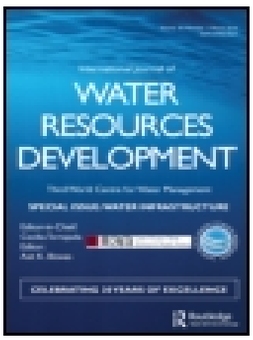

International Journal of Water Resources Development

ISSN: 0790-0627 (Print) 1360-0648 (Online) Journal homepage: https://www.tandfonline.com/loi/cijw20

Cross-sector collaboration within Dutch flood risk governance: historical analysis of external triggers

Emma Avoyan & Sander Meijerink

To cite this article: Emma Avoyan & Sander Meijerink (2020): Cross-sector collaboration within Dutch flood risk governance: historical analysis of external triggers, International Journal of Water Resources Development, DOI: 10.1080/07900627.2019.1707070

To link to this article: https://doi.org/10.1080/07900627.2019.1707070

INTERNATIONAL JOURNAL OF WATER RESOURCES DEVELOPMENT
https://doi.org/10.1080/07900627.2019.1707070

Routledge
Taylor & Francis Group

Cross-sector collaboration within Dutch flood risk governance: historical analysis of external triggers

Emma Avoyan and Sander Meijerink

Institute for Management Research, Radboud University, Nijmegen, Netherlands

ABSTRACT

This article synthesizes the literature on Dutch flood risk governance to analyze how external conditions shaped past and present dynamics of cross-sector collaboration for integrated flood risk management in the Netherlands. It traces the extent to which policy and legal frameworks, socio-economic circumstances, political realities, power relations and conflict situations have influenced attempts at collaboration between flood safety, spatial planning, environmental protection and other sectors. Despite the growing interdependences, existing power relations between the sectors are characterized by the dominance of the water sector. Hence, cross-sector collaboration can develop as long as it does not compromise flood safety.

ARTICLE HISTORY
Received 21 May 2019
Accepted 16 December 2019

KEYWORDS
Collaborative governance; cross-sector collaboration; flood risk governance; Netherlands

Introduction

The Netherlands is well known for its long history of flood protection (Mostert, 2017; Orr, Stodghill, & Candu, 2007; van Buuren, Ellen, & Warner, 2016). Over 55% of country's surface is flood-prone, with more than 25% of the land below average sea level (Klijn, Kreibich, de Moel, & Penning-Rowsell, 2015). It is protected from coastal and river flooding by structural flood defence infrastructure consisting of dikes, storm barriers and dunes built over centuries. Moreover, the Netherlands is well known not only for its flood safety infrastructure, but also for its so-called 'polder model' of decision making (Bergsma, 2016; Hassenforder, Clavreul, Akhmouch, & Ferrand, 2019). This model is characterized by 'collaboration despite differences', whereby all parties should be heard in decision-making processes. In the case of flood risk governance, it implies consideration of different economic, spatial, ecological and other sectoral stakes in the policy-making process (Disco, 2002). However, Dutch flood protection governance and cross-sectoral dynamics have fluctuated considerably over time. After the flood disaster in 1953, flood safety became a national security issue, and the Dutch government initiated the world-famous Delta Plan: a large-scale programme of engineering solutions for flood protection (Meijerink, 2005). Environmental quality, landscape and nature became important issues in flood risk management (FRM) only after the ecological turn in the 1970s (Mostert, 2006). Growing recognition of landscape values, nature conservation and sustainable land-use planning had an impact on FRM policy. In the 1980s and 1990s, landscape, nature and

CONTACT Emma Avoyan e.avoyan@fm.ru.nl

cultural values were taken into consideration in dike reinforcement projects (Warner, van Buuren, & Edelenbos, 2013), eventually resulting in the introduction of the Room for the River (RfR) concept in the 2000s. Overall, this transformation of flood risk governance was reflected in the evolution of national policy memoranda on water management (Rijkswaterstaat, 1964, 1982, 1989, 1998).

The safety standards for flood protection in the Netherlands have been revised recently. It is anticipated that most of the major flood protection infrastructure will have to be reinforced to meet the new standards (Jorissen & Kraaij, 2016). The Dutch Flood Protection Programme aims at accomplishing this task through innovative integrated projects when possible, such as via the construction of multifunctional flood defences. In these projects flood safety purposes will be combined with spatial planning, nature development and other sectoral objectives. Therefore, implementation of dike reinforcement projects requires early involvement and collaboration between the public and private sectors, various governmental actors and agencies. The development and implementation of such integrated projects has been an issue in the Dutch flood safety already for a long time, but it remains a challenge to combine the flood protection agenda, funding and procedural arrangements with the regional spatial development agenda and other sectoral agendas in the Netherlands (Delta Programme, 2017). The implementation of 'smart combination' projects raises a number of coordination issues across the policy sectors involved.

Many studies have analyzed the policy transition (e.g. van der Brugge & Rotmans, 2007) or policy change (e.g. Kaufmann, 2017) in Dutch FRM. These studies generally see a shift in the flood safety policy and legal framework from a scientific technocratic management regime towards a more integrated collaborative management regime (Saeijs, 1991; van der Brugge & Rotmans, 2007; van Herk, 2014; Warner et al., 2013). But some find that current water safety institutional arrangements, procedures and instruments are still characterized by traditional, strongly legalized policies based on a one-track or unisectoral approach to flood management (Leskens, Boomgaard, van Zuijlen, & Hollanders, 2013). Some other studies trace signs of gradual change towards integration yet also acknowledge path dependency in Dutch FRM (e.g. van Buuren et al., 2016).

With this study, we aim to contribute to the ongoing debate on policy transition, change or continuity in Dutch flood risk governance by focusing specifically on the impact of external conditions or system context on cross-sector collaboration. The literature on cross-sector collaboration suggests that changes in the system context are crucial to understanding cross-sector collaboration dynamics. Hence, we are interested in exploring how cross-sector collaboration patterns in flood risk governance in the Netherlands have evolved, considering in particular the role of changing external conditions in shaping attempts and practices of cross-sector collaboration. Ultimately, we seek to describe how external conditions constrain or enable cross-sector collaboration.

The integrative framework for collaborative governance (Emerson, Nabatchi, & Balogh, 2012) is applied as an analytical tool to map external conditions framing possibilities as well as constraints for cross-sector collaboration in the Dutch flood risk domain. Supported by an extensive document analysis and literature reviews, this article offers insights into how the (changing) *system context* has either promoted or hindered cross-sector interactions between the flood protection sector, urban planning, nature conservation and any other sector involved in FRM. The system context is the multilayered and

correlated assembly of conditions and drivers that influence the formation and performance of complex governance systems, such as collaborative governance regimes. Clear understanding of the system conditions and drivers for collaboration brings insights into the opportunities and limitations of effective performance (e.g. the extent to which the joint actions produce the anticipated results) of complex governance systems (Emerson & Nabatchi, 2015b).

Theoretical perspective on cross-sector collaboration

Conceptual clarifications

Policy sectors, generally defined as 'coalitions of an interest whose participants advance ideas or problem definitions about a particular set of issues' (Baumgartner & Jones, 1993, p. 4–6), are the basic unit of analysis in this article. Also referred to as policy subsectors (Jochim & May, 2010), policy domains (Burstein, 1991) or subgovernments (McCool, 1990), policy sectors exist within diverse institutional structures of single-purpose policy sectors, which are characterized by different sets of sectoral goals and interests as well as problem perceptions and solutions (Baumgartner & Jones, 1993; Hovik & Hanssen, 2015; Sabatier, 1993, Verweij, Klijn, Edelenbos, & Van Buuren, 2013). The integration and coordination of policies across sectors, as well as collaboration between policy domains, are of increasing importance for both scholars and policy makers. There is widespread acceptance that to be more effective in promoting synergies, achieving cross-cutting goals and avoiding duplication of effort, different policy sectors need to integrate and coordinate their aims and activities (e.g. Jordan & Lenschow, 2010). The multifaceted nature of contemporary and 'wicked' problems (e.g. Rittel & Webber, 1973) 'that have multiple and conflicting criteria for defining solutions, solutions that create problems for others sectors, and no rules for determining when problems can be said to be solved' (van Herk, 2014, p. 6) necessitates integration across policy sectors (McGuire, 2006), horizontal coordination and collaboration within and across different levels of governmental agencies (Six, 2004) and/or cross-sector partnerships among the private and public sectors (Waddock, 1991).

Scholars use several analytical concepts to unpack the interaction dynamics between different policy sectors. For example, *policy integration* or *integrated policy making* refers to policy measures and instruments that connect various policy goals and designs 'encompassing common visions for the future' (Braun, 2008, p. 231) in different sectoral policies. Similar conceptions, such as 'joined-up' government (Six, 2004; Ling, 2002), policy coordination (Challis et al., 1988) and 'joined-up' policy (Wilkinson & Appelbee, 1999), are used to describe the institutional and organizational issues between different policy sectors. Other relevant concepts in the organizational literature on cross-sector collaboration include inter-organizational coordination (Whetten & Rogers, 1982), intergovernmental management (Agranoff, 1986), inter-organizational collaboration (Huxham, 1997) and network management (Kickert, Klijn, & Koppenjan, 1997). Despite the variations in wording, these concepts mainly apply to the cooperation and/or collaboration between organizations/institutional structures representing various policy sectors. Following Bryson, Crosby, and Stone (2006, p. 2) we define *cross-sector collaboration* as 'the linking or sharing of information, resources, activities, and capabilities by organizations in two or more sectors to achieve jointly an outcome that could not be easily achieved by

organizations in one sector separately'. Moreover, we acknowledge that cross-sector collaboration is supported by a public governance system (collective decision-making bodies or governance regimes such as various committees, programmes, boundary organizations) and interacts with, and is embedded in, a larger context (Bryson, Crosby, & Stone, 2015; Emerson et al., 2012).

Surrounding conditions of cross-sector collaboration

It is generally accepted that the determinants of cross-sector collaboration are rooted in the external context describing situational aspects and conditions present at the start of cross-sector interaction. The literature suggests these conditions can either facilitate or discourage collaboration between various policy sectors (Bryson et al., 2015; Emerson et al., 2012). Several external conditions may determine the essence and prospects of governance regimes, including policy and legal frameworks (O'Leary & Bingham, 2008); precedents of failures to deal with the issues by means of traditional jurisdictions (Bryson & Crosby, 2008); political dynamics and power relations between various levels of government (Ansell & Gash, 2008); the extent of interconnectedness within and across present networks (Selin & Chavez, 1995); and history of conflict among acknowledged interests (Ansell & Gash, 2008; Thomson & Perry, 2006). One of the most recent cross-sector collaboration frameworks, developed by Emerson et al. (2012), broadens the view of cross-sector collaboration into a governance system nested in a larger context/environment (Bryson et al., 2015), consisting of six system context conditions: public resource or service conditions; policy and legal frameworks; socio-economic and cultural characteristics; network characteristics; political dynamics and power relations; and the history of conflict (Emerson et al., 2012). Given contextual characteristics and the focus of our study, we have integrated the public resource or service conditions with the policy and legal frameworks, and the network characteristics with political dynamics and power relations. Public service or resource conditions provide the baseline concern or problem in response to which cross-sector collaboration might emerge (Emerson & Nabatchi, 2015b). In the context of FRM, the risk to public health or safety of physical infrastructure is always embedded in consequent policy and legal frameworks. Similarly, network characteristics, which describe (pre)existing structures connecting collaborators, are reflected in political dynamics and power relations. Below we briefly discuss the system context conditions examined in this article.

Policy and legal frameworks

Policy and legal frameworks originating within legal, administrative and governing systems facilitate or inhibit public decision making as well as private action (Bryson et al., 2006). These institutional frameworks include the substantive laws, rules, regulations, mandates, executive orders, policy guidance memorandums and other legal requirements that concern the management of public resources and services, as well as the operational arrangements that influence circumstances favourable for cross-sector collaboration (Emerson & Nabatchi, 2015a). For example, it is important to trace whether interdependence between policy sectors (or its absence) is reflected in the policy and legal frameworks. Interdependence between policy sectors, which is primarily characterized by the inability of sectors to enact something on their own, is a widely acknowledged

prerequisite for collaborative actions (Emerson et al., 2012; Gray, 1989; Thomson & Perry, 2006). When a public authority does not succeed in addressing a key public issue through its internal organization and with its own resources, then reaching out to other sectors may become necessary. Therefore, we are interested in studying the degree to which policy and legal frameworks enable and/or inhibit cross-sector collaboration in Dutch flood risk governance by also verifying whether the interdependencies between policy sectors are underlined by these frameworks.

Political dynamics and power relations

Political dynamics and power relations exist both formally and informally within and across all sectors and will affect the formation, continuation and performance of cross-sector collaborations (Ansell & Gash, 2008). Power imbalances between policy sectors are a frequently mentioned obstacle in collaborative governance (Gray, 1989; Short & Winter, 1999; Warner, 2006). Power is rarely equally distributed. The degree of power and influence creates conditions that shape the inclinations of potential collaboration participants to pursue their objectives (or not) through a governance regime (Emerson et al., 2012). Moreover, more powerful participants may manipulate the cross-sector collaboration processes by making use of their resources or status (Ansell & Gash, 2008). Political dynamics and power relations have many sources associated with the influence of cross-sector power imbalances, contesting multiple institutional logics, specific organizational control mechanisms, financial resources and responsibilities, funding processes and organizational standard operating procedures (Bryson et al., 2006). In this study, we are interested in sources and distribution of power across sectors involved in and affected by Dutch flood risk governance systems over time. Moreover, we assume that one of the primary challenges of managing 'wicked' societal problems, namely uncertainty (Koppenjan & Klijn, 2004; Rittel & Webber, 1973), may stand out as a source of power imbalance among policy sectors. Instances of doubt and ambiguity, insufficient information or uncertainty about present and forthcoming events, as well as decisions by representatives of other sectors, may determine not only power distribution and political dynamics but also the willingness to collaborate (Emerson & Nabatchi, 2015a).

History of conflict

The history of conflict between key actors and organizations is another decisive condition in the system context (Ansell & Gash, 2008). The literature suggests that the history of opposition between actors will either hamper or facilitate efforts at collaboration (Andranovich 1995; Gray, 1989; Margerum, 2001). The presence of former conflicts is likely to be expressed in low trust, and thus low commitment, as well as methods of manipulation and misleading communication (Ansell & Gash, 2008). Precedents of conflict may pose difficulties in forming future trustworthy relationships and initiating a collaborative governance system. However, there are also cases (e.g. policy deadlocks) when policy sectors are or may become highly interdependent regardless of conflict situations (Ansell & Gash, 2008). The interdependency and the urge for joint action can actually generate a strong impetus for collaborative governance (Futrell, 2003). In this article, we are interested in tracing tensions and conflicts (as well as their implications) over time among various sectors involved in and affected by Dutch flood risk governance systems.

Socio-economic conditions

Socio-economic conditions, such as population growth and spatial development, financial and economic crisis or public health risks, may affect cross-sector collaborations for public purposes in many ways (Sabatier et al., 2006). For example, these characteristics may contribute to the problem (e.g. flood risk) around which cross-sector collaboration unfolds. They may also trigger internal problems, resource needs or threats that must be jointly addressed to mitigate the risk and address the complexity of the problem. Moreover, they may trigger events or situations, for instance, reducing the amplitude of the negative consequences and the impact of inaction (Selin & Chavez, 1995), or not 'working together'. We are interested in exploring the extent to which socio-economic conditions have accelerated or hindered attempts at cross-sector collaboration for flood safety in the Netherlands.

Methods

The data collected for this study are derived from document analysis (national policy and legal documents, governmental and consultancy reports, and scientific research) and interviews. A two-step approach was followed. First, we conducted an extensive literature review and document analysis to identify the major developments as well as cross-sector collaboration in Dutch flood risk governance. Based on this review, four distinct periods or phases relevant to cross-sector collaboration are distinguished. For each period cross-sector collaboration is identified based on consensus in the literature and evidence in policy documents. As a second step, (changes in) system conditions, and how these have influenced cross-sector collaboration were analyzed. For the last period we distinguished, five interviews with flood safety sector representatives were conducted, as the available literature and documents were not sufficient for secondary analysis.

To craft a sufficient explanation as to whether differences in the presence of cross-sector collaboration in flood risk management resulted from changes in the system conditions, we conducted process tracing (e.g. Mahoney, 2015), using the selected literature and documents to identify the processes behind the phases of FRM in the Netherlands. In process tracing, a researcher identifies the causal process between an independent variable and the outcome of the dependent variable (George & Bennet, 2005) through careful tracking of the variables' interactions. We qualitatively analyzed the data by applying qualitative content/policy analysis and deductively coding according to the variables of the conceptual framework: policy and legal frameworks, socio-economic situation, power imbalances and history of conflict.

Historical dynamics of cross-sector collaboration in Dutch flood risk management: analysis of external factors

In this section, we describe the evolution of Dutch FRM by focusing on external system conditions enabling or hindering cross-sector collaboration. Our analysis determines four distinct periods. The first period encompasses the 1950s and 1960s characterized by the construction of large-scale engineering infrastructure. The second period of the 1970s and 1980s is marked by growing attention to the negative impact of structural measures on the environment and ecology, however, these measures continue to prevail. The period

from the 1990s up until 2016 is notably characterized by the introduction of spatial measures to reduce the impact of flood events along with structural measures to reduce the probability of flooding. Finally, we describe recent developments and the introduction of new safety standards in the Netherlands.

Safety-only approach in the 1950s to 1960s

One of the decisive events in the history of Dutch flood risk governance is the 1953 storm surge disaster. It caused a collapse of the coastal flood defence infrastructure in the south-western Netherlands, which took 1835 peoples' lives, inundated about 200,000 ha of land and led to massive economic losses (Vellinga & Aerts, 2013). To ensure that such a failure of infrastructure would never happen again, FRM became a matter of national security and a major goal for the Dutch government. The disastrous flood of 1953 led to the immediate legal adoption of new safety standards for the height of the dikes (Bergsma, 2016). The literature suggests that cross-sector collaboration in this period was characterized by rather low intensity, involving for example consultative interaction or exchange of information (e.g. Kuks, 2002).

Policy and legal frameworks

The Dutch flood safety policy and legal framework is founded on the idea that the national government is liable in ensuring flood safety (van Rijswick, van Doorn-Hoekveld, Gilissen, Keessen, & Wiering, 2015). The public approach to FRM is determined by the constitution (1848), the Law on the Water Boards and the Public Work Act, which also defines the responsibilities of different governmental sectors (Verkerk & van Buuren, 2013). Right after the disaster in 1953, the first Delta Committee was established, composed of civil and agricultural engineers, consultants and contractors, and technical experts from provinces, water boards and different universities (Disco & Toussaint, 2014). The committee developed the Delta Plan, aimed at preventing the lower-lying regions of the Netherlands from being flooded again. The plan envisaged the Delta Works projects constructing a system of new dams, barricades and floodgates and reinforcing dikes according to the new safety standards (Correljé & Broekhans, 2015). To start the construction works, the Dutch Parliament agreed on the Delta Law in 1959. The flood safety objective had absolute priority over other sectoral objectives in the policy and legal frameworks. At the same time, Dutch water management was heavily oriented towards agricultural interests represented by the water board managers (Lintsen, 2002), because the emergence of extensive agriculture demanded strict water level management. The first traces of sectoral interconnectedness are reflected in the First Water Policy Document (1968), addressing also water scarcity, agriculture and navigation, yet primarily focusing on flood protection (Kuks, 2002).

Political dynamics and power relations

Since the collapse of the coastal flood defences was partially ascribed to insufficient maintenance by small local water boards, the Delta project, being a top-priority large-scale national initiative, facilitated the transfer of power and liability over the works from local water boards to the state water authority, the Rijkswaterstaat (Meijerink, 2015). The implementation of urgent and important delta works involved Rijkswaterstaat dominance

over all aspects of national water management (Kuks, 2002). Still, in accordance with the 'polder model', the authority had to consult with numerous parties, including the water boards and provinces, which were responsible for public works and spatial development, respectively. Given the one-dimensional 'flood safety only' nature of water management projects, these consultations and debates were mostly about risk presentation and risk exclusion (Kuks, 2002). In this period, the interaction between the water sector (headed by the Rijkswaterstaat) and other sectors, including housing and agriculture, was characterized not by extensive collaboration but by short-term communication involving some exchange of information. There is little evidence in the literature that the decision-making process entailed some level of integration across the policy sectors involved in FRM. Until the end of the 1960s the Rijkswaterstaat was primarily a civil engineering organization approaching flood management as an issue of 'safety, security, protection and technocratic design' (Kuks, 2002, p. 110). Flood safety was perceived as a national security issue (Lintsen, 2002), and there was no demand to debate the impact of safety measures on other policy sectors.

This was also the period in which the Rijkswaterstaat, wresting the responsibility for national flood safety from the water boards, became a powerful, centralized organization, often perceived as a 'state within a state' (Lintsen, 2002). With the surge barriers, high dikes and dams constructed by the Rijkswaterstaat, the Delta Plan proclaimed the water engineers as heroes saving the nation from disastrous floods (Warner & van Buuren, 2011). Not surprisingly, many of the construction works along the rivers were not even legally approved in this period, permits being issued only after the fact (Kuks, 2002). Many historians (e.g. Lintsen, 2002) stress that it is wrong to claim that that Rijkswaterstaat had absolute power. Although the debate on flood management was not politicalized, given the evident and urgent need for construction projects, the Rijkswaterstaat had to interact with numerous parties, such as water boards and provinces (Kuks, 2002). This interaction can hardly be described as collaborative, however, as there is no evidence whatsoever of debate regarding conflicting values.

Socio-economic conditions

Socio-economic conditions (e.g. population growth, urbanization, socio-economic development) in the Netherlands changed considerably in the second half of the twentieth century. As a result of economic development after the Second World War, the economic value of flood consequences has steadily increased since the 1950s (Vis, Klijn, De Bruijn, & Van Buuren, 2003). On the other hand, continuous increase in GDP has resulted in the growth of financial resources to manage the flood risk (De Moel, Aerts, & Koomen, 2011). In other words, socio-economic development in the Netherlands has resulted in increasing flood risk, along with abundant financial resources to reduce the risk and deal with damage. Furthermore, FRM has become increasingly embedded in a broader view of the socio-economic system underlying FRM activities. The concept of economic optimization of flood defences was first introduced by van Dantzig in 1956. With the development of cost–benefit analysis, the costs of increased protection and investments in flood defences were balanced against the social benefits of reducing flood risk and preventing damage from flooding.

1970s to 1980s: ecological turn, safety first

The safety-only approach was questioned at the end of 1960s by the first attempts towards what was later to be called integrated water management (Kuks, 2002), a concept that stresses the need for cross-sector coordination and has come to dominate the global water management discourse (Molle, 2008). For example, with the adoption of the First Water Policy Document (1968), together with the Surface Water Pollution Act, the focus has extended from water quantity, safety and sanitation to include issues of water quality (Kuks, 2002). Moreover, in line with the increasing complexity of the Dutch water regime, since the 1970s post-materialistic landscape, environmental and cultural values gained significance in Dutch society and consequently in water management policies (Toonen, Dijkstra, & Van Der Meer, 2006). The construction of Delta works and reinforcement of the river dikes after the flooding of 1953 met growing resistance from the public concerned with the impact on the environment and landscape. In the coastal defence works, public resistance was especially fierce regarding the closure of the Eastern Scheldt Estuary, which would have caused loss of tidal area and profitable aquaculture species. In response, the possible ecological impact of infrastructure works was considered for the first time, and in 1974, the Dutch government changed the plan for the Eastern Scheldt Estuary from a closure dam to a surge barrier with moveable panels (Disco, 2002).

Similar public resistance to the traditional water engineering approach of the Rijkswaterstaat arose in the 1970s and 1980s (Kuks, 2002). In a number of river areas, people protested against the impact of the works on the landscape (van Heezik, 2008). The response of the Dutch government was to call in the Becht Commission to evaluate the safety standards, which happened in 1975. The commission's recommendation to lower the safety standards to reduce the impact of the dike reinforcement on the environment was accepted by the government in 1978 (Correljé & Broekhans, 2015). The commission also stressed that the various sectoral interests with a role in decisions on the design of the dike reinforcement works had to be coordinated at earlier stages of planning (van Heezik, 2008). But despite the commission's recommendations and the protests, most of the dike reinforcement projects continued just as before (Brouwer, 2013; van Heezik, 2008). Continuous protests against dike reinforcement projects prompted the government to call in a new commission. In 1993 this commission concluded that dike reinforcement projects should take into account the scenic, natural and cultural-historical values of the landscape (van Heezik, 2008) and ensure the involvement of citizens and local administrations in decision making (van Leussen & Meijerink, 2014). On account of these developments, the literature generally acknowledges the growing demand for coordination and intensification of cross-sector collaboration in this period (Disco, 2002; Kuks, 2002).

Policy and legal frameworks

In this period, the importance of ecological functions of water evolved considerably, while the historically influential role of the agricultural sector declined (van der Brugge & Rotmans, 2007). Using the First Water Policy Document (1968) as a foundation, the Second Water Policy Document (1984) extended the scope of water policies by addressing water quality and environmental issues in a more systematic way (Lintsen, 2002). Another important development in this period was the revision of the Dutch Constitution in 1983, proclaiming that 'the public domain should be dedicated to the protection and

sustainable improvement of the living environment, including the natural water system' (Kuks, 2002, p. 15). Gradually, the flood safety sector demonstrated growing accountability for the impact it was having on the environment and the society, and had to coordinate with the environmental and public sectors *vis-à-vis* the activities undertaken. In the 1980s the concepts of Integrated Water Resources Management and the water system approach were introduced (Mostert, 2006). After the publication of the report 'Dealing with Water' by RIZA (the Ministry of Transport and Public Works) in 1985, new spatial plans were developed in which economic functions of rivers such as agricultural activities, sand extraction and tourism, as well as water supply, were coupled with ecological development (van der Brugge & Rotmans, 2007). This water system management approach, soon embedded in national policy, represented a new way of perceiving water as an integral part of the ecosystem. Likewise, it demonstrated that flood risk governance was not only a safety issue, and that ecological values together with economic considerations should be taken into account when meeting the safety standards (Correljé & Broekhans, 2015). However, this policy turned out to be problematic to implement, as dike reinforcement appeared to be inconsistent with other objectives. Although the high water levels in 1993 and 1995 turned the focus again to dike reinforcement, after the adoption of emergency legislation enabling water boards to implement dike reinforcement projects within a short timeframe, the alternative FRM strategies turned into policy a few years later.

Political dynamics and power relations

The position of civil engineers and the Rijskwaterstaat was dominant until the end of the 1960s, when the discussions about the consequences of flood safety structural infrastructure struck the political arena and placed environmental issues at the top of the political agenda. The Rijkswaterstaat began to share power with biologists and ecologists within the agency itself (Disco, 2002), and adapted to these new interaction dynamics by going 'green' (Warner & van Buuren, 2011). Similarly, the water boards had to adjust to the 'ecological turn' (Disco, 2002) and increasing public participation (Lintsen, 2002). Moreover, the newly introduced legal framework of flood safety in the late 1950s, namely the Delta Act and the safety standards, reduced the autonomy of the water boards, as they had to comply with it. Later in the 1980s, the water boards in turn had to adjust to the water systems approach. The new features of integrated water management demanded much more cooperation and coordination with others, compared to older engineering tasks (Bressers, Huitema, & Kuks, 1994). Obviously, these developments led to extensive modernization and adjustment of the water boards, but the distribution of power and influence among the parties remained challenging (van Buuren et al., 2016). Even after the ecological turn, the water sector regarded safety as the only factor that really mattered (van Heezik, 2008). All other interests and sectors involved would make the reinforcement projects too expensive at the expense of safety. For the civil engineering expert-oriented flood safety sector, it was difficult to open up to outsider initiatives and justifications (Edelenbos, Van Buuren, Roth, & Winnubst, 2017)

History of cross-sector conflicts

In the Netherlands land is relatively scarce, so spatial claims by the water sector and other sectors, such as housing, economy, recreation and agriculture, may conflict (van der

Brugge & Rotmans, 2007). Moreover, flood safety interventions inevitably impact the lives of Dutch citizens in both coastal and river areas (Behagel & Turnhout, 2011). Conflicts based on structural flood defence measures, as in the Eastern Scheldt Estuary, illustrate the social sensitivity of these measures. There is always a segment of society or a policy sector unhappy with and 'damaged' by such measures (Warner et al., 2013; Wolsink, 2006). Nevertheless, the Dutch government was in general responsive to different forms of public resistance to government flood management plans. For example, the nationwide protests of the closure of the Eastern Scheldt Estuary, organized mostly by environmentalists in the 1970s, led to the revision of the initial government infrastructure plan. From this period on, the flood safety sector was aware of the need for more interactive and coordinative ways of dealing with cross-sector conflicts to avoid any form of public resistance (Warner, 2013). The period between the 1970s and the 1980s also witnessed court appeals, including the case of a dike reinforcement project in a small village called Brakel (van Heezik, 2008). The residents of Brakel, and many other villages along the river Rhine, together with newly formed environmental and civic organizations, fiercely protested reinforcing the dikes and thereby damaging the river landscape. This was an important turning point in the history of Dutch flood protection policy (van Heezik, 2008), as the flood safety sector recognized the need for a more cooperative type of interaction characterized by sharing of information, open communication of conflicting issues and mutual awareness.

Socio-economic conditions

Due to the rapid growth of the environmental movement, environmental issues were given high priority, and increasingly taken into account in FRM (van Leussen & Meijerink, 2014). Before this greater environmental awareness, socio-economic development was only favourable for the technocratic regime to flourish, as not only political support but also financial resources were available. In the early 1980s, the economic decline resulted in lower budgets allocated to the Rijkswaterstaat for flood protection (Lintsen, 2002). Emphasis was placed by the central government on a less bureaucratic, more decentralized and more efficient internal governmental structure. This is the period when the water system approach was also introduced, encouraging the integration of spatial planning and water management (Mostert, 2006) and eventually resulting in integrated programmes, such as RfR. Thus, cross-sector collaboration has been a result of socio-economic, environmental and institutional changes reinforcing each other (van der Brugge & Rotmans, 2007).

1990s to 2016: Room for the River, multilayer safety

It was not until the 1990s, when the Dutch government fundamentally changed its traditional flood protection approach of dike reinforcement. High water levels in 1995 resulted in the evacuation of 250,000 people from river areas (Orr et al., 2007). The first reaction during the event was the securitization of the system, which resulted in minimizing the potential damage and improving the emergency systems (van Stokkom, Smits, & Leuven, 2005). The government also immediately adopted emergency legislation and initiated the Delta Plan for Large Rivers (Olsthoorn & Tol, 2001), determining the urgency for all river dikes to meet the safety standards. Dike alternatives delivering flood safety

were also increasingly gaining attention. The high water in the rivers of 1995, along with projections of climate change, raised concern about the long-term flood safety afforded predominantly by higher dikes and improved infrastructure (Meijerink, 2005). The government introduced a new policy approach called Room for the River; its core idea was to reduce the probability of flooding by restoring the natural water storage capacity of river systems. Realizing water safety by providing more space for water was the main objective of the RfR policy and programme. The second objective was to improve spatial quality (Wiering & Arts, 2006). With the introduction of the RfR policy, water management and spatial planning became increasingly interdependent (Verkerk & van Buuren, 2013). Other issues discussed included multilayer water safety (van den Hurk, Mastenbroek, & Meijerink, 2014). The approach entailed a combination of preventive measures (Layer 1) to improve flood protection (dikes, dams and dunes, as well as creating more space for the rivers); spatial planning (Layer 2) to reduce the possible impact of flooding; and emergency management (Layer 3) to counteract the consequences of flooding (Jorissen & Kraaij, 2016; Ritzema & Van Loon-Steensma, 2017). The multilevel safety approach made explicit the connection between flood safety and spatial development (van den Hurk et al., 2014). The introduction of these new policy concepts has been referred to by many researchers as a paradigm shift (Ritzema & Van Loon-Steensma, 2017; van den Hurk et al., 2014; Ward, Pauw, van Buuren, & Marfai, 2017) towards more collaborative and integrated flood risk governance.

Notably, this period is also marked by the launching of a second Delta programme, which was set up with longer-term goals of ensuring flood safety and sufficient freshwater far into the future. The programme, which is still ongoing, takes an adaptive approach to FRM – anticipatory instead of responsive (Klijn et al., 2015) – to be able to cope with future economic development and climate change (Delta Committee, 2017; OECD, 2014). It is a joint undertaking of the national government, provinces, municipalities and regional water authorities, in close collaboration with other public and private entities. As the water governance assessment report by OECD (2014) concludes, cross-sector, multi-stakeholder dialogues in the framework of the Delta programme contribute to better accountability, transparency and improved cross-sector collaboration and public participation.

Policy and legal frameworks

What stands out as the main feature of this period are the new cross-sector collaboration attempts. Various policy publications were produced with recommendations for an integrated FRM approach (e.g. the Living Rivers plan, the Third Policy Document on Water Management) and to enhance the interlinking and collaboration among river management, nature development and spatial planning (van Herk, 2014). Moreover, the RfR programme the government adopted was a multilevel governance approach coordinated by three ministries, in which different policy sectors and governmental agencies actively collaborated at local, provincial and national levels on water safety, spatial planning, agriculture and nature (van den Brink, 2009). Several policy documents, including the Delta Vision and the National Water Plan, not only explicitly highlighted the need for better coordination and collaboration across the sectors (Deltacommissaris 2011) but were also formulated with the participation of different societal parties (Doorn, 2016). Our analysis shows that a more collaborative mode of interaction was encouraged by nearly all the policy and legal documents of this period, to increase flood safety in combination with the enhancement

of ecology or spatial development. The documents included, for example, the Delta Act (2011), encouraging integral decision-making, the Delta Programme, containing goals and objectives to be accomplished also in other policy sectors (but not at the expense of flood safety), and the EU floods directive (2007/60/EC), which, demanding *inter alia* flood risk mapping, emphasized the need for an integrative approach to managing flood risks.

Nevertheless, despite promoting cross-sector collaboration, the policy and legal frameworks of this period do not explicitly propose specific policy instruments facilitating or coordinating the complex interactions between the sectors (Veld, van Vliet-Kuiper, & Noordegraaf, 2016).

Political dynamics and power relations

With the introduction of the RfR approach and the multilayer safety concept, the political dynamics and power relations in Dutch FRM shifted in favour of cross-sector collaboration. These two fundamental strategies, bolstered by climate change uncertainties, resulted in an interplay and complex interaction of policy sectors and actors connected to FRM: water management, spatial planning, environmental protection and disaster management (interview, Deltares, 2018). The growing intensity of interaction among these stakeholders notwithstanding, flood safety remained a dominant sector, with ecology, landscape quality and emergency management being secondary objectives (Warner et al., 2013). However, at the same time, with the dominance of liberal political agendas, the strain on planning and control in spatial development has been reduced, resulting in fewer policy restrictions for regional development (van Buuren, Lawrence, Potter, & Warner, 2018). In the context of RfR, regional and local authorities used the new policy approach to promote regional development.

Socio-economic conditions

Just as in the early 1980s, when economic decline resulted in budget cuts for and decentralization of FRM (Lintsen, 2002), following the economic crisis of 2008, the national government announced budget cuts; water management in particular had to become less bureaucratic and more efficient. The Association of Water Boards proposed to partially cover the costs of dike reinforcement projects, thus also financially taking responsibility for flood defences (Janssen, 2015). In 2011 the Administrative Agreement on Water Affairs was signed by the provincial and municipal authorities and the water authorities, encouraging structural savings in water budgets via more efficient collaboration and coordination among relevant sectors and levels of government, including 'transfers of roles and responsibilities when other organizations are able to perform the same tasks better or at a lesser cost for society' (OECD, 2014, p. 95). Therefore, in this period, the economic decline was an important trigger for the accumulation of resources and more efficient cross-sector collaboration. It was also in this period that the Delta Fund was established to secure financial resources for FRM regardless of economic fluctuations.

History of cross-sectoral conflicts

The RfR programme accelerated cross-sector interaction and continued experimenting with collaboration and realizing an integrated water management approach. The final evaluation report of the RfR programme suggests that one of the programme's accomplishments was in maintaining multisector and multilevel collaboration from the planning

to the realization phases of RfR projects (Rijkswaterstaat, 2018). Nevertheless, the integration of multiple policy sectors (e.g. agriculture, nature, housing, economy) in RfR projects resulted not only in synergies and benefits but also in conflicts of interest among the sectors involved. Many studies (e.g. Wiering & Arts, 2006; Wolsink, 2006) have concluded that the transition to integrated water management was not fully realized. Because of the coupling of objectives and conflicts over priorities, the projects occasionally ran into delays, making collaboration difficult (Edelenbos, van Buuren, & Warner, 2013; Fliervoet & van den Born, 2017). Although integrating flood safety with other sectoral interests led to cross-sector conflicts (Rijke, Herk, Zevenbergen, & Ashley, 2012) and made some of the RfR programme's projects (e.g. Kampen's IJsseldelta-Zuid and Zutphen's IJsselsprong) very complicated (Edelenbos et al., 2013), the RfR programme was assuredly a good example of cross-sector collaboration between the water and spatial planning sectors. It was successful in achieving its dual integrated objective of increasing water safety while contributing to spatial quality (Rijke et al., 2012; Rijkswaterstaat, 2018).

Recent developments

After years of research and planning, the Dutch government has introduced new safety standards for primary flood defence systems (Jorissen & Kraaij, 2016; Klijn, Asselman, de Kruif, Bloemen, & Haasnoot, 2016; Ritzema & Van Loon-Steensma, 2017; Van Alphen, 2016). The new safety standards refer primarily to the flooding probabilities of polder areas, implying the possible failure of multiple flood defence/dike systems (Van Alphen, 2016). Since the acceptable probability of a dike system's structural failure is tuned to the strictest scenario of climate change and socio-economic development in the Netherlands (Klijn et al., 2016), it is expected that more than 50% of the primary flood defences have to be reinforced or raised to meet the new safety standards (Jorissen & Kraaij, 2016). The new Dutch Flood Protection Programme has been launched to accomplish this task (Delta Programme 2017). An alliance of regional water authorities and the Ministry of Infrastructure and Water Management, this institutional arrangement aims at governing the implementation of new safety standards.

Policy and legal frameworks

The starting point of the updated FRM policy is that preventive measures (dike reinforcement and river widening) must remain a priority when it comes to complying with the new safety standards, or in other words, achieving the intended level of protection (House of Representatives, 2016; Ministerie van Infrastructuur en Milieu, 2015). The new standards are based on risk, taking into account both the probability and the consequences of a flood. Therefore, flood safety is achieved using the various layers of multilayer safety: preventing flood and limiting the consequences of a flood – that is, water-robust spatial infrastructure and disaster management (Ritzema & Van Loon-Steensma, 2017; van Buuren et al., 2016). Thus, the implementation of new safety standards may also imply spatial measures as part of a risk-based approach to flooding, in which the cost-effectiveness of flood defence systems is weighed against the cost-effectiveness of alternative solutions like spatial measures (De Vries & Wolsink, 2009; Liao, 2012).

The policy and legal frameworks for new safety standards point out a likelihood of cross-sector collaborations in smart combinations with spatial planning and/or other sectors in

achieving the desired level of protection (Ministerie van Infrastructuur en Milieu, 2015). Nevertheless, spatial solutions and smart combinations are considered mostly when dike reinforcement is very expensive or has an extensive societal impact (interview, Rijkswaterstaat, 2018). Where possible, the government facilitates integrated collaborative implementation by considering area-based development (House of Representatives, 2016). The main difference from the previous phase of the RfR approach is that the ambitions of other policy sectors may be linked to flood prevention measures through co-financing and not under initially determined national funding. However, the government tends to allocate time and funding for the exploratory stages of dike reinforcement projects to cooperate with multiple interested sectors, and to identify and integrate these linking opportunities (Jorissen & Kraaij, 2016; Seijger et al., 2018). Therefore, the new Dutch Flood Protection Programme policy framework provides guidance for cross-sector collaboration and smart combinations, but only under voluntary application (Klijn et al., 2016).

Political dynamics and power relations

The implementation of traditional FRM approaches, such as dike reinforcement, is usually rationalized by the urgency of responding immediately to large-scale flood shocks (Kaufmann, Lewandowski, Choryński, & Wiering, 2016) and the consequent political pressure to 'do something' (Zevenbergen, Van Herk, & Rijke, 2017). Fortunately, since 1953, the Netherlands has not been exposed to a major flooding event. Moreover, as mentioned above, the rationale behind the new safety standards and dike reinforcement projects seems to be apolitical (interview, Ministry of Infrastructure and Water Management, 2018). Neither the periods preceding nor following the formation of a legal base for the new standards in the new National Water Plan are characterized by major policy debates – nor controversies politicizing overall deliberations around the new FRM (Seijger et al., 2018). Most of the debates that took place were about the new standards and their practical uptake by the water authorities (interview, water authority Vallei en Veluwe, 2018); less attention went to discussing, for example, safety standards for the second and third layers or new ways of improving integration and collaboration across the sectors for smart combination measures (van Buuren et al., 2016). The absence of political controversy not only indicates a broad consensus on and support for the new flood risk policies, but may also inform us about the dominant position of flood risk experts and the sector as a whole (interview, Dutch Flood Protection Programme, 2018).

Socio-economic conditions

Current socio-economic conditions in the Netherlands largely reflect the situation in the previous phase. Continuous socio-economic development increases the risk of flooding and calls for greater coherence among the sectors of FRM. As mentioned, the flood protection programme offers opportunities for cross-sector collaboration by financing the exploratory phases of dike reinforcement projects, with the aim of looking beyond and identifying the most cost-effective solutions together with all interested sectors. However, compared to previous periods of the RfR programme, when spatial solutions were also financed by the national government, smart combination projects are currently only possible by means of co-financing. Interestingly, interested sectors may co-finance smart combination projects to integrate their functions, but also the government may consider using the Delta Fund's

resources, on the condition that the proposed measures contribute considerably to safety as well as offering possibilities for enhancing the area's (regional) development (National Water Plan 2016–2021). Therefore, socio-economic conditions do not constrain but facilitate smart combinations and cross-sector collaboration in FRM.

History of cross-sectoral conflicts

Since the implementation of the new safety standards commenced only recently, it is too early to identify sectoral conflicts that might hamper ongoing collaboration practices. However, looking back on the history of opposition between the sectors involved in Dutch FRM, a general observation relevant to the current developments can be made. As mentioned, the government is largely responsive to different forms of conflicts around flood safety issues. The last decades have witnessed not only government commissions appointed to deal with public resistance to the impact of safety standards (e.g. the Bercht Commission in 1975) but also the cancelation of large-scale infrastructure projects (e.g. Schardammerkoog and Ooijpolder) due to strong opposition (Neuvel & van der Knaap, 2010). Although the last example occurred on an ad hoc basis, the first shows that the central government can bargain and solve conflicts by for example linking the issues of one sector with another, thus facilitating collaboration for win-win solutions (OECD, 2014).

Discussion and concluding remarks

The aim of this article was to contribute to the continuous debate on policy change and transition in Dutch flood risk governance. We draw attention to two aspects of the evolution of flood risk policy in the Netherlands that are less systematically discussed in the literature: the transition to sectoral collaboration practices involving not only flood safety but also adjacent sectors; and the impact of external conditions on shaping and leading the transition pattern. First, we reviewed the relevant literature and distinguished four distinct periods for the shifts in cross-sector collaboration. Second, we applied the integrative framework for collaborative governance to describe and analyze in a structured way the system conditions shaping these shifts from 1953 onwards. Our study provides insight into the often overlooked role of external conditions in understanding the evolution of FRM in the Netherlands (see Table 1 for a summary).

Cross-sector collaborative governance regimes are complex, multilevel systems that transform over time along different trajectories. External conditions in which such systems are rooted include policy and legal frameworks, politics and power relations, socio-economic conditions and the history of conflicts. This study indicates that the intensity of cross-sector collaboration is at least to some extent determined by systemic conditions outside the actual collaborative dynamics and processes. By unpacking the context of the system, our analysis shows that all these external conditions have been subject to change over time, yet power relations remain considerably stable. The extent to which external conditions in general and power relations in particular have been addressed in the literature on cross-sector collaboration in flood risk governance appears to be limited. We conclude that specific collaborative governance regime characteristics (e.g. continuity of the dominant position of one of the participants) define the degree to which external conditions may influence the functioning of the regime.

Table 1. Summary of system context conditions influencing Dutch flood risk management from 1953 onwards.

Period and system context	Policy and legal frameworks	Political dynamics and power relations	Socio-economic conditions	History of cross-sectoral conflicts
1950s tp 1960s - safety-only approach - low intensity of cross-sector collaboration - exchange of information	Priority of flood safety over other sectoral objectives; importance of agricultural interests	Flood safety high on the political agenda; dominant position of flood safety sector over agricultural interests	Higher economic cost of flood consequences, but economic growth also brings an abundance of financial resources to deal with flood risk	–
1970s to 1980s - ecological turn / safety-first approach - growing interest in cross-sector collaboration	'Ecological turn' and discussions of the need for intersectoral coordination	Growing discussion of integrated water management and power distribution; dominant position of flood safety sector	Higher economic cost of flood consequences; economic decline brings decentralization, less bureaucracy, more efficient coordination across sectors	Ecological turn leads to public resistance to structural flood measures; conflicts contribute to reconsideration of flood safety sector's dominant position
1990s to 2016 - Room for the River approach, multilayer safety - Intensified cross-sector collaboration	Need for improved coordination and collaboration across the sectors is explicitly reflected	Dominant position of flood safety sector, with ecology, landscape quality and emergency management being secondary objectives	Higher economic cost of flood consequences; economic decline triggers accumulation of resources across the sectors, and so promotes cross-sector collaboration	Occasional conflicts over integration of multiple policy sectors; the government is responsive in terms of finding solutions for this
2017 to present • safety-first approach • next to dike reinforcement other measures may be considered but only when the safety level set by new standards is not compromised • cross-sector collaboration when needed	Possibility of cross-sector collaboration on volunteering based on consensus	Dominant position of flood safety sector, possibility of distributing/ sharing power	Socio-economic development brings higher economic cost of flood consequences	No conflicts determined yet

After 1953, when flood safety had obvious priority over other sectoral objectives in the main FRM policy and legal frameworks, cross-sector partnerships and collaboration would only follow a 'safety first' or 'safety only' logic. This phase was followed by a transition period in the 1970s and 1980s when, under the influence of the ecological turn, the dominant position of the flood safety sector was questioned. The shift in the traditional approach to FRM in the Netherlands was triggered by several societal developments. First, the process of the democratization of Dutch society, and the 'battle against institutions' so common to this process, led to strong criticism of the technocratic works headed by the Rijkswaterstaat. Second, this was the period of the global 'ecological turn' and growing awareness about possible irreversible ecological disaster caused by uncontrolled population growth and economic development. Legislation to protect the environment was developing rapidly, with a distinct sectoral approach. Therefore, environmental protection was starting to manifest as a policy sector to be coordinated with and integrated in FRM. The need for intersectoral coordination across water and environment, as well as agriculture and land use sectoral policy plans, was omnipresent yet highly difficult and complex. The result was the growing number of platforms (e.g. the Becht and Boertien Commissions) where representatives of different sectors tried to align and coordinate their activities.

Although the policy and legal frameworks, along with political dynamics and power relations, began shifting towards enhanced collaboration and integration in this period, it was not until the 1990s when the first attempts at flood policy integration were realized. With the introduction of the RfR and multilayer safety policy concepts, water management and spatial planning became increasingly interdependent. Overall, starting in the 1990s, policy frameworks, political dynamics and socio-economic 'system context conditions' have become favourable for cross-sector collaboration. Collaborative governance was a strategic response to changing structural conditions to enhance the legitimacy and comprehensiveness of FRM actions, bridge different levels of institutional hierarchies and diversify the range of issues governed. However, these processes were evolving within the existing power relations characterized by the dominance of traditional approaches to FRM. The flood safety sector was constantly seeking the right balance between stability and change, asserting continuity in mission and identity of delivering flood safety while responding to changing demands and emerging opportunities. Hence, it has managed to maintain its dominant position, supported mainly by the legislation prescribing strict safety standards as well as the political priority given to flood safety in the Netherlands.

Nevertheless, there is indeed a noticeable trend towards enhanced cross-sector collaboration in Dutch FRM, in which flood safety measures are being connected to other issues such as spatial planning and ecological conservation and development. Currently, the Dutch FRM regime provides the time, resources and institutional capacity required to explore smart combinations, alternatives to dike reinforcement and innovative approaches. The enduring caveat, however, is that cross-sector collaboration can develop only as long as it does not compromise flood safety. The safety-first paradigm is firmly rooted and a continuous factor in the system context of Dutch FRM. What has changed is the portfolio of strategies used. FRM includes not only technical infrastructure but also river restoration, Room for the River, and in some cases multilayer flood safety measures, which increase the dependencies between policy sectors. For certain strategies (e.g. multilayer safety) the flood

safety sector is highly dependent on other actors; for example, meeting standards may depend on urban planning. This poses challenges for a flood safety sector seeking to avoid complexities and reduce its dependency on other policy sectors. Despite the growing interconnectedness and interdependencies among the sectors reflected in current policy and legal frameworks, in the case of Dutch flood risk governance, power relations and political circumstances are still decisive for initiating collaboration. The mere existence of the preconditions for cross-sector collaboration is not enough to guarantee it.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work is part of the Perspectief research programme 'All risk', project number P15-21, which is (partly) financed by NWO Domain Applied and Engineering Sciences.

ORCID

Emma Avoyan http://orcid.org/0000-0003-3207-6627
Sander Meijerink http://orcid.org/0000-0002-4249-6230

References

Agranoff, R. (1986). *Intergovernmental management: Human services problem-solving in six metropolitan areas*. New York, NY: State University of New York Press.

Andranovich, G. (1995). Achieving consensus in public decision making: Applying interest-based problem solving to the challenges of intergovernmental collaboration. *Journal of Applied Behavioral Science*, *31*(4), 429–445. doi:10.1177/0021886395314003

Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, *18*(4), 543–571. doi:10.1093/jopart/mum032

Baumgartner, F., & Jones, B. D. (1993). *Agendas and instability in American politics*. Chicago, IL: University of Chicago Press.

Behagel, J., & Turnhout, E. (2011). Democratic legitimacy in the implementation of the water framework directive in the Netherlands: Towards participatory and deliberative norms? *Journal of Environmental Policy and Planning*, *13*(3), 297–316. doi:10.1080/1523908X.2011.607002

Bergsma, E. (2016). Changed knowledge requirements for spatial flood governance. *Ecology and Society*, *21*(4). doi:10.5751/ES-08952-210440

Braun, D. (2008). Lessons on the political coordination of knowledge and innovation policies. *Science and Public Policy*, *35*(4), 289–298. doi:10.3152/030234208X310347

Bressers, H. T. A., Huitema, D., & Kuks, S. M. M. (1994). Policy networks in Dutch water policy. *Environmental Politics*, *3*(4), 24–51. doi:10.1080/09644019408414166

Brouwer, S. (2013). Policy entrepreneurs and strategies for change: The case of water management in the Netherlands. PhD Thesis, VU University Amsterdam.

Bryson, J., & Crosby, B. (2008, April). Failing into cross-sector collaboration successfully. In *Big ideas in collaborative public management* (pp. 306). Armonk, NY: M.E. Sharpe.

Bryson, J. M., Crosby, B. C., & Stone, M. M. (2006). The design and implementation of cross-sector collaborations: Propositions from the literature. *Public Administration Review*, *66*(SUPPL. 1), 44–55. doi:10.1111/j.1540-6210.2006.00665.x

Bryson, J. M., Crosby, B. C., & Stone, M. M. (2015). Designing and implementing cross-sector collaborations: Needed and challenging. *Public Administration Review*, *75*(5), 647–663. doi:10.1111/puar.12432

Burstein, P. (1991). Policy domains: Organization, culture, and policy outcomes. *Annual Review of Sociology*, *17*, 327. doi:10.1146/annurev.so.17.080191.001551

Challis, L., Fuller, S., Henwood, M., Klein, R., Plowden, W., Webb, A., ... Wistow, G. (1988). *Joint approaches to social policy: Rationality and practice*. Cambridge, UK: Cambridge University Press.

Correljé, A., & Broekhans, B. (2015). Flood risk management in the Netherlands after the 1953 flood: A competition between the public value(s) of water. *Journal of Flood Risk Management*, *8*(2), 99–115. doi:10.1111/jfr3.2015.8.issue-2

De Moel, H., Aerts, J., & Koomen, E. (2011). Development of flood exposure in the Netherlands during the 20th and 21st century. *Global Environmental Change*, *21*, 620–627. doi:10.1016/j.gloenvcha.2010.12.005

De Vries, J., & Wolsink, M. (2009). Making space for water: Spatial planning and water management in the Netherlands. In S. Davoudi, J. Crawford & A. Mehmood (Eds.), *Planning for climate change: Strategies for mitigation and adaptation for spatial planners* (pp. 191–204). London: Earthscan.

Delta Committee. (2011). *Delta Act on water safety and freshwater supply*. The Hague: Delta Committee.

Delta Committee. (2017). *Delta Programme 2017: Work on the delta linking taskings, on track together*. The Hague: Delta Committee.

Disco, C. (2002). Remaking 'Nature': The Ecological turn in Dutch water management. *Science, Technology and Human Values*, *27*(2), 206–235. doi:10.1177/016224390202700202

Disco, N., & Toussaint, B. (2014). *From projects to systems: The emergence of a national hydraulic technocracy, 1900–1970* (pp. 155–204). Institute for Water Resources, U.S. Army Corps of Engineers and Rijkswaterstaat, Ministry of Infrastructure and the Environment. doi:10.1177/1753193413484873

Doorn, N. (2016). Reasoning about uncertainty in flood risk governance. In S. THansson & G. Hirsch Hadorn (Eds.), *The argumentative turn in policy analysis: Logic, argumentation & reasoning* (pp. 245–263). Cham: Springer.

Edelenbos, J., Van Buuren, A., Roth, D., & Winnubst, M. (2017). Stakeholder initiatives in flood risk management: Exploring the role and impact of bottom-up initiatives in three 'Room for the River' projects in the Netherlands. *Journal of Environmental Planning and Management*, *60*(1), 47–66. doi:10.1080/09640568.2016.1140025

Edelenbos, J., van Buuren, M. W., & Warner, J. (2013). Space for the River IJssel: Tortuous quests for striking an acceptable balance between water, nature and development. In J. F. Warner & A. van Buuren (Eds.), *Making space for the river: Governance experiences with multifunctional river flood management in the US and Europe* (pp. 33–49). London: IWA Publishing.

Emerson, K., & Nabatchi, T. (2015a). *Collaborative governance regimes*. Washington, DC: Georgetown University Press.

Emerson, K., & Nabatchi, T. (2015b). Evaluating the productivity of collaborative governance regimes: A performance matrix. *Public Performance and Management Review*, *38*(4), 717–747. doi:10.1080/15309576.2015.1031016

Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. *Journal of Public Administration Research and Theory*, *22*(1), 1–29. doi:10.1093/jopart/mur011

Fliervoet, J. M., & van den Born, R. J. G. (2017). From implementation towards maintenance: Sustaining collaborative initiatives for integrated floodplain management in the Netherlands. *International Journal of Water Resources Development*, *33*(4), 570–590. doi:10.1080/07900627.2016.1200962

Futrell, R. (2003). Technical adversarialism and participatory collaboration in the U.S. chemical weapons disposal program. *Science, Technology and Human Values*, *28*(4), 451–482. doi:10.1177/0162243903252762

George, A. L., & Bennet, A. (2005). *Case studies and theory development in the social sciences (e-book version)*. Cambridge, MA: MIT Press.

Gray, B. (1989). *Collaborating: Finding common ground for multiparty problems*. San Francisco, CA: Jossey-Bass.

Hassenforder, E., Clavreul, D., Akhmouch, A., & Ferrand, N. (2019). What's the middle ground? Institutionalized vs. emerging water-related stakeholder engagement processes. *International Journal of Water Resources Development*, *35*(3), 525–542. doi:10.1080/07900627.2018.1452722

House of Representatives. (2016). *Wijziging van de Waterwet en enkele andere wetten (nieuwe normering primaire waterkeringen)*. Kamerstuk: The Hague (in Dutch).

Hovik, S., & Hanssen, G. S. (2015). The impact of network management and complexity on multi-level coordination. *Public Administration*, *93*(2), 506–523. doi:10.1111/padm.12135

Huxham, C. (1997). *Creating collaborative advantage*. London: Sage.

Janssen, S. K. H. (2015). *Greening flood protection in the Netherlands: A knowledge arrangement approach*. Wageningen: Wageningen University.

Jochim, A. E., & May, P. J. (2010). Beyond subsystems: Policy regimes and governance. *Policy Studies Journal*, *38*(2), 303. doi:10.1111/(ISSN)1541-0072

Jordan, A., & Lenschow, A. (2010). Environmental policy integration: A state of the art review. *Environmental Policy and Governance*, *20*(3), 147–158. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1002/eet.539

Jorissen, R., & Kraaij, E. (2016). Dutch flood protection policy and measures based on risk assessment. In *E3S Web of Conferences*, 7. EDP Sciences. doi:10.1051/e3sconf/20160720016

Kaufmann, M. (2017). Limits to change: Institutional dynamics of Dutch flood risk governance. *Journal of Flood Risk Management*, *11* (3), 250–260. doi:10.1111/jfr3.12307

Kaufmann, M., Lewandowski, J., Choryński, A., & Wiering, M. (2016). Shock events and flood risk management: A media analysis of the institutional long-term effects of flood events in the Netherlands and Poland. *Ecology and Society*, *21*(4). doi:10.5751/ES-08764-210451

Kickert, W., Klijn, E., & Koppenjan, J. F. (1997). *Managing complex networks: Strategies for the public sector*. London: Sage.

Klijn, F., Asselman, N. E. M., de Kruif, A., Bloemen, P. J. T. M., & Haasnoot, M. (2016). Implementing new flood protection standards: Obstacles to adaptive management and how to overcome these. *E3S Web of Conferences*, *7*, 210. doi:10.1051/e3sconf/20160721003

Klijn, F., Kreibich, H., de Moel, H., & Penning-Rowsell, E. (2015). Adaptive flood risk management planning based on a comprehensive flood risk conceptualisation. *Mitigation and Adaptation Strategies for Global Change*, *20*(6), 845–864. doi:10.1007/s11027-015-9638-z

Koppenjan, J., & Klijn, E.-H. (2004). *Managing uncertainties in networks: A network approach to problem solving and decision making*. London: Routledge.

Kuks, S. (2002). The evolution of the national water regime in the Netherlands. *Global Environmental Politics*. doi:10.1007/978-1-4020-2484-9_4

Leskens, A., Boomgaard, M., van Zuijlen, C., & Hollanders, P. (2013, September 5–7). A multi-layer flood safety approach towards resilient cities. In D. Butler, S. Djordjevic, & M. J. Hammond (Eds.), *Proceedings of the international conference on flood resilience: Experiences in Asia and Europe*, Exeter, UK.

Liao, K. H. (2012). A theory on urban resilience to floods: A basis for alternative planning practices. *Ecology and Society*, *17*(4), 48. doi:10.5751/ES-05231-170448

Ling, T. (2002). Delivering joined-up government in the UK: Dimensions, issues and problems. *Public Administration*, *80*(4), 615–642. doi:10.1111/padm.2002.80.issue-4

Lintsen, H. (2002). Two centuries of central water management in the Netherlands. *Technology and Culture*, *43*(3), 549–568. doi:10.1353/tech.2002.0126

Mahoney, J. (2015). Process tracing and historical explanation. *Security Studies*, *24*(2), 200–218. doi:10.1080/09636412.2015.1036610

Margerum, R. D. (2001). Organizational commitment to integrated and collaborative management: Matching strategies to constraints. *Environmental Management*, *28*(4), 421–431. doi:10.1007/s002670010234

McCool, D. (1990). Subgovernments and the impact of policy fragmentation and accommodation. *Policy Studies Review*, *8*(4), 264–287. doi:10.1111/j.1541-1338.1988.tb01101.x

McGuire, M. (2006). Collaborative public management: Assessing what we know and how we know it. *Public Administration Review*, *66*(SUPPL. 1), 33–43. doi:10.1111/j.1540-6210.2006.00664.x

Meijerink, S. (2005). Understanding policy stability and change: The interplay of advocacy coalitions and epistemic communities, windows of opportunity, and Dutch coastal flooding policy 1945–2003. *Journal of European Public Policy*, *12*(6), 1060–1077. doi:10.1080/13501760500270745

Meijerink, S. V. (2015). The path-dependent development of Dutch flood risk management. In L. Peilin & L. Roulleau-Berger (Eds.), *Ecological risks and disasters: New experiences in China and Europe*. London: Routledge.

Ministerie van Infrastructuur en Milieu. (2015). *National water plan 2016–2021 (Nationaal waterplan 2016–2021)*. The Hague: Author. (in Dutch).

Molle, F. (2008). Nirvana concepts, narratives and policy models: Insights from the water sector. *Water Alternatives*, *1*(1), 131–156.

Mostert, E. (2006). Integrated water resources management in the Netherlands: How concepts function. *Journal of Contemporary Water Research Education*, *135* (Ven 2004), 19–27. doi:10.1111/j.1936-704X.2006.mp135001003.x

Mostert, E. (2017). Between arguments, interests and expertise: The institutional development of the Dutch water boards, 1953-present. *Water History*, *9*(2), 129–146. doi:10.1007/s12685-016-0154-1

Neuvel, J. M. M., & van der Knaap, W. (2010). A spatial planning perspective for measures concerning flood risk management. *International Journal of Water Resources Development*, *26*(2), 283–296. doi:10.1080/07900621003655668

O'Leary, R., & Bingham, L. B. (2008). *Big ideas in collaborative public management*. Armonk, NY: M.E. Sharpe.

OECD. (2014). *Water governance in the Netherlands: Fit for the future?* Paris: OECD.

Olsthoorn, A. A., & Tol, R. S. J. (2001). *Floods, flood management and climate change in the Netherlands*. Amsterdam: Institute for Environmental Studies.

Orr, B., Stodghill, A., & Candu, L. (2007). *The Dutch experience in flood management: A history of institutional learning*. doi:10.1094/PDIS-91-4-0467B

Rijke, J., Herk, S. V., Zevenbergen, C., & Ashley, R. (2012). Room for the River: Delivering integrated river basin management in the Netherlands. *International Journal of River Basin Management*, *10* (4), 369–382. doi:10.1080/15715124.2012.739173

Rijkswaterstaat. (1964). *Eerste nota Waterhuishouding* [First national policy memorandum on water management]. The Hague. (in Dutch).

Rijkswaterstaat. (1982). *Tweede nota Waterhuishouding* [Second national policy memorandum on water management]. The Hague. (in Dutch).

Rijkswaterstaat. (1989). *Derde nota Waterhuishouding* [Third national policy memorandum on water management]. The Hague. (in Dutch).

Rijkswaterstaat. (1998). *Vierde Nota Waterhuishouding* [Fourth national policy memorandum on water management]. The Hague. (in Dutch).

Rijkswaterstaat. (2018). *Eindevaluatie Ruimte voor de Rivier: Sturen en ruimte geven*. (in Dutch).

Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, *4*(2), 155–169. doi:10.1007/BF01405730

Ritzema, H. P., & Van Loon-Steensma, J. M. (2017). Coping with climate change in a densely populated delta: A paradigm shift in flood and water management in the Netherlands. *Irrigation and Drainage*, *67*, S1, 52–65. doi:10.1002/ird.2128

RIZA. (1985). *Omgaan met water* [Dealing with water]. The Hague. (in Dutch).

Sabatier, P. A. (1993). Policy change over a decade or more. In *Policy change and learning: An advocacy coalition approach* (pp. 13–40). Boulder, CO: Westview Press.

Sabatier, P. A., Focht, W., Lubell, M., Trachtenberg, Z., Vedlitz, A., & Matlock, M. (Eds.). (2006). Swimming upstream: Collaborative approaches to watershed management. *Natural Resources Forum*, *30*, 173–174. doi:10.1111/j.1477-8947.2006.170_2.x

Saeijs, H. L. F. (1991). Integrated water management: A new concept. From treating of symptoms towards a controlled ecosystem management in the Dutch delta. *Landscape and Urban Planning*, *20*(1–3), 245–255. doi:10.1016/0169-2046(91)90118-6

Seijger, C., Brouwer, S., van Buuren, A., Gilissen, H. K., van Rijswick, M., & Hendriks, M. (2018). Functions of OECD water governance principles in assessing water governance practices:

Assessing the Dutch flood protection programme. *Water International*, *43*(1), 90–108. doi:10.1080/02508060.2018.1402607

Selin, S., & Chavez, D. (1995). Developing a collaborative model for environmental planning and management. *Environmental Management*, *19*(2), 189–195. doi:10.1007/BF02471990

Short, C., & Winter, M. (1999). The problem of common land: Towards stakeholder governance. *Journal of Environmental Planning and Management*, *42*(5), 613–630. doi:10.1080/09640569910911

Six, P. (2004). Joined-up government in the Western World in comparative perspective: A preliminary literature review and exploration. *Journal of Public Administration Research and Theory*, *14*(1), 103–138.

Thomson, A. M., & Perry, J. L. (2006). Collaboration processes: Inside the black box. *Public Administration Review*, *66*(s1), 20–32. doi:10.1111/puar.2006.66.issue-s1

Toonen, T. A. J., Dijkstra, G. S. A., & Van Der Meer, F. (2006). Modernization and reform of Dutch waterboards: Resilience or change? *Journal of Institutional Economics*, *2*(2), 181–201. doi:10.1017/S1744137406000336

van Alphen, J. (2016). The Delta Programme and updated flood risk management policies in the Netherlands. *Journal of Flood Risk Management*. doi:10.1111/jfr3.12183

van Buuren, A., Ellen, G. J., & Warner, J. F. (2016). Path-dependency and policy learning in the Dutch delta: Toward more resilient flood risk management in the Netherlands? *Ecology and Society*, *21*(4). doi:10.5751/ES-08765-210443

van Buuren, A., Lawrence, J., Potter, K., & Warner, J. F. (2018). Introducing adaptive flood risk management in England, New Zealand, and the Netherlands: The impact of administrative traditions. *Review of Policy Research*, *35*, 907–929. doi:10.1111/ropr.2018.35.issue-6

van Dantzig, D. (1956). Economic decision problems for flood prevention. *Econometrica*, *24*(3), 276–287. doi:10.2307/1911632

van den Brink, M. (2009). *Rijkswaterstaat at the horns of a dilemma*. Utrecht: Eburon.

van den Hurk, M., Mastenbroek, E., & Meijerink, S. (2014). Water safety and spatial development: An institutional comparison between the United Kingdom and the Netherlands. *Land Use Policy*, *36*, 416–426. doi:10.1016/j.landusepol.2013.09.017

van der Brugge, R., & Rotmans, J. (2007). Towards transition management of European water resources. *Water Resources Management*, *21* (1), 249–267.

van Heezik, A. (2008). *Battle over the rivers: Two hundred years of river policy in the Netherlands*. Rijkswaterstaat.

van Herk, S. (2014). *Delivering integrated flood risk management: Governance for collaboration, learning and adaptation*. Balkema: CRC Press.

van Leussen, W., & Meijerink, S. (2014). Environmentalism, renewed concern for flood safety, and the Europeanization of Dutch water policies, 1970–2010. In J. Lonnquest et al., (Ed.), *Two centuries of experience in water resources management: A Dutch-U.S. retrospective* (pp. 247–285). Alexandria, VA: Institute for Water Resources, U.S. Army Corps of Engineers and Rijkswaterstaat, Ministry of Infrastructure and the Environment.

van Rijswick, M., van Doorn-Hoekveld, W., Gilissen, H. K., Keessen, A., & Wiering, M. (2015). Shifts in floods policies in Netherlands. *Magazine H2O*, pp. 1–8. Retrieved from http://www.h2o.net/magazine/catastrophes-catastrophes-naturelles/shifts-in-floodspolicies-in-netherlands.htm

van Stokkom, H. T. C., Smits, A. J. M., & Leuven, R. S. E. W. (2005). Flood defense in the Netherlands: A new era, a new approach. *Water International*, *30*(1), 76–87. doi:10.1080/02508060508691839

Veld, P., van Vliet-Kuiper, A., & Noordegraaf, M. (2016). *Op Peil: Wettelijke ex-post evaluatie Deltawet Waterveiligheid en Zoetwatervoorziening*. The Hague: Ministry of the Interior and Kingdom Relations of the Netherlands (in Dutch).

Vellinga, P., & Aerts, J. (2013). Lessons learned from the North Sea flooding disaster in the Netherlands, 1953. In S. Boulter, J. Palutikof, D. J. Karoly, & D. Guitart (Eds.), *Natural disasters and adaptation to climate change*, *9781107010* (pp. 136–146). Cambridge, UK: Cambridge University Press.

Verkerk, J., & van Buuren, A. (2013). Integrated water resources management in the Netherlands: Historical trends and current practices in the governance of integration. *International Journal of Water Governance*, *1*(3/4), 427–452. doi:10.7564/13-IJWG6

Verweij, S., Klijn, E.-H., Edelenbos, J., & Van Buuren, A. (2013). What makes governance networks work? A fuzzy set qualitative comparative analysis of 14 Dutch spatial planning projects. *Public Administration*, *91*(4), 1035–1055. doi:10.1111/padm.2013.91.issue-4

Vis, M., Klijn, F., De Bruijn, K. M., & Van Buuren, M. (2003). Resilience strategies for flood risk management in the Netherlands. *International Journal of River Basin Management*, *1*(1), 33–40. doi:10.1080/15715124.2003.9635190

Waddock, S. (1991). A typology of social partnership organizations. *Administration and Society*, *22* (10), 480–515. doi:10.1177/009539979102200405

Ward, P. J., Pauw, W. P., van Buuren, M. W., & Marfai, M. A. (2017). Governance of flood risk management in a time of climate change: The cases of Jakarta and Rotterdam. *Environmental Politics*, *22*(3), 518–536. doi:10.1080/09644016.2012.683155

Warner, J. (2013). Dances with wolves: Four flood security frames. In B. Lankford (Ed.), *Water security: Principles, perspectives, and practices* (pp. 289–306). Abingdon, UK: Routledge.

Warner, J., & van Buuren, A. (2011). Implementing room for the river: Narratives of success and failure in Kampen, the Netherlands. *International Review of Administrative Sciences*, *77*(4), 779–801. doi:10.1177/0020852311419387

Warner, J., van Buuren, A., & Edelenbos, J. (2013). *Making space for the river: Governance experiences with multifunctional river flood management in the US and Europe*. London: IWA Publishing.

Warner, J. F. (2006). More sustainable participation? Multi-stakeholder platforms for integrated catchment management. *International Journal of Water Resources Development*, *22*(1), 15–35. doi:10.1080/07900620500404992

Whetten, D. A., & Rogers, D. L. (1982). *Interorganizational coordination: Theory, research, and implementation*. Ames: Iowa State University Press.

Wiering, M. A., & Arts, B. J. M. (2006). Discursive shifts in Dutch river management: 'Deep' institutional change or adaptation strategy? In R. S. E. W. Leuven, A. M. J. Ragas, A. J. M. Smits, & G. van der Velde (Eds.), *Living rivers: Trends and challenges in science and management*. Dordrecht: Springer.

Wilkinson, D., & Appelbee, E. (1999). *Implementing holistic government: Joined-up action on the ground*. Bristol, UK: Policy.

Wolsink, M. (2006). River basin approach and integrated water management: Governance pitfalls for the Dutch space-water-adjustment management principle. *Geoforum*, *37*(4), 473–487. doi:10.1016/j.geoforum.2005.07.001

Zevenbergen, C., Van Herk, S., & Rijke, J. (2017). Future-proofing flood risk management : Setting the stage for an integrative, adaptive, and synergistic approach. *Public Works Management & Policy*, *22*, 49–54. doi:10.1177/1087724X16674473