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How High is High Enough?

Dutch Flood Defences and the Politics of Security

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Why are Dutch flood defences as high as they are? And who has made that decision? These seemingly simple questions have complicated answers because they deal with issues of security. Increasingly, historians and political scientists point to 'securitisation' theory to help explain how some security issues are socially constructed as a threat and thereby dramatised as an issue that needs to be dealt with urgently. This article argues, however, for a focus on 'desecuritisation': the process by which measures are first suggested and then adopted to prevent the security breach from reoccurring, thereby allowing for a return to 'normal'. Experts, we suggest, play a key political role in this process, which often remains under- or unstudied because it deals with specialist subjects such as economics or physics. In this article, we analyse the choices and compromises made by the Delta Committee in the wake of the catastrophic storm surge of 1953 in the Netherlands, and the way these were then shrouded in the language of absolute scientific certainty, leading the Dutch Government and Parliament to accept the committee's recommendations without seriously questioning their basis.

Hoe hoog moet een dijk of dam zijn? En wie bepaalt dat eigenlijk? Antwoorden op die vragen hangen samen met visies op wat veiligheid inhoudt en de vraag hoe veilig iets kan of moet zijn. Historici en politieke wetenschappers die geïnteresseerd zijn in 'veiligheidstheorieën' doen dat steeds meer vanuit de gedachte dat bedreigingen voor die veiligheid het resultaat zijn van een politiek, intersubjectief proces waarbij een probleem tot een dringend veiligheidsvraagstuk wordt geconstrueerd. Dit artikel suggereert dat juist ook aandacht moet worden besteed aan 'desecuritisatie': het eveneens politieke proces waarbij maatregelen worden gesuggereerd en vervolgens goedgekeurd om herhaling van de dreiging te voorkomen en terug te keren naar de normaliteit. Dit proces vindt vaak (deels)

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plaats buiten de traditionele politieke arena. Hiervoor worden experts ingeschakeld die een zogenaamd apolitieke en wetenschappelijke oplossing dienen uit te werken. In dit artikel analyseren we hoe de Deltacommissie na de Watersnoodramp van 1953 haar desecuritisatiearbeid verrichtte: door politieke aannames te construeren en die vervolgens als rationele wetenschap te presenteren.

Introduction

In the Netherlands, water levels are indicated as being above or below the Amsterdam Ordnance Datum (*Normaal Amsterdams Peil* or NAP).[1] Originally, its zero line was the relatively constant water level of the Amsterdam canals, but since the nineteenth century NAP has become shorthand for sea level.[2] About a quarter of the current territory of the Netherlands is located below NAP, meaning that it would flood almost instantaneously were it not for dunes and, crucially, man-made sea defence systems. If they fail, the consequences would be disastrous. The sheer weight of thousands of cubic metres of water, pushed through by winds and currents, would crush almost anything – and everyone – in its path. The critical role of man-made flood defence systems in keeping Dutch feet dry has earned them a central place in the public imagination, as part of the self-congratulating myth of a timeless, epic struggle against water serving as a testament to the tenacity of the Dutch ethos and psyche.

The Delta Works, constructed between 1954 and 1997 to protect the Rhine-Meuse-Scheldt delta from the sea, is the most iconic of these flood defence systems. Hailed by the American Society of Civil Engineers as one of the wonders of the modern world, the Delta Works hydraulic engineering project was created in the aftermath of the North Sea flood of 1953. Given the immense impact of the flood and the sea defences meant to prevent their reoccurrence, it seems odd that historical research on this topic is relatively scant.[3] Naturally, social and cultural histories abound detailing

1 The authors would like to thank Jacques Bos as well as the editors and anonymous peer reviewers of this journal for their helpful comments on earlier versions of this article.

2 Petra van Dam, *Van Amsterdams Peil naar Europees referentievlak. De geschiedenis van het NAP tot 2018* (Hilversum 2018); Pieter van der Weele, *De geschiedenis van het N.A.P.* (Delft 1971).

3 Exceptions, although they do not deal specifically with water security, are Cor van der Heijden, *Rampen en plagen in Nederland 1400-1940. Pestbacillen, paalwormen en plunderende Moskovieters* (Zaltbommel 2004) and Jacques van Gerwen and Marco van Leeuwen, *Zoeken naar zekerheid. Risico's, preventie, verzekeringen en andere zekerheidsregelingen in Nederland 1500-2000* (Amsterdam 2000), which deals primarily with social security. In Germany, 'disaster research' is a thriving field. See Gerrit Jasper Schenk, 'Historical Disaster Research. Concepts, Methods and Case Studies', *Historical Social Research/Historische Sozialforschung* 32:3 (2007) 9-31.

the flood's effects. But tellingly, most recent studies on water defence works in the Netherlands have been written at technical universities and focus predominantly on either the science of the sea defences or on analyses of their institutional-sociological surroundings.[4]

This article, by contrast, focuses on what seems like a very straightforward issue. The Delta Works were designed and built to keep the country safe from water, or, in other words, to provide *security*. But security can never be absolute; total and complete freedom from the fear of floods – or, indeed, from any sort of risk – is unattainable. This means that at one point in time, decisions were made to determine an 'acceptable level' of security the Delta Works would provide, and that the height of the dams and dikes was fixed at a level that was 'high enough' to do just that.[5] We set out to discover who made these decisions, and why. By focusing on the politics of security, this article connects strands of water management and natural disaster history studies with a new methodological framework inspired by the concept of 'securitisation'. It is to this concept, and the way this article applies and innovates it, that we turn first.

Water Securitisation?

Historians, social and political scientists first developed an interest in security during the Cold War. Developed as part of international relations theory, security studies focused on the effective use of organised violence and, vice versa, on the protection of the public from organised violence and on the counter of threats. With the shadow of nuclear holocaust hanging over the world, security scholars focused primarily on state security and on measures the state could take to counter threats, ranging from new weapons systems to shifts in the international system, for example by developing new military doctrines or pursuing a more aggressive foreign policy. However, following the 1998 publication of Barry Buzan, Ole Wæver and Jaap de Wilde's *Security: A New Framework for Analysis*, security studies have undergone a marked shift.

Buzan, Wæver and De Wilde rejected the implicit assumption that every decision maker at state level sees and understands threats in a similar way, believes that certain types of responses are necessary and frames these responses in a rational way. In contrast, they argued that threats, and thereby

4 Gerard van der Ven (ed.), *Leefbaar laagland. Geschiedenis van de waterbeheersing en landaanwinning in Nederland* (Utrecht 2003); Alex van Heezik, *Strijd om de rivieren. 200 jaar rivierenbeleid in Nederland* (The Hague/Haarlem 2006); Willem van der Ham, *Verover mij dat land. Lely en de Zuiderzeewerken* (Amsterdam 2007) and *Twee eeuwen Rijkswaterstaat* (Zaltbommel 1998).

5 Deltacommissie, *Nadere beschouwingen in verband met de afdamming van de zeearmen. Vijfde interim-advies uitgebracht aan de Minister van Verkeer en Waterstaat* (The Hague 1955) 19-20.

the idea and interpretation of security itself, are social constructs. Security studies, they suggested, should therefore focus on how events are dramatised as urgent threats, and on how radical political action is subsequently framed as a necessary countermeasure to neutralise the threat and thereby to attain security. Furthermore, the three founding members of what soon came to be known as the 'Copenhagen School' of security studies posited that threat needs to be labelled as such before it comes into being. An actor such as a political party, an opinion maker, a societal pressure group can do so by performing a so-called speech act. This speech act not only designates a threat, but also its referent object: the object of threat, such as the territorial integrity of the state, national honour, or the future of the human race. If the speech act is successful and a politically meaningful audience is convinced of both the nature of the threat and the risk to the referent object, the Copenhagen School (CS) has it, it (said audience) will support measures to counter that threat.[6] Crucially, security according to the CS is not synonymous with harm or whatever one might deem malign or damaging, but is the outcome of a process which constrains the theoretically unlimited scope of security along three lines: the capacity of actors to make socially effective claims, the forms in which these claims are recognised and accepted by the relevant audience, and situations to which these claims refer.[7]

A classic example of the Copenhagen School's approach to security studies is American president George W. Bush's call for a war on terror. On 20 September 2001, following the 9/11 attacks on the World Trade Center and the Pentagon, Bush addressed a joint session of Congress. In this speech act, he referenced the attacks, outlined the threat they represented ('terror') and the referent object (both American lives and the American way of life). He then suggested extraordinary measures to be taken – including the elimination of traditional legal restraints in detaining enemy combatants and the invasion of another country – to fight this unusually deceptive and uniquely anti-American enemy. These measures were justified because the war on terror could only end one way: the alternative, a victory for 'the terrorists', would be too horrible to even contemplate.[8] The speech act was successful

6 Barry Buzan, Ole Wæver and Jaap de Wilde, *Security: A New Framework for Analysis* (London 1998). Cf. Barry Buzan, *People, States, and Fear: An Agenda for International Security Studies in the Post-Cold War Era* (London 1991) 7, 134, 370; Barry Buzan and Lene Hansen, *The Evolution of International Security Studies* (Cambridge 2009) 192-208.

7 Matt McDonald, 'Constructivisms', in: Paul D. Williams (ed.), *Security Studies: An Introduction* (London, New York 2013) 63-76, here 65-67; Thierry Balzacq, 'A Theory of Securitization: Origins, Core Assumptions, and Variants', in: idem (ed.), *Securitization Theory: How Security Problems Emerge and Dissolve* (Abingdon 2011) 1-30, here 8-17.

8 Phil Graham, Thomas Keenan and Anne-Maree Dowd, 'A Call to Arms at the End of History: A Discourse-Historical Analysis of George W. Bush's Declaration of War on Terror', *Discourse & Society* 15:2/3 (2004) 199-221.

and led to what Buzan, Wæver and De Wilde have dubbed securitisation: the elimination of traditional constraints in order to combat a perceived threat. For them, securitisation is the move required to frame an issue as belonging to a special realm of politics where normal rules and regulations do not apply. CS members have therefore, especially in later publications, expressed an outspoken preference for desecuritisation, or dealing with threats within the norms and regulations of normal politics.[9]

Despite, or perhaps because of, Buzan, Wæver and De Wilde's moral objections to securitisation, historians and social scientists have made the study of securitisation processes the keystone of their analyses, turning it into a 'broad and powerful research agenda'.[10] Particularly attractive is the CS's overtly constructivist learnings, which effectively remove the objective ground from the security discourse, opening up the possibility of problematising both securitisation and the *absence* of securitisation. Historians interested in security have eagerly used the concepts introduced by the CS to analyse securitisation and desecuritisation processes in the past. Key areas of research are the ways audiences react to the speech act, struggles between various actors, semantic repertoires of speech acts that are informed by past and present events, as well as the connection between the tools and habitus of those practicing security and their ways of imagining and constructing threats.[11]

Sociologist Huibert Dubbelman's study on changing conceptions of water management provides a key illustration of the application of securitisation theory (although methodology is a more apt term) to the issue of water security. He suggests that in the wake of floods, securitising agents call for action to reduce the risk of new floods, highlighting the danger to both human life and the economy. Using graphic examples of disaster, death, and destruction, they succeed in convincing a politically significant majority that extraordinary measures should be taken to prevent the reoccurrence. By appealing to public opinion and/or political parties, they manage to secure support and, more crucially, funding for water defence projects that, before the flood and/or their securitising actions, would not be considered financially or even practically feasible.[12]

9 Matt McDonald, 'Constructivisms', 74.

10 Michael C. Williams, 'Words, Images, Enemies: Securitization and International Politics', *International Studies Quarterly* 47:4 (2003) 511-531, here 511.

11 Thierry Balzaq, 'A Theory of Securitization: Origins, Core Assumptions, and Variants', in: idem (ed.), *Securitization Theory: How Security Problems Emerge and Dissolve* (Abingdon 2011) 1-30, here 8-17. Cf. Beatrice de Graaf and Cornel Zwierlein, 'Historicizing security. Entering the conspiracy dispositive', *Historical Social Research* 38:1 (2013) 46-64, here 50.

12 Huibert Dubbelman, *Maatschappelijke golven in de waterbouwkunde* (Delft 1999) 8-11; Uri Rosenthal e.a., *De perceptie van veiligheid tegen overstromingen door politici en bestuurders* (The Hague 2004) 8.

Dubbelman's conclusions seem unsurprising and all too obvious. Nevertheless, we argue that applying the securitisation methodology to water security will illuminate something that securitisation studies in general hardly ever talk about but is as crucial to our understanding of responses to threats as the securitisation process: the way these constructed threats, once securitised, are deconstructed. The CS has shown us how to think of threat construction as an inherently *political* process, and we argue that we need to think about threat deconstruction as an equally important part of that political process. Key political players in this process, we argue, are advisory committees and other experts meeting in backrooms and working on devising solutions that are then presented to the public. Again, much depends on the relevant public accepting their proposed solution to the threat in question and their assurances that, once implemented, the threat will be dealt with. It is this political process that our article is concerned with. First, we will provide an overview of how thinking about water security developed, moving back in time to 5000 BC. Second, we analyse how solutions to the threat of a recurrence of the flooding of 1953 was devised.

Managing Floods

Before the area currently known as the Netherlands was settled, its coastline consisted of sand dunes, broken only by the estuaries of various rivers that flowed into the North Sea. As the population of this area grew and an increasing amount of peat was harvested for fuel, the soil bedded down, creating large inlets. During the early Middle Ages, global temperatures rose and the area's natural defences against the encroaching sea began to break down even more. Storm surges such as the St. Elizabeth's flood of 1404, the All Saints' Flood of 1570 and the Christmas Flood of 1717 killed hundreds, possibly even thousands, of people. Even though the heavily populated western parts of the later Dutch territory were under the seemingly continuous threat of flooding, it was deemed impossible to prevent or even contain this threat. Environmental disasters were thought to be outside of human control; they belonged to the realm of the supernatural or the divine. But more earthly concerns played their part as well. Although increasingly complex systems of dikes were built and regularly rebuilt, the institutional bodies in charge of them, namely the provincial governments and the district water boards, were too fragmented to provide a holistic system of water defence.[13] Rather than seeking to prevent flooding, local farmers in at-risk areas shifted from agriculture to cattle breeding, as cattle can be moved in case of emergency. They built their farms on artificial hills (known as *terpen*)

13 Van de Ven, *Leefbaar Laagland*, 67-68, 79-80.

or constructed intricate systems of circular dikes which could be used to compartmentalise a flooded area in order to spare others.[14]

During the nineteenth century, the Netherlands saw a massive development in what we would now call water management. Many of the former inlets, now landlocked lakes, were impoldered; a testament to both the state's increasing administrative power and technological innovations in drainage systems, most notably in the application of steam-powered pumping engines. The new polders promised to increase the Dutch agricultural acreage and were primarily appreciated for their contributions to the GDP. From the second half of the nineteenth century onwards, however, a succession of plans for new polders would combine an economic argument with promises of increased security from the threat of flooding.[15] The Afsluitdijk, which closed off the Zuiderzee and allowed for the reclamation of vast new polders for agricultural use, fitted this profile. However, the final decision to fund the project was equally influenced by the 1916 Zuiderzee Flood.[16] When the Zuiderzee Bill moved through the Lower House in 1918, several MPs urged that the dam should be able to protect the country against a repeat of the 1916 flood.[17]

A committee installed by the government in July 1918, headed by the theoretical physicist and Nobel laureate Hendrik Lorentz, was charged with designing a dike that would protect both the new polders and the existing lands and would determine the new dike's location and, crucially, its height.[18] This was a key moment in Dutch water security history. Before the nineteenth century, floods were near-universally regarded as an essentially unknowable part of God's design or wrath and there was really no way of knowing how high the water would reach the next time. And even after 1800, financial constraints, imperfect data collection on historical water levels during storms and institutional fragmentation made sure the question of the height of dikes was never addressed in a systematic fashion.[19]

The Lorentz Committee's work combined state-of-the-art hydrographic modelling of the impact of a new dam on seawater flows with

14 Petra van Dam, *De amfibische cultuur. Een visie op watersnoodrampen* (Amsterdam 2010). See also her 'An Amphibious Culture: Coping with Floods in the Netherlands', in: Peter Coates, David Moon and Paul Warde (eds.), *Local Places, Global Processes: Histories of Environmental Change in Britain and Beyond* (Oxford 2017) 78-93.

15 Van de Ven, *Leefbaar Laagland*, 67-68, 79-80.

16 Peter Gallé, *Stormvloeden langs de Noordzee- en Zuiderzeekusten* (Leiden 1917); Johan Kooper, *Nota (aan Gedeputeerde Staten van Groningen) betreffende den te verwachten invloed van de afsluiting der Zuiderzee op de waterstanden langs de Friesche en Groninger kusten* (Leiden 1918).

17 Handelingen Tweede Kamer der Staten-Generaal (HTK), vergaderjaar 1917-1918, 1793-1803, 1878-1898, 1958-1977, 2059-2077 and 2139-2147.

18 Johannes Thijsse, *Een halve eeuw Zuiderzeewerken, 1920-1970* (Groningen 1972) 23.

19 Jannis Mazure, 'Hydraulic Research for the Zuiderzeeworks', in: A.A. van Douwen (ed.), *Selected Aspects of Hydraulic Engineering, Liber Amicorum dedicated to Johannes Theodoor Thijsse* (Delft 1963) 119-150, here 121.

a historical analysis of previously recorded wind speeds and water levels. Based on these data, which the committee itself admitted was incomplete, it was suggested that the new Afsluitdijk should be raised by an additional metre to between 7.5 and 7.8 metres above NAP. This proposal was designed to withstand water levels that had accompanied the recent storm surges, taking changes in seawater flows into account. The Lorentz Committee's recommendations were taken up by the government and passed Parliament without much discussion.[20] The securitisation of the 1916 storm surges seems to have been a rather short-lived phenomenon, as debates centred mostly around the economic benefits of new agricultural lands in the former Zuiderzee and whether these offset the projected costs of the Afsluitdijk.[21] New here was the use of cutting-edge research to determine the height of the new defences in order to make sure that the Afsluitdijk would not increase the risk to the profitable Zuiderzee polder projects. The speedy desecuritisation of the project was connected to the aura of deterministic science surrounding the Lorentz Committee's report. Members of Parliament welcomed these scientists as the providers of certainty and truth: science tells us that another metre is necessary and sufficient. This desecuritisation-by-expert would remain a hallmark of Dutch water security debates.

Futureproofing the Netherlands

On the night of Saturday 31 January 1953 a high spring tide combined with a severe windstorm caused water levels to rise to over 4 metres above NAP. Dams and dikes broke and the salt sea water flooded a large part of the southern Netherlands, leaving a swathe of destruction in its wake and killing 1836 people. Images of the disaster quickly spread across the country and the world, prompting an international relief effort. In the Netherlands, the high death toll and the horrible news stories of death and suffering evoked painful memories of the recent German occupation.[22] Public and political pressure urged the government to do everything in its power to repair the damage and prevent a reoccurrence of the 'Water Disaster of 1953'. As a response,

20 *Verslag van de Staatscommissie benoemd bij Koninklijk Besluit van 4 Juli 1918, No. 30 met opdracht te onderzoeken in hoeverre, als gevolg van de afsluiting van de Zuiderzee, ingevolge de wet van 14 Juni 1918 (Staatsblad No. 354), te verwachten is, dat tijdens storm hoogere waterstanden en een grootere golfoploop, dan thans het geval is, zullen voorkomen vóór de kust van het vaste land van Noord-Holland, Friesland en Groningen, alsmede vóór de daarvoor gelegen Noordzee-eilanden* (The Hague 1926) 12-16, 201-206.

21 Hermanus Lovink and J.F. Ligtenberg, *Verslag der commissie, ingesteld bij besluit van den minister van Waterstaat d.d. 11 augustus 1922, La. D, afdeeling Waterstaat T, tot het instellen van een hernieuwd onderzoek naar de baten, welke van de afsluiting en droogmaking der Zuiderzee mogen worden verwacht* (The Hague 1924).

22 Van de Ven, *Leefbaar Laagland*, 400.

a new committee was installed quickly after the water had receded – following the model established by the Lorentz Committee – to make policy recommendations based on scientific analyses. As the securitisation of the 1953 storm was, at least in the immediate aftermath of the disaster, near-effortless, the committee's brief was broad. It had to advise the government on 'measures to secure the South-west of the country against the two evil influences of the sea: storm floods and salinisation'.[23] In contrast to the Lorentz Committee, the new Delta Committee was to recommend policy to protect the country from a repetition of previous types of storms but also against possible future storms. It therefore needed to scrutinise how likely it was that a storm of the 1953 magnitude would recur, or that in the future levels might reach even higher. The committee was also confronted with even more fundamental questions, related to making the Netherlands 'safe again'. How much security could be bought and what could Dutch citizens reasonably expect? And at what point would added security simply cost too much?[24]

For Dutch hydrographic science, the 1953 North Sea Flood proved to be an opportunity to test the latest and greatest theoretical innovations in hydrography. These theories began their lives as critiques of the Lorentz Committee's report. As early as the 1920s several Dutch scientists had begun to take issue with the Lorentz Committee's methodology, arguing that past water levels were an insufficient basis for designing truly future-proof water defences.[25] Pieter Wemelsfelder, an engineer working for Rijkswaterstaat – the official Dutch agency responsible for infrastructural and water management works – published an article in 1939, introducing a new statistical method for extrapolating how often a certain water level was likely to occur. He therefore created a frequency table listing the highest water levels measured in a certain location over a number of years and plotted these on a logarithmic chart. Wemelsfelder claimed that, despite his imperfect and incomplete data, such an extrapolation was the only way to make informed decisions about water security.[26] Johan van Veen, a colleague of Wemelsfelder's at Rijkswaterstaat, was in full agreement with him. In a study of 1939, Van Veen concluded on the basis of preliminary calculations that the water defences in much of the south of the country were in dire need of upgrades.[27]

23 Dutch National Archives [NA] 2.16.45/10: Minutes Plenary Meetings Delta Committee, 13 May 1955, 2.

24 Wetenschappelijke raad voor het regeringsbeleid, *Onzekere veiligheid. Verantwoordelijkheden rond veiligheid* (Amsterdam 2008) 38-39.

25 Kees Vreugdenhil, Gerard Alberts and Pieter van Gelder, 'Waterloopkunde. Een eeuw wiskunde en werkelijkheid', NAW 5-2/3 (2001) 266-276, here 270.

26 Pieter Wemelsfelder, 'Wetmatigheden in het optreden van stormvloeden', *De Ingenieur* 54:9 (1939) 31-35. See for others who shared these insights: Ph. van der Breggen, 'Toepassing van enige formules uit de waarschijnlijkheidsrekening', *De Ingenieur* 60:A (1948) 33-40.

27 Johan van Veen, *Te verwachten stormvloedstanden op de benedenrivieren, eerste voorlopige becijfering* (The Hague 1939).

The 1953 storm surge, which was unprecedented, seemed to prove Wemelsfelder and Van Veen right. Their use of logarithmic extrapolations of historical data on maximum water levels during storms, which were combined with a host of meteorological and hydrographic readings, quickly was established as the core methodology for determining the likelihood of certain water levels occurring in the future. However, several members of the Delta Committee, including Van Veen and civil engineer Reep VerLoren van Themaat, had fundamental doubts on whether historical data sets, which only went back seventy years and included many gaps, would ever provide a reliable basis for predicting future storms.[28] Others, such as the Rijkswaterstaat engineer F. Volker and Wemelsfelder, argued over how to interpret the first preliminary calculations, in particular the impact of contributing factors such as rising sea levels and the likelihood of storms reoccurring during astronomical high tides.[29] The Delta Committee therefore decided, in June 1953, to enlist the aid of the noted mathematician and statistician David van Dantzig from the Mathematical Centre in Amsterdam[30], in order to 'smooth' the logarithmic extrapolations using computer-aided calculations.[31]

Due to the inherent limitations of both the data set and the methodology used, the ARRA-II computer produced a range of possible future storm frequencies and water levels, rather than a single set as the Committee had hoped. Some Delta Committee members therefore argued that a purely scientific approach to determine the height of the new water defences had failed and that another methodology was needed. The Dutch economist and future Nobel Prize winner Jan Tinbergen was brought in to tackle what quickly became known as the 'decision-making problem'; a reference to 'decision theory', which was in vogue in North American business and military circles.[32] Both Van Dantzig and Tinbergen argued that absolute security against any future storm surge was, on the basis of contemporary data and science, simply unattainable. Rather, they argued, the new water defences should provide an optimum between the twin extremes of too much and too little water security. Too much security might lead to regret, as they called it, the way the tax payer's money was spent. Too little investments in new dikes, dams and other water defences, however, might lead to mass economic damages. To solve

28 NA 2.16.45/89: Letter VerLoren van Themaat, 13 April 1953; NA 2.16.45/102: J. Van Veen, 'Bezwaar tegen gemiddelde SV-standen en vergaande extrapolatie', undated [April 1954].

29 NA 2.16.45/993; Ir. Pieter Wemelsfelder, 'Tussen-rapport. Hogere stormvloeden dan 1953', 15 February 1954; NA 2.16.45/94: Ir. F. Volker, 'Bezwaren tegen het Tussen-Rapport: "Hogere Stormvloeden dan 1953"', 8 April 1954.

30 NA 2.16.45/10: Minutes Plenary Meetings Delta Committee, 20 June 1953, 3 and 20 March 1954, 4; NA 2.16.45/186: Delta Committee to Jan Tinbergen, 2 March 1954.

31 Gerard Alberts, 'David van Dantzig, wiskundig omnivoor', NAW 5-1/3 (2000) 288-293.

32 NA 2.16.45/10: Minutes Plenary Meetings Delta Committee, 5 June 1954, 5-6; 3 July 1954, 56; NA 2.16.45/10: Minutes Working Group 8, 31 May 1954, 1-5.

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Photos taken from helicopters widely publicised the damage caused by the 1953 North Sea Flood (Beeldbank Rijkswaterstaat, inv. no. ID406532).

this quandary, the height of dikes should not be determined by their ability to counter all but the most unlikely of future storms but by the economic value of the lands they were protecting.[33]

The Delta Committee gave Van Dantzig, his close collaborator (and former student) mathematician Koos Kriens and Tinbergen the go-ahead to start calculations on a test case. They picked the small and thinly populated island of Terschelling, far away from the flood-damaged South-west of the country, and set out to determine the economically optimal height of its dikes and dams. This turned out to be a massively difficult undertaking, as the Mathematical Centre's computer churned out endless permutations for the development of interest rates and the value of Terschelling's agricultural lands that would be destroyed by desalinisation in case of hypothetical storm surges, even in far-off futures. To make matters even more complicated, the Centre had to come up with monetary values for animal and human lives lost in future floods. Such calculations were at the time unprecedented.[34] One of the key conclusions of the Terschelling case, argued Van Dantzig and Kriens, was that economically more valuable lands should enjoy a higher standard of security. In the case of the Delta Works, this meant that the most important role of the water defence systems in the delta of the Meuse and Scheldt rivers would be to protect the Randstad. Kriens and Van Dantzig attributed the fact that this heartland had not been destroyed during the 1953 storm surge to extraordinary luck. Simultaneous breaches had diverted part of the flood from the Randstad and several ships had been heroically beached to plug crucial holes in dikes. But this good fortune, Van Dantzig and Kriens argued, was unlikely to reoccur. Given the value of capital goods in the Randstad region which would be completely destroyed in case of a new catastrophic flood, the mathematicians concluded that new water defences should be able to offer adequate protection against such storms that statistically would occur once every 125,000 years.[35]

The Mathematical Centre's recommendations created severe controversy within the Delta Committee. Committee member and civil engineer Pierre de Blocq van Kuffeler for example argued that the Centre's central methodology was flawed – for who could say what the interest rate of the Dutch guilder would be in 125,000 years? – and that the statisticians did not understand the realities of storm surges. Their models unrealistically suggested that every time the water level reached that of the flood defences,

33 David van Dantzig and Jacobus Kriens, 'Het economisch beslissingsprobleem inzake de beveiliging van Nederland tegen stormvloeden', *Beschouwingen over stormvloeden en getijdebewegingen* (The Hague 1960) 57-110.

34 NA 2.16.45/186: F.J. de Vos, 'Vervolgnota Bepaling Economische Dijksverhoging Terschelling', 22 June 1954; NA 2.16.45/177: Minutes Working Group Eight, 31 May 1954, 1-2.

35 David van Dantzig and Jacobus Kriens, 'Het economisch beslissingsprobleem inzake de beveiliging van Nederland tegen stormvloeden', *Beschouwingen over stormvloeden en getijdebewegingen* (The Hague 1960) 57-110.

a catastrophic flooding would follow, automatically resulting in total destruction. They failed to take into account the effect of wind speeds and tides on storm surges, De Blocq van Kuffeler opined, and therefore of the very real possibility that a momentary exceedance of a dike's theoretical tolerance would not result in any damage.[36] Other members took exceptions to the way the Mathematical Centre had calculated the effect of so-called imponderables, such as the price of life or, more generally, the emotional impact of a catastrophic flood. Others still argued that it was unethical to equate economic value to a higher standard of protection. People were entitled, they felt, to the same level of protection, irrespective of whether they lived in a small village or in the global port of Rotterdam.[37] They argued for a return for the purer, simpler, and supposedly more scientific, logarithmic extrapolations to determine the statistical likelihood of certain water levels and storms occurring in the future. But critics within the Delta Committee argued that these calculations suffered from similar imponderables as the Mathematical Centre's work, such as the impact of long-term global climate change.[38]

By 1954, the committee had become deadlocked on what methodology to follow, on what kind of data to feed the models and how their results should be interpreted. Rather than choosing between the two models, the Delta Committee chairman, August Maris, concluded that neither could provide a sufficient basis for determining the height of the country's future flood defences. He suggested being upfront about the uncertainties surrounding both models' attempts to predict the future in the Committee's eventual recommendations to the government.[39] Others, including de Blocq van Kuffeler, seemed to agree:

> The question, which water defences are to be constructed, in other words what financial sacrifices will have to be made to ensure a certain increase in security, is a subjective one, which cannot be conclusively answered by experts. The decision should in the end be made by those directly affected by it, provided they are properly informed.

However, De Blocq van Kuffeler also felt that the Delta Committee had a duty to 'the Dutch people'. The Delta Committee should, he felt, do better than present a science paper filled with rigorous but inconclusive results that most Dutch would not be able to understand anyway. What was more, if the Delta Committee did not include a clear-cut recommendation, there was a real risk that the entire effort to build more secure water defences in the vulnerable

36 NA 2.16.45/10: Minutes Plenary Meetings Delta Committee, 3 July 1954, 6; 21 June 1958, 2.

37 NA 2.16.45/177: Minutes Working Group Eight, 31 May 1954, 4-5; 16 April 1955, 2.

38 NA 2.16.45/102: Johan van Veen, 'Bezwaar tegen gemiddelde SV-standen en vergaande extrapolatie', undated [April 1954].

39 NA 2.16.45/177: Minutes Plenary Meetings Delta Committee, 27 February 1954, 3-6.

South-west of the country would be dismissed as a futile effort. Since all Committee members agreed that dramatic upgrades to existing sea defences, whatever their height, were necessary, this was not a viable option.[40]

Chairman Maris added that the Delta Committee had limited time to act. The remembrance of the 1953 storm surge would only remain fresh in people's minds for so long. If the Delta Committee would spend any more time further discussing its use of competing methodologies, this might lead to a reduced willingness on the part of the Dutch taxpayer to pay the hefty sums of money required to upgrade the water defences of the South-west. The more contentious the Delta Committee's report would sound, the more likely it would be that either the whole plan would be voted down – meaning that more valuable time would be lost – or that only some of the dikes would be upgraded and new sea defences built. This would create weak spots in what all Committee members, regardless of their methodological point of view, imagined would be a single sea defence system.[41]

Therefore, the Delta Committee agreed that the report addressed to the Minister of Transport, Public Works and Water Management needed to be massaged in order to help him sell the necessity of spending about 1.5 to 2 billion guilders (roughly between 8 and 11.5 billion euros in 2018) on the new integrated system of dikes and sea defences.[42] It was also agreed that the report would omit any mention of methodological uncertainty. Furthermore, the report would not go into details as to the risks of future storms, as these would need to be expressed in the form of statistical probabilities. It was feared that the public would be confused by statements such as 'statistically once every 125,000 years'. The Delta Committee feared the public would misinterpret this statement and think that the Netherlands would be safe for the next 125 millennia rather than there being a 0.0008 percent chance of a storm of a certain magnitude occurring every year. The report would also omit any reference to the 'decision problem', as it would not make for a convincing narrative.[43] Finally, the Delta Committee agreed that the reports would be signed unanimously in order to create the impression of unity. Evidently, all Committee members approved. Even those who did not agree with paving over the uncertainties probably agreed that it was more important to act now than losing momentum. They probably also concurred with Van Kuffeler who stated that the suggested system of new dams and dikes could be easily upgraded in the future, if the Committee would have solved its methodological quandaries.[44]

40 NA 2.16.45/186: W.G. van Kuffeler to Delta Committee, 2 April 1954.

41 NA 2.16.45/177: Minutes Plenary Meetings Delta Committee, 27 February 1954, 3; 3 July 1954, 6; 18 June 1955, 2-4.

42 NA 2.16.45/177: Minutes Working Group Eight, 31 May 1954, 4.

43 NA 2.16.45/186: W.G. van Kuffeler to Delta Committee, 2 April 1954.

44 Idem.

The Delta Committee's interim report in 1954 synthesised all these points in the following recommendation. Truthfully, the Committee admitted that 'it had not been possible to calculate the risks of higher water levels occurring in the future'. However, it continued that 'we can be sure that sooner or later a catastrophic storm surge will reoccur' and that immediate action was required. It recommended damming off most of the existing inlets and creating a dramatically shortened coastline. As to the height of this new system of sea defences, the report was astonishingly vague. It conceded that 'in the past' dikes were raised by an additional metre above the highest recorded water level. However, given that the reoccurrence of hitherto unforeseen floods was a distinct possibility, the Committee 'deemed it necessary [...] to raise the defences by about 1.5 to 2 metres above the highest recorded water level at Hook of Holland' on 1 February 1953: 3.85 metres above NAP.[45]

However, the committee members conceded that this wording was perhaps too vague, with some expressing the fear that the interim report lacked force and would prompt just the sort of endless deliberations the Committee members had hoped to avoid in the first place.[46] An interim report released a year later stated that while there was every reason to assume that future storms might be accompanied by even higher water levels than the 3.85 metres above NAP recorded in 1953, the chance that they would exceed 5 metres was probably less than '1 percent per century, or one-ten-thousandth per year', resulting in an 'acceptable level' of security. Nevertheless, the report equally suggested that, depending on unspecified local circumstances, dikes and dams could be built to a standard that is 'several decimetres' higher or lower.[47]

Why 5 metres? Curiously, the notion that new dikes should be built to a standard of +5 NAP is already mentioned in the minutes of the Delta Committee plenary meetings dating from April 1953, although these do not clarify the scientific basis for this benchmark.[48] Wemelsfelder's initial calculations, which were most probably based on his logarithmic extrapolations of historical data, suggested that dams needed to be able to withstand a water level of 5.2 metres above NAP in order to counter storms roughly occurring once every 10,000 years. Yet, he admitted himself that his results were preliminary at best.[49] It appears that the Delta Committee's final interim report used Wemelsfelder's calculations to show that the 5.2 metres above the NAP, the so-called 'Delta

45 Delta Commissie, *Afdamming Zeearmen. Derde interim-advies uitgebracht aan de Minister van Verkeer en Waterstaat* (The Hague 1954) 8-10.

46 NA 2.16.45/186: P. Ph. Jansen to Delta Committee, 21 February 1954.

47 Delta Commissie, *Nadere beschouwingen in verband met de afdamming van de zeearmen. Vijfde interim-advies uitgebracht aan de Minister van Verkeer en Waterstaat* (The Hague 1955) 19-20.

48 NA 2.16.45/10: Minutes Plenary Meeting Delta Committee, 18 April 1953, 4.

49 NA 2.16.45/102: Johan van Veen, 'Bezwaar tegen gemiddelde SV-standen en vergaande extrapolatie', undated [April 1954]; NA 2.16.45/186: W.G. van Kuffeler to Delta Committee, 2 April 1954. An interpretation of the data found its way in the Delta Committee's final report: David van Dantzig and Jan Hemelrijk, 'Extrapolatie van de

Standard' was at least (albeit barely) defensible from a scientific point of view. However, it appears that the Committee members' conviction that the project's costs should not exhaust the Dutch tax payer was a far more crucial factor in limiting the height of new sea defences to 5 metres than its scientific foundation.[50] Van Kuffeler for example argued:

> If we were to suggest [to the government] that we would need to raise dikes to a standard of +7.5 NAP and that such a height is defensible from a scientific and economic point of view, the [Delta Works] would not be built, as the conviction, that such a height is necessary, does not live amongst the Dutch people. Every country does not only get the government, but also the water defences it deserves.[51]

In other words, the benchmark of 5 metres above NAP was a believable number which would at the very least provide security against a repeat of the disaster of 1953, providing at least some level of security, while its building costs remained within what the Committee considered to be the Dutch budgetary limits. Those Committee members who were sceptical about this benchmark – and they were in the majority, judging from their reported misgivings during plenary meetings! – probably eased their consciousness by following the rationale behind the recommendations in the earlier interim report. It was considered of higher importance that something was done and done quickly than to get the height absolutely right, especially since the Delta Works, as the Committee members imagined them in the 1950s, could easily be heightened in the future.[52]

Only the Mathematical Centre disagreed. Naturally, Van Dantzig and Kriens were disappointed in the Delta Committee's rejection of both their data sets and their methodology. They were allowed to release what could be called a minority report, in which they argued that on the basis of their calculations the economic optimum for the protection of the Randstad

overschrijdingslijn van de hoogwaterstanden te Hoek van Holland met behulp van geselecteerde stormen', *Beschouwingen over stormvloeden en getijdebewegingen, bijdragen II Rapport Deltacommissie* (The Hague 1960) 7-56, here 18-19.

50 NA 2.16.45/10: Minutes Plenary Meetings Delta Committee, 27 February 1954, 5-6. Pieter Huisman, a former engineer at Rijkswaterstaat, revealed to one of the authors of this article that the Committee members themselves were unsure of the scientific basis of the +5 NAP-recommendation. Huisman, who was not a member of the Delta Committee but had frequent interactions with several of its members, highlights that some members argued for the new standard for dikes built as part of the Delta Programme should be set at 4.85 metres above NAP, following the example set by the Lorentz Committee: adding a metre to the highest recorded historical water level. Others disagreed and argued for a higher standard, but we do not know on what basis. Interview Pepijn Lewis with Pieter Huisman, 22 April 2015.

51 NA 2.16.45/186: W.G. van Kuffeler to Delta Committee, 2 April 1954.

52 Idem.

would involve protecting it against storms occurring statistically once every 125,000 years, meaning that flood defences should be able to counter water levels of 6 to 6.5 metres above NAP.[53] Naturally, the Delta Committee's recommendations would make the Netherlands safer than it was, but the risk of a catastrophic flooding of the Dutch economic heartland remained, as Van Dantzig and Kriens put it, 'by no means negligible'. They even drew a pointed comparison with the Dutch government's anti-polio drive. In economic terms, they argued, a polio epidemic would be much less costly than a flooding of that magnitude. Yet, the Delta Committee's recommendations suggested a significantly lower investment per potential life saved.[54]

The Mathematical Centre's minority report was, however, not included in the Delta Committee's interim reports, on which the government would base its policy. These reports stressed, just as the Lorentz Committee's report had done half a century earlier, that their conclusions were drawn through apolitical scientific consensus. In reality, the Delta Committee's recommendations for policy were based on its members' assessment of how much the Dutch tax payer was willing to contribute and were specifically designed to sway the Dutch Government and Parliament to give a swift go-ahead to the entire project.[55]

Acceptable risks

Nevertheless, the Delta Committee's recommendations to Parliament represented a watershed in thinking about Dutch water security. For most of Dutch history, water security was seen as fundamentally unattainable. The Lorentz Committee argued that, according to their calculations, the new dike damming off the Zuiderzee would protect both old and new land against any storms. The Delta Committee, however, had based its projections not just on an analysis of past storms but had actively tried to predict the chances of future storm surges of a certain magnitude hitting the Dutch coast. Additionally, it had applied cost-benefit analyses to flood defence construction. In doing so, it had shifted from promising total security to suggesting an acceptable level of risk. This was a revolutionary

53 NA 2.16.45/186: Mathematical Centre to Delta Committee, 28 March and 6 April 1955.

54 Van Dantzig and Kriens, 'Het economisch beslissingsprobleem', 72-73.

55 August Maris (ed.), *Rapport Deltacommissie dl. 1. Eindverslag en interimadviezen uitgebracht door de commissie van advies inzake de beantwoording van de vraag, welke waterstaatstechnische voorzieningen dienen te worden getroffen met betrekking tot de door de stormvloed van 1 februari 1953 geteisterde gebieden* (The Hague 1961) 25; Vreugdenhil, Alberts and Van Gelder, 'Waterloopkunde', 271, 274; Johan Thijsse and Henri Stroband, *Rapport Deltacommissie dl. 5. Onderzoekingen betreffende de opzet van het Deltaplan en de gevolgen van de werken* (The Hague 1961).

step, no matter the misgivings presented in this article on the basis of their recommendations.[56]

It is important to remember that the Delta Committee only made recommendations, not policy. From 1953 to 1955, the Committee submitted five interim reports, on the basis of which the Dutch Government drafted legislation. The bill for a Delta Law gave the government the power to act on the advice of the Committee and designated the necessary funding, and submitted it to Parliament for review. The responsible Minister of Transport, Public Works and Water Management, Jacob Algera, prefaced the debates on the bill, held from 29 to 31 October 1957. Algera lauded the work of the Committee which, he claimed, had made suggestions for an economically optimal level of security based on state-of-the-art scientific methods – although in truth it had done neither. Doing any less than the committee suggested would be a tragedy, he argued, but doing more a waste. MPs too seemed convinced that the experts knew best and mainly used the debate on the Law to pontificate on the 1953 tragedy and to signal their party's support for tackling the water security question in a measured and scientific manner.[57] Labour Party MP Jaap Burger was but one of many who suggested that 'science had spoken' and Parliament simply had to follow its lead: '[I]t is clear,' he stated, 'that we must rely entirely on what the experts qualify as technically feasible.'[58]

A few MPs, however, did raise points of criticism. One of them was the Communist Party MP Henk Gortzak. A member of a comparatively small opposition party, he attacked the government along predictably anti-capitalist lines. The Delta Law, following the recommendations by the Committee, would provide for 'optimum' security. Why not simply spend more money, he wondered, and eliminate the risk of floods altogether?[59] Such a question went straight to the heart of the matter: how much security was the Netherlands buying, and would the Dutch be willing to pay for additional security? But Gortzak's question did not lead to a discussion of flood frequencies, the economic value of property and human life or the duelling methodologies used to ascertain the level of acceptable risk. Rather, minister Algera once again pointed out that the complete elimination of all risk would be impossible and higher levels of protection prohibitively expensive. Building new dams and dikes according to the specifications recommended by the Delta Committee did entail a continued risk for those living in areas affected by a possible flooding, that is much of the west of the country. But, Algera assured both MPs and the public at home, this was 'a risk

56 See Georges Dionne, 'Risk Management: History, Definition and Critique', *Risk Management and Insurance Review* 16:2 (2013) 147-166 DOI:10.1111/RMIR.12016; WRR, *Onzekere veiligheid* (The Hague 2008) 38-39.

57 Minutes of the Lower House of Dutch Parliament [Handelingen van de Tweede Kamer der Staten-Generaal, HTK] 1957-1958, 29-31 October 1957, 3023-3024, 3073-3074, 3096.

58 HTK 1957-1958, 29 October 1957, 3036.

59 HTK 1957-1958, 30 October 1957, 3073-3074.

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Delta Committee chairman August Maris submits his final report to the Minister of Transport, Public Works and Water Management, Henk Korthals on 28 December 1960. This final report did include the Mathematical Centre's minority report, but Parliament had voted on the Delta Law on the basis of interim reports. Photo by Harry Pot, collection Anefo, National Archives 2.24.01.05/911-9138.

one should be willing to take', as the new Delta Law would provide protection for storm surges occurring only once every 10,000 years. Notably, this is not the same as 'statistically once every 10,000 years', indicating that perhaps even the responsible Minister did not grasp the complexities of the situation.[60] After three days of debate, the Lower House of Dutch Parliament approved of the Delta Law and after an equally uneventful debate in the Upper House it became effective as of 8 May 1958. Soon after, construction on the Delta Works began. The Delta Law itself does not mention any specificities as to the Works' construction, only that the work would be carried out according to specifications determined by the Minister of Transport, Public Works and Water Management, who, in turn, would be guided by the recommendations on acceptable risk by the Delta Committee.[61]

On the face of it, the debates in the Lower House amounted to the apex of the securitisation process. As the sociologist Dubbelman argued, the threat of water was securitised following the 1953 storm surge. In countless speech acts, ranging from films and photos, to editorials, opinion makers of every ilk highlighted both the referent object – the heavily populated West of the country – and the imminent danger it was under due to the unpredictable nature of the sea. However, the securitisation of water had a time limit and the Delta Committee was most probably correct in assuming that the willingness to undertake extraordinary political measures would be diminished if more time was allowed to pass. Given the realities of postwar fiscal austerity, the huge sums of money designated to build sea defences to counter the threat of water were remarkable. Once the construction of the Delta Works began, public attention to the threat of water seemed to fade and the politics of water security returned to normal. The aura of deterministic science that surrounded the Delta Committee, and politicians and the general public's firm belief in its ability to provide ready and true answers to counter the threat of water and to create a reasoned and reasonable level of security played a key role in the process of desecuritisation.

The Delta Committee's recommendations as to the optimum level of security and the Delta Standard of '+5 NAP' would form the basis of Dutch water security policy for decades to come. The assumptions and compromises at the core of these recommendations remained largely unchallenged until the twenty-first century. It took until 2004 for the National Institute for Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieu, RIVM) to publicly recognise that the Delta Standard is unverifiable and remains untested. It also warned that our evolving understanding of the effects of climate change caused a widening discrepancy between the essentially static Delta Standard and the realities of rising water levels

60 HTK 1957-1958, 31 October 1957, 3096.

61 http://wetten.overheid.nl/BWBR0002283/2004-07-01.

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The Haringvliet Sluices, part of the Delta Works in Haringvliet, the Netherlands. Building started in 1957 and was finished in 1971. 7 August 1963, Rijkswaterstaat / Afdeling Multimedia Rijkswaterstaat, https://beeldbank.rws.nl/MediaObject/Details/446084.

and climatic instability.[62] In 2007, the Netherlands Scientific Council for Government Policy (Wetenschappelijke Raad voor het Regeringsbeleid, WRR) argued that the value of the Randstad in real terms had increased at least sixfold since 1958, meaning that both the scientific and the economic methodologies first employed by the Delta Committee needed an update.[63] Since then, a massive new building programme has been approved by Parliament and numerous upgrades and improvements have been carried out. In 2018, as in 1953, a new cycle of water securitisation has led to the outsourcing of the political responsibility to expert committees for coming up with a credible answer to the threat, underscoring once again their enormous importance in understanding the political process of risk management.

Conclusions and Outlook

How high is high enough? At what point does a dike, a dam or even a complex system of water defences provide enough security? For centuries, the answer to that question remained a mystery. One simply did one's best, which usually consisted of draining the land, rebuilding a dam or dike to be a little bit higher than it was and hoping and praying that this would be enough. In such circumstances, we cannot speak of securitisation, as people did not see the threat as something that could be countered and simply resigned themselves to the inevitability that one's land was likely to be flooded. These attitudes were slow to change, as this article has shown. In the Netherlands, it took until the beginning of the twentieth century for the promise of an effective counter to the threat to emerge. In the wake of the flood in 1916, a securitisation process began which led to calls that the government had to prevent its reoccurrence. Nominally, the government of the day remained in full control of the process and Parliament was given a deciding vote on the proposed measures. But the measures it voted on were, in the end, not devised by government ministers or their civil servants, but by a committee of experts. The language of natural science and the prestige of Nobel Prize-winner Lorentz combined to present an image of trust in a secure future. The work the Lorentz Committee did was groundbreaking in many respects, thanks to its systematic use of historical data and its innovative seaflow-model, but its final recommendations looked a lot like those of previous decades, or even centuries: make the dikes a little higher.

The same combination of natural science and academic prestige surrounded the Delta Committee, commissioned by the Dutch government

62 Wilfried ten Brinke and Bert Bannink, *Risico's in bedijkte termen. Een thematische evaluatie van het Nederlandse veiligheidsbeleid tegen overstromen* (Bilthoven 2004) 112.

63 P.J.H. van Leeuwe, *Waterbeheer en waterveiligheid*, WRR webpublicatie Nr. 39 (The Hague 2007) 19-20.

following the securitisation process that resulted from the storm surge in 1953. Its brief was as massive as it was impossible: protecting the country against all storms, now and in the future. In its search for answers, the Delta Committee was wracked by indecision, as two competing methodologies both produced unsatisfactory results. At first, it kept the answer to the most important question – how high? – deliberately vague in order not to confuse the people. Later, in order to convince Parliament to vote for costly, far-reaching and ultimately unproven measures, the Delta Committee suggested that a height of 5 metres above NAP would provide enough security. In doing so, the Committee took it upon itself to decide how much security should be bought and at what price.

The Delta Committee's recommendations were presented to Parliament as seemingly unanimous findings resulting from rigorous and apolitical scientific enquiry. As such, they were accepted by both the responsible ministers and by Parliament without so much as a critical note. No one questioned the basis of the expert committee's findings or wondered how exactly they had arrived at their recommendations. In all likelihood, they were not aware that the new +5 NAP Delta Norm was not based on financial or statistical considerations, but was, in truth, almost as arbitrary as the 'a bit higher than it was before'-rule of thumb of pre-nineteenth century dike construction. Only those on the fringes of the political establishment dared to raise their voices, but their intercessions were primarily designed to show their constituents how they continued to push the government to provide more water security. The vast majority did not dare to fly in the face of experts nor did they want to block legislation that offered to provide so-called measured security and acceptable risk.

Expert opinions, like those propagated by the Delta Committee, play a critical role in the dealing with issues of security. When confronted with an enemy state, international terrorism, computer hacking or a natural disaster, committees of experts are invariably tasked to come up with plans for Government and Parliament to approve. Those interested in security from either a political science or a historical viewpoint, as well as historians of the political and policy makers would do well to shed their hesitation in engaging with these experts (or, even more generally, with science) in order to gain a better understanding of their work but also of their methodological and political underpinnings. We do not argue that experts should be distrusted *a priori* – as some British politicians opined in the build-up to the 2016 Brexit referendum[64] – but we do warn against simply ignoring the often lengthy reports they submit and just skipping to the conclusions or

64 'Michael Gove attacks "expert economists"', BBC News 28-11-2016, http://www.bbc.com/news/av/business-38138820/michael-gove-attacks-expert-economists.

treating the reports as the result of apolitical scientific truths. In doing so, we put these expert committees on a pedestal where they are above questioning and their work into black boxes magically transforming problems into solutions. Rather, by including the genesis and development of expert advice to governments explicitly in our study of political processes such as securitisation and desecuritisation we gain valuable insights into the political dynamics and methodological choices behind it. The latter are crucial to understand how and why a securitised threat – something that seems like a random act of fate or God to the uninitiated – is turned into something that can be understood, measured, predicted, and ultimately countered.

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