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ORIGINAL ARTICLE

Strategies for integrating water management and spatial planning: Organising for spatial quality in the Dutch “Room for the River” program

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In response to extreme flood events and an increasing awareness that traditional flood control measures alone are inadequate to deal with growing flood risks, spatial flood risk management strategies have been introduced. These strategies do not only aim to reduce the probability and consequences of floods, they also aim to improve local and regional spatial qualities. To date, however, research has been largely ignorant as to *how* spatial quality, as part of spatial flood risk management strategies, can be successfully achieved in practice. Therefore, this research aims to illuminate how spatial quality is achieved in planning practice. This is done by evaluating the configurations of policy instruments that have been applied in the Dutch Room for the River policy program to successfully achieve spatial quality. This policy program is well known for its dual objective of accommodating higher flood levels as well as improving the spatial quality of the riverine areas. Based on a qualitative comparative analysis, we identified three successful configurations of policy instruments. These constitute three distinct management strategies: the “program-as-guardian”, the “project-as-driver,” and “going all-in” strategies. These strategies provide important leads in furthering the development and implementation of spatial flood risk management, both in the Netherlands and abroad.

KEYWORDS

integrated flood risk management, policy instruments, Spatial planning

1 | INTRODUCTION

It is widely acknowledged that the integration of water management and spatial planning is essential for successful flood risk management (Hartmann & Driessen, 2017; Pahl-Wostl, 2007; Warner, Edelenbos, & Buuren, 2012; Wiering & Immink, 2006; Woltjer & Al, 2007). Traditionally, flood protection is based on the construction of dams, dikes, and other civil engineering works, which are aimed at “fighting the water,” and which enforce a strong boundary between land and water (Van Ruiten & Hartmann, 2016). In response to extreme flood events in recent decades and the increasing awareness that traditional flood control measures alone are

an inadequate response to deal with growing flood risks (Luo et al., 2015; Parker, 2000), more holistic flood risk management approaches have been introduced which, instead, try “to work with nature” and which try “to live with the water” (Restemeyer, Woltjer, & Van den Brink, 2015; Scott, 2013). Innovative spatial solutions that create more space for water, such as flood retention areas and river-widening measures, form an important part of these approaches and represent the “spatial turn” in flood risk management (Van Ruiten & Hartmann, 2016; Wolsink, 2006). As land is needed to realise spatial measures, the policy domains of water management and spatial planning have become highly interconnected.

Spatial flood risk management strategies not only reduce the flood probability and the consequences of flooding. Moving spatial planning “centre stage” in flood risk management has also triggered that flood control measures are increasingly considered in coherence with other land use functions (Scott, 2013), such as housing, recreation, transport, nature conservation, and cultural heritage. An important driver of the ambition to realise flood risk management in conjunction with spatial policy objectives is the idea that this will improve local and regional spatial qualities (Nillesen & Kok, 2015; Waterman, 2016). In Dutch spatial planning, spatial quality is often used, but rarely “defined in explicit terms” (Moulaert, Van Dyck, & Khan, 2013, p. 390). With regard to river interventions, for example, improving spatial quality appears to imply that both creating Room for the River and achieving multifunctional benefits is considered (e.g., Juarez Lucas & Kibler, 2016; Potter, 2012). As argued by, among others, Warner et al. (2012), this is reinforced by the recent trend to “restore the original beauty of the river by combining economic values and water safety with ecological, cultural and historical values” (p. 2). In this research, we follow Klijn, De Bruin, De Hoog, Jansen, and Sijmons (2013), who define spatial quality as the coherence between hydraulic effectiveness (including its relationship with other economic land use functions), ecological robustness, and cultural meaning and aesthetics. Whereas much research has been conducted in particular into the required new institutional and governance arrangements (see, for example, Dieperink et al., 2016; Hegger et al., 2014; Morrison, Westbrook, & Noble, 2017), research has largely ignored the question as to *how* spatial quality is to be achieved in planning practice.

In this article, we address this research gap. To this purpose, we evaluate which configurations of policy instruments have been applied in the Dutch Room for the River policy program to successfully achieve spatial quality (Busscher et al., 2017). The Room for the River policy program is internationally well known for its dual objective, in which the accommodation of higher flood levels is combined with the improvement of the spatial quality of the riverine areas. Currently, the policy program is reaching completion. This offers a unique opportunity to investigate how spatial quality can be achieved in planning practice. Policy instruments refer to the “concrete and specified operational forms of intervention by public authorities” (Bemelmans-Videc, 1998, p. 4). We focus on five instruments deployed in the Room for the River program: the “Quality Team (Q-team),” design ateliers (DESA), administrative agreements, landscape architects, and the “Spatial Quality Cluster”. Some instruments focus on planning on a more strategic level and are deployed on program level. These include the Q-team and the Spatial Quality Cluster. Other instruments are more oriented towards local land-use planning and are deployed on project level. Although there

is an area of possible conflict between the program and project level, especially the interaction between instruments on both levels is expected to produce spatial quality.

We collected archival and survey data and analysed it using qualitative comparative analysis (QCA) (Rihoux & Ragin, 2009; Schneider & Wagemann, 2012). Specifically, we applied QCA in its capacity as a method to evaluate the theory of Room for the River program. Policies, such as the Room for the River program, can be understood as theories in the sense that they describe the concrete instruments and activities (“policy instruments”) that are supposed to cause certain policy outcomes (Varone, Rihoux, & Marx, 2006), in this case spatial quality. QCA is an appropriate method to evaluate policy theories (Varone et al., 2006). QCA has recently been introduced in the fields of water management (e.g., Huntjens et al., 2011) and spatial planning (Verweij, Klijn, Edelenbos, & Van Buuren, 2013) and is well-suited to comparatively analyse a medium-n of cases. QCA also allows the systematic and transparent identification of configurations that explain a certain outcome of interest, in this article: configurations of policy instruments that have successfully achieved spatial quality.

This article is further structured as follows. In the next section, the background of the Room for the River policy program is provided (Section 2). In Section 3, the policy theory of Room for the River is elaborated, focusing on the program's instruments that were deployed to achieve spatial quality. Next, the data and method are explained in Section 4. The analysis and results of the QCA are presented in Section 5. In the final two sections, we draw the conclusions and we discuss the results and highlight the strategies that can be applied in organising for spatial quality in spatial flood risk management.

2 | SETTING THE SCENE: THE ROOM FOR THE RIVER PROGRAM

After a flooding and two near-dike breaches in 1993 and 1995, Dutch water experts became increasingly aware of the risk of diking alone (Roth and Winnubst, 2014). Vis, Klijn, Bruijn, and Van Buuren (2003), for example, even consider it to be a form of “Russian Roulette.” Dike failure would cause considerable economic damage (e.g., Vis et al., 2003), major societal disruption (e.g., Netherlands Environmental Assessment Agency, 2014) and would put critical infrastructure at risk. Emerging debates on the impact of climate change on river discharges further stimulated the consideration of alternatives (Van der Brugge, Rotmans, & Loorbach, 2005). As a result, the orientation shifted from diking towards integrating flood risk management with spatial planning (Warner et al., 2012; Woltjer & Al, 2007). This strategic reorientation was epitomised in the €2.3 billion national policy program “Room for the River” (Rijke, Van Herk, Zevenbergen, & Ashley, 2012). In this

A menu of measures

Lowering floodplains

Lowering/excavating part of the floodplain increases room for the river in high water situations.

Lowering groynes

Groynes stabilise the location of the river and ensure its correct depth. However, in a high water situation, groynes may obstruct the flow to the river. Lowering groynes speeds up the rate of flow.

Dyke relocation

Relocating a dyke inland widens the floodplain and increases room for the river.

Removing obstacles

If feasible, removing or modifying obstacles in the riverbed will increase the rate of flow.

Depoldering

The dyke on the riverside of a polder is lowered and relocated inland. This creates space for excess flows in extreme high water situations.

Water storage

The Volkerak-Zoommeer provides temporary water storage in extreme situations where the storm surge barrier is closed and there are high river discharges to the sea.

Deepening summer bed

Excavating/deepening the surface of the riverbed creates more room for the river.

High water channel

A high water channel is a dyke area branching off from the main river to discharge some of the water via a separate route.

Dyke reinforcement

Dykes are reinforced at given locations where river widening is not feasible.

FIGURE 1 Different types of measures in the “Room for the River” program (Ruimte voor de Rivier, 2016c)

program, Rijkswaterstaat,¹ provinces, municipalities, and regional water authorities (i.e., water boards) were cooperating in the implementation of 34 projects, often coined “measures” (Ministerie van Infrastructuur en Milieu et al., 2016; Ruimte voor de Rivier, 2016a). Currently, 26 projects have been completed (Ruimte voor de Rivier, 2016b). The different kinds of measures are illustrated in Figure 1.

The different kinds of measures can be clustered in three general types of measures, with an increasing complexity in terms of integrating flood risk measures with spatial measures (Ruimte voor de Rivier, 2007, 2016b):

- Technical measures, for example, strengthening dikes.
- Measures within the banks, that is, the “wet area” inside the banks that is not protected against floods (in Dutch: *buitendijkse maatregelen*), for example, lowering floodplains.
- Measures beyond the banks, that is, measures in the area behind the dike where residential areas can be found (in Dutch: *binnendijkse maatregelen*), for example, dike relocation and depoldering.

The Room for the River program was coordinated by the “Program Directorate Room for the River”, which is part of Rijkswaterstaat. Within the Program Directorate, the “Spatial Quality Cluster” was responsible for the coordination of the program's spatial quality objective. The Cluster was supported by the so-called “Q-team,” which had an advisory role (Collignon-Havinga, Menke, Oosterwijk, Grift, & Tilstra, 2009; Klijn et al., 2013). The Q-team was chaired by the State Advisor for the Landscape and consisted of five specialists with different disciplinary backgrounds: landscape architecture, urban planning, river engineering, ecology, and physical geography (Klijn et al., 2013; Q-team, 2012). The Q-team was tasked with producing “independent recommendation[s] on enhancing spatial quality [and] commissioned to coach the planners and designers, to peer review the designs and plans, and to report to the minister about the spatial quality achieved” (Klijn et al., 2013, p. 289). The Spatial Quality Cluster and the Q-team visited and advised the projects. The Spatial Quality Cluster furthermore assessed the projects at key moments in their development, most importantly after the development of a design that marked the end of the planning stage (Collignon-Havinga et al., 2009; Feddes & Hinz, 2013).

Next to the centralised program coordination, the Room for the River program followed a decentralised approach: the individual projects were implemented by various appointed

¹Rijkswaterstaat is the executive agency of the Dutch Ministry of Infrastructure and Water Management. It is responsible for the design, construction, management, and maintenance of the main infrastructure facilities, including the waterway network and systems.

governmental bodies. These include municipalities, provinces, water boards, and Rijkswaterstaat. In the Netherlands, a broad distinction can be made between general, territorial governments (in Dutch: *algemeen bestuur*) and functional governments (in Dutch: *functioneel bestuur*) (Raad voor het Openbaar Bestuur, 2015). The projects in the program were initiated by either one of them. The water boards at the regional level and Rijkswaterstaat at the national level are both functional governments and have a strong tradition of, and orientation towards, water safety. Municipalities and provinces are territorial governments and traditionally operate from a more integrated perspective. This means that they have to balance various interests, of which water safety is only one (Unie van Waterschappen et al., 2011; Wiering & Immink, 2006). In the context of the Room for the River program, provinces and municipalities usually acted as initiator of the measures within or beyond the banks, often representing complex integrated area-based planning projects. Conversely, regional water authorities and Rijkswaterstaat usually acted as initiators of the less complex technical measures such as strengthening dikes.

3 | THE POLICY THEORY OF ROOM FOR THE RIVER

3.1 | Spatial quality

The Room for the River Program's policy theory consists of instruments, which were intended to produce spatial quality in the local and regional projects. In the program, spatial quality was defined in three dimensions: user value, experiential value, and future value (Ruimte voor de Rivier, 2015; Terra Incognita et al., 2009). User value refers to the usability, efficiency, and effectiveness of a physical structure and its surrounding space, experiential value refers to the perception and experience of it, and future value refers to the robustness and durability of the structures and the space (Hooimeijer, Kroon, & Luttik, 2001). This so-called “Vitruvius Triplet” was translated by the Q-team into the coherence between hydraulic effectiveness (including its relationship with other economic land use functions), ecological robustness, and cultural meaning and aesthetics (see Klijn et al., 2013). The spatial quality was assessed by the Program Directorate Room for the River at the end of the planning stage. In the analysis that we present in this article, we abbreviate spatial quality as SQUAL.

3.2 | Policy instruments

3.2.1 | Q-team

The first policy instrument is the influence of the Q-team (QTEAM). Of particular importance were the visits of the Q-team to the projects, where suggestions to further improve spatial quality were provided (Collignon-Havinga et al.,

2009). Previous evaluations of the Room for the River program indicated that the Q-team contributed to increasing the spatial quality in the project designs (Hulsker, Wienhoven, Diest, & Buijs, 2011; Van Twist et al., 2011). However, no explicit expectation can be formulated about the relationship between the number of visits by the team and spatial quality. That is, on the one hand, more visits are supposed to increase spatial quality. On the other hand, however, a high number of visits could also indicate an initial low spatial quality requiring additional efforts of the Q-team. The QCA may shed light on which is actually the case.

3.2.2 | Design ateliers

The second policy instrument is the Design Ateliers (DESA). DESA are a form of interactive planning and design workshops where policy makers, project managers and stakeholders codesign, discuss and debate local challenges and possible solutions. Such an interactive collaborative approach is focused on finding common ground between the parties involved (cf. Goosen et al., 2014; Heeres, Van Dijk, Arts, & Tillema, 2016). The DESA were used to discuss the area-specific impact of flood protection and to incorporate local knowledge in the development of spatial flood risk management measures.” Although such interactive design workshops do not necessarily improve spatial planning outcomes, depending on how they are organised, there is the potential that they do (see for example, Enserink & Monnikhof, 2003; Lamers, Ottow, Francois, & Von Korff, 2010). The previous midterm evaluation of the Room for the River program indicated that sufficient and timely participation in DESA “has led to a significantly better spatial quality” (Hulsker et al., 2011, p. 47; Van Twist et al., 2011, p. 14).² Likewise, a recent evaluation of three major water safety policy programs in the Netherlands (including Room for the River) concluded that (local) participation could increase support and improve spatial planning designs (Groenendijk, Kwadijk, Van der Meulen, & Westerweel, 2016). The expectation thus is that if the DESA were well-timed and sufficiently organised this resulted in a more interactive, inclusive process approach where local knowledge is mobilised leading to improved spatial quality.

3.2.3 | Administrative agreement

The third policy instrument is the concretization of the spatial quality objective in an Administrative Agreement between the public partners (AGRE). The “administrative agreements about the division of tasks and cooperation must ensure rapid and effective implementation of measures” (Van Stokkom, Smits, & Leuven, 2005, p. 81). The partners included Program Directorate Room for the River and, normally, regional governments such as water boards and provinces. For each project, an administrative agreement was signed which outlined the framework within which the

²This quote is translated from Dutch.

project was to be developed. This agreement was an important instrument for securing spatial quality in the projects (Collignon-Havinga et al., 2009). Previous midterm evaluations indicated that the dual-objective of the Room for the River program was well-recorded in the agreements, but the integrated approach towards achieving this dual-objective less so (Hulsker et al., 2011; Van Twist et al., 2011). The expectation is that it is not so much important that the spatial quality objective is stated in the agreement; what is important is that spatial quality is specified beyond the general notion that it has to be taken into account. If this is the case, this is expected to provide extra impetus for achieving spatial quality.

3.2.4 | Landscape architect

The fourth policy instrument concerns the involvement of the Landscape Architect (LAND). Landscape architects played important roles in the program's projects (Klijn et al., 2013). Traditionally, "spatial design is often understood as a product, with a strong focus on the content" (Heeres et al., 2016, p. 412). Landscape architects are then involved in creating a specific spatial quality plan. In those projects, the landscape architect was only asked by the project team to deliver a specific product rather autonomously. In contrast, from a spatial planning perspective, designs are "a way to manage a wider creative process of arriving at decisions and action" (Heeres et al., 2016, p. 412). This means that landscape architects are then not only asked to deliver a *product*, but function also as members of the integral design teams (Van Buuren, Klijn, & Edelenbos, 2012) and thus played an important role in the interactive planning *process* as well. This is expected to contribute more to the realisation of spatial quality.

3.2.5 | Spatial Quality Cluster

The fifth and final policy instrument is the involvement of the Spatial Quality Cluster of the Room for the River program in the individual projects (CLUS). The Spatial Quality Cluster is responsible for directing, facilitating, and monitoring the spatial quality objective of the program. To do so, multiple means have been applied, ranging from more formal assessments of plans to a helpdesk where projects can go to for questions and assistance (Collignon-Havinga et al., 2009; Hulsker et al., 2011). Previous evaluations of the program indicated that the Cluster's role as a facilitator, "without sitting on the designer's seat," was influential in achieving spatial quality (Hulsker et al., 2011).³ It is expected that closer involvement of the Cluster as facilitator and guardian of spatial quality leads to higher spatial quality.

³This quote is translated from Dutch.

4 | DATA AND METHOD

QCA is a case-based method particularly suitable for comparatively and systematically analysing a medium number of cases (Ragin, 1987). The method identifies configurations of conditions (here: policy instruments) explaining a certain outcome of interest (here: spatial quality) (Schneider & Wagemann, 2012). These characteristics make it an appropriate method for the present evaluation (see further: Busscher et al., 2017). For the application of the method, we adhered to the protocols detailed in Schneider and Wagemann (2010, 2012) and in Gerrits and Verweij (2018).

4.1 | Case selection and data collection

Of the 26 completed projects in the program, only the 20 projects for which all data were available were selected (see Table 1). The reconstruction of the program's policy theory (see Section 3), as well as the selection and collection of cases and data, progressed iteratively through regular meetings between the researchers and the program managers from the Program Directorate Room for the River, which commissioned the present evaluation. Project data were collected from various sources. The first data source is written documents from the archives of the Room for the River program. Access to the data was provided by the Program Directorate. These data were collected in the period September 2016 to April 2017. An additional survey was sent out in the period April 2017 to May 2017 to all the project managers in the program to collect missing data on several of the instruments. This is the second data source. After the data collection, the data matrix was constructed. Table 1 presents this data matrix.

4.2 | Qualitative comparative analysis

We calibrated the case data in the data matrix into scores between 0 and 1 (Schneider & Wagemann, 2012). In QCA, each of the conditions (here: the instruments), as well as the outcome of interest (here: spatial quality) is considered a set, and cases have a membership in the sets between 0 (full non-membership) and 1 (full membership). The calibration of the conditions was informed by the program's policy theory (Section 3) and/or a cluster analysis (see Table 2). The calibration resulted in the calibrated data matrix provided as Table 3.

We transformed the calibrated data matrix into the truth table using the QCA-package in R (Duşa, 2007, 2016). The truth table is at the core of any QCA. It contains the collected empirical evidence by sorting the empirical cases over the logically possible configurations of conditions (Schneider & Wagemann, 2012). Each truth table row represents one logically possible configuration of conditions (here: the instruments). The number of truth table rows is determined by the formula 2^k , where k stands for the number

TABLE 1 The raw data matrix

Case label	Case name (in Dutch)	Instruments					Outcome
		QTEAM	DESA	AGRE	LAND	CLUS	SQUAL
Case_01	Ruimte voor de Waal	3		No			Sufficient
Case_02	Kribverlaging Waal	11	1.5	No	4	5	Sufficient
Case_03	Langsdammen Waal	11	0	No	7	4	Insufficient
Case_04	Het Munnikenland	6	Multiple	Yes	8	8	Sufficient
Case_05	Uiterwaardvergraving Bedrijventerrein Avelingen	2		Yes			Sufficient
Case_06	Ontpoldering Noordwaard	6	Many	Yes	8	No role	Sufficient
Case_07	Ontpoldering Overdiep	3	6	No	6	0	Sufficient
Case_08	Berging op het Volkerak-Zoommeer	7	> 10	No	7	N/A	Insufficient
Case_09	Nederrijn: Uiterwaardvergraving Doorwerthsche Waarden	5	2	No	6.5	Limited	Insufficient
Case_10	Nederrijn: Uiterwaardvergraving Middelwaard	5	2	No	6.5	Limited	Insufficient
Case_11	Nederrijn: Uiterwaardvergraving De Tollewaard	5	2	No	6.5	Limited	Insufficient
Case_12	Nederrijn: Obstakelverwijdering Machinistenschool Elst	5	2	No	6.5	Limited	Insufficient
Case_13	Ruimte voor de Lek Vianen	7	3	No	9	6	Sufficient
Case_14	Dijkverlegging Cortenoever	10	Multiple	No	4	4	Insufficient
Case_15	Dijkverlegging Voorsterklei	10	Multiple	No	4	4	Insufficient
Case_16	Ruimte voor de Rivier Deventer	6	6	Yes	9	6.5	Sufficient
Case_17	Ruimte voor de Rivier Zwolle: Dijkverlegging Westenholtte	4	Many	Yes	8	1	Sufficient
Case_18	Ruimte voor de Rivier Zwolle: Uiterwaardvergraving Scheller-Oldermele Buitenwaarden	4		Yes			Sufficient
Case_19	Ruimte voor de Rivier IJsseldelta: Zomerbedverlaging Beneden-IJssel	8	Many	No	8	7	Insufficient
Case_20	Uiterwaardvergraving Meinerswijk Arnhem	7	Few	Yes	Low	Positive	Insufficient
Case_21	Dijkverbetering Steurgat	7	5	No	5	7	Insufficient
Case_22	Dijkverbetering Schoonhovense Veer-Langerak	1	0	No	9	9	Insufficient
Case_23	Dijkverbetering Amer/Donges	3	0	No	Low	8	Sufficient

Marked cells indicate missing data. Cases with missing data are not included in the analyses.

of instruments included in the analysis. Hence, the truth table in the present study consists of 32 rows (i.e., 2^5) or logically possible configurations of instruments. In our data, 12 of the logically possible 32 configurations are empirically present (see Table 4).

Each truth table row can be read as a statement that the particular configuration of conditions is “true” (i.e., “sufficient” in QCA) for producing spatial quality (Busscher et al., 2017). The construction of the truth table commences with assigning the empirical cases to only one of the truth table row. Next, it is assessed for each truth table row, based on the empirical cases that cover that row, whether the particular configuration of instruments produced spatial quality (i.e., a score of 1.0) or not (i.e., a score of 0.0). The truth table is provided as Table 4.

After the truth table is constructed, it has to be analysed (Schneider & Wagemann, 2012). Truth table analysis proceeds through the rule of pairwise comparison: if two truth table rows agree on the outcome and differ in their set-membership scores of but one of the conditions, the condition in which the two truth table rows differ can be “minimised away” (i.e., it is logically redundant for explaining the achievement of spatial quality). For instance, comparing Configuration 16 (covered by Case 04) with Configuration

32 (covered by Case 16), we observe that the instrument Q-Team is redundant: whether it paid many visits (i.e., a score of $0.5 < x \leq 1.0$) or none or a few (i.e., a score of $0.0 \leq x < 0.5$), the combination of $DESA*AGRE*LAND*CLUS$ produces spatial quality nevertheless. The pairwise comparison is repeated for all configurations until no more comparisons are possible. This truth table analysis was performed with the QCA-package in R (Duşa, 2007, 2016). The truth table analysis resulted in the solution formula that shows which combinations of instruments are related to the achievement of spatial quality.

5 | ANALYSIS AND RESULTS

The results of the truth table analysis are provided in Table 5. The black circles (●) in the table represent the presence of an instrument (i.e., a calibrated score of $0.5 < x \leq 1.0$) and the white circles (○) represent the negation of an instrument (i.e., a calibrated score of $0.0 \leq x < 0.5$). Blank cells represent redundant instruments. In analysing the truth table, the consistency score is used to assess which of the logically possible configurations can be said to be associated with the outcome. In the literature,

TABLE 2 The calibration rules

	Raw data	Our calibration	Explanation of our calibration
<i>Outcome</i>			
Spatial quality (SQUAL)	Archival data; data from assessments by the Program Directorate Room for the River. No standardised scale was used by the Program Directorate to assess the spatial quality after the planning phase. The data are largely qualitative descriptions	0.0 = insufficient 1.0 = sufficient	In the absence of a standardised scale and because the data are qualitative, we only broadly distinguished between two categories: insufficient and sufficient. Cases were coded as 0.0 or 1.0 based on the Program Directorate's qualitative descriptions
<i>Instruments</i>			
Q-team (QTEAM)	Archival data; data from Q-team reports. The condition is measured as the number of visits as documented in the final report of the Q-team after the planning phase	0.0 = ≤ 3.5 visits 0.3 = 3.6 to 6 visits 0.7 = 6.1 to 8.5 visits 1.0 = ≥ 8.6 visits	In the absence of a standardised scale of precise theoretical expectations on the number of visits for achieving high spatial quality, we performed a cluster analysis with the Tosmana threshold-setter (Cronqvist, 2016). If a single visit included multiple projects (i.e., Cases 02&03, Cases 09–12, and Cases 14&15; see Table 1), these visits were counted for each project. We tested multiple thresholds, indicating 6 visits as the crossover point. Because the crossover point indicates ambiguity. Case 06 and 16 with 6 visits were further examined using the survey data; this showed that the importance of the Q-team for spatial quality was low in Case 06 (score of 1/10) and high in Case 16 (score of 7/10). Hence, Case 06 is calibrated as 0.3 and Case 16 as 0.7
Design ateliers (DESA)	Survey data. Project managers were asked how many design ateliers were organised, how important the ateliers were (on a scale from 1 to 10) for achieving spatial quality in the spatial design, and whether or not the number of organised ateliers was sufficient	0.0 = no ateliers 0.7 = few but sufficient (1 to 3) ateliers 1.0 = many ateliers (≥ 6)	In the absence of any standard or minimum number of design ateliers and because the project managers used various and different ways (both qualitative and quantitative) in response to the survey question, we broadly distinguished between three categories. For projects with only a few ateliers (1 to 3 ateliers) the project managers consistently indicated this was "sufficient" and these cases are hence calibrated above the crossover point. Cases with 6 or more ateliers are calibrated as 1.0 because there is a clear gap between cases with 3 ateliers and cases with 6 ateliers
Administrative agreement (AGRE)	Archival data; data from the administrative agreements. In the administrative agreements, the spatial quality objective was either generally mentioned ("no" specification) or it was specified	0.0 = general notion spatial quality 1.0 = spatial quality specified	Cases where spatial quality was concretely specified are calibrated as 1.0. Cases where spatial quality was only generally referenced are calibrated as 0.0.
Landscape architect (LAND)	Survey data. Project managers were asked in which way the landscape architect was involved in the project, how satisfied they were with the architect's involvement, and the extent to which they were an integral member of the project team (on a scale from 1 to 10, where 10 indicates maximal process-oriented involvement)	0.0 = landscape architect focused on planning product 1.0 = landscape architect focused on planning process	Because some respondents (cases 20 and 23) assessed the role of the landscape architect qualitatively (see Table 1), we only broadly distinguish between two categories. Cases with a score of 6.0 or higher are calibrated as 1.0 because this indicates that the role of the landscape architect is more process-oriented than product-oriented. The respondents' answers to other (qualitative) questions on the role of the landscape architect further corroborate this calibration
Spatial quality cluster (CLUS)	Survey data. Project managers were asked about the extent to which the spatial quality cluster contributed to achieving spatial quality in the spatial design (on a scale from 1 to 10). Additional questions focused on the specific instruments deployed by the cluster, that is, the formal assessments, the helpdesk function, and the spatial quality manual	0.0 = limited or negative contribution 1.0 = important contribution	Because some respondents (cases 06, 09–12, and 20) provided a qualitative assessment of the involvement of the spatial quality cluster (see Table 1), we only broadly distinguish between two categories. Cases where the involvement was scored 6.0 or higher are calibrated as 1.0, because this indicates an important

TABLE 2 (Continued)

Raw data	Our calibration	Explanation of our calibration
		contribution rather than a limited or negative contribution of the Cluster. Data for Case 08 were ambiguous (see Table 1), but the case was calibrated as 0.0 as the data did not clearly indicate importance of the Cluster

TABLE 3 The calibrated data matrix

Case label	Outcome	Instruments				
	SQUAL	QTEAM	DESA	AGRE	LAND	CLUS
Case_01	1	0		0		
Case_02	1	1	0.7	0	0	0
Case_03	0	1	0	0	1	0
Case_04	1	0.3	0.7	1	1	1
Case_05	1	0		1		
Case_06	1	0.3	1	1	1	0
Case_07	1	0	1	0	1	0
Case_08	0	0.7	1	0	1	0
Case_09	0	0.3	0.7	0	1	0
Case_10	0	0.3	0.7	0	1	0
Case_11	0	0.3	0.7	0	1	0
Case_12	0	0.3	0.7	0	1	0
Case_13	1	0.7	0.7	0	1	1
Case_14	0	1	0.7	0	0	0
Case_15	0	1	0.7	0	0	0
Case_16	1	0.7	1	1	1	1
Case_17	1	0.3	1	1	1	0
Case_18	1	0.3		1		
Case_19	0	0.7	1	0	1	1
Case_20	0	0.7	0.7	1	0	1
Case_21	0	0.7	0.7	0	0	1
Case_22	0	0	0	0	1	1
Case_23	1	0	0	0	0	1

Marked cells indicate missing data. Cases with missing data are not included in the analyses.

a minimum consistency score of 0.75 is advised (e.g., Marx & Duşa, 2011; Ragin, 2008). Furthermore, the cases represented by each of the configurations in the truth table need to be inspected as to whether they have produced the outcome. In the present analysis, the outcome is achieved if the spatial quality was assessed as “sufficient” by the Program Directorate Room for the River (see Table 2). Hence, we have set the consistency cut-off point at 0.769. All the cases in Configurations 15, 16, 32, and 2 have achieved sufficient spatial quality (see Table 4); the other configurations are either contradictions or only cover cases that did not achieve spatial quality.

6 | SUCCESSFUL MANAGEMENT STRATEGIES

At the outset of this article, we aimed to identify successful configurations of instruments that are able to produce spatial quality. Spatial quality does not occur naturally. Indeed, the Room for the River program is indicative for the fact that it is essential to develop instruments that actively organise for and safeguard the spatial quality objective of flood risk management programs. Based on our analysis, we identified three successful configurations of instruments in organising for spatial quality. We propose that these configurations can be considered successful management strategies. In this way, these strategies provide important leads for furthering the development and implementation of future spatial flood risk management, both in the Netherlands and abroad. The three management strategies are the *program-as-guardian*, the *project-as-driver*, and *going-all-in*.

TABLE 4 The truth table

Conf. No.	QTEAM	DESA	AGRE	LAND	CLUS	Outcome	N	Consistency	Cases
15	0	1	1	1	0	1	2	1.000	Case_06, Case_17
16	0	1	1	1	1	1	1	1.000	Case_04
32	1	1	1	1	1	1	1	1.000	Case_16
2	0	0	0	0	1	1	1	0.769	Case_23
28	1	1	0	1	1	0	2	0.500	Case_13, Case_19
25	1	1	0	0	0	0	3	0.333	Case_02, Case_14, Case_15
11	0	1	0	1	0	0	5	0.244	Case_07, Case_09, Case_10, Case_11, Case_12
4	0	0	0	1	1	0	1	0.231	Case_22
19	1	0	0	1	0	0	1	0.000	Case_03
26	1	1	0	0	1	0	1	0.000	Case_21
27	1	1	0	1	0	0	1	0.000	Case_08
30	1	1	1	0	1	0	1	0.000	Case_20

The configurations in bold produce the outcome (spatial quality). These are discussed in Section 6.

TABLE 5 Results truth table analysis

	Path 1	Path 2	Path 3
QTEAM	O	O	
DESA	O	●	●
AGRE	O	●	●
LAND	O	●	●
CLUS	●		●
Raw coverage	0.125	0.300	0.212
Unique coverage	0.125	0.175	0.087
Consistency	0.769	1.000	1.000
Cases	Case_23	Case_06, Case_17; Case_04	Case_04; Case_16
Solution coverage: 0.512 solution consistency: 0.932			

6.1 | Program-as-guardian strategy (path 1)

In the first strategy, the efforts are focused on the role of the Spatial Quality Cluster. Whereas the Cluster originally intended to play a role in the background, facilitating and monitoring the spatial quality objective, in this strategy the Cluster plays a much more distinctive role on the foreground of the program. We see two possible explanations for this. The first one is that the Cluster is strongly involved from the start of a project, acting as a facilitator and guardian of spatial quality. As a consequence, fewer resources need to be devoted to the deployment of the Q-team, the organisation of DESA, the drafting of administrative agreements focusing on spatial quality, and on the active involvement of the landscape architect in the planning process (see Table 5). The second explanation, and one that was particularly recognised by the commissioners of the present evaluation, is that, when little energy is devoted in a project to achieving spatial quality, it is required that the Spatial Quality Cluster steps in to steer the project in the right direction. Especially in projects where budgets and planning schemes are under a constant threat of overrunning, spatial quality quickly becomes a “luxury that costs extra money” (Van Twist et al., 2011, p. 15). When the pressure is on, the Spatial Quality Cluster can step in and act as a counterweight and safeguard the spatial quality ambitions by actively promoting, for example, a more prominent involvement of the landscape architect. Hence, we coin this strategy the program-as-guardian strategy.

6.2 | Project-as-driver strategy (path 2)

The second strategy mirrors the program-as-guardian strategy. We coin it the project-as-driver strategy. Here, the steering by the program management is less dominant. Instead, the motor block for achieving spatial quality is formed by the projects themselves. This is done through organising many design ateliers, explicating spatial quality in the administrative agreement, and a close involvement of the landscape architect. This strategy sits comfortably with how the program was designed by intention. That is, the program was to be coordinated on the central level, combined with

implementation on the decentral level (regional, local). The project-as-driver strategy reflects this intention well.

6.3 | Going-all-in strategy (path 3)

The third management strategy is basically to go “all-in” and to maximise efforts to increase spatial quality. In this strategy, there is a strong deployment of nearly all instruments. Through a close involvement of the Spatial Quality Cluster, the landscape architect, and the Q-team,⁴ and through organising design ateliers, and specifying spatial quality in the administrative agreement, a high spatial quality can indeed be achieved. We coin this strategy the going-all-in strategy. The analysis shows that this strategy is effective. This is in line with the expectations about the instruments in the Room for the River program. However, this strategy may be less efficient in terms of the resources (time, budget, personnel) than the previous two other strategies.

7 | IMPLICATIONS FOR FLOOD RISK MANAGEMENT

With the Europeanization of flood risk management and the increasing need for spatial flood risk strategies, coming together in the EU Floods Directive (e.g., Hartmann & Driessen, 2017; Priest et al., 2016), experiences with the Dutch Room for the River program are of relevance both within the Netherlands and abroad.

This study points at the importance of formulating a dual-objective, in which flood probability reduction is combined with improving spatial quality. Flood risk management is characterised by a strong path-dependent development of water safety institutions. This implicates that “preceding steps in a particular direction, especially those with high expenditures, direct further movement in the same direction. Rational considerations of profit and loss often

⁴The instrument QTEAM is indicated as redundant in Path 3. However, the raw data show that for both Cases 04 and 16, the Q-team paid six visits to the projects, which is very close to the crossover point (see Table 1). Moreover, in Case 16, the survey respondent also assessed the Q-team's role in the planning phase as important with a score of 7/10 (see Table 1).

lead to the decision to continue the same practice” (Van den Brink, Termeer, & Meijerink, 2011, p. 284). The construction of dikes, for example, stimulates new developments on the better-protected land behind the dikes, and because of these developments higher safety levels are demanded. This self-reinforcing process, also referred to as the “levee effect” (Liao, 2014, p. 728), makes parties continue on the institutional path. In the face of these strong institutional forces, it is essential to explicitly and purposefully organise a counter-balance, so as to safeguard a sufficient focus on spatial quality. With the formulation of a dual-objective, the Room for the River program has been able to institutionalise attention for spatial quality, as a result of which the individual projects were urged to focus on spatial flood risk strategies as opposed to traditional technical measures.

Although the case of Room for the River shows that spatial flood risk management can be effectively organised, recent developments suggest that the issue of spatial quality in flood risk management requires unabated attention. First, we see that successive programs, such as the national Flood Protection Program (in Dutch: *Hoogwaterbeschermingsprogramma*), only have one primary objective, namely improving flood protection. The implicit assumption is that the attention for spatial quality is between the ears now of Dutch water policy makers and that therefore a dual objective is no longer considered necessary. The question remains if this is indeed the case. Second, although previous mid-term evaluations (Hulsker et al., 2011; Van Twist et al., 2011) had a positive outlook on the spatial quality that was to be achieved in the Room for the River program, at the end of the planning phase in 12 out of 23 projects spatial quality was still considered to be insufficient (see also Table 1). Of course, spatial quality can be improved during the realisation phase. Research shows, however, that all too often, especially during implementation, when the pressure on time schedules and budgets increases, the tendency to simplify and revert to old mono-functional routines increases (Salet, Bertolini, & Giezen, 2013; Verweij et al., 2017). How to safeguard spatial quality during the implementation phase therefore requires further research. Third and finally, although the Room for the River program formally has been able to improve the spatial quality of the Dutch riverine areas, according to its own assessment framework, local inhabitants not always share this positive opinion, as also the public protests against some river-widening plans have shown. Spatial quality is a multi-interpretable and normative concept, and therefore, continued attention is needed as to how the concept is interpreted and approached in planning practice. In the end, spatial quality is in the eye of the beholder (cf. Van den Brink & van Etteger, 2017).

Furthermore, this study sheds light on the interaction between project management and program management. Most often, project management and program management are considered distinct approaches, where the shortcomings

of the first are mitigated by the advantages of the second (Pellegrinelli, 2011). Project management is strong in dealing with context-specific challenges and realising these within time and budget by adopting a strong internal focus. Program management is strong in safeguarding the newly found focus on spatial quality across different projects and connects different projects to each other (Busscher, 2014). By identifying and studying policy instruments on both the project level and the program level, and by adopting a configurational approach using QCA, the present study shows how the balance between both approaches plays out in practice. After all, “balance is a nice word, but a cruel concept. Defining an optimum or mix is difficult or impossible” (March, 1999, p. 5). We have shown how this balance looks like. In particular, we have identified three strategies, which showcase different possible balances. For instance, in the project-as-driver strategy (Path 2) the focus gravitates towards the project-level policy instruments. Conversely, in the program-as-guardian strategy (Path 1), program-level policy instruments are of prime importance. Overall, the results show that the balance plays out differently across the projects. An interesting direction for further research is to investigate the contextual conditions under which a particular balance of project and program instruments is most successful.

Our research also confirmed that codesign processes are important to improve the quality of spatial planning outcomes. This is clearly visible in Paths 2 and 3 of the results, where the organisation of Design Ateliers is an important condition in achieving spatial quality. This importance of codesign processes is also echoed in existing literature (see for example, Heeres et al., 2016; Lamers et al., 2010; Van Dijk, 2011; Von Korff, Daniell, Moellenkamp, Bots, & Bijlsma, 2012). Well-timed and sufficiently organised design ateliers can result in more inclusive solutions where local knowledge is mobilised leading to improved spatial quality. Our research does show, however, that organising Design Ateliers alone is insufficient. Local commitment gained as a result of the Design Ateliers should be complemented with political commitment. In the Room for the River program this commitment was anchored in the Administrative Agreement (Paths 2 and 3). Our study, therefore, shows that political anchorage is an important condition (cf. Hovik & Hanssen, 2016). It helps to ensure that results of codesign processes are not dismissed once formal decision making starts (e.g., Edelenbos, 2005; Edelenbos, Van Schie, & Gerrits, 2010).

Finally, our research highlights the pivotal role of the landscape architect (Paths 2 and 3), both in terms of designer and guardian of spatial quality – especially to prevent the tendency to see spatial quality as a “costly luxury” in the face of limited budgets and time – and as boundary spanner between the different interests and policy sectors involved in spatial flood risk strategies. Although this dual-role of the

landscape architect as designers of landscape interventions and process managers is started to be recognised in the literature (Meijering, Tobi, Van den Brink, Morris, & Bruns, 2015; Van den Brink & Bruns, 2014), current landscape architecture research still largely focuses on the traditional role of the landscape architect as the designer. An avenue for further research is to analyse how the dual-role can be effectively implemented.

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