

# The paradigmatic shift in Dutch water management culture: the case study of Nijmegen in the Room for the River program

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# List of Contents

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Abstract 7

Chapter 1

Introduction 9

Chapter 2

Room for the River, a shift in the paradigm 15

Chapter 3

Making room for the Waal: the case study of Nijmegen-Lent 25

Chapter 4

Designing the landscape: the insider's point of view 33

Chapter 5

Planned vs Result: anticipating the unexpected 43

Chapter 6

Discussion and conclusions 49

*Bibliography* 53

*List of figures* 57

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## Abstract

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The Room for the River project stands as a stepping stone in water management strategies, distinguished by a paradigmatic shift in Dutch water culture towards decentralization of the decision-making process and spatial quality embedded in spatial planning projects. The research presents a comprehensive analysis of the program, focusing on the case study of Nijmegen, through interviews with relevant stakeholders, revealing insights into the planning process, its execution, and the final outcome.

The pivotal concepts of decentralization of the decision-making process towards a bottom-up approach, and the one of spatial quality strongly embedded in the design phase, are analyzed and discussed, first on a general level and then relating to the specific case study.

The outcome of the project is analyzed through the interviews, understanding the point of view of the involved stakeholders and their perception on the execution of the works, and discerned with the mapping tool, comparing the information gathered personally during visits on site to the information extracted from the interviews. Moreover, challenges such as the unforeseen uses of the designed spaces are taken into consideration in the personal analysis and discussed at the end of the research, providing possible implementation to the process for the future.

## Introduction

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The approach towards water and water-safety issues has radically changed in the past decades in the Netherlands, culminating with the Room for the River program. This initiative, particularly evident in the Nijmegen-Lent area, represents a paradigmatic change in architecture, landscape design, and urban planning, emphasizing the integration of water safety and spatial quality considerations. While the program has led to the creation of new usable and inhabitable spaces, the alignment of design intentions with user needs has sometimes fallen short, resulting in unexpected uses of these areas.

This paper offers a comprehensive examination of the Room for the River program, with a focus on interventions along the Waal River in Nijmegen. Through a historical lens, it explores how these water-safety measures have influenced the city's urban fabric, public space utilization, and user perceptions. Central to the analysis is a study of the decision-making processes behind these interventions, shedding light on the motivations, anticipated outcomes, and discrepancies between expectations and realities.

To fully grasp the subject matter, contextual understanding of the Room for the River program and the historical and social significance of *riverfronts* (Durán Vian, 2021) is essential. This structure reflects existing literature, which serves as a foundational component in achieving the objectives of this thesis.

Throughout history, the relationship between cities and rivers has been pivotal, influencing civilizations, trade, and urban development. Mumford (1961) aptly describes rivers as the 'first highroads, moving belts of water,' emphasizing their role in facilitating trade and community development.

This longitudinal connectivity is complemented by lateral and vertical connections evident in the daily activities of local residents (Kondolf & Pinto, 2017). In contemporary urban planning, there is a growing focus on revitalizing riverfronts, particularly in informal areas facing accessibility challenges, with an emphasis on creating accessible and inclusive public spaces (Attia & Ibrahim, 2018).

The term ‘urban riverfront’ is defined as the transitional area directly referencing the river’s edge, where a city is in direct contact with water, fostering interactions between citizens and water (Durán Vian et al., 2021; Zingraff-Hamed et al., 2021; Cao & Wantzen, 2023). The concept of “Riverhood” underscores the intricate relationship between local water cultures, politics, and governance frameworks, with grassroots movements playing a significant role in shaping these dynamics (Boelens, 2022).

Viewing urban riverfronts as social-ecological systems, Cao and Wantzen (2023) explore public perceptions in Tours, France, unraveling the inherent social-ecological systems. Kondolf and Pinto (2017) discuss the historical shift from utilitarian uses to recreation and the challenges arising from interventions altering traditional interactions.

The concept of “River Culture” (Wantzen et al., 2016) adds an eco-social dimension to the relationship between cities, their development, and water flows, emphasizing the influence of rivers’ biophysical setting on human culture. Zalewski and Wantzen (2023) advocate for harmonious coexistence, drawing lessons from historical examples to inform modern river management. Wohl, Lane, and Wilcox (2015) critique the lack of consideration for the social meaning of river restoration projects, while Leisher et al. (2022) explore social changes resulting from such interventions.

Nature-based solutions are recognized as integral components in addressing global societal challenges (Cohen-Shacham et al., 2016). In the realm of socio-hydrology, Di Baldassarre et al. (2013) provide a conceptual

framework for understanding human-flood interactions, shedding light on the dynamic interplay between human societies and hydrological processes.

The research aims to explore the transformative impact of the Room for the River program interventions in Nijmegen-Lent, focusing on how they have reshaped urban spaces and influenced user perceptions. Utilizing a mixed-method approach, the study combines historical analysis, interviews with key stakeholders, and on-site observations to comprehensively examine the outcomes of these interventions.

The research seeks to address the following questions:

- How did the renewed approach of the Dutch government towards water management interventions influence the project’s outcome in Nijmegen, and to what extent was the paradigmatic shift in the decision-making process implemented in this specific site?
- What is the interplay between safety-driven design objectives and the evolving needs of stakeholders in shaping these transformations?
- To what extent have implementations in spatial quality, a fundamental aspect of the design process, contributed to unexpected uses of the space?

Through mapping historical changes and qualitative analysis of stakeholder perspectives, the study aims to provide insights into the tangible outcomes and perceived effectiveness of the Room for the River program in Nijmegen-Lent, shedding light on the complexities of integrating safety concerns with evolving urban needs.

This research encompasses the fields of History of Architecture and Urban Planning, delving into the Room for the River program and the Nijmegen

case study, as well as touching upon the Theory of Architecture when examining unexpected uses of space. Methodologically, the study employs mapping to understand urban development over time and interviews to capture diverse perspectives from actors involved in the design process.

Following this introduction, the thesis is structured into four chapters. The second chapter provides a general overview of the paradigmatic shift in water management approaches in the Netherlands. Subsequent chapters focus on site-specific investigations, beginning with an in-depth analysis of the Nijmegen case study enriched by insights from interviews with key stakeholders. The use of mapping facilitates a qualitative examination of the project and its site. The research concludes with a final discussion synthesizing the findings.

## Room for the River, a shift in the paradigm

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River deltas, characterized by fertile land and water, serve as hubs for economic growth, settlements, and transportation, hosting approximately 10% of the global population and ranking among the most densely populated regions worldwide (Overeem & Syvitski, 2009). However, their dynamic and vulnerable nature, subject to rapid mutations due to natural sedimentation and severe storms, poses challenges for human habitation (Taylor, 2023).

Human interventions on these ever-changing landscapes introduce an additional layer of complexity which causes new unforeseen damages, being a clear paradox where safety interventions introduce damages (Overeem & Syvitski, 2009). The interplay of natural and anthropogenic activities shapes the landscape, encapsulating the social, cultural, and economic history of delta inhabitants (Wantzen et al., 2016).

Technological advancements and attempts to control nature's unpredictability are woven into the narrative of these regions, amidst growing concerns about the sustainability of delta populations and the increasing hazards they face (Overeem & Syvitski, 2009). The Netherlands, particularly vulnerable to flooding with 55% of housing located in flood-prone areas (Slomp, 2012), has historically focused on coastal engineering projects to mitigate sea-related flooding threats. However, uncertainties persist regarding riverine flooding, necessitating a shift in water management approaches (Yu et al., 2020).

The Dutch government responded to this concern with a drastic shift in the water management paradigm, approving the Room for the River



program in 2006. According to Hans Brouwer – ecologist who has worked at Rijkswaterstaat since 1996, involved also in the Room for the River project in a management role – in an interview personally held on March 7th, 2024, the means to provide safety from flooding had changed.

*Hans Brouwer: “[...] the purpose of Room for the River was bringing safety in a new way compared to the years before. So for centuries, if you have a situation where we had to do something about flood safety, then we heightened the strength of the dams. [...] And now we said make Room for the River”*

In 1953, a devastating storm on February 1st led to a significant rise in water levels, resulting in over 1800 casualties, widespread displacement of civilians, and flooding of more than 200,000 hectares of land. This event prompted initial discussions regarding a shift in approach to water management, culminating in the implementation of The Delta Plan, which commenced unofficially in 1955. Central to the plan was the construction of the Oosterschelde Storm Surge Barrier, which, upon completion, was perceived as a disaster by the public (Bijker, 2002). By the project’s conclusion, societal attitudes had evolved, with discontent arising from outdated intervention methods (Feddes, 2017). By 1970, there was a renewed societal emphasis on landscape and environmental quality, aspects overlooked by the pragmatic approach of the interventions, resulting in environmental degradation and loss of historical landscapes.

The growing dissatisfaction with traditional decision-making processes in water management spurred calls for administrative reform. The hierarchical system gave way to a more decentralized governance structure, with tasks delegated to smaller local authorities, transitioning from top-down to bottom-up interventions, reflecting a shift from government to governance (Palumbo, 2017). Public consultation became a standard procedure within this restructured framework.

The first major implementation of this new approach occurred in 1985 with Plan Ooievaar, a proposal for the Dutch river area based on the *Casco*

planning model (Figure 1). This marked a departure from traditional architectural and urban planning paradigms, prioritizing spatial quality over aesthetic beauty (van der Brugge et al., 2005). The plan focused on three key objectives: preserving wild nature and shipping outside the dikes, promoting large-scale agriculture in reclaimed back swamp areas, and balancing ecology with economy. While not all objectives were fully realized due to various constraints, Plan Ooievaar opened up new possibilities for architecture and urban planning, particularly in the realm of water-management-related interventions that profoundly influenced the landscape.

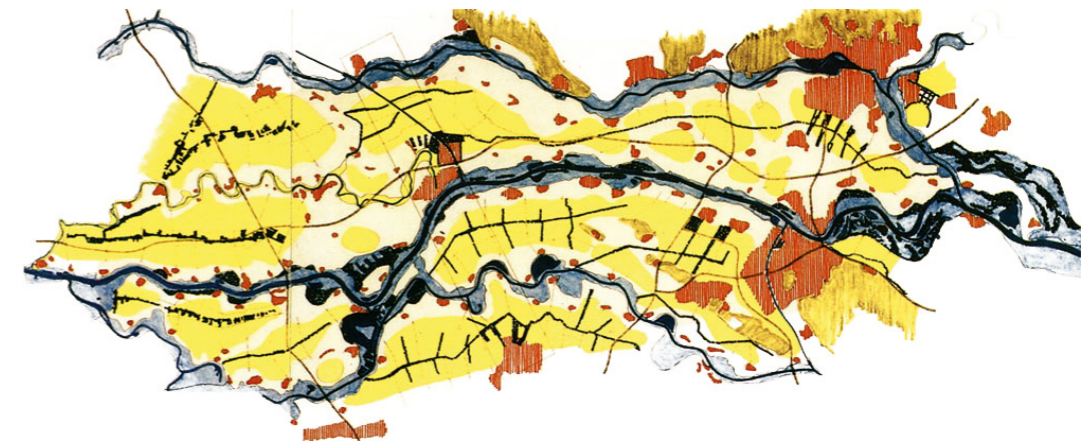


FIG. 1 Plan Ooievaar [Drawing], by Dirk Sijmons, Lodewijk van Nieuwenhuize, and Dick Hamhuis, 1985, Collection H+N+S Landschapsarchitecten

Between 1993 and 1995, heightened water levels along the Meuse and the Rhine, including its distributaries such as the Waal (Figure 2), drew public attention back to water safety concerns. While immediate measures were taken to mitigate short-term risks, a decision was made to pursue an innovative long-term approach to water management. This approach, rooted in the *casco* model and applied at a larger scale, signaled a paradigm shift from a strategy of “keeping all water out” to one of “allowing some water in, sometimes” (Warner et al., 2018).



FIG. 2 Riverine Flooding in Nijmegen in 1995 [Photograph], by Baron, H., 1995, [www.henkbaron.nl](http://www.henkbaron.nl)

In the new century, this paradigmatic shift crystallized into a comprehensive policy for water-management interventions (Wiering & Arts, 2006), encapsulated in the concept of making ‘room for the river’. This concept was formalized into a program of actions under the collective title of Room for the River (de Groot et al., 2006), culminating in the adoption of a National Spatial Planning Key Decision (PKB) in 2006. The PKB outlined a dual objective: enhancing water safety against flooding by accommodating discharge capacities of 16,000 m<sup>3</sup>/s for the Rhine and 3,800 m<sup>3</sup>/s for the Meuse (Ministry of Infrastructure and the Environment, 2012), while concurrently emphasizing the importance of spatial quality.

Despite initial public discontent stemming from issues with other government-funded projects, such as delays, cost overruns, and lack of quality (Sayers et al., 2015; de Groot & de Groot, 2009), the Room for the River program garnered overall acceptance due to its primary aim of providing safety. To bolster its structure, a third objective of appropriate and expeditious implementation was added. Rijkswaterstaat assumed overall responsibility for the program’s progress, but delegated many tasks to smaller local authorities, allowing for more detailed, day-to-day

control over individual interventions (Klijn et al., 2013; van Twist et al., 2011).

Departing from the traditional top-down approach, Room for the River was framed as a national project rather than a government initiative (Feddes, 2017), emphasizing extensive collaboration with the public at local, regional, and national levels. Rather than solely led by the national government, it involved partnerships across thirty-four different projects. The process involved ongoing cooperation with the public, engaging local stakeholders to address various opinions and needs and prevent potential arguments that could impede progress.

Roth, Warner, and Winnubst (2021) contend, however, that public opinion remains divided regarding the adopted procedure for the Room for the River project. Despite efforts toward decentralization and public participation, they argue that the Dutch water sector is still entrenched in a technical discourse, often sidestepping broader debates, and genuine attempts to engage opponents are infrequently pursued.

Drawing on three case studies from the Room for the River project, their argument is underscored by the prominent case of Kampen. Here, public sentiment largely opposed the national project, with the specific intervention in Kampen being likened to a bathtub (fig.3), which became a potent symbol in the opposition’s narrative (Roth et al., 2021).



FIG. 3 Kampen as a bathtub [illustration], by Werkgroep Zwartendijk, 2009. <http://www.zwartendijk.nl/bestanden/flyer.pdf>

The narrative of opposition against the Room for the River program does not uniformly apply to all its individual case studies. This variance was facilitated by the program's subdivision into smaller, autonomous projects. During the planning phase, over six hundred fifty potential sites were identified, but only those where spatial quality and safety could be effectively pursued, and where interventions would yield the greatest impact, were selected, resulting in thirty-four project areas (Figure 4). Each site was managed by a specific project team overseen by the national office, allowing for the isolation of any issues specific to that site without impacting others. This decentralized structure also enabled tailored measures for construction management, significantly reducing associated risks.

However, as noted by Hans Brouwer in a personal interview conducted on March 7th, 2024, while Room for the River consists of individual autonomous projects, they cannot be viewed in isolation. Rather, they must be understood in relation to one another to function effectively.

*"[...] you cannot see it [Room for the River] as individual projects. Because, you know, if you make here Room for the River, it works at 34 centimeter, and at one point, upstream, it doesn't work anymore. And then you need, at that point, or earlier, you need*

*another project to take over. If you take one out, you don't have a program anymore. It's like a chain of pearls. You take one out and you don't have a chain anymore."*



FIG. 4 Map of the Netherlands with indicated the 34 selected sites of the Room for the River program [Drawing], by De Lotto, M., 2024

While decentralization was instrumental in achieving the primary goal of enhancing water safety, ensuring spatial quality, a key objective of the national program, required a different approach. To address this, a Quality Team was established at the government authority level (Luiten, 2017), underscoring a commitment to both decentralization and centralized oversight.

The division into multiple autonomous projects was necessitated by the unique characteristics of each site, requiring site-specific interventions

tailored to the specific challenges and opportunities present (van Alphen, 2020). To effectively achieve both spatial quality and safety objectives, a diverse array of techniques, represented as a toolbox of interventions (Figure 5), was developed. This approach afforded the necessary flexibility to select the most appropriate method to meet the project's goals. Unlike the singular approach of dyke reinforcement prevalent in the past, a range of nine distinct possibilities was provided, with dyke strengthening reserved as a baseline option only when no other feasible alternatives were available.

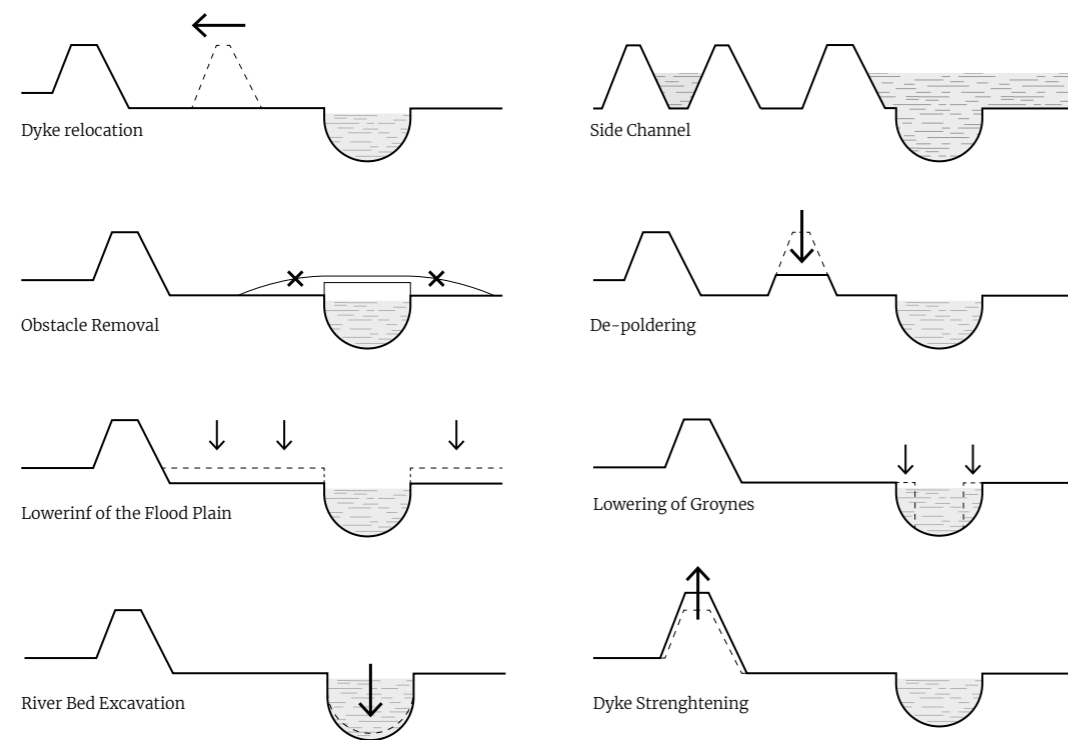


FIG. 5 Scheme of Room for the River toolbox [Drawing], by De Lotto, M., 2024

Among the thirty-four sites, one of the most formidable projects, due to its scale and complexity of interventions, was situated along the Waal River, intersecting with the city of Nijmegen.

## Making room for the Waal: The Case Study of Nijmegen-Lent

The area of Nijmegen-Lent (Figure 6) emerges as the principal case study for this research due to several factors, notably its strategic location along the Waal River, where the river reaches its peak discharge capacity, rendering it particularly vulnerable to riverine flooding. Moreover, among the thirty-four sites selected for the Room for the River program, Nijmegen-Lent stands out as the largest in scale, setting - being one of the very few sites located within an urbanized area -, and often serves as a flagship project for the national program (Rijkswaterstaat, 2016). This chapter introduces the project site of Nijmegen-Lent and delves into the key factors that shaped its final outcome.

Nijmegen played a pivotal role in pioneering an innovative national approach through the Room for the River program, an undertaking that carries within it a lot of potential for conflict with the existing local plans and policies (Yu et al., 2020). Furthermore, the municipality of Nijmegen has experienced significant expansion since 1990, particularly on the northern banks of the river (Figure 7), to meet the growing demand for housing, necessitating the development of a series of plans and policies (City of Nijmegen, 2010).



FIG. 6 Partial map of the Netherlands with indicated the 34 selected sites of the Room for the River program and the case study area of Nijmegen in red [Drawing], by De Lotto, M., 2024



FIG. 7 Map of the area of Nijmegen-Lent showing the evolution overtime in grayscale [Drawing], by De Lotto, M., 2024

In the way the city was structured before the interventions (Figure 8), no connection - on the social and urban levels - between the center of Nijmegen and the area on the other side of the Waal (Lent) was present. Moreover, the city had its back turned to the river, developing further and further toward the land, and not much value was attributed to the riverfront neither by the city, nor the people living in it.



FIG. 8 Map of the area of Nijmegen-Lent showing as was before the intervention, in 2010 [Drawing], by De Lotto, M., 2024

The project was conceived and structured based on the principles of nature-based solutions (Cohen-Shacham et al., 2016), emphasizing collaboration with nature rather than opposition to it. Exemplification of the shift in Dutch water management from government-centric to governance-oriented approaches (Feddes, 2017), this particular case study feature also a significant collaborative effort between stakeholders from various backgrounds who were actively engaged, throughout the whole decision making process.

The focus of the project shifted from mere problem-solving to viewing the project as an opportunity for social and economic advancement

(de Groot & de Groot, 2009). This inclusive approach is fundamental to achieving outcomes that consider the interests of all stakeholders in the area.

In fact, the initiative at the national level to involve the closest possible authority in the construction phase (Ministry of Transport, Public Works and Water Management, 2006) was successfully implemented in Nijmegen. This approach, based on the premise that local interests would be better addressed in the design, leading to increased commitment and support for implementation (Klijn et al., 2013; van Twist et al., 2011), saw the municipality assume full responsibility for this aspect of the project.

To enhance both water safety and spatial quality, the selected intervention focused on the excavation of a by-pass channel, known as the Spiegelwaal, to augment the river's maximum discharge capacity; the relocation of the dike to create a broader floodplain; strengthening and raising the existing dike; and the modification of groynes along the river to enhance their aesthetic appeal (Ministry of Transport, Public Works and Water Management, 2006).

The excavation of a new side channel (Figure 9) necessitated the demolition of existing buildings within the designated area, leading to the relocation of the affected population and presenting one of the most challenging aspects of the project in terms of public acceptance (H. Brouwer, interview, March 7, 2024). Due to its significant impact on the already urbanized area, and to the significant effort of relocating families, this site, more than others, underscored the need for comprehensive spatial planning actions, necessarily characterized by enhanced spatial quality.

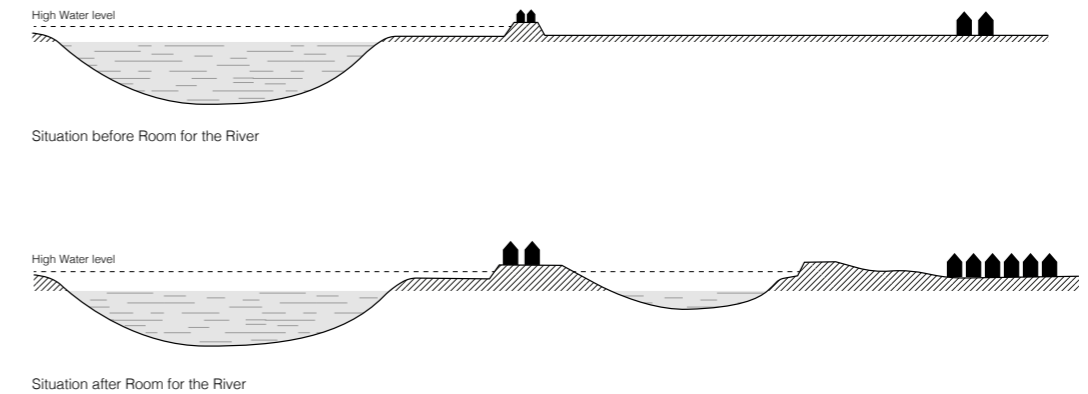


FIG. 9 Schematic section of the Waal River in the place of the interventions, before and after [drawing], by De Lotto, M. (2024)

Questions may arise regarding the selection of this location and whether alternatives could have been considered to avoid demolishing existing buildings. According to Eric Luiten – former Government advisor on Landscape and Water, and then chair of the Quality Team for the Room for the River project –, in an interview conducted on March 8th, 2024, this location was deemed necessary to fulfill the requirements for water safety, leaving it as the sole feasible solution despite its implications.

*MD: “Was there a basic reason for which it was decided to do this specific intervention of Nijmegen in that specific spot?”*

*EL: “Absolutely. There was no other option, actually. It has to do with the fact that the river Waal in that specific area makes two very strong turns. So there’s two meanders that [...] break the discharge capacity of the river to a strong extent. There were some alternatives, for example, to create a fully new canal already further upstream. [...] There were alternatives also in terms of what can we actually do within the existing dike lines. And there was just always not enough room for discharge capacity that was crucial for that specific point.*

*So there was not much room to start moving around with dikes and other stuff. It had to be done at the location that was chosen.”*

On the other hand, Hans Brouwer, states that there might have been also other reasons to it, related to further urban development of the city of Nijmegen.

MD: “Was there ever a discussion about moving this idea of creating a side channel towards another bending of the river upstream?”

HB: “[...] It has to do with support. But I think there was also the development of the Waalsprong, and the wish, for instance, for the extra bridge for traffic, which is more downstream here, which you can see, the bridge after the railway bridge, that was not there yet. And there was a lot of traffic and traffic jams and problems that I think the municipality saw the possibility of combining one and another.”

By constructing a bypass channel, an elongated island is created in the river Waal, between the historic centre and the new Waalsprong district (Figure 10). The island and bypass channel together form a river park, conceived as part of a broader landscape plan, aimed to encapsulate the area’s most significant spatial qualities and bring together key locations. Components of this intervention included bridges, water features, an urban riverfront, and beaches along the newly formed island, covering an area of over 120 hectares. (H+N+S Landschapsarchitecten, 2015)

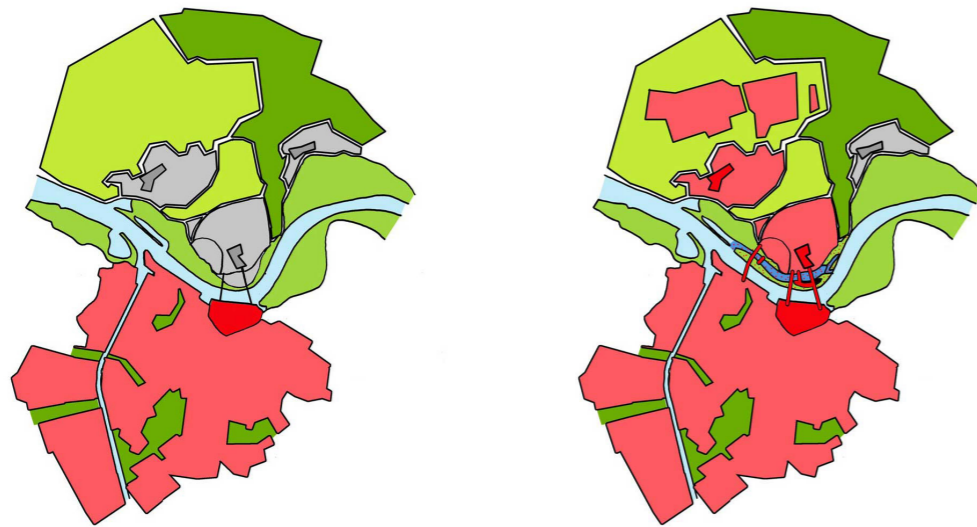


FIG. 10 Plan of Nijmegen before and after the interventions [Drawing], by H+N+S Landschaparchitecten, 2015. <https://www.hnsland.nl/en/projects/room-river-nijmegen/>

The interventions in Nijmegen significantly influenced the urban fabric of the surrounding area (Figure 11). The newly formed island, known as Waalsprong, serves as a central hub connecting the city of Nijmegen to Lent, becoming a focal point of urbanization. This development has resulted in a

diverse range of urban riverfronts, each offering unique interactions with the water and integrating seamlessly into the cityscape, thereby enhancing the city’s relationship with the river. According to Hans Brouwer, Nijmegen greatly benefited from these completed interventions.

HB: “[...] So now the river has been transformed as a part of town, and even more as part of the center of town, which is different than before.”

After the finalization of the interventions, the area of Lent, which was mostly used for agricultural purposes before, witnessed a quick development.

HB: “[...] The interesting thing is also in that respect that Room for the River changed the perspective of the municipality of Nijmegen in seeing the river really as center of town, and that influenced the development elsewhere in the city.”

The implementation of Room for the River significantly influenced urban planning in the area, redirecting focus towards the river and fostering a newfound connection between the city and its watercourse. Before 2006, the riverfront was primarily utilized for commercial and industrial purposes, lacking recreational amenities. However, following the project’s completion in 2015, it has evolved into an integral and harmonious part of the cityscape, aligning with a broader trend observed in many European river cities (Kondolf & Pinto, 2017).

HB: “[...] So the ideas of the new spatial development in the old town, in the industrial area, and the railway station area are influenced by thinking from the river, and the relation with the town, which was not before Room for the River. So I think that changed as well.”

MD: “Was it an organic change, or was it somehow planned?”

HB: “The change of thinking was planned.”



## Designing the Landscape: the insider point of view

The necessity of understanding the project and its outcome calls for multiple points of view on the facts, to provide a thorough analysis. In this case a valuable point of view is provided by the interviews conducted with some of the responsible of the planning process of this project.

The interviews were planned and designed according to the goal of gathering information from different points of view coming from the broader frame of figures involved in the planning process of the national program. The interviewees, in fact, showcase a multiplicity of different backgrounds, allowing to obtain valuable opinions and insights on various topics, in which each of them has a specific knowledge.

Hans Brouwer, the first interviewee, is an ecologist and has worked at Rijkswaterstaat since 1996, in this timespan he worked on the Room for the River project in a management role, often focusing on the more ecological aspects of the project, which were strategically used to make the Room for the River feasible from EU standards.

Sander Wegbrans, the second interviewee, is a senior advisor at Rijkswaterstaat in the Department of Communication and Strategy and is also the Regional Coordinator at Rijkswaterstaat for the Noord Brabant area. He worked on the Room for the River project, supervising the overall procedure.

Eric Luiten, the third interviewee, is a licensed landscape architect and urban planner; he was first appointed Government advisor on Landscape and Water, and then chair of the Quality Team for the Room for the River



FIG. 11 Map of the area of Nijmegen-Lent showing as is, after the intervention, in 2020 [Drawing], by De Lotto, M., 2024

project, being in charge of supervising all 34 sites in the pursuit of the goal of spatial quality.

The attribute all the interviewees are united by is the role they played in the making of the Room for the River program, hierarchically positioned in the highest part of the structure, as part of Rijkswaterstaat. The hierarchical system was not erased completely through the decentralization concept (Roth et al., 2021), but was still maintained to have an overall view and supervision on the project.

*Hans Bouwer: “[...] So we had specialists at home to help them but also to control. And two times per year I said, now I’m your boss, it’s control time.”*

This chapter is structured in the way that a topic is introduced, an excerpt from the interview is quoted on that topic, and a discussion on what is being said in such part of the interview is provided. The aim of this part of the research is not to support the argument that has been developed up to this moment but to provide new insights on the project that, especially when contrasting the thesis argument, challenge the analytically constructed image of it.

In the previous chapters, the concept of shift in the paradigm (Wiering & Arts, 2006) in the Dutch approach towards water management has been discussed, and it is understood how this shift happened on multiple levels. Firstly, the program took onto a bottom-up approach.

*Hans Brouwer: “[Room for the River] It’s a national initiative. The European Union has contributed, but in money, it’s minor. It’s not much. [...] we built from bottom-up, with the regional government. So we went to the Prime Minister, we went there and made the ideas.”*

Secondly, bringing local authorities into the process, and decentralizing responsibilities.

*HB: “[...] we had another paradigm shift also by, and that’s how it started, asking local governments that they took the leading role in projects. [...] when it was the planning stage, the project leader was the province. [...] But the province will not do the maintenance, so [if] it’s expensive for maintenance it’s not their problem. So we can better ask, in a realisation phase, the water authorities to realise, because they will be responsible for maintenance. So they will be wise in designing.”*

According to the interviewee, this decentralization of the work was necessary to achieve different goals and satisfy the needs of different stakeholders. It can be argued that the reasons behind this choice lie in the bureaucracy realm, of efficiency of costs, maintenance, and, ultimately, in the effort of making the project suitable and share responsibilities. For this reason, the work was not totally delegated to smaller authorities, but there was a constant dialogue between those and the government.

*HB: “So in effect, what stakeholder is, is finding the connection between the different goals. Then you have the basics to work together or to approach it. That’s the challenge.”*

*But as a central government, we signed ourselves as well. But we made sure that these two processes were connected to each other, so that we could bring the information that the region needed to build their package, and we built our package. But we knew from each other where it... So at the end, it’s almost the same.”*

According to the Eric Luiten, this decentralization happened according to the typology of intervention. In the specific case of Nijmegen, the municipality was able to take over the majority of mansions.

*Eric Luiten: “So, for example, some of the work that was, for example, related to dike reinforcement or dike replacement was handed over, transferred to the water management authorities as the main client. Other larger aerial development issues were handed over to provinces as the client.”*

*EL: “In this case, the city of Nijmegen took over the responsibility for the execution. So, the city of Nijmegen and Rijkswaterstaat were in constant discussion about the availability of budget and the kind of result that would come out with this budget at hand. The municipality of Nijmegen was actually responsible for also the quality of the work. As a quality team, we were appointed by Rijkswaterstaat. We were working for the municipality of Nijmegen.*

*Of course, they [Rijkswaterstaat] were controlling the whole thing and they were looking at the watches and at the number of euros being spent, but they more or less*

*handed over this responsibility, this basic existential responsibility for the execution of the whole project to the municipality.”*

The other shift in the Dutch approach towards water management, already mentioned in the previous chapters, was the added layer of complexity that spatial development – and spatial quality – brought into the concept of water related interventions.

*HB: “[...] Bringing back Room for the River, that means spatial development and it gives the opportunity to change the landscape and make it fit for the future. Or in another way, to make up for mistakes in the past. And that gave the possibility that we get a second goal. So the first goal was flood safety. The second goal, on the same level, was improving the spatial quality of areas.”*

This concept of spatial quality (Ministry of Transport, Public Works and Water Management, 2006) became a fundamental part of the design process – to supervise the correct implementation of spatial quality in the executed design, a specific team (Quality Team) had been set up.

*MD: “[...] you talk a lot also about the spatial quality...”*

*EL: “[...] basically we were driven by this notion that there should be a better and more beautiful landscape after the work than before the work. That basically was our guiding principle.*

*[...] quality has always been, from the very first start, actually, already on the basis, and that was also explained by the book, in the moment of staging the work and finding political and societal support. It always was framed in terms of quantity and quality at the same time.”*

The concept of spatial quality, the flagship of a renewed approach in the Dutch water culture, became a means to gain public consensus. However, spatial quality, as a concept, lies in the realm of intangible features of the space (Rapoport, 1970), and can assume multiple faces and tangible implementations depending on the environment it is set in.

*MD: “How is spatial quality articulated in these 34 different settings?”*

*HB: “It’s a big project on a large scale, but at the same time, the different areas are different contexts and there are different solutions. It’s based on the physical circumstances of the location, on the history, on the use, on the ambition, on the possibilities, on what you technically can get out of it. Because at the beginning, I said these two goals were at the same level, but at the end, it’s, of course, a flood safety program, so it has to achieve the goal of [water safety]. So that also determines the possibilities to design, of course. But it differs a lot per project.*

*[...] if it’s about spatial quality, it’s about taste, in a way. So we asked the state advisor for physical environment to make a group and to advise us about spatial quality, and that worked very well, because they were at several stages in every project, from design to realization, and they were involved in how the plan developed and challenged also the designers and the contractors to get the most out of it. And I think that worked very well. So that was new, and that way of working is now quite common in spatial projects.*

*[...] we also took the possibility of spatial quality to add nature, so the river would need two and a half thousand hectares of extra nature. So we had a positive effect.”*

Due to the difficulty of materializing such concept of spatial quality, some initial reluctance was common among the figures involved in the execution phase of the work. But, according to Eric Luiten, – chairman of the Quality Team, established specifically to ensure this goal to be met – the concept became very tangible in the case of Nijmegen in the forms of a continuous dike profile, a well laid-out recreational link between two existing routes, an attractively finished shoreline of a new channel. or a ‘family ‘ of new narrow bridges with recognizable, gently arched attenuated bridge deck (Luiten, 2017).

*EL: “[...] And basically it’s very human and very basic in a sense that we asked them [the contractors responsible of concrete interventions], will you be proud of what you’ve delivered here? That was the basic question. Are you going to take your friends to this project to show them what you did?*

*And that sort of ricochets back on them in terms of, ‘I hope they appreciate this, what I’ve done’. Because they realized that they were involved in, well, something innovative, something that had not been there before.”*

*MD: “Was it [the Quality Team] like individual, not individual, but like self-standing?”*

*EL: “It was, yes, it was more or less, how would you call this? Yeah, self-standing is a nice word. It was a specific, substantial, procedural mechanism.*

*That's the best word, I guess. To not only look at quantity, civil engineering, hydrological effects, costs, and all that. Which has worked for 12 [15] years in total. We also would look at the sites and go back and go back again and see how the work was progressing, yeah. [...] At a certain moment, it was one of the few moments, actually, that I, as a chairman of the quality team, had to protest against a constructed situation [Noordwaard project site], already more or less finished, which was that the four entrances or the four gaps that were built in the river dike to allow the river with a high level to go into the area and start flooding it with three levels. And the cut-through of the original winter dike led to four entrances that were higher than the original dike. So you would have this camel sort of... Two camels in a row, then a gap, dike, gap, four times. And I said I am not going to accept this. [...] in all the other cases, it was on a much more detailed level, like fences and bridges and all that stuff."*

According to Sander Wegbrans, in a walking-interview held on February 15th, 2024, this concept of spatial quality in the interventions that took place in Nijmegen found its realization in the spatial planning choices that shaped the riverfront on the side of Lent, where a new amphitheater was built on the side of the new dike profile, gently sloped toward the Spiegelwaal. The sequence of bridges that cross the Spiegelwaal, also according to Wegbrans, responds to this concretization of the concept of spatial quality. Achieved through the detailed design of the concrete structure of the bridges, specifically cast in-situ to achieve a certain texture that reflects the water; the alignment of the Lentloper, which looks directly toward the main landmark on the side of Nijmegen, connecting visually the two sides of Lent and Nijmegen; or finally, the profile of the dam that divides the Spiegelwaal from the main course of the river, which features 6 openings set at different heights, that appear/ disappear according to the water level.

Overall, as explained by Wegbrans, the result of the interventions in the area is really successful, and the number of people using the space is much higher than the expectations. The positive perception of the outcome is shared between the interviewees, on various aspects, from the societal effect, to the quality of the landscape design.

*EL: "So, I know that Nijmegen also sort of celebrates this new condition that the city now has. This new situation was embraced by the people, many hundreds, maybe thousands of people taking a sun bath and swimming in the Spiegelwaal. It's taken over by people, absolutely, and it's taken over by many, many, many more people than the people that had to leave."*

*I think it's really good. You know, also in terms of societal effect and support, it's clear that this is a successful trajectory."*

*MD: "So you would say at the end, what was the expectation and what is the actual outcome?"*

*EL: "It's better than we expected. You know, it's also from a landscape architecture point of view, right? You know?"*

*This river, this beautiful large-scale stream that runs through the country, it's almost untouchable in many sorts of landscape-quality eyes. The fact that it was substantially transformed in that specific area, motivated by climate adaptation criteria, actually, has led to [...] sort of adds quality to the whole city, to the region, to the river itself, to the people who live nearby."*

As stated by Brouwer, all the goals that were set at the initial stage have been achieved, reaching the goal of aligning the actual outcome with the original expectations; also according to Brouwer, the project gained international resonance for the high quality of the designed spaces, and, says Wegbrans, was nominated and awarded multiple times for the quality of the spatial planning.

*MD: "In the final result, you had a lot of achievements for the goal you set for yourself. Would you say that what was achieved and what was planned at the beginning aligned? I think recently. How would you feel about the actual outcome of the project?"*

*HB: "Yeah. For Nijmegen, I still believe it's quite positive. [...] I think the quality is very high standard and does attract a lot of international attention for the structures and the design. You know, I still feel quite proud about the program and about what we achieved."*

Although the initial expectations have been met by the finalized product, some unexpected uses of the can be recorded, especially by young users that use the underdeck connecting platforms of the Lentloper bridge to dive into the side channel.

According to Luiten, the possibility of people misusing this portion of the bridge, which also play a role in the definition of spatial quality of the area, serving as viewing and resting spaces, was never taken into account by the involved figures.

*MD: “Do you think this possibility of unexpected uses of the space were taken into account during the design process?”*

*EL: “Everybody was aware of the fact that the Spiegelwaal would be used as a swimming basin. I don’t remember, at least, in all the discussions we had on the quality of that specific bridge, about, for example, that it would be a perfect diving board to jump into the river. I don’t remember this.*

*[...] the city of Nijmegen never sort of put this issue of danger or unexpected use on the agenda because they didn’t have the experience. Rijkswaterstaat does have this experience, but was a little bit laid back in this specific situation. But again, and that is hypothetical I would say, these issues like, ‘are we aware of the kind of unexpected use that might pop up afterwards?’, it was, let’s say, neglected.”*

The rise of unexpected uses of certain spaces could lead to the implementation of the areas in which the project fell short, especially in the field of spatial quality. However, the people involved in the planning process moved on, according to Wegbrans and Brouwer, and were placed in other projects, making impossible the eventuality of continuation of the project after the completion of it.

*MD: “Once the Room for the River is done, then what is the role of the people who plan it?”*

*HB: “They moved on. But you raised the question about continuation And that’s always a problem, because always people move to other positions and to other jobs. So... But I do think also that what Room for the River is also about, in a way, an old-fashioned way of problem solving, that we said we have a problem, we make a solution, we solve it, and we leave.”*

On the topic, Luiten shares the same opinion as the other interviewees.

*MD: “Do you think there was any, so like after the conclusion of the works, was there any kind of continuation of that, or like an observation by the design team?”*

*EL: “No, at least not by me, no, no, that’s not how it worked. I mean, the municipality was responsible, that also was part of the deal, that it was decided that Rijkswaterstaat is the major owner and maintainer of the river, and the river shores, and the rest was left to the municipality of Nijmegen to be monitored, maintained, repaired if necessary, and all that.*

*[...] So, as far as I know, the work of the quality team at one stage stopped because the work was done. Contractors go, hit, and run. Designers publish and celebrate the results, and then move on, and the owners and the inhabitants happily take the results into their arms and use it.”*

## Planned vs Result: anticipating the unexpected

The insights extracted from the interviews conducted play a pivotal role in unraveling the intricate dynamics of the Room for the River project. These discussions provide valuable perspectives on various facets, including the planning process, the diverse array of stakeholders with their distinct interests, and the envisioned outcomes for the targeted area. These envisioned outcomes encapsulate not only the desired spatial qualities of the space but also considerations regarding its overall quality, accessibility, and the intended uses by the community.

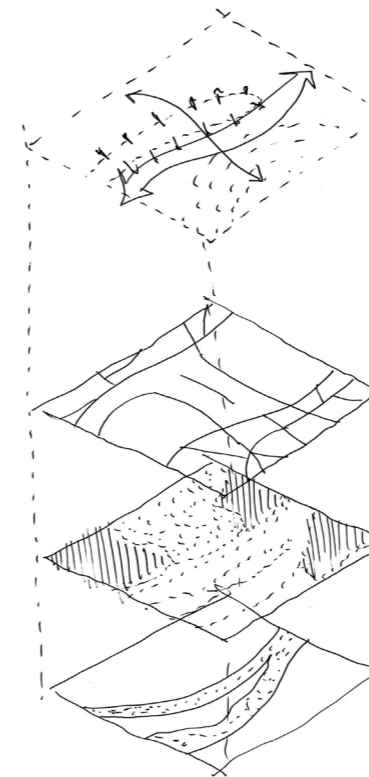


FIG. 15 Layer composition in GIS mapping process for qualitative analysis [drawing], by De Lotto, M. (2024)

The approach of combining qualitative research and analysis with GIS-based analysis, into a sort of *mixed method approach* (Cope & Elwood, 2009) has established itself as a major direction for research in the field of spatial planning.

Through this mixed approach, a thorough analysis can be conducted, combining the representation of place, qualitative inquiry, and information technology (Pavolovskaya, 2017). This combination can be depicted as a superimposition of multiple layers coming from different fields of

research, mirroring the complexity of the space that is being researched and analyzed. (Figure 15).

Furthermore, this work methodology, being based on geospatial referenced data, allows for the possibility of storing the results of analysis within a certain framework, fundamental for future implementations.

According to this methodological framework, the rich repository of information gathered from the interviews was systematically translated into distinct layers on a geospatial map. These layers serve as a visual representation of the key factors influencing the design process, the aspirations of the planners, and the intended uses of the designated spaces. This mapping process results in what can be termed a *post-process masterplan*, narrating the project as perceived by some of its authors after its completion, synthesizing crucial information into a coherent visual representation (Figure 12).

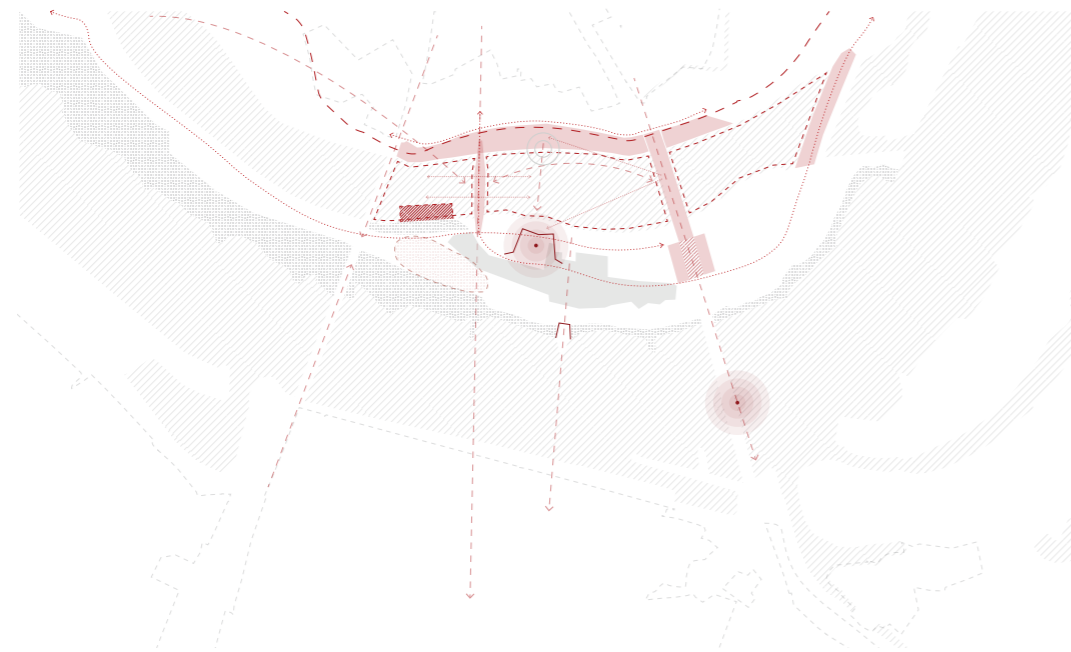


FIG. 12 Map of the area of Nijmegen-Lent with intangible attributes derived from interviews [Drawing], by De Lotto, M., 2024

Following the same methodology, another map was crafted to portray the realized outcome, what actually transpired in the designated spaces.

The intangible features represented on this map, when superimposed onto the physical features of the city, are the outcome of a qualitative analysis developed on the site through objective observation of the place and its users. This process of observation of the space was conducted over several days, in different time frames and with different weather conditions, achieving a thorough analysis of the uses and misuses of the space, the spatial quality, and the accessibility of the space (figure 13).

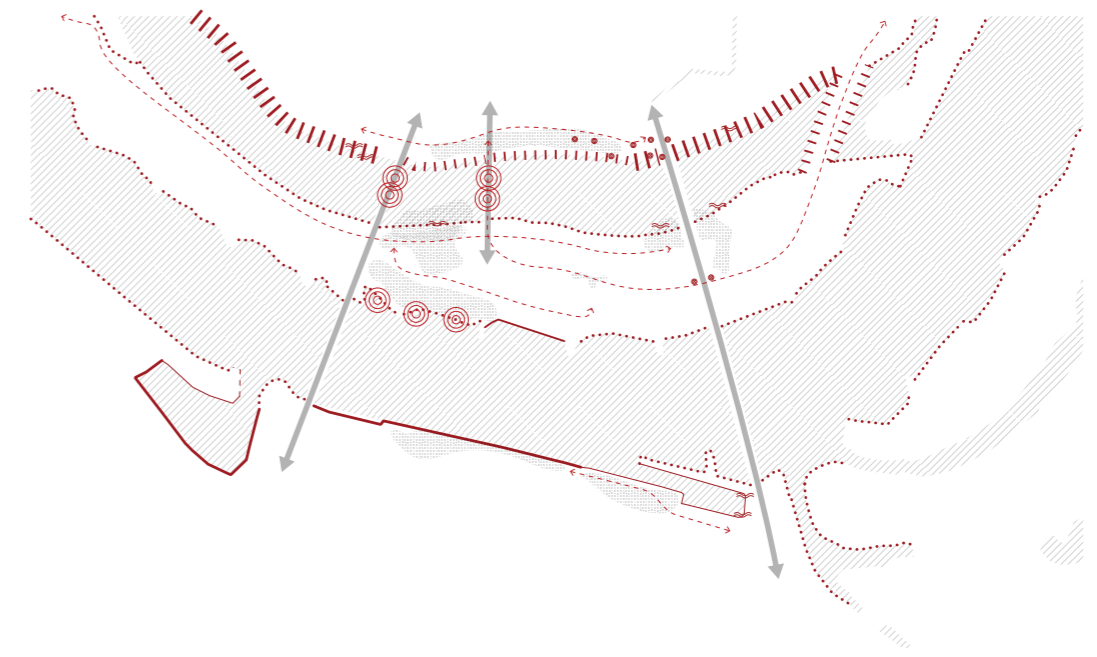


FIG. 13 Map of the area of Nijmegen-Lent with intangible attributes derived from site visits [Drawing], by De Lotto, M., 2024

These two sets of intangible features, one extracted from discussions with individuals who played an active role in the planning process of the project and the other derived from on-site observations, were systematically compared to identify any discrepancy between the expectations and the actual occurrences. Resulting into a final mapping effort, a sort of *impossible palimpsest* (Figure 14); a juxtaposition of intangible layers which highlights the areas of overlap between the two previous maps, representing the points of coherence between the planning and the outcome, specifically in the case where the areas of gathering of users coincide with the areas where effort on spatial quality was put. The

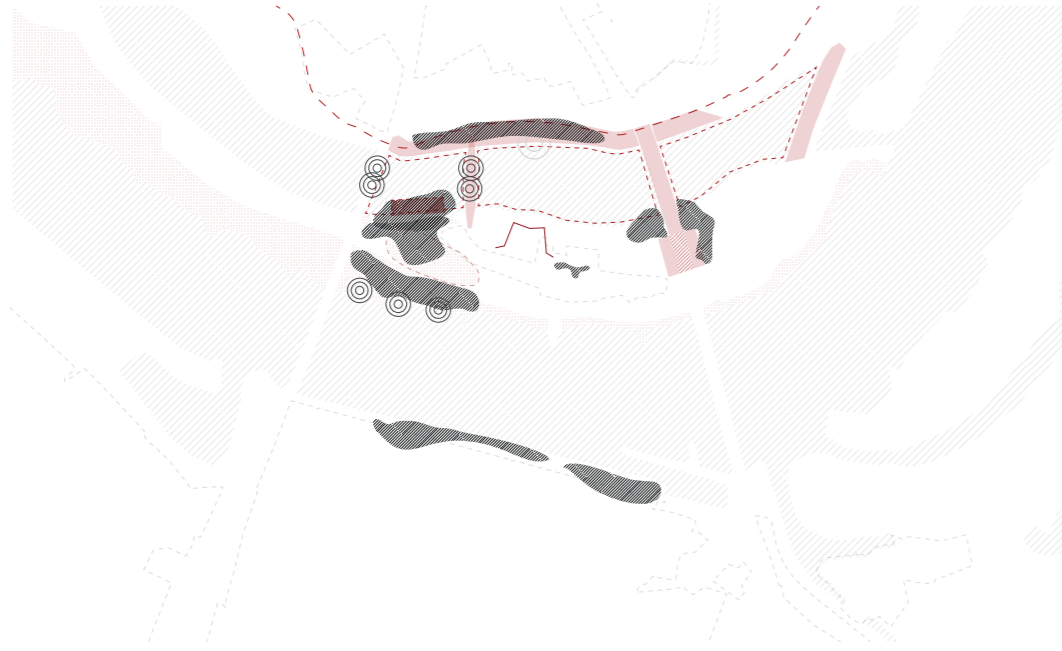


FIG. 14 Abstracted map of the area of Nijmegen-Lent with juxtaposition of the attributes retrieved from site visits and interviews [Drawing], by De Lotto, M., 2024.

coherence of these two elements show the concretization of spatial quality into a tangible value.

The translation of qualitative observation into a GIS-based mapping system facilitates the understanding of where the project may have fallen short in meeting expectations regarding the spatial and landscape quality, what considerations were perhaps overlooked during the planning phase, and whose needs were not properly addressed in the creation of these urban spaces.

Moreover, integrating data pertaining to the quality of the space into our observation-based map provides additional layers of insight. This comprehensive analysis not only enriches the comprehension of the Room for the River project in Nijmegen-Lent but also imparts valuable lessons for the broader realm of urban planning and design.

By systematically comparing intentions with actual outcomes through GIS mapping, future projects can be strategically planned to be more geared

toward the users and aligned with the needs of the community, fostering a more responsive and inclusive urban environment.



## Discussion and Conclusion

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The Dutch Room for the River program represents a groundbreaking effort in the realm of water management, marked by a shift towards decentralization and a new emphasis on spatial quality. Through interviews with key stakeholders, this research has provided valuable insights into the planning, execution, and outcomes of the program, shedding light on its multifaceted impact and underlying principles.

One of the central themes that emerged from the study is the importance of decentralization in achieving effective governance and stakeholder collaboration. By involving various levels of government and delegating responsibilities to local authorities, the Room for the River program set a collaborative environment beneficial to nuanced decision-making and alignment of goals across different governance levels. This decentralization not only empowered local communities but also ensured that interventions were tailored to local contexts and needs, enhancing the program's effectiveness and relevance.

On the other hand, the involvement of regional governments and the gathering of ideas from local communities at the project's initial stages are undoubtedly steps in the right direction. However, it is crucial to recognize that a full and true bottom-up approach goes beyond mere consultation and incorporates active participation and decision-making power at the local level. In this sense, while Room for the River may have laid the groundwork for a more participatory approach, it still seems to adhere to a top-down model in which solutions are primarily formulated and implemented by higher levels of government.

As Hans Brouwer points out, the Room for the River program still falls to reflect the traditional problem-solving approach, where a problem is

identified, a solution is designated, and once implemented, the project is considered complete. This observation raises important questions about the depth of the paradigmatic shift generated by Room for the River. While the program may have introduced new elements of collaboration and decentralization, it may still be entangled in old-fashioned ideologies of both project completion and governance.

Therefore, it could be said that Room for the River serves as a starting point rather than a culmination of efforts towards a renewed culture, highlighting the need for further evolution and refinement of governance structures to truly embrace bottom-up approaches.

Moving forward, by prioritizing the enhancement of flood safety while simultaneously improving the quality of the landscape, the Room for the River program exemplified a holistic approach to water management that goes beyond mere infrastructure development. The establishment of a Quality Team further underscored the program's commitment to ensuring high standards of design and execution, ultimately enhancing public consensus and satisfaction.

The tangible outcomes of the Room for the River program, such as the creation of recreational spaces and improved riverfronts, attest to its success in achieving its objectives. The widespread utilization of these newly developed areas, as argued in chapter 5, highlights the program's impact on both the physical and social fabric of the landscape. Furthermore, the international recognition it achieved underscores its significance as a model for innovative water management initiatives on a global level.

However, challenges such as unforeseen uses of spaces and the oversight post-completion remain areas of concern. Addressing these challenges will require ongoing monitoring, adaptation, and collaboration among stakeholders to ensure the long-term success and resilience of water management initiatives; only through continuous reflection and

adaptation can water management initiatives fully respond to the given goals.

Finally, it could be valuable to consider the potential of incorporating the idea of post-occupancy evaluation (POE) as a means to evaluate and examine the effectiveness for human users of designed spaces (Zimring & Reizenstein, 1980).

Incorporating this practice into water management practices would enable to assess the impacts of projects, the response of the users to certain design and planning choices, identifying areas for improvement and informing future decision-making processes.

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## List of Figures

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FIG. 1 Plan Ooievaar [Drawing], by Dirk Sijmons, Lodewijk van Nieuwenhuize, and Dick Hamhuis, 1985, Collection H+N+S Landschapsarchitecten <sup>17</sup>

FIG. 2 Riverine Flooding in Nijmegen in 1995 [Photograph], by Baron, H., 1995, [www.henkbaron.nl](http://www.henkbaron.nl) <sup>18</sup>

FIG. 3 Kampen as a bathtub [illustration], by Werkgroep Zwartendijk, 2009. <http://www.zwartendijk.nl/bestanden/flyer.pdf> <sup>20</sup>

FIG. 4 Map of the Netherlands with indicated the 34 selected sites of the Room for the River program [Drawing], by De Lotto, M., 2024 <sup>21</sup>

FIG. 5 Scheme of Room for the River toolbox [Drawing], by De Lotto, M., 2024 <sup>22</sup>

FIG. 6 Partial map of the Netherlands with indicated the 34 selected sites of the Room for the River program and the case study area of Nijmegen in red [Drawing], by De Lotto, M., 2024 <sup>24</sup>

FIG. 7 Map of the area of Nijmegen-Lent showing the evolution overtime in grayscale [Drawing], by De Lotto, M., 2024 <sup>26</sup>

FIG. 8 Map of the area of Nijmegen-Lent showing as was before the intervention, in 2010 [Drawing], by De Lotto, M., 2024 <sup>27</sup>

FIG. 9 Schematic section of the Waal River in the place of the interventions, before and after [drawing], by De Lotto, M. (2024) <sup>29</sup>

FIG. 10 Plan of the Nijmegen-Lent area before and after the interventions [Drawing], by H+N+S Landschaparchitecten, 2015. <https://www.hnsland.nl/en/projects/room-river-nijmegen/> <sup>30</sup>

FIG. 11 Map of the area of Nijmegen-Lent showing as is, after the intervention, in 2020 [Drawing], by De Lotto, M., 2024 <sup>32</sup>

FIG. 12 Map of the area of Nijmegen-Lent with intangible attributes derived from interviews [Drawing], by De Lotto, M., 2024 <sup>44</sup>

FIG. 13 Map of the area of Nijmegen-Lent with intangible attributes derived from site visits [Drawing], by De Lotto, M., 2024 <sup>45</sup>

FIG. 14 Abstracted map of the area of Nijmegen-Lent with juxtaposition of the attributes retrieved from site visits and interviews [Drawing], by De Lotto, M., 2024 <sup>46</sup>

FIG. 15 Layer composition in GIS mapping process for qualitative analysis [drawing], by De Lotto, M. (2024) <sup>43</sup>