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Limits to change – institutional dynamics of Dutch flood risk governance

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Abstract

Despite several stimuli for change, flood risk management (FRM) in the Netherlands remains dominated by a probability-reducing flood defence approach. The aim of this article is to analyse, empirically, the institutional forces for change and stability that explain particular institutional dynamics. The qualitative research revealed that even though a combination of forces for change (in the realm of discourses, actors, resources and rules) is present, their influence is partly neutralised by forces for stability. These forces for stability became incrementally and iteratively more and more institutionalised and mutually reinforced each other, thus stabilising the defence approach. As a consequence, FRM is path dependent, i.e. the development of alternative FRM approaches may be influenced by the dominant defence approach. Nevertheless, in this context, change processes of conversion and layering can be observed, which indicates that even a highly path dependent arrangement has the possibility to adapt to particular challenges.

Introduction

In terms of flooding, the Netherlands is one of the most flood-prone areas in Europe, due to its coastal location and the fact that it serves as a delta to four major river systems (De Bruijn and Klijn, 2009; Klijn *et al.*, 2015). Around 35% of the population are prone to fluvial or coastal flooding (De Moel *et al.*, 2011, p. 623). Historically, flood risk management (FRM) in the Netherlands is characterised by a defence approach to reduce the probability of flooding (Van de Ven, 2004; Van Heezik, 2006). Nowadays, the frequency of major flooding is limited as embankments protect 55% of the country's area (De Moel *et al.*, 2011, p. 623). Apart from embankments, societies would have various other strategies at their disposal to manage flood risk (see Table 1). In the Netherlands, particularly since the 1990s, discussions on alternative management approaches emerged, e.g. spatial planning measures or insurance (Van der Brugge *et al.*, 2005; Jongejan and Barrieu, 2008; Hartmann and Driessen, 2013; Hegger *et al.*, 2014). However, the defence approach remains dominant and the effective institutionalisation of alternative strategies tends to be delayed or limited (Wesselink, 2007; Klijn *et al.*, 2008; Van den Brink *et al.*, 2011, p. 284f; Ward *et al.*, 2013, p. 533; Warner *et al.*, 2013; van Buuren *et al.*, 2016). It appears that forces for change are counteracted by forces for stability, which contribute to the prevalence of the defence approach.

Correspondingly, the aim of this article is to contribute to the understanding of institutional dynamics, by analysing how the interaction of both forces for change and of stability explains the ongoing dominance of the defence approach. The following research questions are analysed: what factors contribute to change in Dutch FRM between 1990 and 2015? What are the forces for stability that stabilise the defence approach and influence the development of alternative management approaches?

An analytical framework to analyse stability and change

To empirically analyse institutional dynamics (i.e. change and stability) in FRM the article applies Wiering *et al.*'s (2017) analytical framework on forces for stability and forces for change. Wiering *et al.*'s (2017) framework is based on a literature review of policy change theories (e.g. North, 1990; Baumgartner and Jones, 1993; Kingdon, 1995; Streeck and Thelen, 1995; Pierson, 2000; Sabatier and Weible, 2007; Zahariadis, 2014). The framework enables

Table 1 Flood risk management strategies (after Hegger *et al*., 2014)

Strategy	Prevention	Defence	Mitigation	Preparation	Recovery
Examples	Prohibiting spatial development (e.g. zoning plans)	Structural measures (including embankments, retention basins)	Flood-adapted infrastructure	Emergency planning	Insurance, governmental compensation

the analysis of complex dynamics in Dutch FRM as it combines more structure-based theories (e.g. North, 1990) with more agency-based theories (e.g. Kingdon, 1995). In line with Giddens' (1984) duality of structure, Wiering *et al*. argue that the interaction of actors and structures produces stability and change. On the one hand, Wiering *et al*. elaborate upon theories of path dependency and institutional stability (North, 1990; Pierson, 2000), on the other hand, they focus on the role of policy entrepreneurs and actor-coalitions that introduce new ideas on how policies should be organised (Sabatier and Weible, 2007). Moreover, the Wiering *et al*. framework integrates theories explaining more radical policy changes (e.g. Baumgartner and Jones, 1993) and theories explaining more incremental changes (Streeck and Thelen, 1995).

Wiering *et al*.'s framework utilises the policy arrangement approach (PAA) (Arts *et al*., 2000; Arts and Leroy, 2006) to differentiate the forces for change and stability (Table 2). The PAA has been applied in studies of environmental policies, water management and FRM (Boonstra, 2004; Wiering and Arts, 2006; Hegger *et al*., 2014). It is a an analytical framework that maps a snapshot of a particular governance arrangement in terms of discourses, i.e. paradigms and historical metaphors; rules, i.e. formal and informal regulation; actors and coalitions, including their interests, responsibilities and working procedures; and resources, i.e. the financial, knowledge, legal and other resources that influence the power position of actors (Arts and Leroy, 2006; Liefferink, 2006). Hence, the PAA enables a comprehensive study of the governance arrangement as a whole. Initially, institutional dynamics may be identified and described based on changes in one or more dimensions. Subsequently, Wiering *et al*.'s expansion of the PAA enables an analysis of the forces for change or stability that may explain dynamics.

To distinguish between and discuss different processes of stability and change, this article applies the typology of incremental institutional change by Streeck and Thelen (2009, p. 9). The typology identifies the following modes: (i) displacement describes the changing relevance of institutions; (ii) layering is the attachment of new elements onto an existing institution; (iii) drift describes the failure to maintain institutions, which causes their decay; (iv) conversion includes redirection of institutional goals and resources; and (v) exhaustion is the gradual breakdown of institutions.

Methodological accounts

The article is based on research carried out in the course of the STAR-FLOOD project (Kaufmann *et al*., 2016a). The article analyses the time period between 1990 and 2015 as a

Table 2 Forces for stability and change, associated with the dimensions of governance arrangements (modified after Wiering *et al*., 2017)

Forces for stability	Dimensions of governance arrangements	Forces for change
Coordination effects: governance is grounded in specific divisions of accepted responsibilities	Policy actors and coalitions	Entrepreneurs highlighting perception of suboptimality of governance and approach Pressure by specific interest groups (actor coalitions)
Fixed costs and *increasing returns* through large investments in flood infrastructure (sunk costs)	Power and resources	Doubts concerning the increasing costs of flood infrastructure, maintenance or sudden financial cutbacks, opening alternative options
Learning effects: evolution of strong expert body of knowledge and strong epistemic community		New expertise (learning)
Law has an important stabilising effect in the formalisation of rules and procedures	Rules of the game	Decreasing legitimacy of rules New rules (e.g. EU Floods Directive)
Hegemonic historical narratives *Adaptive expectations*: public trust in existing institutions and their efficiency	Policy discourses	Diminishing trust in existing institutions and their efficiency New ideas, new problem definitions and policy concepts leading to counter-narratives

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number of trends triggered debates on FRM that resulted in incremental changes. The data collection for this research consisted of document analysis (national policy and legal documents, governmental or advisory reports and scientific research; see Table 3 for an overview of key documents) and semi-structured interviews. In total, 40 governmental and nongovernmental stakeholders were interviewed from the realm of government, industry (e.g. insurance) and societal interest groups. Additionally, representatives from different policy levels (e.g. national ministries, regional provinces and local municipalities) and from different policy sectors (e.g. regional and national water managers, spatial planning authorities and emergency managers) were interviewed. The respondents were chosen based on a stakeholder analysis that yielded an overview of responsible actors, subsequently, the snowball technique was employed to find additional respondents. In the interviews, the different dimensions of the PAA were reviewed. Moreover, the chronological development of particular policies and strategies was discussed and traced. The interviews were recorded and transcribed.

The data were analysed by applying qualitative policy analysis. The documents and transcripts were deductively coded according to the four dimensions of the analytical framework: discourses, rules, actors, resources and power. This initial coding was done with Atlas.ti and aimed to filter the material. Subsequently, the material was analysed by hand to identify the explanandum (what changed or not) and the corresponding forces for stability and change. The results were further informed when presented, discussed and validated during two practitioner workshops on 9 October 2014 and 26 May 2015, with about 30 interviewees and other stakeholders in attendance.

Table 3 Analysed key documents

Year	Document
1985	Dealing with Water – Integrated Water Management
1996	Delta Plan Great River
	Flood Defence Act
1997	Policy Room for the River
1998	Fourth Memorandum on Water
2000	Dealing differently with water
	Advisory report: Tielrooij Committee
2002	Fifth Memorandum on Spatial Planning
2003	National Administrative Agreement on Water
2004	Risks in dijked areas
2006	Policy Guideline Great Rivers
2008	Veerman Committee
2009	Water Act
2011	Administrative Agreement Water
2014	Delta Programme

Characterisation of FRGA

The Dutch flood risk governance arrangement (FRGA) of the 1990s was dominated by a 'defence approach' for fluvial and coastal FRM (Kaufmann *et al.*, 2016a). The FRGA was characterised by a hydro-engineering discourse that centred around the idea that mankind had the capability to control nature to satisfy human needs (Van Heezik, 2006, p. 29). This approach had become more and more institutionalised. By the 1990s, the actor dimension was defined by the dominance of governmental authorities from the water sector who were accountable for managing flooding and ensuring the habitability of the country (Van Rijswick and Havekes, 2012). At the national level, *Rijkswaterstaat*, a national agency that is over 200 years old, was responsible for the construction of flood defence structures. At the regional level, regional water authorities that had been formed in the Middle Ages were responsible for managing and maintaining flood defence structures. By the 1990s, an extensive hydro-engineering research expertise had developed which had become embedded in the working procedure of governmental water authorities and transmitted to successive generations. The resource dimension was characterised by secure financing through national and regional taxes that enabled governmental authorities to carry out their tasks (Van Rijswick and Havekes, 2012). In the rules dimension, safety standards were increasingly formalised. After a storm surge of 1953, semi-formalised technical standards had been developed that defined an exceedance probability for embankments (Van Danzig, 1956). In 1996, after two fluvial flood events, these technical standards were legally formalised in the Flood Defence Act (Van Rijswick and Havekes, 2012). In conclusion, by the 1990s the technical defence approach had become highly institutionalised and formalised in all dimensions of the PAA. FRM was a water sector specific task, with a minor role for other policy sectors, e.g. spatial planning or emergency management, or private actors, e.g. the insurance sector. The remainder of this article investigates how the presence of a highly institutionalised defence strategy influences the development of alternative management strategies.

Trends

Within this highly institutionalised FRGA, a number of discursive trends emerged since the 1990s. These trends initiated debates about the diversification of strategies. One trend is the so-called paradigm shift from a hydro-technocratic FRM towards a more ecosystem-based approach that also considered the environmental function of floodplains (Disco, 2002; Van Ruiten and Hartmann, 2016). The policy programme Room for the River emerged

from this trend (VROM and V&W, 1996; PKB, 2006), which has been widely analysed in the scientific literature (see Van Eten, 1997; Roth *et al.*, 2006; Wiering and Arts, 2006; Rijke *et al.*, 2012; Kaufmann *et al.*, 2016b). Another trend is the appearance of a risk discourse, which advocates the management of both probabilities and consequences of flood risk. The policy concept multilayered safety emerged from this trend (Rijksoverheid, 2009). It comprises three management approaches: embankments, spatial planning measures and emergency management, and has also been widely analysed (Jongejan *et al.*, 2012; Hegger *et al.*, 2014; Tsimopoulou *et al.*, ; Kaufmann *et al.*, 2016c).

Within these two macro-trends, this article zooms in on three more specific institutional changes (or lack thereof) to analyse the interaction of forces for stability and change. First, even though the defence strategy remains dominant, the governance of implementing the strategy has slightly changed to be more integrated, transparent and efficient since the mid-1990s. Second, the Water Assessment, a procedural instrument to integrate spatial planning and water management, has been institutionalised in 2001. However, its practical implementation is often described as ineffective to prevent inappropriate urban development or to support flood-proofing (Steenstra and Kwadijk, 2010; OECD, 2014). Third, the establishment of a private-public or private insurance system has been discussed at the beginning of the 21st century. Yet, a broad institutionalisation failed.

Explaining institutional dynamics: three illustrations

Forces for change

Adjustment of the defence approach

In the past, the Dutch flood defence approach was characterised by the dominance of the water sector that acted in a relatively authoritarian and autonomous way, since it had its own financing system and was legitimised by safety standards that needed to be fulfilled. FRM was characterised by a technocratic and engineering-based decision-making, which tended to neglect other values. Water managers were criticised as a 'state within the state' (Bervaes and Noordzij, 1990; Van den Brink, 2009). Nowadays, even though the dominance of the water sector is still prevalent, its governance has become more based on efficiency (e.g. cost–benefit analysis), transparency (e.g. *MIRT*[1] working procedure) and integration [e.g. public participation procedures, environmental impact assessment (EIA)]. Regional and national water managers cooperate increasingly with other actors [e.g. in the Flood Protection Programme (2014–2019)]. To sum up, the way governmental water managers communicate or collaborate with other actors has been adjusted to be more participatory, integrated, transparent and efficient. Which forces for change contributed to this adjustment?

In the 1970s, several discourses emerged that challenged the authoritarian defence approach: an environmental discourse, a democratic discourse and a new public management discourse (Schwartz, 1993). The increased recognition of environmental and democratic values resulted in a critique of technical flood defences as they generated adverse ecological and societal consequences, e.g. relocation of houses (Lintsen, 2005). Societal and political support for engineering projects decreased (Bosch and Van der Ham, 1998; Disco, 2002). These forces of change in the discourse dimension were connected to forces of change in the actor and resource dimension. An actor coalition advocated for integrated water resource management, focusing on a participatory and decentralised governance approach (Van Herk *et al.*, 2012, 2015). To deal with the environmental problems, professionals from other disciplines, such as biologists, were appointed to *Rijkswaterstaat* (Van der Brugge *et al.*, 2005). In other words, the epistemic community and knowledge expertise within governmental authorities broadened. Due to these developments, actors in favour of change were in the right venue to strategically promote their new values (Van der Brugge *et al.*, 2005; Huitema and Meijerink, 2007; Van den Brink, 2009; Kaufmann *et al.*, 2016c). This development was further supported by the rules dimension in two ways. Firstly, at the national level the environmental discourse was also affecting other policy sectors and thereby indirectly FRM; an example is the EIA (1985). Secondly, at the EU level, the environmental discourse had been institutionalised in the Water Framework Directive (2000) (Liefferink *et al.*, 2011; Van Ruiten and Hartmann, 2016). This EU Directive reinforced the actor coalition at the national level.

Additionally, the water sector was challenged by the emergence of a new public management discourse, which led to increasing political appreciation for effectiveness and efficiency and which criticised the increasing costs of defence structures (Bosch and Van der Ham, 1998; Kettl, 2000). Leading politicians, such as the then Secretary of the State, were proponents of this discourse. As a result, more employees with a public administration background entered governmental water authorities, which influenced the internal procedures and priorities (interview with Ministry of Infrastructure and Environment, I&M).

To sum up, the defence approach has been challenged from different sides. In order to compensate for these challenges the throughput legitimacy was revised (see Schmidt, 2013), i.e. the defence approach was adjusted to be more participative, integrated, transparent and efficient. Hence, its societal acceptance was ensured. The section 'forces for

[1]Multiannual Programme of Infrastructure, Space and Transport.

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stability' below explains why there was only an adjustment of the communicative and cooperative principles and not a redistribution of tasks or responsibilities.

Diversification of FRM towards spatial planning and multisector governance

The Water Assessment (Dutch: *watertoets*) is a formal advisory construction that facilitates the integration of spatial planning and water management. The procedural instrument specifies that spatial planning authorities, i.e. municipalities and provinces, need to consult regional water authorities during the process of drafting spatial plans. Water managers give a nonbinding advice to facilitate the consideration of water issues in spatial planning (V&W, , p. 43; Van Rijswick and Havekes, 2012). In general, interviews with water managers and spatial planners revealed that the instrument improved communication between the two sectors. Which forces for change explain the introduction of the Water Assessment instrument?

The integration of water issues in spatial planning became a critical issue when problems of urban water management increased. In particular in the west of the country the change of land use from farming to urban resulted in an increased sealing of the land surface, which generated problems with drainage (V&W, 1998, p. 21). The regional water authorities of these areas had to regularly deal with the adverse consequences spatial planning decisions had on water management. An interviewee explained that spatial planners developed 'a plan here and a new plan there, we [water managers] were always at a disadvantage. Water needed to become a guiding principle in spatial planning' (interview with regional water authority). These problems became palpable when, in the 1990s, a number of heavy rainfall events caused huge damage in the west of the country (Tielrooij Commissie, 2000, pp. 19f). These events offered a window of opportunity to define urban water problems anew in the context of discourses of sustainability and climate change (VROM, 2002, p. 63). The regional water managers were well connected to the Secretary of State for Traffic and Water. Through this connection, they could influence the discussions. Together they developed and advocated for a better integration of water issues in spatial planning (interview with regional water authority). This advice was acknowledged by the Tielrooij advisory committee and included in their influential advisory report (Tielrooij Commissie, 2000, p. 59), which eventually led to the institutionalisation of the water assessment in the Spatial Planning Decree by 2001.

Even though a diversification of FRM approaches took place, an assessment of the effectiveness of the Water Assessment instrument (Steenstra and Kwadijk, 2010; OECD, 2014) revealed that in practice the instrument could not systematically prevent constructions in flood-prone areas or result in adaptive development. The section 'forces for stability' below analyses why the enforceability and practical implementation of the Water Assessment instrument remained limited.

Diversification towards insurance and multi-actor governance

After the storm surge of 1953, the government and the insurance industry agreed not to insure damage from large-scale floods caused by the failure of flood defences out of concern for the viability of the insurance industry (Jongejan and Barrieu, 2008). Since the beginning of the 21st century, schemes for a private or public–private insurance system have been periodically discussed. In 2006, a task force, consisting of representatives from the government and the insurance industry, deliberated the possibility of public–private flood insurance (interview with Dutch Association of Insurers). Two main insurance models were considered: (1) a public–private layer model with the national government as reinsurer (Aerts and Botzen, 2011); and (2) a private solution, which included the establishment of mandatory insurance against flooding (interview with Dutch Association of Insurers). Which forces for change contributed to the establishment of the discussion?

These discussions took place in the context of two discourses: firstly, a peripheral discourse of 'living with water', which embraced the idea that the awareness of citizens should be increased (V&W,) and, secondly, a neo-liberal discourse that foresaw a spreading of the financial risk of flooding (Adviescommissie Water, 2006). The discussion was formally enabled as, in 1998, due to pressure from the EU, the agreement not to insure damages from large-scale floods was withdrawn (Jongejan and Barrieu, 2008). Because of economic interests, the insurance industry wanted to access this untapped market (Interview with Association of Dutch Insurers). In parallel with this, new insights emerged (*learning*): (1) due to advances in technology, models and data to project and assess the flood risk had improved, which enabled insurers to calculate their financial risk (interview with Association of Dutch Insurers). (2) The Borghouts Committee (2004) had criticised the national compensation act, consequently the government considered alternative recovery arrangements and started negotiations with the insurance industry. However, eventually, neither a public–private nor a private insurance arrangement emerged. Only one insurance company has offered coverage since 2012, the market penetration of which is unknown but assumed to be low (interview with Association of Dutch Insurers). The section on 'forces for stability' below

explains the lack of a comprehensive insurance system for coastal and fluvial flooding.

Forces for stability

The forces for change perform within a highly stabilised and path dependent FRGA that is focused on defence. The corresponding forces for stability may influence the possibilities for fundamentally changing the defence approach or for alternative management approaches to effectively emerge. Forces for stability are active across all dimensions, i.e. discourses, actors, resources and rules (see Table 4).

Firstly, the *discourse* dimension is characterised by a strong, historically developed narrative that defines the government as the provider of safety that manages the collective task of coastal and fluvial flooding based on the principle of solidarity (Keessen *et al*., 2016). This discourse is widely accepted and taken for granted. As a consequence, it is hardly discussed or challenged in the political or societal realm, and so it has become silenced (Kaufmann *et al*., 2016d). Management measures that might question the capability of the governmental defence approach are contested. An interviewee illustrates this dilemma 'In the past even the development of maps that indicate inundation zones was controversial since it may suggest that we are not safe […]. This may cause fear among citizens' (interview with regional water authority). Moreover, citizens expect governmental protection and feel entitled to it (*adaptive expectations*), an interviewee summarised 'I pay tax to the regional water authority. They are responsible for ensuring dry feet' (interview with municipal policymakers and citizens). Consequently, management strategies that may suggest the occurrence of flooding or that could result in an extra financial burden for citizens tend to receive little societal or political support (see also Wesselink, 2007, p. 242f). Consequently, the government did not agree to burden its citizens financially with a public–private insurance system in 2010, especially not during a financial crisis when costs for governmental flood defence were already rising (interview with Dutch Association of Insurers and Ministry of I&M). The hesitance for more private

Table 4 Summary of the forces for change and stability. The left column describes the forces for stability per PAA dimension, the middle column summarises the explanandum, i.e. the institutional consequences of particular trends regarding the 'diversifying FRM strategies and governance' and the right column summarises the forces for change per PAA dimension

Main forces for stability	Institutional dynamics: three illustrations	Main forces for change
Actors • Economic interests of government/ industry • Influential network of hydro-engineers in governmental authorities, private companies and knowledge institutes • Nonwater actors expect water managers to cover FRM (coordination effects) Resources • Extensive flood defence structures (increasing returns) • Hegemonic hydro-engineering knowledge infrastructure Rules • Legally formalised regulations and procedures to guarantee safety norms Discourse • Government as provider of safety (hegemonic narrative) • Citizens expect protection (adaptive expectations) • Lack of societal (and consequently political) support for insurance	Adjustment of the defence approach: more participatory and integral, efficient, transparent Diversification of FRM approaches towards spatial planning: institutionalisation of Water Assessment instrument, practical effectiveness sometimes limited Failed diversification of FRM approaches, no comprehensive insurance scheme	Discourses • New discourses: environmental, economic, democratisation discourse Actor • Lobbying environmental coalition • Support of political proponents Rules • EU legislation (Water Framework Directive) • Legislation other policy sectors (e. g. EIA) Discourses • New problem definition: urban water management Actor • Lobbying of policy entrepreneurs Discourse • Living with water and neo-liberal discourse Rules • EU ruling Resources • New modelling data available Actors • Insurance industry as proponent

PAA, policy arrangement approach; FRM, flood risk management; EIA, environmental impact assessment.

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responsibility became apparent when citizen interest groups and consumer organisations (e.g. '*Eigen Huis*', '*Consumentenbond*', '*MKB-Nederland*') did not support a private and obligatory insurance scheme in 2012. In addition to the lack of societal support, the Consumer and Market Authority declared that such an obligatory scheme would be contrary to competition rules (interview with Ministry of I&M). To sum up, governmental responsibility is societally and politically expected and accepted. Accordingly, support and awareness for private actors to take on responsibilities is lacking.

Secondly, forces for stability are present in the *actor* dimension. The prevention of major floods is an crucial objective of the government because it is connected to a number of economic incentives. First of all, water and delta technology is an important export sector with 2000 companies, 80 000 jobs and a revenue of €15.6 billion in 2011 (Ministry of Foreign Affairs, 2014). Developing and improving technical management approaches has, therefore, important economic benefits. Furthermore, the credibility of the hydro-technology sector is partly connected to the successful prevention of major flooding in the Netherlands. In addition, the decision of foreign investors (e.g. Google) to come to the Netherlands and base, e.g. their IT infrastructure or manufacturing processes here, might potentially be limited if the country were to be frequently flooded, which would be the case without protection from embankments. Also, safeguarding shipping on major rivers is essential for Dutch harbours to continue to be major trade centres (interview with Ministry of I&M). In conclusion, the defence approach both enables and fulfils important economic functions in the Netherlands.

Another stabilising factor of the actor and resource dimension is the position of hydraulic engineers, which is supported by their strong and constantly evolving knowledge infrastructure within governmental organisations, knowledge institutes and private companies. Due to the long-established tradition, a hydro-engineering working approach has been transmitted across generations of Dutch water managers through engineering-based education. It defined the identity of water managers, who trust and believe in the effectiveness of technical measures and therefore act strategically to ensure the financing of these measures. Whilst being criticised in the 1990s by societal and environmental coalitions, once political support for environmental issues had waned, hydrological experts pushed for the establishment of a second delta committee. The committee should develop a long-term vision for flood management in light of the threat of climate change. This committee, known as the Veerman committee (Delta Commissie, 2008) re-emphasised the importance and effectiveness of embankments and proposed to raise safety standards. The consideration and acceptance of this advice was generally high because the committee had a strong degree of legitimacy due to its connectedness with scientific and political realms (Boezeman, 2015, p. 78). Furthermore, water management had adjusted its governance to re-strengthen its societal acceptance. Water management had become more efficient, transparent and integrated. Yet, with their hydrological knowledge and expertise, water engineers could still influence and dominate discussions.

Another stabilising aspect of the actor dimension is that other governmental authorities rely on and accept water managers to carry out the FRM task (*coordination effects*). Consequently, FRM is not the main priority of spatial planning authorities, who have in most cases more and other priorities than water managers, such as economic growth, mobility, environmental quality etc. These interests might even clash with FRM as 'land is valuable and if you use it for water management measures your economic profits may be limited' (interview with regional water authority). The two policy sectors were relatively isolated for a long time. Due to their different tasks and interests, they aligned with different discourses, which have been institutionalised in different arrangements (see also Hartmann and Driessen, 2013). As a result, their operating principles, procedures and terminologies are different. An interviewee summarised it as follows 'the water world is very sectoral with their own technical terminology, spatial planning has a different jargon that is less quantitative and more qualitative. In the past that caused conflict and nowadays it may be a challenge to get both parties to talk with each other' (interview with Ministry of I&M). In conclusion, the two policy sectors have different interests and operate differently, which tends to make it difficult to cooperate and communicate. As a consequence, the effective implementation of the Water Assessment instrument may be hampered in practice (see also Wiering and Immink, 2006). Similar issues between spatial planning and water management are a common problem in England as well (e.g. Porter and Demeritt, 2012).

Thirdly, forces for stability are present in the resource dimension. The defence approach produced tangible outcomes in the form of defence structures. These structures enabled development to be carried out in flood-prone areas. More developed areas required higher embankments to compensate for the increase in risk (see also Wesselink, 2007, p. 239). This reinforcing circle went on for centuries and resulted in over 3000 km of primary flood defences (Van Rijswick and Havekes, 2012). This comprehensive infrastructure has a number of stabilising consequences: first of all, experts and policy makers state that it limits the technical feasibility of implementing other measures or the practical feasibility of relocating citizens (interview with regional and national water managers). In addition, the technical measures led to a high-impact, low-probability

situation, which is difficult to insure. Consequently, the proposed scheme for postevent insurance demands an involvement of the state, according to the insurance industry (interview with Association of Dutch Insurers). However, due to the high-impact situation, policy makers doubted whether the insurance industry could cover any substantial damage, which limited the conceived added value of an insurance scheme (interview with Ministry of I&M). As the insurance industry lacked political and societal support and was unable to develop a scheme on its own, no comprehensive insurance scheme could develop. Another consequence of past investments in embankments is that it is nowadays more cost-efficient to invest further in embankments. Cost-efficiency is a widely accepted tool because of the dominance of a new public management discourse, which was strengthened by the economic crisis in 2008 (interview with Ministry of I&M). These increasing returns create a specific cost/benefit balance that reinforces the defence approach by discouraging investments in other strategies.

Fourthly, forces for stability are present in the rule dimension. Responsibility for the management of flood defences is laid down in legislation. Governmental water authorities are accountable for their duties, i.e. fulfilling the safety standard. Other measures, like spatial planning measures, would be implemented by other actors; therefore water managers require a change of law to redistribute responsibilities. However, it is difficult to legally develop, agree on and formulate these new regulations and divisions of responsibility since other actors are hesitant to take on these duties. Furthermore, the accountability regulations for water managers can be based on quantitative assessments and projections of water levels and the correlating height of the embankments. However, the effect of other measures, like spatial planning measures, is less easy to quantify (interview with regional and national water managers), which makes it difficult to legally establish new accountabilities.

This section demonstrated that the defence approach is highly stabilised in the Netherlands. As a consequence, FRM is path dependent, i.e. it influences the possibilities for developing alternative FRM approaches.

Processes of change

What kinds of processes of change can be identified? Using the category of Streeck and Thelen (2009), the incremental adjustment of the defence approach may be interpreted as a marginal *conversion* since the existing institutions were slightly adjusted to be more integrated, transparent and efficient thus accompanying new purposes. However, the main institutional structures remained largely unchanged. Between the two contrasting forces for stability and change, an incremental adjustment of communicative and cooperative principles took place to accommodate some aspects of the critique and to re-establish the acceptance of the defence approach. In other words, due to the dominance of the defence approach, forces for change were absorbed and neutralised.

The analysed institutional dynamics illustrate that the stability of the defence approach may affect alternative management approaches to develop effectively or even to emerge at all. The diversification of FRM approaches towards an integration of spatial planning (Water Assessment instrument) is interpreted as *layering*, in terms of Streeck and Thelen (2009). The Water Assessment instrument developed in parallel to the defence approach with a focus on the issue of urban water management. It did not directly compete with the defence approach. The research suggests that this facilitated the establishment of the Water Assessment instrument. However, the practical effect of the Water Assessment instrument tends to be limited in some cases, although the integration is improving (Steenstra and Kwadijk, 2010; OECD, 2014). The willingness and awareness of spatial planning actors to consider flood risk seems to be limited because of the reliance on water managers. Additionally, the procedures of the defence approach, which are based on quantification, are difficult to apply to spatial planning measures. In comparison, an insurance scheme could not develop because it partly competed with the dominant flood defence arrangement and the government as the main responsible, since it would shift responsibilities towards the private sector. The research suggests that the path dependence of the flood defence arrangement may delegitimise the establishment of other, potentially rival paths. Alternative management arrangements may be established through layering when they emerge parallel to the dominant approach with a slight focus on other problems. However, the effective practical implementation of these layered approaches may still be hampered by the stability of the defence approach.

Concluding and discussing limits to change

A number of trends emerged in recent years in Dutch FRM, which triggered incremental changes, for instance, adjustments of governance (Van Herk *et al.*, 2012) or the integration of spatial planning and FRM (Hartmann and Driessen, 2013; Jong and Van Den Brink, 2013; Van Ruiten and Hartmann, 2016). Nevertheless, Dutch FRM is still characterised by a dominant defence approach (Wesselink, 2007; Klijn *et al.*, 2008; Van den Brink *et al.*, 2011, p. 284f; Ward *et al.*, 2013, p. 533; Warner *et al.*, 2013; van Buuren *et al.*, 2016). The research presented in this article contributes to understanding the limits to change in Dutch FRM and how the interaction of forces for stability and change

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influence institutional dynamics. The forces for stability and change are summarised in Table 4.

The research suggests that a combination of forces for stability are present in Dutch FRM. Two characteristics of stabilisation are implied, firstly, every dimension of the PAA became incrementally and iteratively more and more institutionalised and, secondly, the four dimensions mutually reinforced each other. To sum up: (1) A widely accepted hydro-engineering discourse based on collective management was no longer subject for societal and political debate but was taken for granted. (2) The corresponding knowledge and financial resources slowly accumulated, thereby reinforcing the dominant discourse, until they became fixed in structural defence infrastructures and established knowledge networks. (3) To ensure the quality of these resources, i.e. the defence infrastructure, an informal or semi-formal technical standard became a legally formalised rule accompanied by particular responsibility distributions, which are now difficult to change. (4) To fulfil this responsibility, the actors adopted their task as an identity with particular working procedures, which are transmitted across generations and kept in the organisational memory. The fulfilment of these tasks became widely accepted and expected by other actors.

Within this highly stabilised arrangement, incremental change is the result of a combination of various forces from all dimensions of the PAA. These forces are mutually reinforcing. (1) Initially, in the discourse dimension, a problem is acknowledged. This problem is not necessarily new. However, these problems need to be legitimised by the hegemonic discourses to be discussed in the political or societal domain. (2) Actor coalitions and policy entrepreneurs have a driving and sustaining function of the change process since they strategically influence the policy-making processes. The influence of these actors is increased if they have access to the right venue, such as being an employee of a governmental authority or being part of an advisory committee; or if these actors have a position of power in these venues. This position of power may be inherent, i.e. the actors are influential employees, experts or politicians, or extrinsic, i.e. based on their network and connection to powerful actors (see also Huitema and Meijerink, 2007). The establishment of an insurance scheme might have failed because the position of power of the pro-insurance coalition was limited and societal support was missing. (3) The actors can develop new expertise and knowledge to reduce the acceptance of the existing approach. (4) Rules that developed outside the policy domain, for example at EU level (e.g. Water Framework Directive) or in other policy sectors, can also support change.

The research suggests that forces for change and stability may interact on different levels, e.g. local/regional, national or EU level. This multilevel interaction can reinforce both change and stability. On the one hand, forces for change, such as new discourses, can act at the national level and the EU level. If they are institutionalised at the EU level, such as the environmental discourse in the Water Framework Directive, they may support national actors, who advocate for change as it increases the legitimacy of their demands. On the other hand, institutional change at the national level does not necessarily lead to practical effects at the regional or local implementation level, in particular, if the legal instrument, e.g. the Water Assessment instrument, is flexible. It takes time for local implementing actors to change their formal and informal working procedures, which have been stabilised over decades.

Finally, this article reflects on the implications of these dynamics for FRM. A lack of effective diversification as a consequence of stability may decrease the number of back-ups. Furthermore, missing effective spatial planning measures and insurance schemes may result in increased damage potential or delayed recovery respectively. Nevertheless, the example of the Netherlands also shows that stability and focus on a defence approach may have benefits, i.e. relatively high efficiency, effectiveness due to clear procedures and responsibility distributions, durability in times of political change, and trust among citizens and investors (Kaufmann *et al.*, 2016a). In terms of adaptability, the example shows that even a highly path dependent arrangement has possibilities to adapt to particular challenges. On the one hand, the governance of the dominant management arrangement may be slightly adjusted (conversion) and, on the other hand, new arrangements may be layered next to existing ones. Notably, a potential danger of diversification may be institutional fragmentation and ineffectiveness. Future research may analyse the consequences of diversifying strategies and under which circumstances particular forms of change are possible and appropriate. For instance, under which conditions may fundamental changes occur in the future and what may be the effect of potentially increasing costs of FRM due to climate change? An increase in costs may trigger societal debates regarding the efficiency and legitimacy of current FRM approaches leading to a demand of alternative strategies.

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