Political Reflection

Developing a Flood Risk Management Plan for the Ijssel River

Student	Student Number
Agathe Mommeja	5726816
Aaron Paris	5890780
Carolina Niewöhner	5889073
Emma Lombardo	4464249
Justus Hinze	5898234
Mira Kopp	5892953

Research by

ECAMJA | Analytics

Table of Contents

Introduction

Rijkswaterstaataat's main objective is to reach a consensus of all parties on one policy for the flood management of the IJssel River. Special emphasis is on the agreement of the Delta Commission due to its veto power. Therefore, the general focus lies on safety and a long-term approach. However, as introduced by the Rijkswaterstaat in its opening speech during the final debate, a policy integrating the interest of many different actors will leave all parties somewhat dissatisfied. Nevertheless, most actors agreed that a good policy should always minimise the number of casualties. While some actors are primarily concerned with limiting the disruption of the existing ecosystem (environmental interest group), others are concerned with securing the economic activity of certain regions (Overijssel, Gerlderland), or businesses (Transport Company). In the final debate, all actors iteratively tried to develop a policy that includes as many interests as possible. Yet, such a method did not limit the challenges and tensions associated with seeking a policy which could satisfy all or, at the very least, most. As analysts for the Rijkswaterstaat, group 25 did not have political objectives and instead held the position of bystander and advisor. This reflection will focus on four pillars. First, on introducing the challenges and tensions experienced during the process of decision-making. Second, on the implemented measures: which steps can be identified and associated with these challenges. Third, on outlining future measures and strategies which could be applied. Finally, a brief reflection on the impact and role of our advice in the debates will be presented.

Potential Tensions and Challenges

Multi-actor decision-making

Within the context of problem-solving, a category of challenges is known as wicked problems. These are characterised by their intricate nature. Their complexity arises from the interplay of numerous interdependent factors, such as in the IJssel River case, making it difficult to establish a clear understanding of the problem itself (Rittel & Webber, 1973). One prominent aspect of this wicked problem is the divergence in how different groups framed the existing conflict. Various stakeholders brought forth their distinct perspectives: the environmental interest group focused on the imperative to limit environmental damages, Rijkswaterstaataat emphasised the need to protect lives, while the provinces aimed to limit material damages and safeguard the economic hub. Hidden alliances between players like Overiijssel and Gelderland and tactics further complicate the resolution process, adding another layer of complexity to the wicked problem (Klein et al., 2001).

Contested knowledge and information bias

There is a significant risk associated with proposing a policy, which involves actors raising doubts about the scientific knowledge underlying the policy. This can result in political disputes and controversy, shifting the focus from policy selection to the discussion of details. Paradoxically, the increasing growth of scientific knowledge aimed at resolving political issues can actually exacerbate conflicts and impede progress. Here the concept of negotiated knowledge, shaped by various perspectives, interests and contexts (De Bruijn & Leijten, 2007) becomes a critical factor. Despite using the same model, there can be significant ambiguity in terms of what is being discussed and how it is interpreted. This was demonstrated to be the case, as all the actors had worked with the same model, yet most of them came to different conclusions as a result of the interpretation stemming from each analysis.

Flaws in traditional decision-making

Following the final round of debate, it could be tempting to assume the flood risk management plan to be completed. However, much uncertainty regarding the implementation of the plan and its effectiveness in responding to future flood events persisted as a result of our changing environment (Kwakkel et al., 2014). Traditional decision-making assumes there is an ideal solution to a problem, however, this is not applicable to complex problems and multi-actor contexts where the problem formulation and decision are influenced by the actors' subjectivity (Crowley & Head, 2017). While a solution may seem appropriate in the current context, there is high uncertainty about its sufficiency in the future due to the wicked problem characteristics. In order to guarantee long-term safety, adaptivity is required in case future events differ from those previously hypothesised (Haasnoot et al., 2013). Kwakkel et al. (2014) argue that adhering solely to a single policy pathway may cause serious harm to people and the economy, making the development of adaptive policy pathways crucial to create a robust solution.

Modeller as a policy broker

While the model is supposed to inform the decision-making process, it should not be seen as the ultimate policy solution when there is deep uncertainty (a model does not generate certainty) (Bankes, 1993). When pursuing a top-down approach in which the model dictates the outcome, actors may feel like their interests are not reflected in the model, causing them to impede the process. Additionally, to prevent the model results from being influenced by political agendas, Saltelli et al. (2020) argue about the importance of ensuring that modellers do not overstate their models' certainty. Furthermore, politicians cannot selectively rely on chosen models to evade accountability. Recognizing that the model should not be seen as the ultimate policy solution, but rather as an informative tool, it is essential that the Rijkswaterstaat as the ultimate decision-making authority weighs the different options. Stakeholders' interests should be considered and the "correct" solution should then be decided upon from a policymaker's perspective. By adopting this approach, the modeller serves as a valuable advisor or so-called "policy broker", facilitating the learning process and providing insights.

Implemented Measures

Multi-actor decision-making

Rijkswaterstaat took the initiative to meet up with all actors individually, aiming at understanding their objectives and strategies. However, all parties were rather reluctant to share thresholds and transparency was low. To prepare our client for the debates, we decided to create an overview of the different positions held by the actors involved (see Appendix A). Due to our exclusion from the preliminary debates by actors, our perspective was influenced by the perception presented by Rijkswaterstaat. Though our intention was to prepare custom argumentation and replies, our focus was redirected by Rijkswaterstaat towards other endeavours, altering the course of our engagement. In our attempts to provide Rijkswaterstaat with relevant policy advice through modelling, we integrated different perspectives. Firstly, we performed an open exploration exposing extreme policy decisions. Secondly, in collaboration with the other analyst group of Rijkswaterstaat, different problem formulations were modelled, optimising for aggregate results and spatial detailed results.

Contested knowledge and information bias

Displaying initiative, we made efforts to initiate discussions with other analysts and actors involved in the decision-making process to find some preliminary agreements on thresholds and solution preferences, aiming at reaching negotiated knowledge. Sadly, these attempts proved unsuccessful, primarily due to a lack of interest from the other stakeholders. The minimal engagement from other participants hindered our ability to gather diverse perspectives and insights and foster an open discussion. We counterbalanced the lack of access to first-end information by having frequent debriefs with the Rijkswaterstaat. Such meetings were preferably held right after their meetings and/or debates to limit the amount of loss of information. Another challenge we faced was the inability to access the source code for the modelling of the visualisation tool presented by Gelderland, as it was not made publicly available. However, we undertook measures to verify the reliability of the model and the starting values used to obtain the presented data. Through our independent evaluation, we confirmed that both the model and the starting values were indeed reliable. This validation ensured that the information provided by Gelderland was grounded in a sound foundation, contributing to the overall credibility of the knowledge shared. The knowledge that proved most contested was how RfR would be performed in practice. Especially during the final debate, a major debate arose around the consequences of river widening and deepening on the water level, the ability of the transport company to use the river and biodiversity.

Flaws in traditional decision-making

In order to confront the high uncertainty involved, a multi-scenario MORDM analysis was performed optimising over many different uncertainty combinations. Robustness checks allowed for the selection of a policy that performs well in many scenarios defined in the model. However, outside parameters might change drastically in the future (e.g. through climate change), potentially rendering the model outcomes obsolete. The multi-scenario modelling cannot give certainty about the occurrence of any scenarios. For such cases, Walker et al. (2012) suggest a dynamic adaptive approach, which requires the definition of concrete immediate actions, but also the establishment of a monitoring system, and trigger responses. While Rijkswaterstaat mentioned in the final debate possible renegotiations about the dike heightening in rings 2 and 4, there was not a clear decision made on the procedure. For an adaptive pathway, all actors need to agree on signposts and subsequent actions (Walker, 2019). Thus, it cannot yet be considered an adaptive pathway as Kwakkel et al. (2014) propose for decision-making under deep uncertainty. Another important prerequisite for the establishment of an adaptive policy pathway would be the open negotiation about the problem formulation for the model and thresholds for certain parameters. Both guide the model and could help in monitoring and adapting to a future situation. Consequently, further negotiations with the stakeholders would be needed to develop an adaptive pathway for river management that clearly defines above which thresholds there will be renegotiations or changes in strategy. While the Rijkswaterstaat did try agreeing on thresholds, the public setting in the debate round 1 made it difficult for the actors to openly share their limits.

Modeller as a policy broker

Throughout the process Rijkswaterstaat instructed the analysts to explore different types of problem formulations and simulate specific cases to inform their policy and strategy making. The models thus were used as learning tools to better understand the problems, and not to evade accountability

by Rijkswaterstaat. The tool that Gelderland proposed in the first round was scrutinised by us analysts to test whether it would fulfil its promises on neutrality. As the source code behind their visualisation table itself had not been made public, we as analysts recommended not to use it in the process. Gelderland's political agenda might have influenced the results and dictated a policy that not all actors would be fully in line with. Based on the negotiations Rijkswaterstaat led with all the actors prior to the second debate, certain boundaries were defined. Through modelling, a preferable policy proposal was drafted. In the debate, we further assisted Rijkswaterstaat with simulations such as the costs and impacts of the debated policies. Lastly, a policy was compiled and agreed upon. A critical observation regarding the final debate is that partial agreements were reached on measures specific to dike rings in order to shape the final decision. However, from a perspective that acknowledges the complexity of the problem, this approach is suboptimal as it fails to recognize the interconnected nature of the problems and their solutions.

Future Measures & Strategy

Multi-actor decision-making

It is evident that the discussions lacked clear guidelines and structure. It would have been beneficial for Rijkswaterstaat, as the debate leader, to establish clear processes from the outset. Allocating specific time slots for each participant to speak would have ensured balanced participation, as only those who disagreed predominantly voiced their opinions. While some smaller discussions were organised by Rijkswaterstaat, they were mostly limited to a single meeting per actor. In retrospect, follow-up meetings and frequent smaller discussion groups to build trust and solidify the engagement of all involved parties can be recommended. Such meetings could have hopefully harboured a feeling of unity against the problem. Creating an environment for dialogue and collaboration would have allowed for a more thorough exploration of ideas, concerns, and potential solutions. Furthermore, the interconnected nature of the debate should have been acknowledged and leveraged. Recognizing the links between the current decision-making process and other relevant arenas, such as the nitrogen crisis and future drought, would have allowed for a more comprehensive understanding of the complex challenges at hand. In doing so, innovative and effective solutions could have been explored. Complexity should be embraced as an opportunity to uncover interconnected solutions that may not be achievable through isolated approaches alone (Klein et al., 2001).

Contested knowledge and information bias

The ambiguity surrounding the interpretation of the model and its results proved a significant challenge. To mitigate this, efforts can be made to translate the formal language of the model into the language that resonated with the clients and stakeholders (Tsoukiàs, 2008). By offloading ambiguity through clear and concise communication, we could have ensured that everyone involved had a consistent understanding of the concepts and variables being discussed. Prior to the debates, it would have been beneficial for all actors to agree on the interpretation and usage of the model, establishing a common ground for meaningful discussions. Incorporating visual aids, such as diagrams or presentations, would have been instrumental in facilitating a clearer understanding of complex concepts. Overall, Rijkswaterstaat should prepare better and prior to any negotiation define a framework and agree on definitions. Counter-arguments to offset critics could be prepared in advance of the debate. An in-depth discussion about critical issues should have taken place, such as how to interpret measures like room for the river to ensure a common understanding.

Flaws in traditional decision-making

As previously mentioned, Rijkswaterstaat's future policy should focus on developing adaptive policy pathways to make the policy more reactive to future uncertainty. For this to be achieved, stakeholders need to get together again and form a task force that will be responsible for defining these pathways. Additionally, the development of river flood risks should be monitored to be able to act in time. To establish such pathways, Kwakkel et al. (2014) define an iterative process (Appendix B) which provides them with structure and enables them to shape actions. Importantly, this approach does not compromise the ability to make decisive future plans; instead, it encourages a balanced approach that combines short-term measures with a strategic vision. This combination is especially beneficial for the Rijkswaterstaat as it ensures continuity for the implementation while also avoiding unnecessary investments in case solutions become ineffective due to changes in the circumstances.

Modeller as a policy broker

In order to ensure the future development of the model aligns with the needs of society, it is crucial to undertake a thorough revision that focuses on minimising biases inherent in the model and selected problem formulations. This approach aims to prioritise the model's ability to serve society by offering valuable insights rather than imposing predetermined solutions. Saltelli et al. (2020) outline that underlying assumptions and the problem framing should be re-assessed, unnecessary complexity is avoided from being added to the model, and the uncertainty about the quantification, and unknowns from the model are clear and transparent to all the stakeholders. Therefore, adding more dimensions to the model such as biodiversity or water level should be avoided but rather solutions should be negotiated on a qualitative basis. Finally, the results from the model should go through a series of filters to ensure the minimum requirements of the parties are met.

Reflection on our Strategy

Unclear Procedures: The predominant issue observed throughout the debate was the lack of clear procedures. To address this, several steps can be taken. First, it is crucial to define the meaning of all measures and establish who will bear the costs for each measure. Second, setting fair speaking time limits can ensure a balanced and inclusive debate where opponents don't dominate. Third, involving stakeholders and forming a committee with representatives from each stakeholder group can facilitate negotiations on boundaries and assumptions used in the model. Finally, a decision should be made on how the measures will be monitored, and responsibility for developing a Dynamic Adaptive Policy Pathway should be assigned (Kwakkel & Haasnoot, 2019). The absence of established standards for implementing adaptivity might result in future risks. As analysts we could have assisted Rijkswaterstraat more in developing these procedures, however, we decided that it lay outside of our responsibility to manage the political debate. Instead, we focused on creating a stakeholder analysis and developing the model so we could help them find the optimal policy.

Contested Information: Agreement on the meaning of variables and how to use the model beforehand is crucial to avoid ambiguity and conflicting interpretations. The discussion leaned towards a technocratic and model-based approach, with little reflection on the practical implementation. This lack of clarity in interpreting the model's outcomes and understanding its limitations can hinder decision-making. To address this, it is important to translate the formal language of the model's results into a language that is easily understood by the stakeholders, offloading ambiguity and promoting shared understanding (Tsoukiàs, 2008). Our initial approach of facilitating shared knowledge did not succeed, likely due to the hidden agenda Gelderland was following, negotiating with all the dike-rings outside of the public. Doing this earlier on, jointly with Rijkswaterstraat and a clear process procedure might have avoided the secret alliance and created a more transparent process.

Multi-Actor Interests: The lack of transparency regarding the actual interests of the actors poses a challenge. Attempting to gather stakeholders' positions in the first debate did not yield satisfactory results, as actors were reluctant to share them in that public setting. To address this, a more private and productive discussion could have taken place earlier in the process, allowing for a deeper understanding of individual interests and alignment on modelling efforts. Actors should come together and agree on knowledge beforehand based on their values and beliefs (De Bruijn & Leijten, 2007), aligning the basis on which further discussion and modelling will be built upon. Additionally, Gelderland's attempt to implement a universal tool failed due to a lack of full public disclosure.

Understanding of Complexity: The negotiation of measures at the individual dike rings in isolation neglects the interconnected nature of the measures and their implications. It is essential to recognize that nothing is decided until everything is decided, adopting a holistic perspective. The strong interconnections between measures and their wider implications should be considered to ensure a comprehensive and effective decision-making process.

In conclusion, despite the challenges posed by unclear procedures and contested information, the model proved valuable in deepening the understanding of the problem and informing the decision-making process. By implementing the suggested solutions, such as defining procedures, enhancing transparency, clarifying variable interpretations, and considering the complexity, the decision-making process can be improved and better equipped to address the identified problems.

References

Bankes, S. (1993). Exploratory modeling for Policy Analysis. *Operations Research*, *41*(3), 435–449. https://doi.org/10.1287/opre.41.3.435

Crowley, K., & Head, B. W. (2017). The Enduring Challenge of 'Wicked Problems': Revisiting Rittel and Webber. *Policy Sciences*, *50*(4), 539–547. https://doi.org/10.1007/s11077-017-9302-4

De Bruijn, H., & Leijten, M. (2007). Megaprojects and contested information. *Transportation Planning and Technology*, *30*(1), 49–69. https://doi.org/10.1080/03081060701208050

Haasnoot, M. (2013). *Anticipating Change : Sustainable Water Policy Pathways for an Uncertain Future.* https://doi.org/10.3990/1.9789036535595

Haasnoot, M., Kwakkel, J. H., Walker, W. E., & ter Maat, J. (2013). Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world. *Global Environmental Change*, *23*(2), 485–498. https://doi.org/10.1016/j.gloenvcha.2012.12.006

Häberli, R., Bill, A., Scholz, R. W., & Welti, M. (2001). 1. Summary and Synthesis. In J. T. Klein & W. Grossenbacher-Mansuy (Eds.), *Transdisciplinarity: Joint Problem Solving Among Science, technology, and Society: An Effective Way for managing complexity* (pp. 11–11). Birkhäuser.

Kwakkel, J. H., & Haasnoot, M. (2019). Supporting DMDU: A taxonomy of approaches and Tools. *Decision-Making under Deep Uncertainty*, 355–374. https://doi.org/10.1007/978-3-030-05252-2_15

Kwakkel, J. H., Haasnoot, M., & Walker, W. E. (2014). Developing dynamic adaptive policy pathways: a computer-assisted approach for developing adaptive strategies for a deeply uncertain world. Climatic Change, 132(3), 373–386. https://doi.org/10.1007/s10584-014-1210-4

Kwakkel, J. H., Haasnoot, M., & Walker, W. E. (2016). Comparing robust decision-making and dynamic adaptive policy pathways for model-based decision support under Deep uncertainty. *Environmental Modelling & Software*, *86*, 168–183. https://doi.org/10.1016/j.envsoft.2016.09.017

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, *4*(2), 155–169. https://doi.org/10.1007/bf01405730

Saltelli, A., Bammer, G., Bruno, I., Charters, E., Di Fiore, M., Didier, E., Nelson Espeland, W., Kay, J., Lo Piano, S., Mayo, D., Pielke Jr, R., Portaluri, T., Porter, T. M., Puy, A., Rafols, I., Ravetz, J. R., Reinert, E., Sarewitz, D., Stark, P. B., ... Vineis, P. (2020). Five ways to ensure that models serve society: A Manifesto. *Nature*, *582*(7813), 482–484. https://doi.org/10.1038/d41586-020-01812-9

Tsoukiàs, A. (2008). From decision theory to decision aiding methodology. *European Journal of Operational Research*, *187*(1), 138–161. https://doi.org/10.1016/j.ejor.2007.02.039

van Remortel, E., & H+N+S Landscape Architects. (2021, November 29). Room for the river – NbS for coastal and river flood protection in cities. Panorama.solutions. https://panorama.solutions/sites/default/files/ontwerp.jpg

Walker, W. E., Marchau, V. A. W. J., & Kwakkel, J. H. (2012). Uncertainty in the Framework of Policy Analysis. International Series in Operations Research & Management Science, 215–261. https://doi.org/10.1007/978-1-4614-4602-6_9

Walker, W.E., Marchau, V.A.W.J., Kwakkel, J.H. (2019). Dynamic Adaptive Planning (DAP), in: Marchau, V.A.W.J., Walker, W.E., Bloemen, P.J.T.M., Popper, S.W. (Eds.), Decision Making under Deep Uncertainty. Springer International Publishing, Cham, pp. 53–69.

Appendix A

Stakeholders, perspective and power-interest matrix

Different stakeholders, alongside their perspectives, were presented in the technical report. The following information was developed, and the power-interest matrix was consecutively developed.

- *The transport company* aims at keeping the level of water deep enough for freight transport,
- *The rural dike rings* would like to avoid losing farmland,
- *The environmental group* prefers to avoid human intervention along the river,
- *Dike rings and their representatives*, Overijssel and Gelderland provinces, are not only morally concerned by saving lives, but directly affected.
- The *Rijkswaterstaat* and the *Delta Commission* both have responsibilities involved in case of a flooding and are financially highly involved to implement the policies as well.

The **power** of the stakeholders can be explained in different ways.

- The *environmental group and the inhabitants* (dike rings) do not have immediate levers to defend their interests,
- The *transport company* can argue that its services benefit the wider economy,
- The *provinces* have the strength of the number, given the size of the population they represent. They can also argue on their participation to the wider economy,
- *Delta Commission* has a financial power, and a veto right translating into executive power
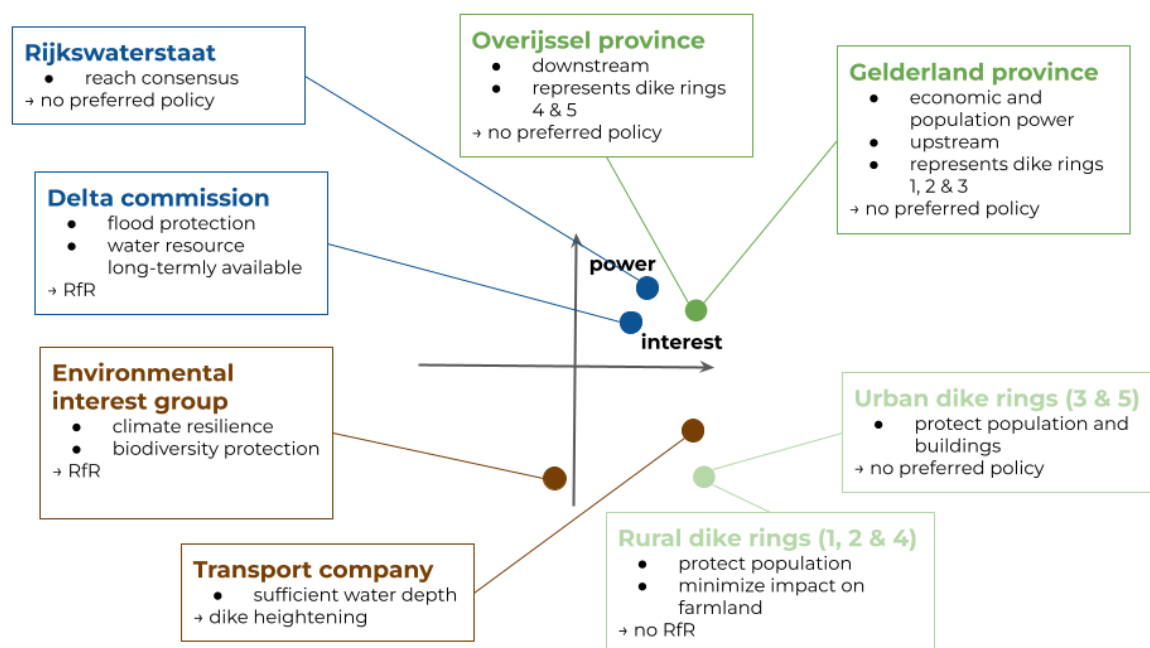- *Rijkswaterstaat* decides about and is responsible for implementing the chosen policy.

Figure 1: Power vs Interest matrix representing all stakeholders, with their core aim and a priori preferred policy lever.

Appendix B

Process framework for developing dynamic adaptive policy pathways

Figure 2: Process for developing dynamic adaptive policy pathways (Kwakkel et al., 2014)