourable but realistic vision of the Haringvliet in the context of Delta21. It also provides a theoretical basis and a tool which could be used to identify the governance mismatches and create the governance arrangements for other decision-making problems that the complete Delta21 plan might face.

7 | Recommendations and further research

The following chapter will suggest a number of recommendations that Delta21 could use as action points to deal with the decision-making challenges surrounding the Haringvliet. Furthermore, it will provide ideas for further research for the Delta21 project.

Our first recommendation is the use of the workshops to deal with a number of the identified governance mismatches. The first type of workshop are focus workshops. These workshops should bring stakeholders to the table and voice their position, ideas and needs. From the focus workshops the independent advisory group forms a vision of the future Haringvliet with compensatory measures for certain stakeholders. The second type of workshop are general workshops, which bring the important stakeholder groups from the focus workshops together after they have had their individual workshops. During the general workshop the stakeholders can propose their ideas and negotiate under the supervision of the independent advisory group and Delta21.

Our second recommendation is the use of a DSS as a tool in the negotiations. It can be used to visualise the consequences of certain adaptations. Furthermore, the use of a DSS should help with determining the compensatory measures. A great example is the DSS from the 'Room for the River' project, which was created by a group of knowledge institutes and consultancy firms. It might be beneficial in the creation of the DSS to include impacted stakeholders in the creation process as they are the ones that will be using the DSS.

Our third recommendation is to work towards the creation of an organisation similar to the 'Deltadienst' in the creation of the plan for the future of the Eastern Scheldt. This service would consist of at least the key stakeholders and an independent advisory group. This new Delta21-Service would be vital in implementing the entire Delta21 plan and would take up the tasks of leading the workshops as described in the first and second recommendations. The trust, relationships and knowledge that Delta21 has built up over time should be available to the Delta21-Service, be it either by the inclusion of Delta21 within the service itself or by transferring these resources over to the Delta21-Service.

Our fourth recommendation is that the tools to identify governance mismatches and governance arrangements created in this report are designed to solve the problems around the salt- versus freshwater debate. However, the theory and results can be applied to other parts of the Delta21 plan as well.

Realistically, the implementation of the complete Delta21 plan can only be achieved by creating a final iteration that is so attractive that the most important government bodies have to partake in the plan. This study can be used as a tool to identify the governance mismatches and create the governance arrangements for other decision-making problems that the complete Delta21 plan might face. Thus, by using this report as a starting point, it might speed up the implementation of the Delta21 plan.

This research has set the principle for follow-up possibilities. Therefore, we want to recommend a few ideas for further research:

1. A deeper understanding is needed of the impact of the Delta21 plan on the Haringvliet regarding salt intrusion, mobility of polluted sediments and the impact of the plan on the whole sedimentation system of the Dutch coast. This would require testing of the sediment in the Haringvliet and modelling of sediment flow in the case of an open or semi-open Haringvliet. This would most likely require professionals with the resources to design and build these kind of models.
2. More interviews are needed with other stakeholders to fill in the knowledge gaps regarding their specific needs and interest. These stakeholders include industry dependent on the fresh water of the Haringvliet, more nature organisations, different types of agriculture, local municipalities and the province of South-Holland. These interviews might provide more insight into the problem and could possibly show more governance mismatches. This research could be done by an ACT group with knowledge of governance.
3. The theory of this study could be used and expanded for other decision-making challenges of Delta21: challenges regarding (former) Natura2000 areas, getting more traction for the Delta21 plan as a whole, getting energy

companies on board, getting the water safety community on board etc. Even an informal use of the tutorial (see Appendix 9) by Delta21 on these topics could provide some important insights.

4. As stated before, further research could look into the important principles and key parts of a DSS to prepare for the creation of a Haringvliet specific DSS. The creation of a DSS will most likely require hiring consultancy firms. This research could focus on learning from the 'Room for the River' project use of a DSS. Furthermore, it could create the parameters which the Haringvliet DSS needs to meet. This preparatory research for the creation of the Haringvliet DSS could be done by an ACT group that has a background in system dynamics.
5. Possible ecological improvement opportunities to the Haringvliet in different scenarios. Rijkswaterstaat is looking into possibilities to connect ecological improvement of the Haringvliet to the Delta21 plan. It might be beneficial to research what opportunities there are in different future scenarios of the Haringvliet. This would lead to more knowledge on ecological restoration that could be used to negotiate with different stakeholders. This research could be done by an ACT group with an ecology and spatial background.

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About the authors

We are students from the Wageningen University and Research, following an Academic Consultancy Training course. This course aims to give us practical experience in consultancy regarding the design of Climate Change Mitigation and Adaptation Strategies. Our project group is called Deltamatch, which is a reference to the project taking place in the Dutch Delta and the focus of the project on matching governance misalignments.

Deltamatch consists of five students with varying backgrounds:

- Christoph Brühl: Master Earth and Environment, specialisation Hydrology
- Gijs Helsen: Master Climate Studies, specialisation Human-Environment Interaction
- Gijs van Kempen: Master Earth and Environment, specialisation Hydrology
- Daan Kivits: Master Earth and Environment, specialisation Meteorology and Air Quality
- Maarten van Toorn: Master Climate Studies, specialisation Human-Environment Interaction

Together we bring knowledge on climate change, water systems, climate adaptation, climate mitigation, climate governance, meteorology, hydrology, system modeling and much more to the table. Our goal is to provide scientifically valid, well-founded information by combining the theoretical knowledge with real life experience to give the best possible advice on difficult challenges that interact with climate change.

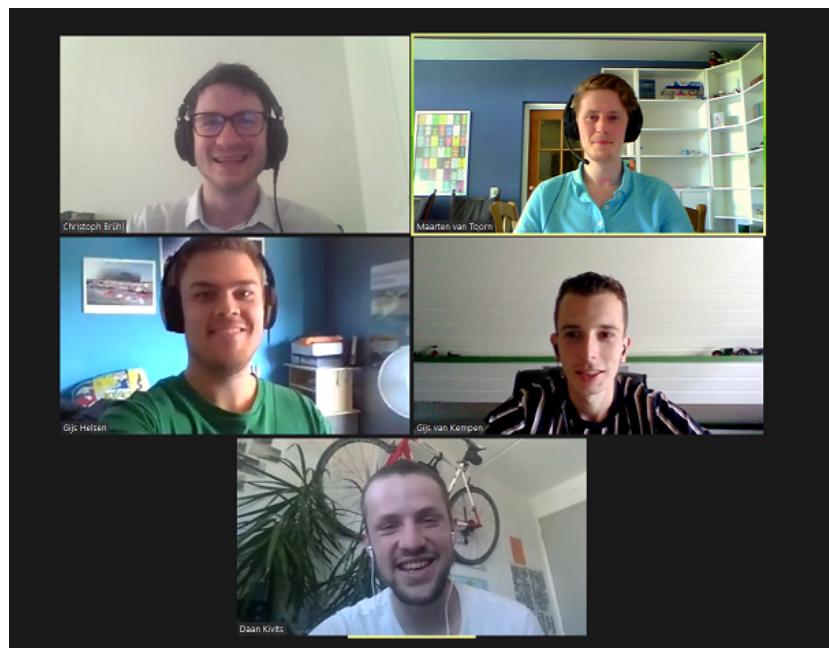


Figure 7.1: Group photo during one of the virtual meetings

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8 | Interview transcripts

This Appendix includes the transcripts of the conducted interviews. One of the group members conducted the interview and the answer of the expert is written in *italic*.

8.1 Interview 1: Jos Wieggers (Rijkswaterstaat)

Jos werkt al 20 jaar bij Rijkswaterstaat als eco-engineer. Hij vond het geen probleem om geïnterviewd te worden.

Wij zijn studenten van de Wageningen Universiteit waar wij een ACT vak volgen. Wij houden ons bezig met de verzilting van het Haringvliet in het kader van Delta21. Wij waren benieuwd over het Kierbesluit in het Haringvliet. Zou u ons daar wat over kunnen vertellen?

We hebben bijna 20 jaar gedaan over het Kierbesluit bij de Haringvlietsluizen. Dat zat vast op een paar dingen:

- *Het water wat nodig is voor de omliggende agrarische industrie op de Zuid-Hollandse eilanden.*
- *Verdroging van de rivieren in de zomer. In de zomer vooral tekorten.*
- *Hoe ver dringt die verzilting het land binnen als het Haringvliet zout wordt gemaakt?*
- *Het hoogwater beschermingsprogramma vooral een aangelegenheid in de winter door de hogere rivierafvoer.*

Al deze aspecten zijn te berekenen, maar dat is enkel voor de huidige situatie zo. Zeespiegelstijging kan hier nog niet bij worden ingecalculiseerd omdat het nog onbekend is hoeveel dat precies gaat zijn. Deze aspecten zorgden ervoor dat het Kierbesluit zo lang duurde voordat het werd ingevoerd. Het is hartstikke leuk om de getijden weer terug te brengen in het Haringvliet, 'a dream come true' voor Jos. Het is echter wel heel ambitieus als je met die omgeving te mak en krijgt. Ik weet dat Huub en Leen van Delta21 hard bezig geweest zijn om de plaatselijke belangen in kaart te brengen. Waar ik op wil wijzen is dat het meerdere jaren gaat duren. De agrarische wereld zal een transitie moeten doormaken naar verzilte teelt. Voorbeeldje van Texel waar ze een zee-boerderij hebben, en waar ze gewassen in zoute omgevingen verbouwen. Ik zou even informeren bij Saline Farming. Dan richt je de omgeving in op het verzilte water. Je zou de omgeving moeten conditioneren op het feit dat er zout water gaat komen. Het gaat erom dat de omgeving deze verzilting accepteert.

U zei dat het vanuit het oogpunt van een eco-engineer de verzilting van het Haringvliet erg positief is, zou u dit kunnen uitleggen? En wat ziet u als de grootste voordelen en nadelen?

Als eco-engineer vind ik het verzilten van het Haringvliet een zeer positieve situatie. Wij hebben in Nederland weinig intergetijdengebieden, gebieden van zout- en zoetwater combinaties. Omdat dat zo uniek is missen we een soort ecologisch habitat die daar op aansluit. Als we willen zorgen voor meer biodiversiteit is dit een top actie. Waarschuwing van mij: je moet goed zorgen voor de omgeving, en voor de beheer-en-onderhouds fase. Als je kijkt naar morfologische processen (erosie, aanzanding door getijde werking etc.), moeten die goed bekend zijn om er mee om te gaan en beheerbaar te houden. Dit is nodig voor scheepvaart, recreatie en natuurbehoud. Hier moet je goed op aansluiten bij de afdelingen van Rijkswaterstaat en de provincies. Het is niet enkel een mooi landschap, maar er moet meer gebeuren wil het geaccepteerd worden. Voorbeeld: strandjes voor recreatie, water voor agrarische wereld, diepe geulen voor scheepvaart. Strandjes zijn niet heel nuttig voor natuurbehoud, maar zijn wel nodig om de acceptatie van verschillende stakeholders te krijgen om dingen door te voeren. Zorg voor de volle breedte van de functies, en zorg ervoor dat je je omgeving mee gaat krijgen. Als ik kijk naar de enormheid van dit project, past het dat je investeert zodat de omgeving je ingrepen accepteert en een cultuuromslag meemaakt. Het geleidelijke van deze transitie zorgt ervoor dat het een langdurig project wordt.

U had het in uw mail over een aankomend onderzoek wat ook Delta21 beslaat. Kunt u daar wat over vertellen?

Jazeker, dat is het Kader Richtlijn Water. Rijkswaterstaat voert tot 2027 in heel Nederland nog 300 natuurontwikkelingsprojecten uit, o.a. in het Haringvliet en Hollands Diep. We willen dit duurzaam doen. We kijken naar 2 dingen: ten eerste, kunnen onze natuurontwikkelingen meeliften op de plannen van Delta21, zetten wat we geld opzij wat bij het Delta21 plan voor uitvoering gebruikt kan worden? Dit vraagt om inventarisatie. Past het binnen de uitvoering van Delta21? Ten tweede, zit het Delta21 project de water kwaliteit niet in de weg? Over dat laatste heb ik wel een mening. Als je kijkt naar de functie van de nieuwe waterweg (met de Maasvlakte), dan zie ik Delta21 als een nieuwe mega Maasvlakte (niet helemaal hetzelfde). Als je naar de neergelegde zandmotor kijkt, is dat er neer gelegd om een morfologisch proces op gang te houden met weinig behoefte voor beheer. In principe zou dat binnen de contouren van Delta21 ook kunnen, maar hoe het er nu ligt bevindt het precies in de monding van de nieuwe waterweg. Er wordt al redelijk geklaagd door gemeente Rotterdam over het bagger volume wat gedaan moet worden om de geulen bevaarbaar te houden. Het project moet duurzamer worden, zonder dat er zoveel extra bagger werkzaamheden plaats moeten vinden. Dus: in het gebied zelf kijken of we dingen kunnen overhevelen naar het Delta21 project, en verder kijken of het Delta21 project duurzaam genoeg is.

U noemt Rijkswaterstaat die hier mee bezig is, zijn er andere instanties of overheidstakken die u kent die hier aandacht aan besteden?

Ja, bijvoorbeeld de Rijksdienst van Ondernemend Nederland, de domeinen van vroeger. Moeten we contact opnemen met Huub en Leen voor commerciële partijen. Hier zitten ook energiemaatschappijen bij die geïnteresseerd zijn. Het kan een beetje vroeg zijn voor energiemaatschappijen om die nu al in het proces te betrekken omdat er nog weinig concreet is.

Ons project is wel echt gefocust op verzilting van het Haringvliet. Weet u ook wat specifiek over dat onderwerp?

Ik verwacht vanuit de agrarische sector weerstand op verzilting, vanwege het feit dat zij aanpassingen moeten doen. Dan kom je snel in de onteigening- en grondaankoop-hoek terecht. Dan gaat het lang duren. Met de recreatiesector ga je geen problemen hebben. Vanuit het oogpunt van Rijkswaterstaat, gaan de Haringvlietssluisen nog een functie hebben? Dit moet ter discussie komen als het verziltingsproces doorgezet wordt. Verder zeewaarts, is er nog een constructie. De Haringvlietssluisen kunnen dan een brug worden o.i.d.

Als het goed is, is het een zeekering tussen het energiemeer en Goeree-Overflakkee.

Ja, dat klopt. Als dat een sluis wordt dan wordt dat eigenlijk gedaan terwijl die sluisen van het Haringvliet er al liggen, wat een beetje onnodig lijkt. Delta21 is vanuit Rijkswaterstaat gezien vooral een investeringsmogelijkheid voor energiemaatschappijen. Rijkswaterstaat gaat wel mee participeren wanneer de mee-koppelkansen voldoende zijn. Als je alles optelt wat er nu op papier staat, hebben we het over een project van 7-10 miljard. Dat is te veel voor Rijkswaterstaat op dit moment. Het kan positief zijn voor hoogwaterbescherming voor Nederland. Als natuurontwikkelaar kan je natuurdesign op dat eiland toepassen, rekening houdend met de morfologie. Rijkswaterstaat wordt echter geen hoofd-initiatiefnemer als ik er zo naar kijk.

U had het erover dat Rijkswaterstaat wel mee zou willen werken met Delta21. In welke vorm of welke functie zou dat zijn?

Rijkswaterstaat kan de regie nemen in zo'n groot project. Rijkswaterstaat gaat niet compleet onzichtbaar zijn, maar verschillende infrastructurele werken waar zij financieren zitten zij bijvoorbeeld maar voor 10% in. Als er gekeken wordt naar de meekoppelkansen wat betreft Kader Richtlijn Water voor de natuurontwikkelingen en het Hoogwaterbeschermings-programma, zou Rijkswaterstaat voor ongeveer 30% mee kunnen financieren. Dan is het

aan de energie sector om te kijken of het het waard is voor hen om te investeren.

Binnen Rijkswaterstaat zijn er verschillende takken met verschillende taken, speelt dit nog een rol binnen de bijdrage van Rijkswaterstaat in zo'n project?

De bijdrage is geen enkel probleem. Waar je verschillende geluiden hoort van Rijkswaterstaat is op verschillende locaties. Beheerorganisatie in Rotterdam (West-Nederland Zuid). Die kijkt naar waar het water op dit moment is, en staat daar nogal conservatief in: graag behouden zij de huidige zaken. Wij van de realiserende diensten denken juist: Nederland klimaat-adaptief maken voor de toekomst. Binnen Rijkswaterstaat is het daarom soms uitleggen wat we doen en waarom we dat doen. Ik vind het hartstikke leuk dat we een mooi project neer gaan leggen met allures van de Deltawerken, maar het Districtshoofd van West-Nederland Zuid zal zich achter de oren krabben met de vraag wat het met zijn district gaat doen. Daar zit dus veel onzekerheid.

En als je de onzekerheden wegneemt? Als er vroeg duidelijkheid is?

De normale gang van zaken gaat als volgt: het bouwen, vervolgens plus minus 100 jaar beheer en onderhoud, daarna reconstructie of sloop. Wanneer je zo gedetailleerd mogelijk bent over de beheer en onderhoud periode, is de kans van implementatie het grootst. Daarom is het belangrijk dat we voor ons onderzoek ons richten op de periode van beheer en onderhoud. Voor Delta21 gaat het zeer waarschijnlijk 10 tot 15 jaar duren voordat het daadwerkelijk gerealiseerd kan worden. Duidelijk maken wat het eindresultaat is.

Om een stapje dieper in te gaan op ons project: kent u de term 'governance mismatches'?

Ik ken het niet, maar gezien de termen kan ik me het een en ander inbeelden.

Omdat Rijkswaterstaat een nationale organisatie is, hebben zij last van bepaalde knelpunten hiermee op de verschillende niveau's vanuit waar hun organisatie fungeert?

Bedoel je daarmee dat we bijvoorbeeld Kader Richtlijn Water, Natura 2000 etc. hebben, en dat die maatregelen zwaar conflicteren met de implementatie van Delta21?

Met name de verschillende schalen per locatie, met hier als voorbeeld nemend de regio West-Nederland Zuid.

Er kan wel degelijk een mismatch plaatsvinden, bijvoorbeeld als we de doelstellingen niet gaan halen. Maar als we nu al zeggen dat er een aantal maatregelen niet uitgevoerd kunnen worden, maar die aspecten wel meegepakt worden binnen Delta21, dan is het probleem al opgelost. Natura2000 stopt in 2030, Kader Richtlijn Water in 2027. We kunnen een aantal dingen niet opleveren binnen deze instanties omdat we afgesproken hebben dat Delta21 dat oplevert. Er wordt goed gekeken in ons netwerk schakelplan, waar Huub en Leen zich al hebben gemeld. Hoe zouden de lange-termijn visies van het district in conflict kunnen komen met Delta21? Het is aan het districtshoofd om dat uit te zoeken.

U had het over het Kierbesluit. Wat heeft u hiermee te maken gehad?

Ik heb daar nauwelijks mee te maken gehad, maar heb wel deze maatregel als Kader Richtlijn Water maatregel opgevoerd. Toen het woord Kierbesluit voor het eerst viel was dat in 1997. Lang verhaal kort: het was een maatregel die zou worden ingevoerd door Rijkswaterstaat Zuid-Holland. Toen in 2005-2006 Kader Richtlijn Water actief ging worden, ging het meer als volgt: we moeten zorgen dat we andere maatregelen binnen ons project halen. We moeten dat Kierbesluit binnen Kader Richtlijn Water verband halen. Beiden hebben ze hetzelfde doel. Heel goedkoop, want er is een man die wat knoppen indrukt in een machinekamer.

Zijn er stakeholders die we misschien gemist hebben in onze analyse?

Een lijstje met belangrijke stakeholders:

- *Drinkwatervoorziening*
- *Waterschap Hollandse Delta*
- *Rijkswaterstaat*
- *Provincie Zuid-Holland*
- *Omliggende gemeentes (specifiek Goeree)*
- *Ministerie van Infrastructuur en Waterstaat (Ik zou het breder trekken dan dat. Energievoorzieningen spelen ook een rol, en die vallen als het goed is onder economische zaken.)*
- *Landbouw, natuur en voedselvoorziening. LNV: Landbouw, natuur en voedselkwaliteit. Dan denk je aan een LTO Zuid-Holland.*
- *Ik zou ook zeker kijken naar natuurorganisaties en de visserij belangen. Ook activistische partijen zoals Urgenda.*

Dit zijn in mijn ogen de belangrijke stakeholders.

Als je zulke activistische partijen aantrekt, vinden andere instanties het dan misschien minder aantrekkelijk om dan mee te werken?

Ik werk graag met partijen rondom een kaart aan tafel. Vergeet niet de zandwinners (ook voor ons van belangrijk (Bouwend Nederland)). Als je die aan tafel krijgt is dat een goed teken. Ik heb weinig weigerend gedrag meegeemaakt. Iedereen komt wel aangezien het belangen hoog is. Over het lijstje van de vorige vraag: je haalt overheden binnen, maar ook bouwers (want het moet uitvoerbaar zijn). Daarnaast: omgevingsdiensten. Intergemeentelijke samenwerkingen zoals Milieuhandhaving. Omgevingsdienst Zuid-Holland zeker bij betrekken. Klinkt misschien gek, maar watersport- en recreatie-belangenorganisaties ook bij betrekken aangezien hun inkomsten grotendeels rusten op het Haringvliet. Energiebedrijven: niet alleen de investeringskant, maar ook beheer/onderhoud (i.v.m. kabels en dergelijke). Daarnaast: de unie van de waterschappen inlichten. Daar zitten zeker de geschikte personen bij. Twee onderdelen van Rijkswaterstaat: ervaring voor grote infrastructurele werken (regie nemen), en de regionale diensten voor beheer/onderhoud fase. Deze laatste is nog belangrijker dan bouw, want dit is een veel langere fase. Daarnaast: visserij zeker niet onderschatten. Het is belangrijk om de beroepsmatige visserij aan tafel te krijgen.

Een stukje waar wij nog wat discussie over hadden is de haven Moerdijk. Zou dat wel of geen stakeholder zijn in het kader van het verzilten van het Haringvliet?

Dan ga ik de breedte zoeken van de functies. Moerdijk moet beschikbaar zijn voor zeescheepvaart. Dat is goed, omdat dan de zee-gebondenheid goed in beeld wordt gebracht. Ik denk dat ze enthousiast zijn, maar ik zou ze zeker uitnodigen.

Heeft u misschien vragen voor ons?

Wat is het eindproduct wat jullie gaan leveren?

Het eind product wordt een tweedelig rapport. Dat is een uitdaging die je aangaat met betrekking tot theorie als governance mismatches, en governance arrangements. Een werkatelier kan als voorbeeld worden gezien worden om die governance mismatches tegen te gaan. Ons plan is om alle stakeholders in beeld te brengen in het Delta21 plaatje. Delta21 kan dit gebruiken voor problemen waar zij tegenaan lopen.

Kan ik hier een kopie van krijgen?

We zullen Huub en Leen hierover contacteren, maar als dat geen probleem is moet dat zeker lukken.

Als dat niet zo is dan bel ik hen wel even. Succes met de rest van het project.

Hartelijk dank voor de snelle reactie en voor uw tijd.

8.2 Interview 2: Arjen Bevelander (Bestuurslid LTO & Agrariër)

Introductie ACT vak, Delta21, verzilting Haringvliet. Kunt u kort beschrijven wat uw taken zijn als bestuurder van LTO Noord?

Ik werk niet bij LTO Noord, nee, ik heb een eigen onderneming. Ik heb een groente-kruidenteeltdoelbedrijf. Ik ben wel lid van het bestuur van LTO Noord Goeree-Overflakkee. Daar heb ik de portefeuille water en energie. En ja, een stukje opleiding zit daar ook bij. Maar met name water en energie, binnen LTO Goeree-Overflakkee.

Hoe zou LTO Noord als stakeholder het proces in gaan bij een onderwerp als de verzilting van het Haringvliet?

Nou om te beginnen vind ik dat de vraagstelling binnen het interview, dat baat mij wel zorgen. En waarom, jullie hebben het nu genoemd het verzouten van het Haringvliet. Laten we voorop zeggen dat dat gewoon nooit mag gebeuren, en waarom niet, ten eerste is er wereldwijd maar 1 procent zoetwater, en daarnaast is de agrarische sector van enorm belang op het eiland, niet alleen het eiland maar ook voor de omliggende eilanden. Wij gebruiken als sector natuurlijk enorm veel zoet water. Zou het Haringvliet gaan verzilten dan is dat het einde voor een groot deel van de akkerbouw op Goeree-Overflakkee, dus verzouten mag nooit gebeuren. Wat er nu gebeurt met het Kierbesluit is dat de westkant van het Haringvliet inderdaad aan het verzilten is, er is een grens getrokken. Verder dan die grens mag het zoute water niet komen. Jullie noemen het hele Haringvliet maar eigenlijk zou je het moeten splitsen

Wat weet u van het Kierbesluit? Heeft u daar zelf ook iets mee te maken gehad? Wat waren uw ervaringen daarmee? Is de mening van boeren veranderd sinds het openen van de kier?

Je moet altijd oppassen wat je zegt, niet mee eens met het Kierbesluit is een groot woord. Wij zijn heel blij met de uitwerking van het voortraject van het Kierbesluit. En waarom zijn we daar blij mee, met name omdat er nu veel meer is gemonitord dan er in het verleden is gebeurd. Waar we achter zijn gekomen in de laatste tien jaar is dat er gigantisch veel vervuiling vanuit Duitsland het Haringvliet in kwam. Dus verzilting vanuit de rivieren met name vanuit Duitsland, dat is nu afgenomen. Dus de waterkwaliteit van het water onttrokken uit het Haringvliet is verbeterd, en die kennis is naar boven gekomen dankzij het Kierbesluit. Dat is lastig zeggen dat we blij zijn met het Kierbesluit. Voor die paar vissen maakt het mij niet zo uit, er wordt gezegd het is beter voor de visstand, alsof die vis alleen voor de kier liggen en niet durven omzwemmen door de nieuwe waterweg. Dat is natuurlijk onzin.

We hebben gesproken met iemand van Rijkswaterstaat, die heeft ons advies gegeven om eens bij Texel te kijken naar saline farming, dat houdt in dat er met zout water agrarische cultuur wordt bedreven, is er een optie dat toe te passen in de buurt van het Haringvliet?

Ja, daar zijn ze zelfs mee bezig, maar het project in Texel is failliet gegaan. Dus of dat daar nog steeds gekeken kan worden vraag ik me af. Ze zijn ook op het Haringvliet bezig met een project om daar zeewier te gaan telen, maar ik weet wel daar gaan velen miljoenen in en eer daar een paar tientjes uit gaan komen zijn we jaren verder. Dus of dat überhaupt rendabel gaat worden vraag ik me af. Kijk, waarom zouden we op Goeree-Overflakkee of in Zuid-Holland überhaupt zilte teelt gaan doen? Terwijl we weten dat in Zeeland je brak en zout water hebt. In Zeeland kunnen agrarische ondernemers niet beregenen omdat je daar zout water hebt, dus waarom gaan we die teelten niet daar creëren als er al een groot belang is. Ze zijn nu alternatieven aan het zoeken om iets gerealiseerd te krijgen. Dan denk ik, probeer dingen te realiseren waar al alles is. Je gaat ook geen bioscoop bouwen op het platteland waar geen mensen zijn. Misschien een slecht voorbeeld in coronatijd. Ik woon hier nu twintig jaar, toen we hier kwamen wonen zijn we eerst naar de waterkwaliteit gaan kijken, wat voor water heb je hier. Kun je de gewassen daar telen die je wilt telen. Toen bleek dat de waterkwaliteit in orde was, maar eerder zijn we verderop gaan kijken, daar was de waterkwaliteit niet op orde. Dan kun je niet telen wat je wilt telen. Als we dan nu gaan kijken, kunnen we op Goeree-Overflakkee zilte teelt gaan doen vind ik gewoon niet handig. Dat kan in Zeeland veel beter, daar heb je zout

water voldoende.

U had het over bepaalde initiatieven die u dan zou kunnen doen, wat zouden die dan inhouden?

Welke initiatieven doel je op?

U zei net dat u een beetje moest kiezen tussen zout en zoet, een soort tussenweg had u het over, wat zou dat dan inhouden?

Ik zit te zoeken wat ik daarmee bedoelde. Ik zoek geen tussenweg, de agrarische sector heeft veel belang bij zoetwater, er is geen tussenweg mogelijk. Wij hechten heel veel waarde aan de waterkwaliteit. Die hebben we ook nodig om bv bladgewassen en om tulpen en dat soort zaken te kunnen telen, dat gaat gewoon niet met brak water. Aardappel zou je nog water kunnen geven met een EC van 2 bijvoorbeeld, maar heel veel hoger kan ook niet. Dus dan heb je een gewas met een soort tussen.

Hoe reëel is het voor uw sector om een transitie aan te gaan naar vormen van andere agricultuur, indien deze verzilting plaats gaat vinden, Wat zou er nodig zijn om die transitie te maken, dus bijvoorbeeld een subsidie, of een andere plek?

Er is voor alternatief zoetwater gezorgd met het Kierbesluit, dus er is vanuit Den Bommel vandaan een nieuwe waterinlaat gemaakt en ook bij Middelharnis, richting de kop van het eiland. En dat heeft vele miljoenen gekost, om te creëren dat er in plaats vanuit Ouddorp vandaan, water in te laten vanuit Middelharnis. Als ik dan naar duurzaamheid ga kijken met al die dieselstook, wat is dan het onderliggende belang van het Kierbesluit, is dat echt zo veel beter voor de natuur? Dat vraag ik me sterk af. En dat er beter gemonitord wordt wat er geloosd wordt op het water, ik denk dat dat een veel groter effect heeft gehad dan een nieuwe waterweg graven. Dit verhaal gaat zich ook afspelen of heeft gespeeld bij het Volkerak-Zoommeer, daar kreeg ik dezelfde vraag, moet je een nieuwe waterweg aanleggen? Dat zou betekenen dat je honderden hectares gaat afgraven om een nieuwe watervoorziening aan te leggen terwijl er al mooi water ligt. Dat zou dan puur zijn dat je daar andere vissen gaat telen. Volgens mij ga je dan het probleem verleggen. Dus volgens mij moet je meer kijken naar problemen oplossen in plaats van wateroplossingen verzinnen voor een probleem wat mogelijk gaat komen.

Een eiland verderop hebben ze zout aan beide kanten. Hoeveel aanpassingen hebben ze daar moeten doen om nog steeds de agrarische sector uit te kunnen voeren?

Nou wat je ziet is dat klimaatverandering daar effect heeft, de droge periodes worden steeds langer, periodes waar water valt worden ook heftiger, maar het komt minder gedoseerd (water), je ziet dat het de laatste jaren nauwelijks meer mogelijk is daar de originele producten te telen. Er moet zoetwater aangevoerd worden met boten om daar te kunnen telen. Dat is ook niet helemaal de manier, maar dat gebeurt wel, dus ze hebben een serieus probleem dat het water niet meer ten alle tijden valt. Er liggen al grote uitdagingen voor de sector om überhaupt alle teelten te kunnen blijven doen die we doen. Daar moeten we ook een beetje naar andere landen kijken. Als ik in Amerika kom dan hebben zetten ze daarin op het vasthouden van water. In Spanje zie je dat er wordt bevoed met druppelirrigatie, dat is een andere manier van irrigeren dat je minder water nodig hebt voor hetzelfde effect. Het is mogelijk, maar je moet een boel investeringen. Op Schouwen-Duivenland worden bepaalde gewassen niet geteeld, geen blad, geen bollen. Vergelijk dan ook de gewassen als je die vergelijking maakt. Er worden meer oudhollandse gewassen geteeld. Omdat de watervoorziening daar niet op orde is. De grond hier is duurder omdat er een boel zoetwater beschikbaar is. Wij telen bladgewassen, en als ik morgen ga planten gaat er ook morgen water op, die kunnen niet wachten op regen. Er worden hier veel tulpen geteeld, er worden veel duurzamere gewassen geteeld dan in Zeeland. Een switch van gewassen zou betekenen dat we een inflatie hebben van een landbouwareaal en dat je 50% moet inleveren. Op dit moment is de grondwaarde hier hoog, Zeeland is op zo'n 60% van hier. Dus er gaan een boel ondernemers failliet en de anderen hebben het zwaar. Er worden gewassen geteeld daar die erg arbeidsintensief zijn, dus de complete

economie zal instorten, ik heb 40 werknemers, als ik geen zoetwater beschikbaar heb, zijn er zo'n 30 gezinnen die alternatief werk moeten zoeken.

We proberen heel veel stakeholders mee te nemen in het proces. Vind u dat u genoeg meegenomen wordt in het besluitvormingsproces? Word u genoeg gehoord in projecten?

Op zich ben ik daar positief over, we worden als LTO wel benaderd. Ik denk wel, dat de grootste bottleneck is dat de burger slecht geïnformeerd is. Ik denk dat dat het grootste probleem is, als je bijvoorbeeld bij natuurmonumenten of Staatsbosbeheer, of dat soort partijen. Daar zitten poppetjes aan de macht die met heel veel geld van de burger aan het speculeren zijn over iets wat ze als persoonlijk doel stellen. Zonder goed te informeren wat er werkelijk gaat gebeuren, dus wat er wordt gezegd is we gaan zoiets creëren en dat is goed voor de vis, fantastisch! Het wordt beter voor de natuur, daar komen nieuwe parken waar mensen gebruik van maken. Maar als ik ga praten met een visvereniging die zegt leuk, maar zo gaat niet werken, dat is niet de beste manier. Als ik kijk naar de Haringvliet, daar hebben ze een nieuw eiland gecreëerd en als je met de schippers praat, zeggen die, hoe hebben ze het in hun hoofd gekregen om dat daar te doen. Zij weten dat daar extreme stroming is. Het moet veel te vaak opgespoten worden, dus dat heeft helemaal geen zin. Je praat over mensen die willen iets creëren waar ze niet genoeg verstand van hebben. En de burger vindt het fantastisch, beter voor het milieu. Wat is het effect? Kijk naar het eiland tiengemeten daar was veel meer diversiteit vroeger omdat het beheerd werd. Dat is het probleem bij natuurorganisaties die denken dat ze alles zonder beheer achter kunnen laten, dat gaat niet werken, een gezond beheer doet alles. Als je akkerbouwers hebt die 20 gewassen hebben, die vogels hebben verschillende voorkeuren en krijg je hoge diversiteit. Als je alles laat verloederen krijg je overal gras en bomen, een boel vogels willen daar niet in nesten. Ik geloof meer in diversiteit en proberen dingen te beheren in plaats intvan alles maar over te laten aan de natuur.

Dus u zegt dat het beste is om eerst lokale kennis op te vragen. Is dat een oplossing voor dit soort problemen?

Ja ik denk dat dit een serieuze oplossing is. Om te zorgen dat je in goed contact blijft. Samen met de huidige ondernemers en de burger in gesprek gaan over waar komen we nu echt verder mee. Nu staan er bijvoorbeeld windmolens langs de kust, waarom staan die daar? Om de burger tevreden te houden, want dan staan ze niet bij de woonwijk. Maar als je het dichterbij de bewoner kunt brengen dan zou je die burger voordeliger van stroom kunnen voorzien, en nu zeggen ze het is verloedering van het beeld. Het aanzicht van het eiland is verloederd omdat er allemaal palen omheen staan. Communiceer goed, geef de burger terug waar die recht op heeft. Dat geldt voor natuurmonumenten, Eneco, zolang de burger niet moppert vinden die het prima. Er zijn te veel mensen bezig met hun eigen belang, dat vind ik wel een probleem.

Ik heb het idee dat onder klimaatverandering er moeite is met zoetwater garantie, de zeespiegel gaat stijgen. Is het sowieso niet al dat de landbouwsector moet veranderen van gewassen?

Denk jij dat door de keringen open te zetten de zeespiegel niet zal stijgen?

Nee dat denk ik zeker niet, maar ook als de keringen dicht blijven gaat de druk van het zoute water hoog blijven en hoger worden. Ik denk dat het sowieso een probleem gaat zijn.

Bekijk dit nou eens met het nuchtere boerenverstand, als je denkt dat je het zoutwater naar binnen laten de klimaatverandering tegen gaat heb je het gewoon niet bij het juiste eind. We leven onder de waterspiegel, hoe ga je ons beschermen tegen het water? Of dijken ophogen of ontpolderen, iedereen eruit en het teruggeven aan de zee, maar daar kan niet genoeg water in om de stijging tegen te gaan. Willen we de provincies laten bestaan dan moeten we zorgen voor een goede waterkering, dan hebben we geen discussie over zoet of zout. Je moet waterkwaliteit proberen los te koppelen van zeespiegelstijging. Volgens mij is dat een verstandiger iets. Met zeespiegelstijging moet

je nadenken, willen we Zeeland en Zuid-Holland nog bewaren.

Ik zat meer te denken aan de druk op het grondwater.

Ik denk dat de bodemwaterkwaliteit alleen maar gaat afnemen als je gaat verbrakken. Op hoe meer plekken zout komt, op hoe meer plekken het bodemwater ook zout wordt.

Wat je hoort uit de natuursector, is over de oorspronkelijke stand van de regio, dat is anders dan wat u zegt. Natuur versus Agrarische sector, hoe kun je die haaksheid doorbreken?

Kijk eens naar de Nieuwe Waterweg, er gaat te veel zoet water verloren door de Nieuwe Waterweg, er wordt al veertig jaar gesproken over hoe kunnen we daar zoetwater tegenhouden? En dan ga je nu zeggen we gaan een eb en vloed creëren in het Haringvliet maar kijk ook eens naar de Biesbosch, die is zoet, je krijgt dan ook zoutwater in de Biesbosch.

Dat kan dat hangt af van hoeveel water je binnenlaat. Dat moet je berekenen.

Wat natuurorganisaties willen is een de dam weg, een open verbinding, als je dan zulke droge zomers hebt zoals afgelopen jaren, op dit moment valt er ook te weinig, in het oosten hebben ze al een probleem. Dan krijg ik brakwater in de Biesbosch, dat is een feit. Dan krijg je ook te maken dat de industrie boven de nieuwe waterweg ook weg moet. We zijn nu als sector de industrie boven de nieuwe waterweg heel dankbaar, want er gaat een pijpleiding van het Haringvliet naar de andere kant van de nieuwe waterweg omdat ze vanuit de nieuwe waterweg geen zoet water kunnen pakken. Dat is wat veel mensen niet weten, dat wist ik tien jaar geleden ook niet, dat de industrie zo ver weg water uit het Haringvliet pakt om alles te kunnen koelen want als je dat gaat doen met zout water stort die fabriek in. Dat was allemaal nog niet bekend gemaakt. (Stukje over wet Dordrecht lozingen in Maas). Wees nou eens eerlijk, er wordt te weinig gecommuniceerd. Wij horen dat als sector, omdat je in al die kanalen komt te zitten, je zit met meer aan tafel, als het groot in het nieuws komt hebben ze pas echt een probleem in Nederland (over lozingen in de Maas).

Delta21 plan wordt uigelegd, hoe zou een radicale verandering bespreekbaar gemaakt kunnen worden voor de agrarische sector?

Ik denk dat dat een heel duur verhaal wordt, want dan moet je dus zoetwatervoorziening aan gaan leggen. Misschien wel vanuit Duitsland een zoetwatervoorziening naar de industrie en de agrarische sector komen. Of de dure teelt hier moet stoppen, maar goed.

Het gaat dus om geld, subsidie, of water aanvoeren?

Ja, maar dan nog, er wordt altijd gezocht naar wat kan er dan wel, ik zei net ook al er is 1% zoetwater op de wereld, daar moeten miljarden mensen van leven. Daar moet zoetwater van gemaakt worden. Er was een mooie zoetwatervoorziening bij Ouddorp, de duinen filtreerden het water en er kwam bijna drinkwater uit, dat kan nu niet meer gebruikt worden, dat is brak. Er wordt niet breed genoeg gekeken vind ik. Ik wil kijken naar hoe kunnen we bereiken naar wat de natuurorganisaties willen zonder het Haringvliet te verbrakken, en wat kost dat dan? Er is bijvoorbeeld een vistrap die niet werkt. Je kunt ook een vistrap aanleggen die wel werkt. Volgens mij moet daar ook eens naar gekeken worden, in plaats van iets te radicaal een kijken wat kunnen we. Die vraag die ons gesteld wordt, wat kun je doen dat het wel mogelijk is, die vraag zouden zij ook eens gesteld moeten worden.

8.3 Interview 3: Jan van Oorschot (Gepensioneerd directeur innovatie en ontwikkeling Kon. Volker Wessels Stevin)

Kunt u meer vertellen over uw achtergrond?

Mijn achtergrond is civiele techniek, Delft. Ik ben op een gegeven moment beland in het ontwerpteam voor de stormvloedkering Oosterschelde. Daar heb ik meegewerkt tot aan de oplevering. Ik werkte voor de aannemerij, dus niet namens Waterstaat, maar ik zat in de aannemerscombinatie. Daarna heb ik jaren leiding gegeven aan een ontwerp bureau, binnen VolkerWessels. Op een gegeven moment vanuit die positie heb ik de leiding gekregen voor het ontwerpteam van de eerste aanbesteding van de Maeslantkering. Dat heb ik een paar jaar gedaan tot het ontwerp goed op weg was. Daarna ben ik in de directie van een van de werkmaatschappijen beland. Dus mijn achtergrond is eigenlijk waterbouwkundig ontwerper.

Huub en Leen vertelden over uw bijdrage bij de Oosterscheldekering, bij dit proces was een onafhankelijke partij betrokken, in dit geval de RAND Corporation. Kunt u iets meer vertellen over uw bijdrage en de reden waarom er een onafhankelijke partij bij betrokken werd?

Jullie rapport lezend, kreeg ik het gevoel dat Rijkswaterstaat de leiding zou moeten hebben. Toen dacht ik aan de parallele situatie aan de Oosterschelde kering. Daar was ook Rijkswaterstaat samen met de aannemerij in een join venture aan de leiding. Het was een project van Rijkswaterstaat. Het was in een tijd dat Rijkswaterstaat nog functioneerde als een technologen club. Wat ze zeiden was goed voor het volk. Zij bepaalden de planologie in Nederland. In de aanloop van de Oosterschelde kwam er nogal veel protest uit de samenleving tegen die figuur Rijkswaterstaat, die alles maar inrichtte volgens z'n eigen regels. Dat heeft geleid tot een heleboel rumoer in de Tweede Kamer. Een groot debat in de tweede kamer. Er werd een nota gevraagd, en Rijkswaterstaat dacht zeer terecht dat het niet handig is om zelf dat rapport te maken. We zoeken een onafhankelijke partij die ons bij de hand neemt, dat was die RAND Corporation. Dus de RAND Corporation heeft in feite de beslissing onderbouwd op grond waarvan uiteindelijk de Oosterschelde kering is gebouwd. Er waren drie opties, drie alternatieven. Of helemaal open en de dijken verhogen, dat was de optie van de milieubeweging en de visserij. De andere optie was het oorspronkelijk plan van Rijkswaterstaat, de Oosterschelde helemaal afsluiten. De Oosterschelde zou dan een zoetwatermeer worden. De derde optie was een compromis van een doorlaatbare dam. Rijkswaterstaat durfde zelf niet een rapport te maken om een van die drie aan te bevelen en heeft dus RAND gevraagd om voor hen dat verhaal te maken. De RAND heeft uiteindelijk dat rapport aan de Tweede Kamer aangeboden. Op basis van dat rapport en een boel andere overwegingen is toen die keuze gemaakt. Het was ook weer niet een knip en klaar advies, er waren natuurlijk een heleboel mitsen en maren en het was toch een beetje appels en peren vergelijken. De voorkeur ging toch naar die halfopen kering. Waarbij de RAND al zei: wij vinden de begroting van RWS voor dat project wel erg optimistisch. Ze waarschuwden toen al voor de kosten. De kern van het verhaal is dat niet Rijkswaterstaat zelf in de lead is om zo'n project er politiek doorheen te jassen, maar een externe organisatie als de RAND. Geen van de ingenieursbureaus in die tijd, en dat geldt nog steeds, is in staat om zoiets te doen. Je moet een organisatie hebben met het gewicht van de RAND Corporation om dat te doen. Ik heb ze zelf helaas niet meegemaakt, maar ik ken hun verhalen en hun advies. Zij hadden een decision support instrument wat hen heeft geleid tot een politieke beslissing. Toen ik jullie verhaal las, jullie beginnen met een workshop, het is niet helemaal duidelijk wie daar de leiding heeft. Ook als dat Rijkswaterstaat is wek je de nodige argwaan en achterdocht op. Dus het moet echt een onafhankelijke club zijn. Maar het moet een club zijn die van wanten weet. En dan ga je over naar de uitvoering. Waar een aparte entiteit waar alle stakeholders aandeelhouder zou zijn. Dat is een goede aanpak.

We waren een beetje op zoek wie de leiding zou nemen in die workshops, eerst was dat of Rijkswaterstaat of Delta21 maar het is inderdaad verstandig om een onafhankelijke partij erbij te betrekken.

Het vooral laten lopen of trekken van de workshop door Rijkswaterstaat is zoiets als de klimaattafels laten trekken

door de kolenindustrie. Ze zijn te veel geïdentificeerd met hun verleden van technocraten en bouwers, wat al lang niet meer zo is, maar de achterdocht zou er zijn. Bij de RAND Corporation zei Rijkswaterstaat zelf ook; als wij het doen zouden we achterdocht wekken in de maatschappij. Mijn pleidooi in jullie geval zou zijn om die entiteit naar voren trekken, voor alle grote werken in de infrastructuur en waterbouw in Nederland hadden we een aparte dienst. Je had de Deltadienst die volledig autonoom opereerde naast alle bestaande directies. Ook de Zuiderzeewerken, dat was gedaan door een aparte entiteit. Jullie focussen heel erg op het Haringvliet, en dat is prima, het kan een showstopper zijn voor het hele project. Het is buitengewoon belangrijk daar een oplossing voor te hebben. Maar het gaat niet om het Haringvliet, het gaat om een veel groter geheel. Je moet een entiteit maken die het grote geheel overziet, die neemt ondertussen het Haringvliet mee daarin. Rijkswaterstaat kan die rol niet vullen. Ze zijn inmiddels heel anders ingericht.

Hoe ziet u die entiteit voor u? Is dat een onafhankelijke partij samen met de initiatiefnemers en Rijkswaterstaat? Of gaat het voornamelijk om die onafhankelijke partij?

Rijkswaterstaat en andere stakeholders moeten daar in meegaan, of ze nou echt participeren of meedoen als aandeelhouder. Het moet een club zijn die zelfstandig in staat is concepten te bedenken, dus de ontwerpcapaciteit in huis heeft om een concept te bedenken. Het detailwerk weer te leggen bij adviesbureaus en de Deltaressen en Rijkswaterstaat. Het moet een nieuwe dienst van de overheid zijn, de dienst Delta21.

In principe wel, in een dienst heb je dat alle stakeholders participeren, maar je hebt wel een onafhankelijk bureau aan het hoofd.

Ja, een onafhankelijk bureau zit aan het hoofd daarvan. Die moeten genoeg verstand hebben van zaken, en voldoende vertrouwen hebben binnen de maatschappij. En niet voorgesorteerd hebben op een bepaalde ontwerprichting.

Wat zijn de voor- en nadelen van het betrekken van een onafhankelijke partij in een complex besluitvormingsproces?

Nadelen zie ik niet zo veel, alleen dat je misschien bepaalde organisaties krijgt, die menen dat het hun project moet zijn, op de tenen gaat staan. In vergelijking met de Maeslantkering, het was een opdracht van de minister om dat aan de markt over te laten. En Rijkswaterstaat moest een stap terug doen, het was zeer tegen het zere been van Rijkswaterstaat, en ik denk ook wel terecht. Dus daar hebben we veel last van gehad. Ze hebben voortdurend geprobeerd aan te tonen dat ze het beter kunnen. Dat kan een nadeel zijn. Datzelfde zou kunnen spelen bij de provincie Zuid-Holland of de waterschappen. De partij die dat gaat leiden moet een club zijn die het vertrouwen heeft van allemaal. Denk aan het parallel met de Deltacommissaris. De Deltacommissaris die functioneert ook voor de overheid parallel aan de provincie en aan Rijkswaterstaat. Het voordeel is dat je zo'n dienst kan uitrusten met de kennis die je echt nodig hebt. Jullie focussen je op het Haringvliet in de huidige situatie met het kierbesluit, maar het gaat om veel meer. Delta21 is eigenlijk de aanleiding maar de echte aanleiding is de stijging van de zeespiegel. Dus in die club heb je mensen nodig die 50 of misschien wel 100 jaar vooruit denken. Wat zijn effecten op langere termijn van de zeespiegelstijging. Als de zeespiegel een meter stijgt, dan moeten de huidige sluizen eruit. Je krijgt een heel andere dynamiek. In die club moeten mensen zitten die zelf conceptueel nadenken over de toekomst. Dat vind je niet zomaar bij een willekeurig ingenieursbureau.

Bij de Oosterschelde was RAND die onafhankelijke partij, als je op dit moment een vergelijkbare partij zou aanwijzen, zou u weer bij RAND uitkomen, of zijn er modernere opties?

Nou het was een aparte dienst, de Deltadienst die zich liet assisteren door RAND, om dingen te zeggen die zij maar beter niet konden zeggen. Dus de kern was het oprichten van een aparte dienst, met heel goeie know-how van alle concepten op globaal niveau. Dat gaat hier wat ver, en je moet ook niet terugrijpen op het verleden

maar iets van dat voorbeeld zou ik wel willen adviseren, want dat heeft fantastisch gewerkt. Neem alleen al de ruzie binnen Rijkswaterstaat, of het beton of staal moet worden, allemaal competentiestrijden, daar stond die dienst boven. Die organiseren ook zo'n workshop, misschien dat je wat kleinschaliger kunt beginnen want het gaat om het bin-nenhalen van allemaal ideeën begrijp ik, dat had misschien ook nog begeleid kunnen worden door een ingenieursbureau.

Hoe zou de dienst eruit komen te zien? Zou die betrokken zijn vanaf de eerste workshops?

Ja.

We hebben nu focus-workshops, waarbij bepaalde groepen stakeholders uitgenodigd worden, om gezamenlijk een visie te creëren.

Jullie hebben terecht heel veel aandacht gegeven aan mismatches, ik vond dat een eye-opener, maar als je stake-holders bij elkaar roept, en die komen allemaal met een eigen oplossing, hoe kom je dan tot een concept wat een niveautje hoger ligt bij wijze van spreken? Waar ze in kunnen schuiven, het mee eens kunnen zijn. Ik mis de dirigent die zelf met plannen komt en probeert consensus te krijgen voor die plannen. Hij verzamelt alle meningen maar hij blijft wel de dirigent.

De onafhankelijke dienst zou dan door zo'n Decision Support System (DSS) een gezamenlijke visie kunnen creëren met de andere stakeholders.

Nogmaals je hebt een entiteit nodig, noem het een dirigent, die zelf ook in staat is in de materie te duiken en met conceptuele oplossingen te komen. Die hoeft niet te ontwerpen maar hij moet de weg kunnen aanduiden en proberen om de rest daarin mee te krijgen. Als je dat aan de stakeholders zelf overlaat dan is de ene alleen met paling en palingvangst bezig en de andere alleen met hoogwaterbescherming.

Als er z'n dienst wordt opgericht, zou die dan voor het hele Delta21 plan zijn?

Absoluut, het Haringvliet is een bijvangst, een hele belangrijke, want zoals ik zei het kan een showstopper zijn. maar het is niet het enige. Er zit een belang boven.

Wat is de rol van de initiatiefnemers in zo'n dienst?

Ik zie ze geen deel daarvan vormen. Het zijn particulieren, mensen die begaan zijn met hoogwater bescherming, daar is het uit geboren. Maar het initiatief moet overgenomen worden. Ze hebben geen organisatie om daar in mee te draaien. Ze moeten een soort 'graceful degradation' ondergaan, ze stappen eruit als het eenmaal in werking is. Het moet niet te abrupt zijn, er moet een verstandige overgangperiode zijn waarin ze het vooronderzoek kunnen inbrengen. Maar het is geen organisatie die later in de realisatie een functie kan hebben.

Kan de RAND nu weer die rol vervullen, zijn er andere voorbeelden van organisaties die dat kunnen?

Nee, ik ken de RAND niet meer maar ik denk niet dat je ze moet hebben. Ze hebben in de Verenigde Staten volgens mij het Tennesseeproject gedaan waar een boel tegengestelde eisen waren. Zij hebben er iets van gebakken dat vandaag nog steeds functioneert. Maar dat is erg lang geleden dus ik denk niet dat de RAND meer voor zoiets in beeld komt. Ik denk dat je moet zoeken naar een nieuwe organisatie. Ingenieursbureaus heb je nodig voor allemaal deelstudies maar die kunnen niet de leiding nemen. De Deltadienst en Zuiderzeewerken waren compleet nieuwe organisaties die opgericht werden die mensen links en rechts wegtrokken die nodig waren. Je kunt ook niet de aannemerij leggen. Die komen pas later in beeld. Dit soort toekomstperspectieven kun je daar niet aan overlaten. Misschien moet je wel beginnen bij een organisatie als Bereschot, een organisatiebureau en die de opdracht geven

om de contouren van zo'n dienst maken.

Heeft u nog vragen voor ons?

Nee, maar nogmaals wil ik jullie op het hart drukken dat het project groter is dan alleen het Haringvliet.

9 | Tutorial: Identifying mismatches and designing arrangements

Step 0: Define definitions for all participants

Mismatch: A situation in which the scales and level of the government bodies and/or sectors and stakeholders proves operationally incapable of addressing the bio-physical (spatial and temporal) attributes of the problem [Wu and Ramesh, 2014, Biesbroek, 2020].

Scale: Dimensions used to analyse patterns or processes (The spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon, after Gibson et al. [2000]).

Level: Units located at different positions on a scale (After Gibson et al. [2000], Cash et al. [2006]).

Temporal scale: Short: 1 year, medium: 10 years, long: 100 years planning into the future.

Network scale: Society is the community around the Haringvliet, Trans-society is broader national/international network.

Sectors: An area of society with similar goals, interest, needs and demands.

Actors/stakeholders: A person, group or organisation that has interest or concern in the problem.

Step 1: Identifying scale and levels

What is the problem?

The challenges of decision-making regarding the future of the Haringvliet in the context of the Delta21 plan.

At what scale and level does the biophysical aspect of the problem manifest itself? (the Haringvliet)

Spatial: regional and temporal: decades (medium-long term)

Are there already existing governance arrangements place at the different levels the problem manifests itself?

In the Kierbesluit decision-making process:

- Higher measuring frequency of water quality.
- 'Klankbordgroep' for the Kierbesluit.
- 'Ondernemerscafé, salt or sweet' by nature organisations to discuss opportunities, ideas and knowledge with entrepreneurs and active citizens.
- Workshops about the south-western delta area, including discussions about the Haringvliet area. Here, different sets of stakeholders were invited, depending on the subject at hand. The core group that was present at all meetings was Rijkswaterstaat, the Ministry of Infrastructure and Water Management, the three provinces and the workshop leader (Zuidwestelijke Delta, 2018).

These are examples of already existing governance arrangements.

Step 2 and 3: Stakeholders and sectors

Who are the important stakeholders and at what scale and levels do they act?

Table 9.1: The most important stakeholders and at what scale and levels they are acting.

Stakeholder	Scale	Level
Rijkswaterstaat	Spatial Temporal Management Knowledge	National Long term Projects/tasks General and specific
LTO North	Spatial Temporal Knowledge Network	Provincial Short-medium term Specific Trans-society
Delta commissioner	Spatial Temporal Jurisdictional Management Knowledge	Regional Long term (6 year cycles) National Strategies Specific
Evides	Spatial Temporal Network	Regional Medium-long term Trans-society
Water Board Hollandse Delta	Spatial Temporal Jurisdictional Knowledge	Provincial Medium-long term Municipal and Provincial Specific
Province of South Holland	Spatial Temporal Management Institutional Jurisdictional	Provincial Medium-long term Strategies, projects Law, regulations Provincial
Municipalities	Spatial Temporal Jurisdictional Institutional Network	Local Short-medium term Municipal Operating rules Society
Ministry of Infrastructure and Water Management	Temporal Jurisdictional Institutional	Medium-long term National Laws, regulations
Droomfondsproject Haringvliet <i>Coalition of six nature organisations</i>	Spatial Temporal Management Network Knowledge	Regional Medium-long term Projects Trans-society Specific
Inhabitants	Spatial Temporal Knowledge Network	Local Short-medium term Indigenous, specific Kin
Industry	Spatial	Local
Commercial fisheries	Spatial Knowledge	Regional Specific
Knowledge institutes	Knowledge Network	General and specific Trans-society
Delta21	Spatial Temporal Knowledge Management Network	Regional Medium-long term Specific Project Trans-society

What are the important sectors and at what scale and levels do they act? In which sectors are a group of stakeholders with similar rules/practices.

Table 9.2: The most important sectors and at what scale and levels they are acting.

Sector	Scale	Level
Agricultural sector	Spatial	Local
	Temporal	Short-medium term
	Knowledge	Specific
Fishing sector	Spatial	International
	Temporal	Short term
	Knowledge	Specific
Environmental sector	Spatial	Regional
	Temporal	Medium-long term
	Knowledge	Specific
Tourism sector	Spatial	Regional
	Temporal	Medium term
Industrial sector	Spatial	Local
	Temporal	Medium term
Drinking water supply sector	Spatial	Regional
	Temporal	Medium term
Shipping sector	Spatial	International

Step 4: Identify the most important scales and levels

How do these scales and levels impact the scales of the Haringvliet?

The jurisdictional borders of the province and the municipalities do impact the spatial scale of the Haringvliet. As the biological and especially the ecological aspects of the Haringvliet interact at a large scale. Both with the river area upstream and the area in front of the Haringvliet sluice. For example, the fish in the Haringvliet travel far up the Rhine to lay eggs only to return to the sea.

Most important scales and levels

Spatial: Regional, both the biophysical scale of the problem and many important actors are around the regional scale.

Knowledge: Large range of spatial scale levels means many different levels of scales of knowledge.

Jurisdictional: is important in decision-making.

Institutional: is important in decision-making.

Step 5: Identify mismatches based on the scale/level mismatches

Where do the spatial and temporal scale of the Haringvliet problem not match up with other scales mentioned in step 2? Where can governance mismatches be found?

- LTO Noord and the agricultural sector operate at the short-medium term temporal scale, basing their decision-making more around their direct survival whilst the Nature organisations think about medium term for a natural Haringvliet in the future.
- Local inhabitants and farmers have indigenous and specific knowledge ('boerenverstand'), compared to the large knowledge institutes who have more general scientific knowledge. This mismatch also exists between nature organisations with a vision for the whole area while farmers focus more on their needs. This creates different depths of knowledge and boundaries for research.
- The plan addressing the bio-physical aspects of the problem has to be considered and approved by the Delta-commissaris but the Deltacommissaris does not have jurisdiction to realise the plan.
- Nature organisations and government agencies look at the Haringvliet as part of a larger ecosystem while the agriculture sector see the Haringvliet as a freshwater basin on its own. This is caused by the difference in timescale at which the agriculture operates compared to the timescale at which the national government

(mainly the Ministry of Infrastructure and Water Management) makes their policies for the Haringvliet area. Most farmers on Goeree–Overflakkee have not experienced a (partially) salt Haringvliet – as it was before the instalment of the Haringvliet sluices - in their lives and thus most of them only see the negative effects of the altered sluice management plans like the Kierbesluit or Delta21.

- Fragmentation of specific knowledge, the many stakeholders with specific knowledge: Rijkswaterstaat, nature organisations, agriculture all have specific knowledge that does not per se occupy the same field and leads to different frames and understandings of the problem and the possible solutions.
 - The Haringvliet is owned by the national government while the land that surrounds the Haringvliet and is heavily impacted by the Haringvliet is private or municipally owned land. In other words, the jurisdiction of Haringvliet and the jurisdiction of the interconnected land surrounding the Haringvliet are different at both scale and type.
 - The stakeholders most effected by a saline Haringvliet, namely the inhabitants and agriculture, do not have the institutional level to impact the outcome.
 - The spatial scale of the Delta21 plan is larger than the Haringvliet spatial scale as defined in the problem.
- Where do government bodies not match up with the scale or the spatial and temporal scale of the Haringvliet?*
- Ministry has a national jurisdiction, but it must make the final decision for water-systems that spatially occupy local or at most regional areas. Jurisdiction is done at different levels: municipal jurisdiction is done by the municipality and inhabitants of this municipality; provincial jurisdiction is done by the province and national jurisdiction is done by the Ministry at hand.
 - Rijkswaterstaat is responsible for the tasks and projects in the Haringvliet's meaning they are planning the future development. However, they do not have the jurisdiction to make the final decision. → organisation responsible for strategies: Ministry of I&W and projects and tasks: Rijkswaterstaat
 - The National Deltaplan is reconsidered every 6 years, whilst the temporal timescale at which the Deltacommissaris operates is much longer: they look at the far future. (level mismatch) When there's a need for policies to be constructed at a timescale smaller than these 6 years, for these policies to be implemented in the National Deltaplan you would need to wait.
 - Large number of overlapping jurisdictions and institutions make it hard to pin-point the responsible actor who has to take the lead and has ownership. (no single entity taking leadership/ownership over the problem).
 - The stakeholders that can provide the financial resources for addressing the problem are at the national jurisdiction while the spatial scale of the Haringvliet is regional.

Step 6: Identify mismatches based on experienced issues

Discuss other problems and how they could be defined as a mismatch.

- Large number of stakeholders with very high interest in the outcome.
- Opening the Haringvliet sluices isn't in itself a climate adaptation measure, but a trade-off for exchanging areas with a high natural value elsewhere for a climate adaptation plan. (Does the decision-making revolving around the entire Delta21 plan consider the positives from salinizing the Haringvliet specifically).
- Organisations such as Rijkswaterstaat have multiple institutional scales that act on the same problem. This could introduce communication issues and knowledge gaps about the problem between these institutions.
- Who is responsible for the chemically polluted sediment which has settled on the bottom of the Haringvliet over the past years (1970s?).
- Uncertainty and lack of jurisdiction/institutions regarding the future impacts of climate change on the Haringvliet and its surroundings, all governed within the Dutch model of 'Polderen'.
- Problems of representation could occur in the actors representing the sectors capable of representing all individual actors. Example: Individual farmers can have differing opinions from LTO Noord; or Nature organisations can lobby and create projects that end up having a negative effect on nature.

- There are European Guidelines on water quality (Europees Kader Richtlijn Water), Nature (Natura 2000) and water safety (Flood protection) which are designed for the entire area of Europe have to be applied to the regional area of the Haringvliet.
- The goal of nature organisation is opening the sluices while the discussion point of agriculture is against the results of this: more saline water in the Haringvliet and how this will impact them.
- Problems in communication because of fragmentation of the actors.

Step 7: Define what problems are caused by scale mismatches

- Communication can become cumbersome with such a large group of stakeholders.
- Decision-making only happens after long and inefficient debates and discussions, which slows down the process of solving the problem at hand.
- Reorganising the Deltaplan happens every 6 years, thus implementing the plan depends on timing.
- Decisions that are made in other parts of the Delta21 plan influence the Haringvliet area in some way. Take for example the energy storage lake, the creation of which might change the geomorphology in the area.
- Many (government-)institutes must be on board to realise the opening of the sluices.
- Little chance that someone takes the leadership in addressing the problem, since it is so complex and resource consuming.
- Strategic coalitions of actors with similar goals (with veto rights? Blocking coalitions).
- Powerful interest groups with understanding of the political aspects of the problem.
- Low trust between the stakeholders and thus high administrative costs to set up meetings and discussions.
- Difficulty to break the current debate with new, innovative/radical ideas.
- Different parties trying to frame the debate both in the discussion as in the media.
- Local knowledge is disregarded to some extent or local stakeholders can feel their specific knowledge is not taken into account.

Keeping in mid subjective judgement: Discuss how different stakeholders might judge scales and levels to be different from us as researchers.

- Stakeholders often only reflect upon their own needs: for farmers, this would mean no salinization of the soil or water, because this would affect their crops negatively. Researchers search for the best solution overall, striving to construct advice in which no parties are given preference over the others.
- Researchers try to investigate all positive and negative effects of a certain measure, whilst stakeholders often focus on a specific area of interest or sub-topic within the problem.
- Researchers set preliminary boundaries when they start conducting their research on the problem, whilst stakeholders can operate on a cross-boundary level. This might give an advantage to the stakeholders because they are more able to think 'outside of the box', in this case defined as the preliminary boundaries between which the research on the problem is conducted.
- Jurisdictional: stakeholders tend to follow the jurisdictional scale set for their profession/interests etc. In other words, government agencies only/mainly look at their jurisdictional level as the spatial level of the problem.

Designing governance arrangements to overcome misfit

Step 8: Identify the most important mismatches

Which of misfits identified in the previous steps do you consider to be the most prominent to be in need of a governance arrangement?

- Jurisdiction, management and institutional scales of governance agencies mismatch with the scales of the Haringvliet.
- Differences nature and agriculture organisations regarding temporal, spatial and knowledge scale.
- The scales at which the actors with financial resources act and the Haringvliet are not aligned directly.

- Uncertainty climate change and different levels of knowledge of stakeholders.
- Problems in communication due to the fragmentation of the actors.

Step 9: Brainstorm governance arrangement ideas

Which governance arrangements are needed in order to create a better match between the bio-physical scales of the problem and the other scales?

- Workshop: collaborative knowledge creation, trust building, traditional knowledge acquisition, define boundaries, ensure local context is considered (look at existing knowledge-creating endeavours).
- Creation of groups of stakeholders that share the same (realistic) vision about the past, the present and the future of the Haringvliet.
- Scientific forum.
- Public Private Partnership: partnership between private actors and public agencies to decide on the future of the Haringvliet.
- Strategic public expenditure to ensure enough fresh water.
- Creating an organisation with all important stakeholders to have (temporary) jurisdiction of the problem. Government stakeholders and 'advice' from other stakeholders? ← Participation is key, have to keep trying (just like the Delta commission for the Haringvliet).
- Find a larger network to nest this governance arrangement into.
- Sanctions if agreements are not followed.
- Experimentation: both with solutions and arrangement.
- A user-friendly decision-support system that serves as a source of knowledge, mostly meant for the local stakeholders as a way to share their local knowledge and gain insight as to how realistic certain measures will be.

Step 10: Choose an arrangement composition

Select governance arrangements that could help to realign the problem-governance mismatch for that specific challenge. Note that multiple arrangements can be combined to tackle multiple governance challenges at the same time.

- Workshop: collaborative knowledge creation, trust building, traditional knowledge acquisition, define boundaries, ensure local context is considered. (look at existing knowledge-creating endeavours). Using a Decision Support System (DSS) to experiment with different outcomes based on actors' visions and demands. These experiments and negotiations can lead to a shared and agreed upon vision or at least will promote the cooperation between different sectors and actors.
- Haringvliet Jurisdictional Commission: a governance arrangement which provides a platform consisting of relevant representatives which has the jurisdiction to realise the vision created in the workshop (after a democratic vote in Tweede Kamer) to ensure that this vision will be implemented.

Rules: After you selected the governance arrangement(s), try to make them as specific as possible. This is a crucial step as this will allow by specifying: main rules and how to manage the implementation of adaptation measures.

- All important stakeholders have to participate in the workshop. Important stakeholders are those who are directly or indirectly affected by changes in the state of the Haringvliet and those who have the power to influence the process. The initial stages will be invitation based, based on the previously done stakeholders analysis. However, over time stakeholders can be added to the invite list when it becomes clear they are being affected or have power to influence. To speed up the discussion process, you could do some preliminary brainstorm sessions in pre-defined focus groups. For the latter, you have to be cautious that every voice is heard equally, and especially local knowledge is not lost in the process (e.g. a focus group like the Droomfonds Project that played a role in the process of the Kierbesluit).
- The other side of the coin, the workshop and the jurisdictional organisation should not have more participants than necessary.

- All stakeholders in the process have to be recognized by the Ministry of Water and Infrastructure as this is the final decision maker
- The jurisdictional organisation responsible for implementing the vision should have a clear mandate and should not be allowed to exceed its tasks it was originally delegated for.
- The jurisdictional organisations should have a set time limit for which it is mandated. The time limit should have a time limit both irrespective of the work it is doing and a final goal after which it is finished.
- The parties represented in the Haringvliet jurisdictional organisation are set at its start and should not change afterwards.
- The final vision created from the Workshops needs to be realistic and not a water downed compromise.
- The process should be transparent
- It is the workshop leader, Delta21, to ensure smaller stakeholders that might not reach the importance of partaking directly in the process are not ignored.

Process: How should the process be organised, and which stakeholders should be involved in your case.

- Regular interaction between the participating stakeholders, four times a year.
- The workshops are organised by and led by the Delta21 initiative
- Firstly, all parties involved need to create a common understanding of the Haringvliet as a system. Creating clear definitions and terms that can be used in further knowledge creation and negotiations.
- Trust building through answering important questions via independent scientific research and knowledge gathering.
- Build a knowledge base via literature research and new research to determine the impact of climate change on the Haringvliet and proposed ideas.
- Creating a shared vision for the future of the Haringvliet.
- Conflict mediation should be sought by a more neutral party, preferably Rijkswaterstaat, as the responsible stakeholder for the Haringvliet or the workshop leader.
- Possible compensatory measures for fresh water supply have to be investigated.
- A workshop should be organised where smaller stakeholders that are not included in the normal workshops have the opportunity to verbalise their needs, demands and interest.
- Coordinate with workshop experts in Rijkswaterstaat to ensure the right parties and people are invited.
- Delta21 needs to ensure that before any invitations for the workshops are sent out, actors like Rijkswaterstaat and other key stakeholders are on board to ensure legitimacy. This should most likely include arrangements with the final decision maker that if the workshops are successful, the Haringvliet Commission will become reality.

Instrument: What are the instruments needed to make this arrangement work in your case?

- Decision Support System: Based on the experience of the 'Ruimte voor de Rivieren' project. A decision support system consists of three main phases: Information phase, definition phase and the testing phase. The DSS allows for experimentation with different ideas in order to see how they would impact the area. A DSS will have to be tailored to the Haringvliet. However, it can be based on existing structures.
- Financial resources are required for administrative costs, renting a space to hold meetings, developing software for the DSS, and pay for members of the Haringvliet decision programme.
- Haringvliet Commission: an organisation that receives the jurisdiction to present the plan for the Haringvliet to the final decision makers which is assumed to be the Tweede Kamer as the Haringvliet is a complex topic with many interest regarding a government owned water body.

- **Workshop:** A day or afternoon/morning event where all stakeholders together to ask questions, experiment with the DSS, discuss changes and create a shared vision. Workshops are preferably held close to the project area, i.e. near the Haringvliet. They should also include more informal opportunities for stakeholders to network in for example lunches.
- An online science forum created for easy use that visualises the vision for the Haringvliet and allows everybody to see changes.