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The Influence of Stakeholder Participation on Flood Risk Management: The Case of Nijmegen

Name: Qusai Khaled Fahmi Abo Shama - 552039

Supervisor: Dr. Ogenis Brilhante

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Summary

In the past few decades, modern flood risk management has emerged with the aim of reducing flood risk without relying only on conventional engineering flood defence solutions. But rather considering other adaptive measures that reduce severity and consequences of floods; such as making more room for the rivers. Therefore, recent years have seen a transition taking place in flood risk management towards participatory, adaptive to climate change, and more natural approach.

Moreover, the recent years have seen a trend towards incorporating citizens in decision making given the widespread recognitions of the importance of stakeholder participation, where it can produce better outcomes for both citizens and governments, in addition to building trust, educate citizens, and other benefits.

Yet top down approaches to water management are still persistent in a manner that impedes the full realization of such transition regardless of the proven benefits of participation; in addition to the lack of empirical studies that address the impact of stakeholder participation on the final decisions in flood risk management and how to translate it into a meaningful and effective participation in practice towards successful flood risk reduction.

Therefore, the aim of this research is to further explain the influence of stakeholder participation on flood risk management project and flood risk reduction. The nature of the research topic and objective and unit of study leads to the selection of case study as the most suitable research strategy, a case study aims towards gaining deeper and richer understanding on the influence of stakeholder participation on flood risk management, all through collecting both qualitative data and quantitative data.

The findings of the research concluded that stakeholder participation largely influence flood risk reduction in flood risk management projects, if implemented in aspects of consultation and participation, but not to the extent of legal standing. where the research considered participation in first two types as a crucial and effective component toward successful flood risk reduction.

On the other hand, the findings concluded that certain aspects of participation can have a slight or negligible effect, which can contribute to impeding the implementation on the account that stakeholders can be more inclined toward their interests rather than reducing the flood risk, especially in the early stages of the project.

Keywords

Flood Risk Management, Stakeholder Participation, Participation, Public Participation, Flood Risk Reduction, Room for the River, Room for the Waal.

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Abbreviations

FRM	Flood Risk Management
FRR	Flood Risk Reduction
SP	Stakeholder Participation
AB	Advisory Board
UK	United Kingdom
IHS	Institute for Housing and Urban Development

Table of Contents

List of Figures

List of Tables

Chapter 1: Introduction

1.1 Background Information

Cities are the most areas vulnerable to floods, since its characterized with high population density and critical infrastructures, and flood prevention techniques have long been used to fight floods and prevent disasters, through dikes, dams, climate-proof structures, and the like.

Yet flood risk has increased in the last decades worldwide due to several factors, climate change that leads to sea level rise, intense rainfall, and increased rivers overflow. In addition to land subsidence, urbanization, and socio-economic changes (Ward et al., 2012). Therefore Frequency and consequences of extreme flooding events have increased and may increase even more in the next decades, which could greatly affect people's lives and damage countries' economies (Van Herk et al., 2013).

Such risk calls of innovative approaches to flood risk management to reduce flood risk that threatens cities given that 50% of the world's population today lives in cities, and to adapt to the increasing risk in future due to aforementioned factors.

In the Netherlands, it is worth noting that the country have had many bad experiences with floods in the 20th century when it was struck by devastating floods in the year 1926 and 1953 (Van Alphen and Lodder, 2006). Moreover, it is one of the most flood vulnerable countries in the planet, given that over 60% of its land lies within flood-prone areas, where 9 million people live and 70% of the country's gross national product are centred (Kabat et al., 2005).

On that basis, the country have ever since been implementing flood prevention techniques by reinforcing its dikes and levees and other structural measures to protect itself from river floods and storm surges, and it have been following this approach since 1000 AD when the first dike construction took place, Moreover, this event was followed with establishing of today's national water boards (Ward et al., 2012).

But this approach was challenged in the 1993 and 1995 when the rivers Meuse and Rhine increased in their levels to the points that almost resulted in dike failures. During these events, the Dutch dikes were not strong enough, and Province of Limburg was flooded, in addition to the unpaved villages of Borgharen and Itteren. Back then the government had to evacuate 250,000 people and 1 million animals in the Gelderland river area (Van Herk et al., 2013; Ruimte voor de rivieren, 2020).

Accordingly, a major shift in flood management is undergoing worldwide stimulated by these catastrophic events and the like, these shifts can be observed along major river basins; the Oder, Yangtze, Elbe, Rhone. Also in New Orleans, the Danube, and in the UK.

In light of these events, and given the increase of flood risk over time, it is increasingly recognized that engineered/ structural solutions alone cannot solely prevent nor mitigate the impacts of increasing floods, which necessitates the need for integrated and adaptive approach that combines both structural and non-structural measures, and as a result not only prevent the flood but manage its risks, hence the concept flood risk management emerged.

Therefore, modern flood risk management has emerged with the aim of reducing flood risk without relying only on conventional engineering flood defence solutions, such as dykes. But rather considering other measures that reduce severity and consequences of floods; such as making more room for the rivers. Moreover, the concept of flood risk management (FRM) has developed throughout the years in different directions depending on the location.

For instance, after the Rhine river flooding in the years 1993 and 1995, the Dutch have implemented flood risk management policy 'room for the river' that increase storage capacity of river basins. In the UK, on the other hand, this concept has been implemented in 'making space for water' policy in The Future Flooding Project. Also in France, the country have shown through multiple initiatives the transition from flood management to flood risk management with the focus on spatial planning (Pender and Faulkner, 2010).

However, Participation plays a crucial role in flood risk management projects as it is widely considered an effective component for efficient, effective, and inclusive disaster-risk reduction (Hore et al., 2020); by involving citizens among other stakeholders, the government can increase support in the decisions made in in this field, improve decision making quality, and create democratic legitimacy and trust (Edelenbos et al, 2016).

1.2 Problem Statement

In the Netherlands, the rivers are distributed over the low-lying Areas and drained partially in the North sea and the Ijsselmeer, the rivers Waal, Ijssel, Lower Rhine and Lek are fed by rain and melting ice coming from the Swiss alps through the Rhine. In addition to the Maas/Meuse river which originates in France, crosses Belgium and enters the Netherlands.

However, climate change contributes to the increase in water levels of these rives because of the increased portion of ice melting and increased frequency of rain. Theses extreme water levels resulted in a new approach to high water, where the Dutch Government shifted towards giving more room for the rivers instead of strengthening and raising dikes.

Room for the River is a national Dutch flood risk management program that took place between 2007 and was completed 2019 at 34 different locations in the Netherland along the rivers Ijssel, Waal, Nederrijn and Lek to improve flood safety, spatial quality, and quality of life. Different measures were implemented; such as depoldering, water retention, lowering the floodplain, and dike relocation. The total budget of the program was 2.3 billion euros (Ruimte voor de Rivieren, 2020).

Room for the Waal project in the Dutch city of Nijmegen is part of the Room for the River program and is the subject of this case study.

The city of Nijmegen, the oldest city in the Netherlands, where the river Waal bends sharply and forms a bottleneck that threatens the city by the increased discharges of the river. Therefore, Nijmegen saw the need to take action against the increasing flood risk from the river over the years. But instead of raising the existing dike, the government decided to approach this in a different way, that is sustainable and adaptive to climate change in which it removes the bottleneck and creates more room for the river to flow, while improving in the same time the spatial quality of the city.

Room for the River program represented a chance to change the traditional raising dikes solution.

The objective of the Room for the Waal project in Nijmegen was therefore: reducing flood risk, through reducing river water level by 27 centimeters, and the second one is that the implementation of the measures must benefit the spatial quality of Nijmegen on the Waal.

The Dutch government decided after long participative process and extensive social discussion to implement two main flood risk management measures to achieve the objective: dike relocation at Nijmegen lent 350 meters inland to give the river more space and ancillary channel digging in the flood plain to let the water flow through during high tides (Nijmegen Municipality 2013b).

The implementation took place between 2013 and 2016 with a budget of 351 million euros (Nijmegen Municipality 2013b) and both measures were realized as the water level dropped 34 centimetres and the dike has been moved 300 meters inland, in addition to digging 4 kilometres 200 meters wide 8 meters deep ancillary channel.

When the project was completed, the river Waal has been widened, and a unique island was created in centre of the city, and the Government of the Netherland have concluded that "the risk of Nijmegen and the surrounding upriver area becoming flooded, today or in the future, has been considerably reduced." (Room for the Waal project reduces flood risk in the Nijmegen area, 2020)

However, there have been several success factors that contributed to the success of the project, and therefore reducing the flood risk. According to the European Climate Adaptation Platform Climate-Adapt (2020), an important success factor was the broad involvement of stakeholders and the local community. Another factor is that the Room for the Waal was part of the overall program 'Room for the River' program which was coordinated and largely funded by the national government, aside from the fact that the overall program was developed coordinately with the involvement of total of 19 partners, including national, provinces, municipalities and water boards.

Therefore, stakeholder participation played a key role in this project, the three types of participation; consultation, partnership, and standing (Bishop and Davis, 2002) were implemented in the project through a variety of instruments; newsletters, information meetings and interactive workshops, advisory boards, and strategic environmental assessment and environmental impact assessment. (Edelenbos et al, 2016, Climate-ADAPT, 2020).

In general, stakeholder participation is seen as an integral tool for improving flood risk management, and its importance have been recognized in flood risk management on an international level, however, participation in this field have left a space for debate and conflict. Furthermore, it was faced with many barriers and experts who disagree with implementing in such strongly expert-dominated policy domain (Kuhlicke et al., 2016; When et al., 2015).

Nonetheless, the Dutch case of Nijmegen's Room for the Waal represents a successful case in which participation presented one of the factors that contributed towards the success of the project, and thus effectively reducing the flooding risk of Nijmegen.

Building on that, this research will focus on stakeholder participation in Nijmegen's Project for the following reasons: lack of empirical studies that address the impact of stakeholder participation on the final decisions in flood risk management and how to translate it into a meaningful and effective participation in practice towards successful flood risk reduction, in addition to the growing importance of stakeholder participation in flood risk management in particular (Edelenbos et al, 2016; Hore et al., 2020; When et al., 2015).

1.3 Research Objective

In line with what was discussed in problem statement. The objective of this research is to understand the influence of stakeholder participation on flood risk reduction.

1.4 Research Question

To what extent have the stakeholder participation influenced flood risk reduction in Room for the Waal project in Nijmegen?

* Variables: Stakeholder Participation, Flood Risk Reduction

* Sub-variables: Consultation, Partnership, and Standing

1.4.1 Sub-Research Question

How did the consultation of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

How did the partnership of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

How did the standing of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

What flood risk reduction measures were taken during the Room for the Waal project and its contribution to flood risk reduction in Nijmegen?

1.5 Relevance of the research topic

Stakeholder participation is widely acknowledged as a necessary and effective component in disaster-risk reduction. (Hore et al., 2020) and given that stakeholder participation have played a crucial role in the success of the programme and remains, it is important to understand the Dutch case to explain the success within the context of stakeholder participation and it is impact in flood risk management projects.

From an academic perspective, there is lack of empirical studies that address the impact of stakeholder participation on final decisions made in flood risk management. Moreover, stakeholder participation has become a popular research topic in flood management in the past few years (Edelenbos et al, 2016). Furthermore, room for the river programs is considered also a hot topic in both of research and practice, because it reflects the natural connection between urban societies and environment (Smith et al. 2014).

Therefore, it is important to understand the Dutch case which could bring lessons to other programs and help fully realize the transitions taking place in the Netherlands.

From a practical Perspective, understanding how stakeholder participation influence flood risk management projects can help policy makers and decision takers further improve the process of involving stakeholders and eventually help realize the flood risk reduction using the optimal instruments and types of participation.

Chapter 2: Literature Review

this chapter will provides the theoretical background of the research, by describing the main concepts of risk management, participation, and both variables; Flood Risk Reduction and Stakeholder Participation, and will go through the concept of room for the river.

In addition to discussing the development of participation approaches, participation typologies, advantages, disadvantages, participation methods, and its influence on flood risk management projects.

2.1 Project description

2.1.1 Room for the River

The concept of making room for the river is a flood risk management measure that seeks to restore the original beauty of the river by combining water safety and economic values with cultural and ecological historical values. In other words, it represents a risk reduction pre-flood intervention that increase the discharge capacity of rivers through deepening and widening.

Similarly, room or space for the river can be considered as a resilient approach to flooding (bouncing back) rather than resisting, furthermore, this trend broke down the barriers between different policy domains; urban development, flood risk management, and restoration of natural values (Warner, 2014).

On the other hand, this trend or concept offers the promise of sustainable participatory planning that improves the quality of life. similar analogies of this concept are explored as holistic approach for river flood management in France, Germany, the Netherlands, Britain, Poland, and other countries under different name; such as “adaptive water management” or “water governance” or “spatial water management”.

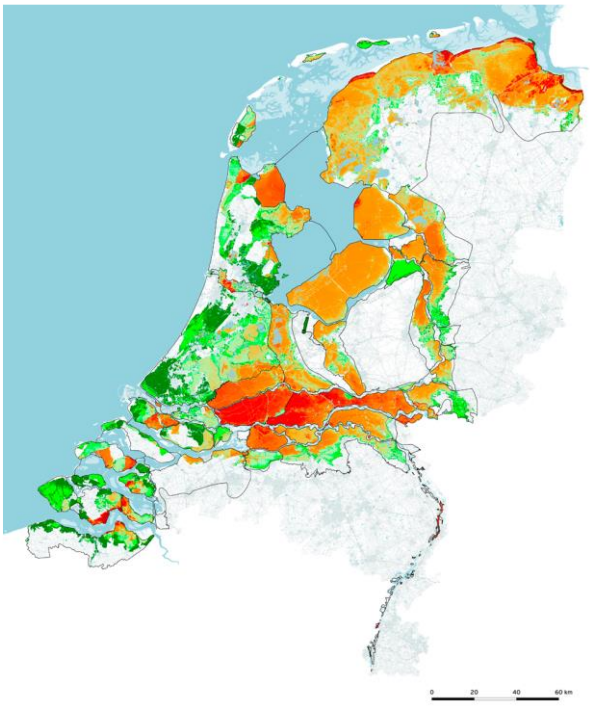
Furthermore, making Space for the River often is multipurpose/multi-issue: security from floods (and/or droughts), economic development, enhancing natural values, urban regeneration, spatial quality, and flood risk management (Warner, 2014).

However, stakeholder participation plays a key role when making room for the river. Warner (2014) concludes that making space for the river is essentially a multi-stakeholder challenge. Social groups, citizens and NGOs insist on becoming more involved in water issues, and rightly so, since water affects their interests. This creates the need for legitimate governmental actions in which citizen participation, stakeholder involvement and community-based approaches are developed.

2.1.2 Room for the River in the Netherlands

The Netherlands is one of the most flood vulnerable countries in the planet, given that over 60% of its land lies within flood-prone areas, where 9 million people live and 70% of the country’s gross national product are centred (Kabat et al., 2005). A high risk of flooding that threatens the safety of population and poses an economic risk over losing critial and high value infrastructure that goes up to 960 Billion dollars.The map in figure 3-1 shows the individual flood risk map of Netherlands prepared by the Ministry of Infrastructure and Environment Rijkswaterstaat, which graduates from low in green to high in red.

Figure 2-1: Individual Flood risk map of Netherlands.



Source: (The National Flood Risk Analysis for the Netherlands, 2016)

Therefore, since the beginning, the country have been working on mitigating floods, which made it well known for its water engineering solutions. However, High water levels recorded in 1993 and 1995 provided the evidence that the intervals of extreme high water in the Dutch river system of once every 1250 years could be in practice much shorter. During those two big flood events, the government had to evacute people from flood prone areas because of the risk of a dike breach was very high. And this was severely threatening the capacity of the country's river dikes.

Nonetheless, these events opened the minds of the policymakers and The ministers political parties to decide to take a new approach. And realizing that a totally new approach to river management had to be applied rather than the traditional dike strenghening approach, the Dutch government developed the Room for the River program, and the manifestation of this novel approach was realized in the program, which had budgeted at Euro 2.3 billion, the program aimed to provide flood control relief by allowing Dutch rivers to expand naturally during periods of high flows.

Room for the River was large project that targeted 39 project sites and was completed by 2016, in which wide range of actors were involved; six provinces and 60 municipalities , 2 ministries, the Ministry of Economic Affairs and the Ministry of infrastructure and environment, and 12 Regional Water authorities.

All with the idea to make the horizontal surface of the rivers larger, and with the effect that vertical Space could go down, which results in less high water levels in this river during difficult times. In other words, increasing the river discharge or the capacity of the rivers to avoid flooding into cities and avoid the risk of flooding.

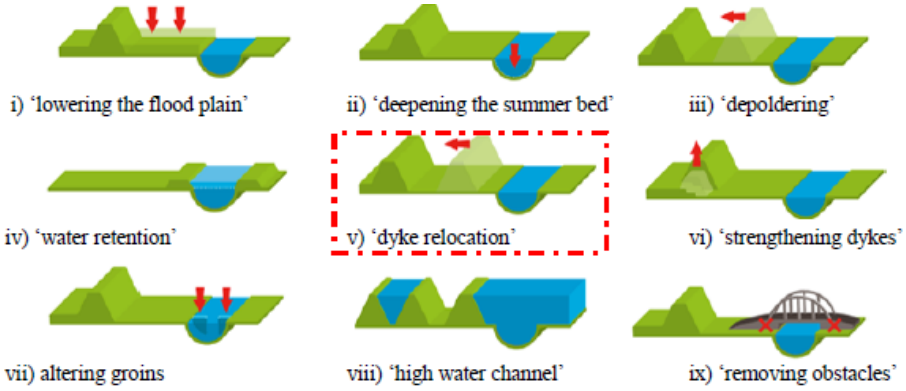
Furthermore, most of these sites aimed at both of nature development and water safety. Where the later aimed at giving more space to the river.

The program involved the Rijkswaterstaat (Directorate-General for Public Works and Water Management), provinces, municipalities and water boards engaging in projects at separate locations in the Netherlands.

2.1.3 Room for the River Waal and Nijmegen

Flood risk reduction measures implemented in Nijmegen belongs to the strategy of flood defense, where structural measures were used to make space for the river; through dike relocation inland 350 meters and digging of ancillary channel. This is part of the overall measures implemented in the Netherlands shown in figure 2-2.

Figure 2-8: Room for the river measures.



Source: (Ruimte voor de rivieren, 2020).

In Room for The River Waal, two measures were implemented: the relocation of dike, which is a flood risk management measure that belongs to flood defense measure, by relocating the dike, a more room for river is given, which causes a drop in water level, and therefore, a reduction of the flood risk. The new relocated dike will moreover, protect population living behind it from floods. Also, ancillary channel were implemented, which is a measure of flood risk management that aims towards reducing water level to reduce flood risk. This is conducted by digging a channel in the flood-plain lowering it in order to let water from the river flow through the channel during high tides to prevent water from rising.

Room for the River Waal is one of the biggest projects within the program, and it was executed in Nijmegen; the oldest city in the Netherlands on the river Waal at one of the narrowest river bends in the country. On the south bank, opposite Nijmegen is the village of Lent, where the river was just 450 m wide compared to 1,000 m elsewhere. This bottleneck resulted in large volumes of water having to force their way through the narrow passage at periods of high water and was one of the areas where the river is to be widened through relocation of the dike during the project.

Figure 2-2: the bottleneck Nijmegen, the situation before.

Source: Materials from Interview D10

The water from the River Waal pass by Nijmegen and discharge in the sea, where the catchment area starts from the Alps and comes from the rivers Rhine and Muse, and acrosses Germany, France, and Switzerlands. As shown in figure 4-2, the river Waal makes a sharp narrow bend of 90 degrees in Nijmegen, that bend was the focus of the project, where the river is only 450 meters in width, while it is 1 kilometers wide at upstream and downstream, which created a flood risk, where there was a threat of breaching the dike and flooding the city, therefore the room for the river measure had to be taken at that exact location.
The water of the river Waal flows in 2,200 cubic meters per second and it tops at 12,000 cubic meters per second. However, the peak discharge can reach 16,000 cubic meter per second. Moreover, it is expected that this number might peak up to 18,000 in the future because of climate change.

Accordingly, and nearby the bottleneck, the risks of dike breach and flooding was high and an action had to be taken. Where you can see the difference water level during high and low water levels in figure 4-3.

Figure 2-3: the situation with high and low water levels at the bottle neck of Nijmegen before Room for the river Waal Project.

Source: Materials from Interview D4

Therefore, the very large urban project Room for the river Waal had to be executed in the heart of Nijmegen with a twin focus, upgrading spatial quality and ensuring water safety, where the latter means reducing the flood risk in Nijmegen, therefore a new channel was be excavated in the floodplain on the Lent side of the river, two measures that will increase flood protection for the village (some 350 m inland) through a lowering of the water level in the Waal, all of which are shown in figures 4-4/4-5.

Figure 2-4: 1) the current situation with the existing dike 2) relocation of the dike 350 inland 3) digging a secondary channel giving the river more room, which created an island 4) connecting the channel banks with bridges.

Source: Materials from Interview D4

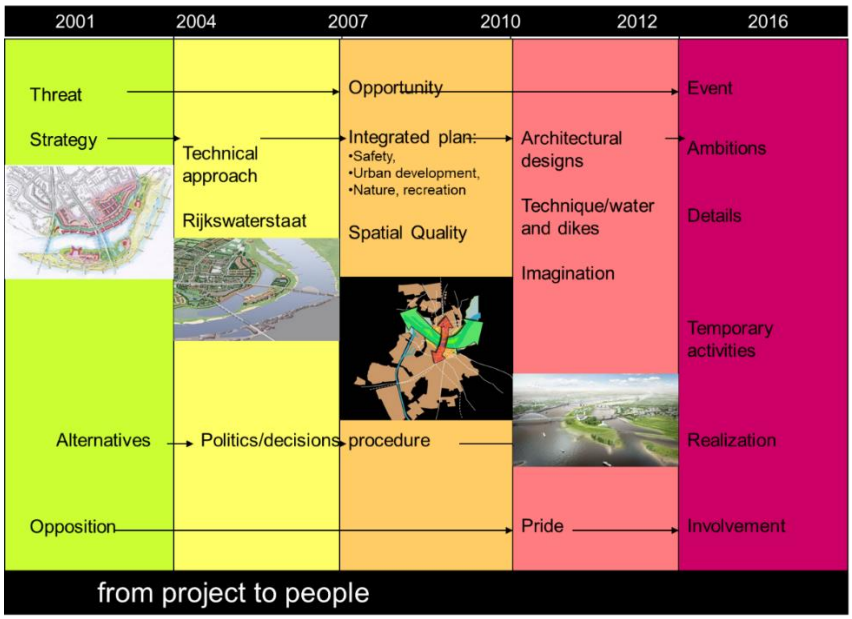
Figure 2-5: the situation after the project.

Source: Materials from Interview D4

However, the project executed faced many barriers and opposition where the government aimed at the start towads execution and the public toward opposition, therefore, the governent took a strategic approach and incorporated citizens in the project, and later on, citizens of Nijmegen collaborated with the government to realize the project, which they take pride nowadays, the timeline is shown in figure 4-6.

With the participatory approach the governmne tiers selected, the citizens attitude over the year have changed from opposition into support, and their feedback were included and helped into the acheivement of the project. Therefore, participation played a crucial role in the success of the project, and therefore reducing the flood risk in Nijmegen.

Figure 2-6: Project Timeline.



Source: Materials from Interview D4

2.2 Flood Risk Reduction

2.2.1 Flood Risk Management

Pender and Faulkner (2010) defines flood risk management as a "process of decision making under uncertainty that involves purposeful choice of flood risk management plans, strategies, and measures that intends to reduce flood risk." And the reduction of risk is accomplished through a variety of instrument and measures.

Another definition for flood risk management as cited by (Schanze et al., 2004) defines it as decisions and actions undertaken to analyze, assess and trying to reduce flood risks. In this case, flood risk management covers the risk analysis, risk assessment and risk reduction (Plate 1999, Sayers et al. 2002, Hall et al. 2003). Another definition by Hall et al. (2003) defines FRM as a process that intends to reduce or control or accept or redistribute risk of flooding.

Within this context, flood risk can be defined as a harm to flood-prone elements with a specific vulnerability ("elements at risk") due to probable flood events with their features. To deal with this issue, the concept of Flood risk management emerged to deal with a wide array of issues and tasks ranging from the prediction of flood hazards, through their societal consequences to measures and instruments for risk reduction (Schanze et al., 2004).

Therefore, Flood risk management have three tasks; risk analysis, risk assessment, and risk reduction (Plate 1999, Sayers et al. 2002, Hall et al. 2003). Accordingly, if risk were assessed to be not tolerable, flood risk management applies sets of measures and instruments towards risk reduction (Olfert and Schanze 2005).

These measures and instruments falls within a set of flood risk management strategies, according to (Hegger et al, 2014) these strategies consist of: flood defense, flood risk prevention, flood risk mitigation, flood preparation and flood recovery, as shown in table 2-1.

Table 2-1: flood risk management strategies.

Strategy	Explanation
Flood defence	Flooding can be prevented by infrastructural works, such as dikes, dams, embankments and weirs, upstream retention or giving more space to the river within its current embankments ("keeping water away from people"), mostly referred to as "flood defence" or "structural measures". Main actors: generally governmental water management actors at national/ regional level.
Flood risk prevention	Negative consequences of flooding can be avoided by proactive spatial planning or land use policies ("keeping people away from water"), aimed at building only outside areas that are prone to flooding. Main actors: actors involved in planning processes (governmental actors, private parties). Flood insurance companies may influence planning decisions, for instance by (not) insuring properties in high-risk areas or the use of risk-based premiums (Kunreuther 2008).
Flood risk mitigation	Consequences of floods can be mitigated by a smart design of the flood-prone area. Measures include spatial orders, constructing flood compartments, or (regulations for) flood-proof building. Main actors: citizens, project developers, water managers and other public and private actors.
Flood preparation	Consequences of floods can also be mitigated by preparing for a flood event. Measures include developing flood warning systems, preparing disaster management and evacuation plans and managing a flood when it occurs. Main actors: governmental organisations like the meteorological office, flood forecasting centres, local and regional governments.
Flood recovery	This strategy facilitates a good and fast recovery after a flood event. Measures include reconstruction or rebuilding plans as well as compensation or insurance systems. Main actors: national governments establishing disaster relief funds, insurance companies as well as the affected citizens themselves.

Source: (Hegger et al., 2014)

2.2.2 Risk Reduction

Flood risk reduction is one of the three tasks of flood risk management and can be defined as the process of using measurements and instruments to reduce flood risk by reducing the probability and consequences.

Flood risk reduction measures can be mainly divided into structural and non-structural measures, where the first is used to describe flood defense measures (dams, dike, embankments) and the other to address other interventions; such as evacuation, recovery (Schanze et al., 2004).

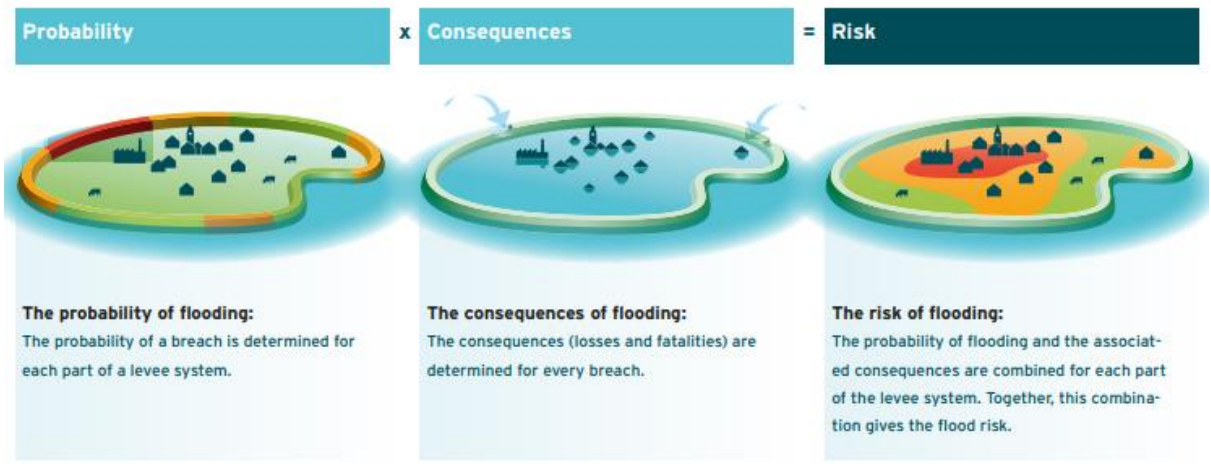
Measures can be divided into permanent and temporary measures, where the first leads to durable change to physical conditions of the flood risk system, and the latter includes direct physical interventions that reduce the risk during floods. Moreover, Permanent measures aims towards controlling the flood through engineering technical solutions. Under this category falls (dykes, dam, storm surge barriers, embankments. On the other hand, temporary measures consists of demountable flood protection, for instance sand bags and movable barriers, evacuation and flood recovery plans.

Another way to classify measures of flood risk reduction is dividing them into structural and non-structural measures, where the first indicates intervention of flood defense and non-structural indicates all other interventions. (Schanze et al., 2004). But in either case, all of these intervention falls into 5 main flood risk management strategies (flood defense, prevention, mitigation, preparation, and recovery) as mentioned in table 2-1.

Furthermore, when addressing flood risk, the term risk equals the probability of flood hazard in the area multiplied by the vulnerability of area to undesirable consequences of floods;

Risk = Probability x consequences**.** In a more simple words. Risk is combination of probability and consequences as shown in figure 2-1.

Figure 2-7: Flood risk definition.



Source: (Vergouwe et al., 2016).

Accordingly, and based on table 2-1. Room for the river is one the flood risk reduction measures that reduces risk by giving more spaces to the rivers.

2.3 Stakeholder Participation

2.3.1 Participation in Theory

The concept of stakeholder participation stems from participation theories. The researcher will start with defining participation and stakeholders then delft into its different approaches, public participation approaches, typologies, theories, limitations and implications.

In the past few years, the word stakeholder has gained momentum in public management, it refers to persons, groups, organizations, that must be taken into account by leader and managers (Bryson, 2004). Also, Freeman (1984) defines a stakeholder as 'any group or individual who can affect or is affected by the achievement of the organization's objectives.

Consequently, there is a plethora of literature that describes different definitions of participation; Wojtyla's theory of participation defines this word as "the way in which, In common acting, the person protects the personalistic value of his own acting and participates together in the realization of common action and its outcomes" (Majos, 2007).

However, a common problem arise in participation when trying to distinguish the difference between involving the public or involving specific stakeholder groups and participants involved in the policy (Rider and Pahl-Wostl, 2005). Therefore, this paper will only focus on the public participation on the local level, by defining citizen or the community as the stakeholder for the purpose of this research.

Public participation is defined by Bishop and Davis (2002) as "mechanism deployed by politicians and officials to expand those voices heard in decision process". But despite of different views, the idea behind the participation is the sharing of powers between the governed and government. Thus, it is logical when the world bank defines participation in book (The World Bank participation sourcebook, 1996) as a "process through which stakeholders influence and share control over development initiatives and the decisions and resources that affect them."

However, practices have shown that participation can have different meanings according to the context in which it is applied in, which raises a variety of questions concerning the level of power in the participation process and the relation or interactions between the government and citizens; for instance, Munro-Clark (1993) argues that even though participation implies an interactive process between citizens and their respective government, yet it does not elaborate the nature or bounds of this process.

Moreover, different approaches to participation have developed throughout time. For this reason, and to build typologies of participation, Bishop and Davis (2002) propose four approaches to describe the development of participation over time; Participation as a continuum, Participation and policy problems, A continuum of management techniques, and Participation as discontinuous interaction.

2.3.2 Participation approaches

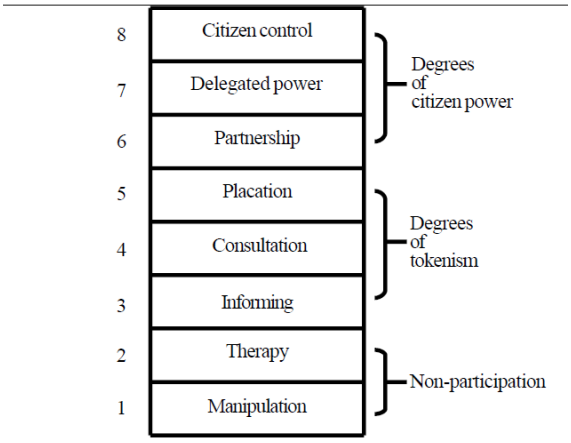
the continuum model of participation views participation as a ladder in which each steps represent different degree of participation, which enables the researchers to demarcate this concept into different typologies, but with certain limitations and shortcomings that will be discussed later (Bishop and Davis 2002).

One of the most prominent and earliest theories of participation that established the continuum model is the ladder of participation by Arnstein (1969) shown in figure 2-3 which categorized

the interactions between community and government. The ladder constitutes of 8 steps/rungs and shows participation as a continuum. The lowest rung is named manipulation then ascends up to highest which is citizen control.

Also the rungs have three categories; non-participation for first three which is not considered participation, where the second (tokenism) means no transfer of power, and implies manipulation of public opinion. Therefore, from the authors point of view, participation occurs starting the sixth rung and its degree increases upwards.

Figure 2-9: Ladder of Participation.



Source: (Arnstein, 1969)

However, the ladder of participation was formulated from the perspective of Arsntein; a citizen activist who made this model with a degree of skepticism of the government ability to create participation mechanisms with its exiting political structures. In addition to view the 3,4,5 rungs in her ladder as a token attempts of government to consult citizens, and implying that participation becomes meaningful when it only involves transfer of power from government to citizens.

Second approach is the participation and policy problems approach that states that participation take different forms from information gathering to sharing in decision making, and that which form is taken is up to officials to decide. But although this approach views participation as continuum model as Arsntein, the model emphasize that participation is shaped by policy at hand; and that it is not a virtue, but rather it is about the right response in particular circumstances (Thomas, 1993).

Third approach is the continuum of management techniques approach created by Shand and Morten (1996), this approach shift in the focus from policy problems to a continuum of participation in service delivery, which moves from minimal involvement to community control. The continuum is similar to Arnstein continuum in increasing the chances of participation, but rather than moving upwards towards the goal of increased participation, they view the continuum as a movement to set of choices for public officials.

Nonetheless, both of second and third approach promotes a gradual degree of participation from minimum to maximum, however, Bishop and Davis (2002) argued that it is possible to formulate a fourth approach that builds a descriptive scheme of policy participation rather than normative, given the discontinuous nature of policy problems, the local history influence over participation approaches, and the overlapping application of participation mechanisms.

As noted previously, there is no one shared theoretical base for participation, however, participation could be shaped according to nature of policy, and the availability of resources

and techniques, all of which concludes a political judgement on the importance of issue and the need of public involvement.

Accordingly, Bishop and Davis (2002) built on work of Thomas, Shand, and Morten, then proposed new model consisting of five-way-characterization of contemporary participation types and their related policy instruments. The model consists of the following types: consultation, partnership, standing, consumer choice, and control. As shown in table 2-2.

Table 2-2: map of participation types.

Participation Type	Objective	Key Instruments	Limitations
Consultation	• to gauge community reaction to a proposal and invite feedback • consultation is only participation when information gathered can influence subsequent policy choices	• key contacts • surveys • interest group meetings • public meetings • discussion papers • public hearings	• delay between consultation and any outcomes • communities feel betrayed if they do not like the decision • expensive and time consuming for complex decisions
Partnership	• involving citizens and interest groups in aspects of government decision making	• advisory boards • citizens advisory committees • policy community forum • public inquiries	• issue of who can seek for a community • bias toward established interest groups • legitimacy issues with those excluded from the process
Standing	• allowing third parties to become involved in the review process	• review courts and tribunals • open and third party standing • statutory processes for social and environmental impact assessment	• only relevant for those issues which come to court • expensive and time consuming • bias toward well funded interests • legal approach may be inappropriate for some issues
Consumer Choice	• allowing customer preferences to shape a service through choices of products and providers	• surveys, focus groups • purchaser/provider splits • competition between suppliers • vouchers • case management	• relevant only for service delivery issues
Control	• to hand control of an issue to the electorate	• referendum • 'community parliaments' • electronic voting	• costly, time consuming and often divisive • are issue votes the best way to encourage deliberation?

Source: (Bishop and Davis, 2002)

Building on that, the model Map of Participation by Bishop and Davis (2002) will be used in this research because it views participation instrumentally, not as a mean pursued by community activists, nor as a choice to be managed by officials. but rather as a discontinuous set of techniques or tools chosen according to the issue in hand and political imperative of the times.

However, practice have shown that most citizen participation lies within consultation. Also, on the other extreme end of this scheme is control which is accompanied with concerns since extensive participation may complicate the policy process and could block projects with the power of veto. Therefore, the first three types of participation will be used in the research, while the last two will be excluded. The final map of participation used is show in table 2-3.

Table 2-3: map of participation types excluding control and consumer choice.

Participation Type	Objective	Key Instruments	Limitations
Consultation	• to gauge community reaction to a proposal and invite feedback • consultation is only participation when information gathered can influence subsequent policy choices	• key contacts • surveys • interest group meetings • public meetings • discussion papers • public hearings	• delay between consultation and any outcomes • communities feel betrayed if they do not like the decision • expensive and time consuming for complex decisions
Partnership	• involving citizens and interest groups in aspects of government decision making	• advisory boards • citizens advisory committees • policy community forum • public inquiries	• issue of who can seek for a community • bias toward established interest groups • legitimacy issues with those excluded from the process
Standing	• allowing third parties to become involved in the review process	• review courts and tribunals • open and third party standing • statutory processes for social and environmental impact assessment	• only relevant for those issues which come to court • expensive and time consuming • bias toward well funded interests • legal approach may be inappropriate for some issues

Source: (Bishop and Davis, 2002)

2.3.3 Advantages and Disadvantages of Stakeholder Participation

After discussing the typologies and instruments, it is essential to explain why governments implement this approach. Public/citizen participation produces many important benefits. It is intended to produce better decisions and plans for both citizens and governments, whether during the decision process, planning, or in the outcomes.

Moreover, These stakeholders may bring specific knowledge or specific local knowledge, experiential knowledge, which can be relevant to developing a good plan.

During the decision process, participation could help educate citizens, and provide them with the skills required for active citizenship. In addition to helping the government building trust, gaining legitimacy of decisions, and empowering citizens through the process of co-generation of knowledge with researchers as well as promoting social learning (Reed, 2008; Fischer, 2000). Moreover,

Furthermore, citizen participation could yield better outcomes by producing better policies and implementation and citizens will gain control over the policy process. Given that participatory process would produce high quality decisions since these decisions are based on complete information. Over and above, citizen participation helps achieving the outcomes, which would benefit both citizens and governments. (Greenwood et al., 1993; Irvin and Stansburg, 2004; Blackstock et al., 2007).

Also, When it comes to technology, it is argued that participation facilitates the adaptation of technologies and interventions to environmental and socio-cultural conditions (Reed, 2007).

On the other hand, citizen participation could have many disadvantages. Indeed it is a time and budget consuming process, which sometimes would have been better spent in the actual implementation of the project. Furthermore. It could result in the loss of decision-making control for the government, which in turn could produce bad policy decisions if the project was influenced by opposing interest groups (Irvin and Stansburg, 2004).

Moreover, there is a growing concern that stakeholder participation in practice may not live to its expectations (Reed, 2008) based on different arguments; for instance, the empowerment of previously marginalized groups may result in negative interactions with existing power structures (Kothari, 2001). And the credibility of participation has been questioned on the base that many stakeholders may lack the experience required to engage in decisions making over technical debates (Fischer and young, 2007).

Therefore, policy makers should consider the advantages and disadvantages of participation, and find the right balance in the type of participation chosen and its predicted benefits.

2.3.4 Stakeholder Participation in International Practice

Despite the growing interest in stakeholder participation in the past decade, and that many benefits have been claimed from implementing this approach in policies and projects, there is lack of empirical evidence on its influence over the final decisions (Begg et al., 2017). Nonetheless, these claimed benefits have led to the incorporation of stakeholder participation into many national and international policies.

Furthermore, practices have shown that stakeholder participation do not often yield the expected results due to several barriers, such as institutional barriers, power inequalities, stakeholders characteristics. In addition to frustration when stakeholders contributions do not achieve significant impact (Edelenbos et al, 2016).

For instance, Fritsch and Newig (2012) conducted meta-analysis of 35 cases on participatory environmental decisions making in North America and Europe to study the influence of participation on environmental outcomes. They concluded that the most determinant factor in context of environmental effectiveness was the interests and goals of stakeholders, in addition to the degree to which they favor sustainable environment outcomes.

On the other hand, as cited by Reed (2008), Sultana and Abeyasekera (2007) have analyzed 36 cases community fisheries management in Bangladesh during planning with stakeholder participation and without it to find that participation have resulted in greater degree of conservation measures implementation and less conflict between stakeholders.

Another research have coded information from 239 publish cases studied concluded that stakeholders participation in environmental decision taking have improved the quality of decision making in majority of the cases and that more intensive participation will likely result in higher quality decisions (Beierle, 2002).

2.3.5 Stakeholder Participation in Nijmegen's Room for the Waal

Stakeholder participation have played a key role in this project, the three types of participation; consultation, partnership, and standing (Bishop and Davis, 2002) were implemented. Consultation was implemented through instruments of newsletters, information meetings and interactive workshops; where the plans of the project were adopted based on the input of these workshops.

Moreover, Partnership presented another type of participation that have been used in the project, in which citizens and interest groups were involved in aspects of decision making

through an advisory board that represented citizens interests through advising the steering group in decision making issues (Edelenbos et al, 2016).

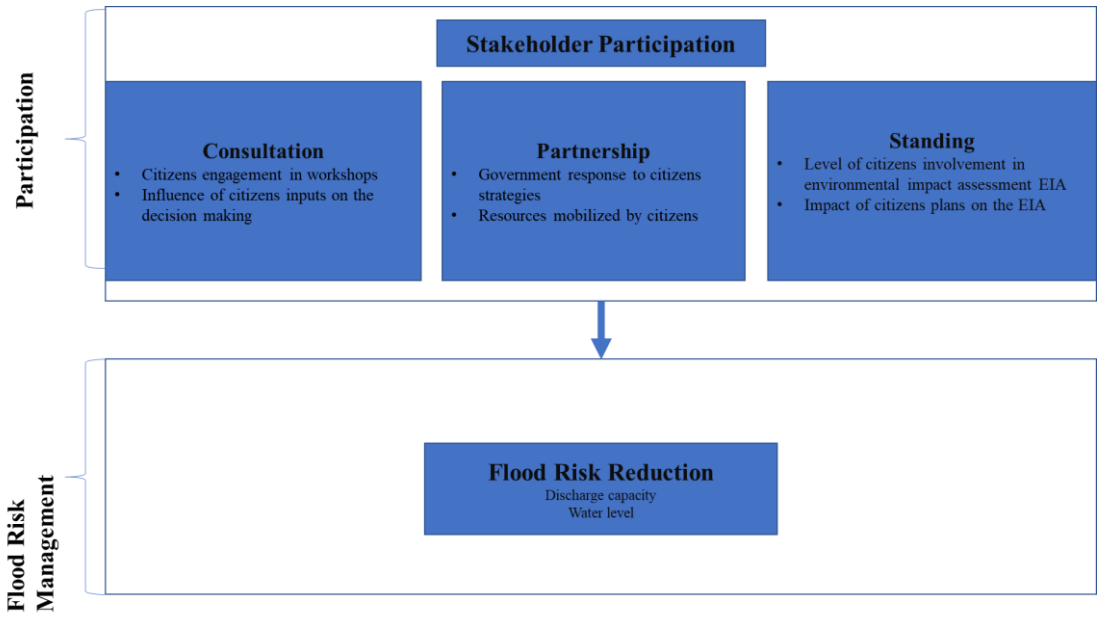
The third type of participation standing was implemented given that the overall planning of project was subject to strategic environmental assessment and environmental impact assessment, which allows third parties to involved in the review process (Climate-ADAPT, 2020).

2.4 Conceptual Framework

Based on the model of participation by Bishop and Davis (2002) and the definition of the flood risk management concept by (Schanze et al., 2004; Hooijer et al., 2004): the conceptual framework will be used, which is shown in figure 2-5.

Main concepts of the research are flood risk management and participation, the variables selected are stakeholder participation and flood risk reduction, where the sub-variables are consultation, partnership, standing.

Figure 2-10: Conceptual framework



Chapter 3: Research design, methods, limitations

This chapter focus on the main variables stakeholder participation and flood risk reduction based on theories of participation and the concept of flood risk management, in addition to discussing sub-variables and indicators of the study and how to operationalize them. It also describes the research strategy used and how it fits the nature of the research. Then it indulges through the methodology of collecting the data, size of samples chosen, unit of study area of study, and data analysis.

Furthermore, it focuses on the challenges that were faced when conducting the study in terms of validity and reliability and how the researcher overcome these challenges. Finally, the chapter will conclude the data analysis methods suitable for this type of research.

3.1 Research Question

To what extent have the stakeholder participation influenced flood risk reduction in Room for the Waal project in Nijmegen?

* Variables: Stakeholder Participation, Flood Risk Reduction

* Sub-variables: Consultation, Partnership, and Standing

3.1.1 Sub-Research Question

How did the consultation of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

How did the partnership of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

How did the standing of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

What flood risk reduction measures were implemented during the Room for the Waal project and how it contributed to flood risk reduction in Nijmegen?

3.2 Description of the research design and methods

3.2.1 Research Strategy and Type

The nature of the research topic and objective and unit of study led to the selection of case study as the most suitable research strategy, a case study aims towards gaining deeper and richer understanding on the influence of stakeholder participation on flood risk management, it is crucial to use a case study given that it collects large amount of qualitative data. Thus effectively and deeply explaining the influence between the variables; stakeholder participation and flood risk reduction.

The type of this research is explanatory as it seeks to explain the relationship between independent variables and dependent variable by collecting both qualitative data and quantitative data. It is therefore a single case study with co-variation, since the research's variables are known and the researcher is studying to what extent the variable stakeholder participation leads to flood risk reduction.

3.2.2 Data Collection Methods

As a single case study aiming at gathering rich information and gaining a deeper understanding on the research, The main data collection method of this research is semi-structured interviews, and questionnaires.

Where the interviews are addressed to experts to capture their perception on stakeholder participation and flood risk reduction, and questionnaires were addressed to citizens to capture their perception on stakeholder participation.

The semi-structured interviews are usually applied in case studies since they are a flexible way of collecting data, offering the researcher a chance to generate rich qualitative data; where during the research, the researcher asks questions to gain deeper and rich understanding. Semi-structured interview is an interviewing technique in which the researcher formulates few open-ended questions and writes them down in the interview manual for discussion, where the interview manual is used to guide the conversation between the interviewer and interviewee without having a structured nature during the process (Van Thiel, 2014).

Respectively, an interview guide was prepared beforehand to the discuss the variables, sub-variables, and indicators related to the research question. However, the semi-structured nature of interviews gave the respondents room for adding more information that could be of use for the research. Consequently, experts from government and other organizations were interviewed to capture their perception on the participation influence and the flood risk reduction taken place in Nijmegen during the project.

Moreover, questionnaires were also used addressed to citizens to understand from their perception the level and influence of participation during the project. On the contrary of semi-structured interviews, questionnaires were not flexible, but rather introduce questions with direct possible and clear answer to choose from. They consist of close-ended questions, meaning every question is accompanied with a multitude of answers to choose from. After which they are analyzed quantitatively using SPSS software. Questionnaires played a crucial role in data triangulation as it confirm or deny the findings from the semi-structured interviews, in addition to extraction of the data from different resources, where the interviews targets experts, and questionnaires target the citizens.

Moreover, secondary data was used to verify the findings, which increased the study's validity and reliability by serving as a mean for data triangulation. Secondary data was drawn from a variety of sources; reports, policies, social media, official government websites on Room for the Waal project, and academic literature. Also, secondary data provided information on potential citizens and experts involving in the project.

3.2.3 Unit and Area of Study

The research area was the Dutch city of Nijmegen where the project Room for the River Waal took place, precisely the location of the Room for the Waal project in Lent, which is shown in figures 3-1 and figure 3-2.

Figure 3-1: Area of the Project.

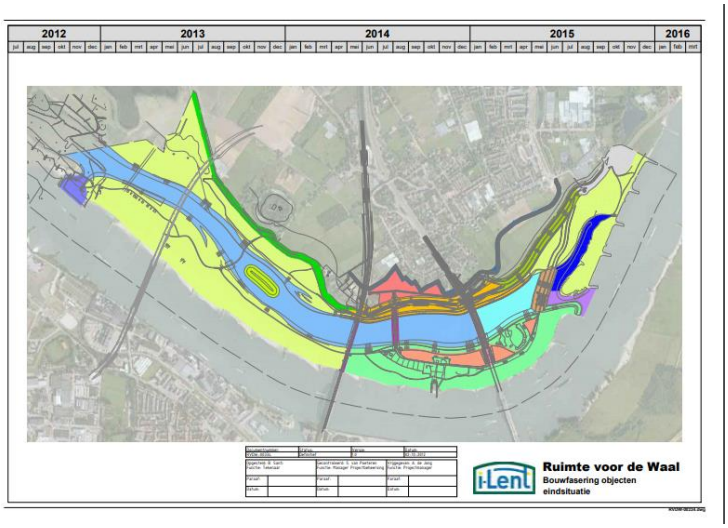


Figure 3-2: Area Photo for the Situation before and after the Project.

Source: (Ruimte voor de Waal, 2020; Landezine, 2016)

The unit of the study was the Room for the Waal project in Nijmegen-Lent, and the population is citizens of Nijmegen-lent and experts involved in the project (from Municipality of Nijmegen, national level, regional level, academic, and designers of project). But as it is hard to include all the citizens and experts in this area, a selection has to be made. This selection is the sample of the study (n). according to Van Thiel (2014) a sample is selection from the total population (N). However, it is possible to draw a conclusion on the population of as a whole.

3.2.4 Sample Size and Selection

3.2.4.1 Semi-structured Interviews

As a case study, the focus is on attaining deeper and richer understanding of the research rather than generalization, therefore, for the interviews, the research used non-probability sampling where the researcher made a purposive selection of samples of the research, and the selection was geared only towards experts that have had the most knowledge on Room for the Waal project. In Addition, snow ball sampling was used to guide the researcher towards more acknowledged respondents. Therefore, after each interview, the interviewer asked the respondents to recommend more volunteers who have knowledge on the subject.

In snow ball sampling, the researcher started by using secondary data to identify few potential respondents of experts for the interviews, then caried on through the interviews to gain a list of experts.

The size of the sample was not determined beforehand, but through means of saturation; meaning that the interviews continued until the information starts to repeat. But without interviewing larger number of respondents, since it could provide less depth for the qualitative study. The researcher reached saturation after 8 interviews.

However, the interviews were addressed purposively to experts involved in the project with a minimum target of 8 experts (municipal, regional, national, academic, and designers of the project), and the identification was conducted through secondary data and snow ball sampling, given that interviews were carried on until saturation achieved.

The data was is collected through the semi-structured interviews then recorded with the consent of the respondents, after that, the researcher transcribed each interview, then started the coding process.

3.2.4.2 Questionnaires

Questionnaires were addressed to citizens to capture their perception only on stakeholder participation. Given that the risk reduction variable was only addressed to experts through interviews, due to the technical nature of the variable.

Questionnaire is a data collection method that consists of a list of standardized close-ended questions that would be distributed and answered through phone, face to face, or written forms (Van Thiel, 2014).

In this research, questionnaires are prepared using Likert scale where answers varied from strongly disagree, disagree, neutral, agree, and strongly agree. Which provided answers on the level and influence of participation on flood risk management project in Nijmegen.

Questionnaires targeted only citizens of Nijmegen-Lent with a population of 11,192 citizen (Gemeente Nijmegen, 2020) through probability random sampling. This is done by going to the location of the research and hand in written questionnaires to citizens.

To find the sample size, the software Raosoft is used with a confidence level of 90% and a margin error of 7%, the sample size in this case is 137 citizens. however, the researcher managed to gather only 60 due to Covid-19 limitations.

3.2.5 Validity and Reliability

Validity and reliability is an important criteria towards a sound scientific research, especially in case studies, so it should be discussed thoroughly and how to achieve both.

3.2.5.1 Validity

Validity consists basically of two types: internal validity and external validity.

Internal validity refers to the cogency of the research and if the researcher has measured the effects he intends to measure; whether the researcher has adequately operationalized the variables, and if the casual relationship between the variables actually exists (Van Thiel, 2014).

The research ensured internal validity through triangulation, meaning the use of more than one method in the research with the aim of double checking the data collection and research results. In this case by using mixed methods for data collection through semi-structured interview, questionnaires, and secondary data. Moreover, the researcher ensured internal validity through interviewing experts from different institutions, in addition to citizens. and also by using a

proper operationalization of the variables into a measurable indicators based on academic literature.

External validity, on the other hand, refers to the ability of generalizing the research to other situations. However, external validity is of a great importance to statistical research that make use of sample results to conclude statement for the whole population (Van Thiel, 2014). But this is not the case here, as this research is a single case study of mainly qualitative nature where generalization is limited and the true value of this a deductive research lies in the wealth of empirical information collected, which serves later as basis for new or improved theories.

In this case, generalization is difficult since the sample size is not large enough to generalize the results. Yet the aim of this case study is to generate a wealth of empirical data towards improving theory. Also the generated information are suitable to generalize only for the case study selected within its specific context.

3.2.5.2 Reliability

The reliability of research refers to the accuracy and consistency when measuring the variables. By increasing both, the results tend to be less coincidental. In explanatory research, when achieving high level of reliability, it can be concluded that the research offered the most certain explanation.

Different measures were taken to achieve reliability of the research, firstly, the researcher used different data sources: citizens, experts, and secondary data. Secondly, given that it is considerably hard to achieve reliability with the semi-structured interviews because of its open design, the reliability improve through the use of close ended questionnaires that would supplement the interviews. Moreover, the reliability of the questionnaires is ensured through Cronbach Alpha test.

3.2.6 Data Analysis Methods

3.2.6.1 Analyzing the qualitative data

Analyzing the qualitative data refers to breaking down larger data units into smaller units, then labeling them with codes, and finally comparing these codes (Van Thiel, 2014).

The researcher started analyzing through coding process; which represent a short description of the data units (opinions, meanings, relationships, perceptions, and the like) where they correspond with the operationalization table and are given in advance due to the nature of the deductive research.

After coding, the researcher started grouping these codes according to the variables, sub-variables, and indicators of the research, during this phase, the research would try to find patterns, cause and effect relationships between codes through a variety of techniques; mainly clustering codes with the same alignment of operationalization table.

Subsequently, the researcher matched the observed patterns with the aim of answering the main question of whether there is indeed a relationship between the dependent and independent variable in reality.

To achieve this goal, the researcher coded the data through software to be better able to classify the data and group it into an easier form. Codes were created according to the variables, sub-variables, and indicators of the research, Finally, the researcher generated frequency tables through software Atlas.ti, given that frequency tables were generated using the Query tool of the software.

Finally, the frequency tables generated helped cluster patterns and codes of response, and visualizing the data through graphs, tables, and figures, with the aim of answering the sub-research questions and main research question.

3.2.6.2 Analyzing the quantitative data

The researcher analyzed the quantitative data through descriptive statistics that showed the percentages of satisfaction for each indicator on Liker scale.

This was realized starting with coding the Likert scale responses, then input the code into the SPSS software. Thereafter, the researcher analyzed the codes with descriptive statistics which would generate percentage of responses for each indicator to show how much each indicator scored on Likert scale in percentage.

Finally, the results were visualized on graphs using excel sheets to show the extent to which respondent agree to each statement, after which, the researcher compared the quantitative results or the qualitative results, and therefore contributing the triangulation of answer.

However, the reliability of the analyzed data was measured using Cronbach Alpha as a mean for ensuring the reliability of the scale. Where the test value ranges from 0 to 1 and the higher is the more reliable given that 0.7 upwards is considered acceptable (Van Thiel, 2014).

3.3 Operationalization

Definitions of theories/concepts, variables, and indicators

3.3.1 Flood Risk Management

Flood risk management concept is defined as a "process of decision making under uncertainty that involves purposeful choice of flood risk management plans, strategies, and measures that intends to reduce flood risk." (Pender and Faulkner, 2010). Based on these definitions; it can be concluded that flood risk management consists of three tasks: Risk analysis, risk assessment, and risk reduction, that aims with its processes, instruments, and measures towards flood risk reduction.

3.3.1.1 Flood risk reduction (Dependent Variable)

Flood risk reduction is defined as sets of measures and instruments applied to reduce flood risk, where measures represent interventions based on physical action, and instruments are based on mechanisms that affects the human behavior. However, these measures and instruments are often applied after analyzing and assessing the risk, and only in case the risk was high (Schanze et al., 2004).

3.3.1.2 Flood risk reduction in context of Room for the River

Making room for the river is a flood risk reduction measure that falls withing flood defense strategy. This is confirmed in European Union's project STAR-FLOOD "Strengthening And Redesigning European FLOOD risk practices: Towards appropriate and resilient flood risk governance arrangements" in which it states that the measures implemented in Room for the Waal project (Dyke relocation and digging the ancillary channel) belongs to the strategy of flood defense (Nijmegen – STAR-FLOOD, 2020).

The indicators of the flood risk reduction are water level and discharge capacity, given that the flood risk management program "room for the river" aim lies within increasing the horizontal surface of the rivers with the effect that vertical space could go down. In other words, increasing the river discharge or the capacity of the rivers to avoid flooding into cities and avoid the risk of flooding.

3.3.2 Participation and Stakeholder Participation (Map of Participation)

Participation is defined as "the way in which, In common acting, the person protects the personalistic value of his own acting and participates together in the realization of common action and its outcomes" (Majos, 2007). This definition is based on Wojtyla's theory of participation. Moreover, the word stakeholder can refer to persons, groups, organizations, that must be taken into account by leader and managers (Bryson, 2004). However, this paper will focus on the public participation on the local level defining citizen or the community as the stakeholder for the purpose of this research.

The main independent variable is stakeholder participation and is broken down into three sub-variables based on map of participation developed by Bishop and Davis (2002). Therefore, the sub-variables should be consultation, partnership, standing, consumer's choice, and control. However, last two types will be excluded as consumer choice is only relevant for service delivery issues and that control has not been implemented in Room for the Waal project.

3.3.2.1 Consultation

Consultation refers to government gathering data from citizens and listening to their concerns to ensure that their voices are made when the decision is made, but with the acknowledgment that government will have the final say. However, consultation assumes that the information gathered from citizens will be considered when making the final decision (Bishop and Davis, 2002). Instruments used in consultation are workshops, information meetings, surveys, newsletters, discussion papers and public meetings.

3.3.2.2 Partnership

Partnership assumes that the government considers citizens as partners in the decision making and represents a higher level of participation than consultation, and it involves citizens in aspects of government decision making through advisory boards, citizen advisory committees, policy community forum, and public inquiries. (Bishop and Davis, 2002). In Room for the Waal project, citizens were represented through advisory boards.

3.2.2.3 Standing

Participation as legal standing offers the citizens a chance to access government information, which enables them to seek reasons for governmental decisions, and gives them the right to review these decisions by a third party; (Bishop and Davis, 2002). Standing was presented in Room for the River Waal project through an Environmental impact assessment which played the role of the third party, where the first and second parties are the government and citizens of Nijmegen.

3.3.3 Operationalization Table

Table 3-1: Operationalization table

Concept	Independent Variable		Indicators	Data Type/Analysis	Data Collection Method
Participation	Stakeholder Participation	Consultation	citizen engagement in Interactive workshops	Qualitative, Quantitative	Semi-structured interviews, Questionnaires, secondary data
			Quality of information provided in the information meetings and newsletters		
			Frequency of meetings and workshops		
			Influence of citizens input on the final decision making		
			recognition of citizens knowledge by government		
			citizens understanding of the project and flood risk reduction		
			Opinions of citizens that aim towards flood risk reduction		
		Partnership	Citizens ability to provide opinions through the advisory boards		
			Level of representatives of citizens in the advisory board		
			Resources mobilized by citizens towards flood risk reduction		
			Level of advisory boards involvement in decision making		
			Type of Government response to stakeholders strategies		
			Common interests of advisory boards towards flood risk reduction		
		Standing	Level of citizen involvement in Environmental Impact Assessment through the advisory boards		
			Impact of plans proposed by citizens on the environmental impact assessment		
			Ability of citizens to propose their plans in the environmental impact assessment		
			Contribution of citizens Plans in EIA towards flood risk reduction		
Concept	dependent Variable	Sub-Variables	Indicators	Data Type	Data Collection Method
Flood Risk Management	Flood Risk Reduction		Water level	Qualitative	Semi-structured interviews, secondary data
			Discharge Capacity		

3.4 Challenges and Limitations

This research is a single case study that studies one Room for the River project, because of time limitations, the research could study all room for the river projects in the Netherlands. Also the researcher addressed only one factor that contributed to the success of the project and eventually reduction of flood risk in Nijmegen, it would be interesting to study the other factors and their influence.

In this research, the researcher aimed towards conducting face-to-face interviews, but it was not possible in light of the Covid-19 pandemic situation. However, online interviews were used as an alternative in this case. Moreover, the researcher recorded the interview on the consent of the interviewee for qualitative data analysis.

Corona pandemic posed a significant a challenge in this case study, which influence mainly the data collection since face to face interviews were not possible under these circumstances, which called for managing online interviews as an alternative solution. This limited the researchers option of data collection and constrained their ability of collection the data necessary for case study. Moreover, observation were not also possible as it could endanger the researchers live, in addition to constrains over movement, lock down measure, and the like.

Moreover, the language represented a barrier for the researcher as it was hard to communicate with citizens of Nijmegen with English, given the nature of the city, and that not all citizens spoke English, therefore, the researcher had to seek help from translators to facilitate the communication process.

Also, the researcher could not conduct questionnaires on flood risk reduction due to the technical objective nature of the variable, where the variable was only investigated through interviews and secondary data, this limitation prevented the researcher from incorporating statistical analysis of regression and correlation in the research, however, the researcher was still able to conduct descriptive frequency analysis on stakeholder participation.

Furthermore, time was another limitation as it prevented the research from reaching the required number of questionnaires, especially that the researcher conducted the questionnaires manually given by hand to ensure the random sampling process..

Chapter 4: Research Findings and Analysis

4.1 Introduction

This chapter presents the finding of the research, starting with describing the case, and the characteristics of the respondents for both interviews and questionnaires, afterward the analysis of the collected data will be presented according to each sub-research question. Finally, statistical analysis will be summarized and discussed according to the data of the questionnaires and interviews.

4.2 Description of the Case

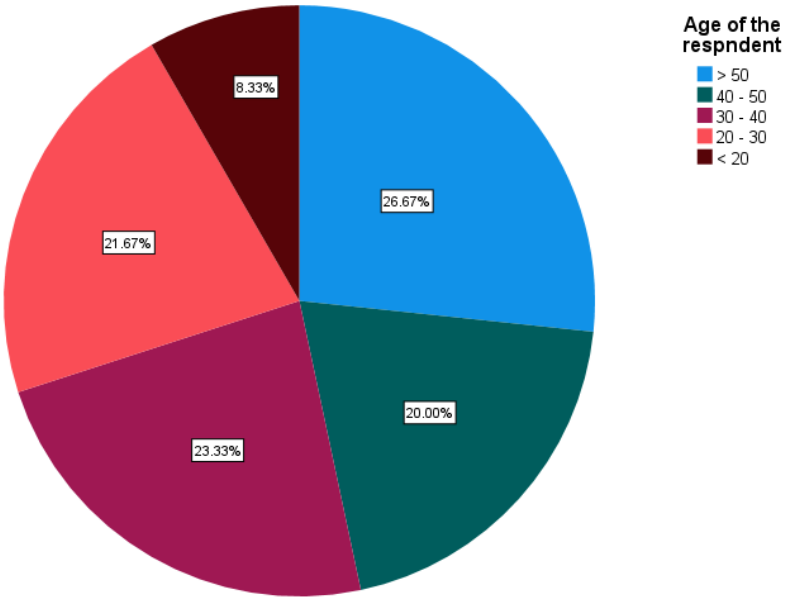
The study was based on 8 interviews and 60 questionnaires, and the unit of the study was Room for the Waal project in Nijmegen-Lent. The research interviewed experts involved in the project (from Municipality of Nijmegen, national level, regional level, academic, and designers of project). The list of interview respondents is presented in table 4-1.

Table 4-1: List of Interview Respondents

Code	Position	Organization
D1	Communications representative	Municipality of Nijmegen
D2	Academic Research Expert involved in the project	Erasmus University
D3	Academic Expert who conducted case study on the project	Erasmus University
D4	Stakeholder Manager	Municipality of Nijmegen
D5	Academic experts involved in the project	Erasmus University
D6	Academic Expert involved in the project	Radboud University
D7	Program leader	Gelderland Province
D8	Environment Manager for the Room for the Waal Nijmegen project	Rijkswaterstaat

And questionnaires were distributed randomly among citizens of Nijmegen-Lent to get a fair view on the perception of participation, where 43.3% of the respondents were above the age of 30, and 26.7% were above the age of 50. As shown in figure 4-1.

Figure 4-1: Age distribution of the respondents



4.3 Presentation and analysis of the research question

This section presents the analyzed data in line with the sub-research questions, starting with the analysis of the qualitative data from the eight interviews as the main data collection method, which presents the frequency tables, followed with the quantitative data taken from the questionnaires with the aim of comparing results of both interviews and questionnaires for each sub-research questions.

The frequency tables will summarize the responses of the interviews and the frequency of each summary in line with their indicators. Moreover, the questionnaires results will be followed by the interview results for comparison and triangulation.

Moreover, the reliability of the indicators used in the questionnaires is tested with Cronbach Alpha test to prove consistency in measuring the variables.

Cronbach Alpha is a reliability test conducted to ensure the consistency of the variables measured, its value ranges from 0 to 1, where > 0.6 is acceptable. The test was conducted for the three variables of the research: Consultation, Partnerships, and Standing. The results are summarized in table 4-2.

Table 4-2: Cronbach Alpha test results

Variable	Consultation	Partnership	Standing
Cronbach Alpha	0.746	0.848	0.689

As shown in table 4-2, all values of Alpha are higher or equal to 0.7 implying the consistency of the questionnaire items, and therefore contributing to the reliability of the research (Van Thiel, 2014).

However, the survey results showed that the majority of citizens were inclined to be neutral in their views, meaning having no opinion on the questions in hand.

Accordingly, the neutral responses in literature represent a significant source of dispute, and while some researchers suggested removing that choice from Likert scale, the researcher chose to keep it in the questionnaires as the existence of this choice contributes towards more reliable results, because it gives the respondents who had no knowledge on the issue or no specific opinion a choice of avoiding selecting a false response, instead of choosing a choice that does not reflect their true belief.

And while the interpretation behind the neutrality remain debatable in literature, since the answer can either indicate non-response to be excluded or a true substantive response that means no clear opinion, which weighs 3 on the Likert scale used in the study.

Nonetheless, several reasons can be attributed towards explaining why the majority were neutral in this survey, according to (Edwards and Smith, 2016) respondents tend to falsely choose the neutral option due to; cognitive effort, social desirability, and ambivalence.

On the other hand, another paper studies the same issue, and concluded that it is not possible to judge whether respondents choose neutral to indicate a non-response/lack of knowledge or that they truly neither agree or disagree out of lack of point of view, arguing that such manner depends largely on the characteristics of the respondents themselves, such as educational level, political views, age, and the like (Blasius and Thiessen, 2001).

Accordingly, it is likely that the majority were neutral due to lack of knowledge rather than lacking a point of view, because many respondents explained to the researcher that they have recently moved recently to the area or they were not involved in the project or that they were not well informed about the project during implementation, which will be explained later on in the conclusion.

4.3.1 The Influence of Consultation on Flood Risk Reduction

The aim of this sub-section is to answer the sub-research question: How did the consultation of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

8 experts were interviewed to answer the question and were presented with the indicators of the question which are: citizens engagement, quality of information, frequency of meetings, influence of citizen input, recognition of citizen knowledge, understanding of project, and opinions contributing to flood risk reduction. The results can be seen in table 4-3.

Moreover, 60 citizens were asked to capture their perception on the same indicators and question, which contributes to triangulation of data. The questionnaires were presented with Likert scale and the results are shown in figure 4-2.

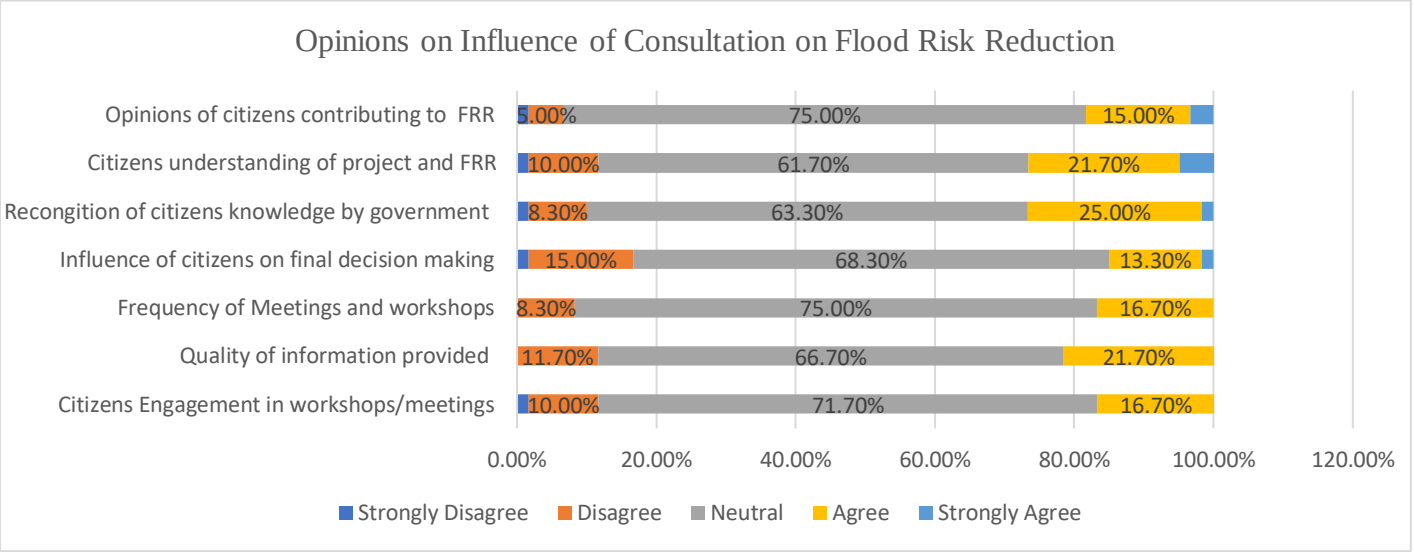
Table 4-3: frequency table summarizing the influence of consultation on flood risk reduction in Nijmegen

Indicator	Summary of responses	Frequency
citizen engagement in interactive workshops	The government kept the citizens actively engaged through press releases, articles, and newsletters, and held meetings/workshops with citizens to discuss their plans and ideas where they were consulted and asked for their feedback.	6

Quality of information provided in the information meetings and newsletters	Citizens were kept well informed using different tools from all governmental level, and plans were illustrated for them with transparency, adequacy.	3
Frequency of meetings and workshops	Meetings with citizen were regular during both planning and execution with an open door policy where citizens could voice their concerns.	4
Influence of citizens input on the final decision making	Citizens input and affected the government final decision making to a large extent, by incorporating their feedback in the final plan of the project.	4
	Although citizens alternative plans were presented to the national government, the latter did not go with the alternative plan which made the influence on inputs on the whole project not significant.	2
Recognition of citizens knowledge by government	The government harvested citizens experience and knowledge through consultation and advisory boards	4
citizens understanding of the project and flood risk reduction	citizens had a lot of expertise and knowledge and they were supported by experts and engineers	6
Opinions of citizens that aim towards flood risk reduction	An alternative plan was proposed by citizens that would reduce the flood risk in Nijmegen and simultaneously would keep their houses from being demolished	4
	The main focus of citizens was not the flood risk but the spatial quality	2

Number of Respondents (N) = 8

Figure 4-2: Survey Results – Opinions on the Influence of Consultation on Flood Risk Reduction



Citizen engagement in Interactive workshops and meetings

6 out of the 8 respondents explained that the citizens of Nijmegen were well informed through press releases, articles, and newsletters, and actively engaged through the interactive workshops and meetings held on a regular bases. Moreover, government would assign experts to meet the citizens to discuss their design ideas and plans and concerns regarding the project. In addition to demonstrating the project plans and asking citizens for their feedback and comments.

For example, respondent D3 explained that *"some of the architects and landscape architects, they told me that they really sat down with the citizens to discuss the design Different turns. They had some kind of participatory mapping. So the citizens could say exactly what were the historical points that were important for them. Why they needed that cannon to stay there where it was because there was a history of war."*

Furthermore, respondent D6 highlighted the high level of citizen engagement by arguing that the project had much room for negotiation and high degree of flexibility, in addition to using the word *"Collaborative Endeavour"* where citizens and government tiers developed the plans jointly and gradually.

As for the questionnaires, 16.70% of citizens agreed that citizens were indeed actively engaged in the interactive workshops of the project, compared to 11.70% who thought otherwise (both disagree and strongly disagree). While 71.70% of citizens chose to be neutral.

Quality of information provided in the information meetings and newsletters

From the interviews conducted with the respondents, 3 of them indicated that the information which government provided to citizens on the project were sufficient and adequate, during which all government levels had intensive discussions with the citizens.

Moreover, the Municipality kept the citizens well informed through press releases, articles, newspapers, newsletters. In addition to the information meeting during which plans and agenda were presented to citizens for their feedback. To support this, respondent D7 argued that *"The resistance from the citizens must have had influence on the decisionmakers: realizing that they had to be very clear in explaining the reasons for decisions."*

Therefore, citizens were well informed with transparency and no secret agendas, and through all governmental levels; Municipality of Nijmegen, Rijkswaterstaat, Waterschap.

In addition, survey results indicated that 21.70% of citizens agreed that the information provided to them by the government were sufficient and of high quality, compared to almost half the percentage 11.70% who disagreed, while 66.70% of them who had no opinion on this matter.

Frequency of meetings and workshops

Meetings with citizens were regular according to 4 out of the 8 interviewed respondents, with an open door meeting policy; meaning citizens affected by the project, especially those who lived in the project area under the threat of demolishing their houses, those in particular were in 24/7 constant communication with Nijmegen's Municipality workers.

For instance, D4 as one of the respondents was a municipality worker, and they explained by saying *"So there's a lot of stress with people and it doesn't stop at five o'clock. Yeah, of course. It continues. So in this case, you cannot say I work from nine until five, five days a week and in the weekend, you just sent me an email, it doesn't work.*

And they have called me late at night. In the beginning, they have called me in the weekends. But in the in the beginning, they were like phoning, phoning, phoning. And then it just became like a normal, because they knew I would answer and they would knew I would answer them, they'll answer the phone no matter what."

However, when asked about the frequency of meetings and workshops, Rijkswaterstaat experts D8 stated that the government held a monthly meetings with citizens during the planning phase, and more than a monthly meeting during the execution.

Moreover, the local government (Municipality of Nijmegen) contacted citizens and had substantial number of meetings with the citizens, along with experts from different levels of governments, in addition to few conferences in different bars with capacity of 150-200 people per meetings.

Furthermore, the survey conducted revealed that out of the 60 citizens, 16.7% agreed with the interviews results, where they were inclined toward thinking that the meetings and workshops were indeed sufficient and frequent. On the other hand, 8.3% of them disagree, which is almost half of the agreed citizens, and 75% were neutral.

Influence of citizens on the final decision making

As mentioned previously, consultation refers to government gathering data from citizens and listening to their concerns to ensure that their voices are made when the decision is made (Bishop and Davis, 2002). therefore, the influence of their input is a significant indicator for measuring the participation variable; especially the consultation sub-variable.

Half of the respondents shared the same view about citizens influence on the final decision making,

After the national government announced their plan in the newspaper, citizens hired experts and formulated their own alternative plan in order for them to keep their houses, however, the national government did not go with citizens plan and implemented the original one. Nonetheless, the government worked alongside citizens to include their preferences in the original plan, which shifted their attitude over time from opposition to support.

For instance, respondent D1 explained that the local government tried to make the plan more appealing for citizens through atheistic aspects; D1 mentioned that *"our plan from the local government will be realized and not your plan. But we will make even more beautiful. So in the original plan, I think the side rivers stopped after the railway bridge, but then it was lengthened until, well, it's 3.5 kilometres long, so it was doubled."* Therefore, some elements proposed by citizens were included in the final plan.

Moreover, citizens had concerns on the cultural heritage of the area, which was addressed properly by the government, after which preserved the canon in Nijmegen-lent. According to respondent D4 *"everything that we found, we kept in place. So we kept as much as we could houses in the area."*

Furthermore, citizens managed to incorporate 20 meters seepage screen in the project to protect Lent from seepage risk, which is an addition to the original plan. Respondent D8 explained that citizens interest groups had significant influence regarding the seepage risk.

However, it should not be confused with the fact that their feedback did not affect the final decision making on whether the project should or should not be implemented regardless of the opposition by citizens in the beginning. Since 2 of the respondents argued that the citizens influence did not impact the final decision of the government.

The two respondents claimed that the ministry implemented their original plan regardless of citizens alternative plan, and explained that the municipality aimed at improving the plan with citizens input without being able to affect final plan of the ministry. For example, D8 commented on the government decision on execution of the *project "The influence on 'yes' or 'no' on the whole measurement was not very big."*

Therefore, looking at the interview results, citizens of Nijmegen indeed had an impact on the outcome, but could not alter government final decision on implementing their original plan, rather only adding their concerns, feedback, comments, and preferences to the original.

However, the survey results show a clear divide in the opinions of citizens whether their input and feedback had an actual influence on the final decision making, with a slight inclination toward disagreement of having influence, where 15% of citizens agreed (both agree and strongly agree) that their feedback had an influence, and 16.7% of them disagreed, while 68.30% of citizens had no opinion.

Recognition of citizens knowledge by government

Half of the respondents indicated that the government acknowledged citizens knowledge and expertise in the project; their knowledge in the area and the flood risk, in addition to other aspect; historical, cultural, technical, aesthetic, all of which were considered and contributed to the success of the project.

Accordingly, the government would consult citizens to gain deeper understanding and rich experience for the project. As an example, according to respondent D1, the municipality of Nijmegen consulted the head of the advisory board. Also, Nijmegen-lent had a society of farmers supported by academics and expert to support their interests and concern, their alternative plans were therefore taken seriously under the advisory board presentation at the highest level of government since they had substantial understanding of the technical aspect of the project.

However, respondent D3 mentioned different view by claiming that the national government did not consider citizens on the technical aspects, which questions the level of involvement of citizens if not presented under the umbrella of advisory board

Nonetheless, citizens living near the floodplain and nearby the project area had substantial knowledge on the flood risk, the risk of flooding was familiar to them, which was essential for their survival.

In line with what is written, A respondent of the interview D4 who worked in the Municipality of Nijmegen admitted this by explaining that *"I had been born in the city, I was not concerned with flood risk at all. But the people that were in the floodplains. they have all been very conscious of the flooding. They know when there is going to be flood risk, and they look in Switzerland and they look at the level of the of the river there, They can swim, they can cross the river, they can cross the river by swimming. they know how ships behave and how the currents of the Waal behaves."*

As for the survey results, 63.30% of citizens had no opinion on recognition of their knowledge in the project, but when citizens asked if the government had recognized their knowledge in the project, 26.7% of them (both agreed and strongly agree) agreed with the statement, which is more than double the citizens who disagreed which equals 10%.

Citizens understanding of the project and flood risk reduction

Citizens did have a sufficient understanding of the flood risk on a different levels according to the location they are living in, out of the 8 respondents, 6 of them confirmed this claim by demonstrating that people living near the river were used to high water, and accordingly, they prepared their houses to be adaptive and keep them safe.

Also, when it comes to the project, citizens had known that at certain point the government will act; since they had well reputable engineering knowledge among themselves, in addition to the knowledge gained over generations living in Nijmegen, for instance, respondent D3 indicated that farmers know when the water rise by looking at the color and the flow of the river.

Moreover, in the Netherlands, the level of understanding of water safety projects is relatively high, Furthermore, since Nijmegen is a university city, there have been significant number of highly educated people, retired engineers.

Finally, citizens were supported by experts of whom they cooperated with to formulate an alternative plan based on engineered information; respondent D5 mentioned that "*citizens had a lot of expertise and knowledge and they were supported by some others that helped them the engineering information from Radboud university but also from other places, and I think they're surprised the municipality with plans and with very well Plans supported by good engineering."*

The survey results conducted show that 11.70% of citizens disagree that they had sufficient understanding of the Room for the Waal projects and its objective regarding reducing the flood risk, while more than double this percentage 26.7% agree that they did have enough understanding of the project, while 61.70% of them had no opinion.

Opinions of citizens that aim towards flood risk reduction

Based on previous sections, it is given that citizens were involved in the project and provided their feedback, comments, opinions, and plans. Whether individually or through representative groups. But this indicator focuses on opinions that mainly addressed the flood risk reduction issue.

Half of the 8 respondents explained that citizens did provide opinions that would contribute towards flood risk reduction, since citizens united with experts and formulated an alternative plan to government's original plan, which would reduce the flood risk in Nijmegen without having to demolish citizens houses in the floodplain region.

However, 2 of the respondents indicated that experts opinions were geared towards spatial quality rather than water safety. Respondent D8 mentioned that *"The alternative plan was a clear feedback on the plans. However, the main influence of the citizens was not on flood risk reduction, but on spatial quality."* Moreover, respondent D6 explained the 'not in my back yard problem' where citizens were aware of the flood risk but opposing its measures if it meant having to move away from their houses.

Although there is a divide in the interview results whether citizens did show an interest in reducing the flood risk in Nijmegen, the survey results obtained from citizens shows that 75% of them had no opinion, while 18.3% of them indicated that they did provide opinions on how to reduce the risk, compared to about third the mentioned percentage 6.7% who stated that they did not provide opinions on FRR.

Summarizing the results from both interviews and questionnaires, it can be shown that consultation had been implemented effectively in the project through meetings, newsletters, and workshops, which presented some of the key instruments of consultation as referred to in literature review by (Bishop and Davis, 2002).

Also, going through the definition of consultation cited by (Bishop and Davis, 2002) the results affirmed the use of consultation since the government did recognize the citizens knowledge, experience, and understanding of the project, and therefore harvested this knowledge for achieving the objectives.

In addition, interviews showed that meetings were frequent with an open door policy, which ensures that citizens voice is heard when decision made. Moreover, although that the final decisions were made by the government, citizens had the chance of including their input, which is

consistent with the notion that consultation refers to the acknowledgement that the government will have the final say without the obligation of implementing citizens feedback.

Furthermore, regardless of the differing views on whether citizens showed interest on flood risk reduction, the researcher thinks that consultation of citizens despite of their interest led to reduction of flood risk as citizens knowledge, opinions, input, and various forms of engagement presented a significant asset and tool to the government towards the ultimate objective of reducing the flood risk.

This is consistent with literature as participation plays a crucial role in flood risk management projects as it is widely considered an effective component for efficient, effective, and inclusive disaster-risk reduction (Hore et al., 2020) since room for the Waal project is part of a national flood risk management program, and that consultation is a type of participation.

4.3.2 The Influence of Partnership on Flood Risk Reduction

The objective of this sub-sections is to answer the sub-research question: How did the partnership of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

8 experts were interviewed to answer the question and were presented with 6 indicators of the question which are: citizens ability to provide opinions through AB, level of representativeness, resources mobilization towards FRR, level of AB involvement in decision making, type of government response, Common interest of AB towards FRR. The results can be seen in table 4-4.

Moreover, 60 citizens were asked to capture their perception on the same indicators and question, which contributes to triangulation of data. The questionnaires were presented with Likert scale, and shown in figure 4-3.

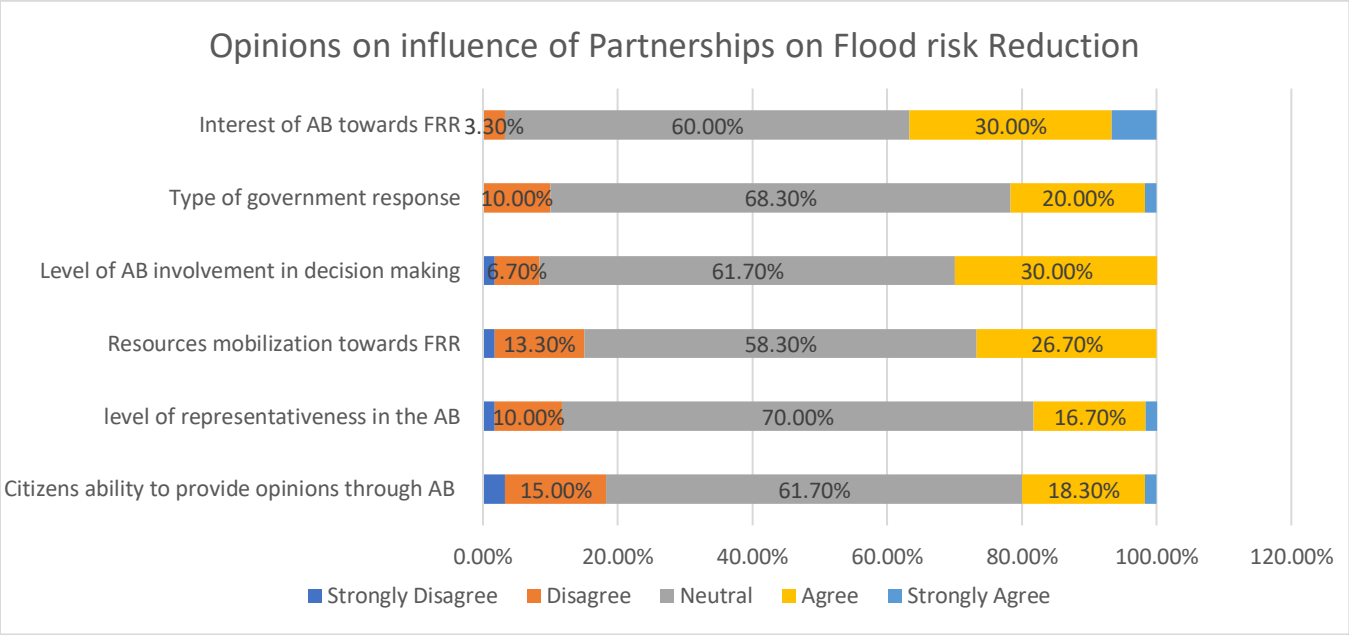
Table 4-4: frequency table summarizing the influence of partnerships on flood risk reduction in Nijmegen

Indicator	Summary of responses	Frequency
Citizens ability to provide opinions through AB	Advisory board provided a platform for citizens through which they were able to voice their opinions by formulating their own alternative plan which was taken into consideration.	3
	The advisory board was a manifestation of the opposition and resistance of citizens for the project with high activity level, protest, banners, demonstration, influence, and organizations	3
	Although citizens were able to provide their opinions through the advisory board, the board itself had no legal basis.	1
level of representativeness in the AB	Advisory board represented a delegation of citizens that protects their interest and represented them on the meeting tables with all levels of government.	3
	even though advisory boards were formed to represent citizens, it did not include all citizens or represent them in the sense they were elitist groups that lack accessibility to all citizens without openness to everyone.	2
Resources mobilization towards FRR	The mobilization of resources did not only take place through the expertise of citizens in law and engineering, but also through hiring experts from different fields, and the use of networking and technical universities.	3
Level of AB involvement in decision making	Decisions were jointly made between government and advisory boards which were actively involved with both local and national government levels during the meetings by providing their alternative	7

	plans, feedbacks, ideas, concerns, and interests. But the final decisions were exclusively made by the national government.	
Type of government response	A positive response that aimed to serve the board interests for almost the same price and within scope and time of the project.	5
Interest of AB towards FRR	Reducing the flood risk was a common interest between the government and the advisory board	5

Number of Respondents (N) = 8

Figure 4-3: Survey results – Opinions on the Influence of Partnerships on Flood Risk Reduction



Citizens ability to provide their opinions through the advisory board

7 out of the 8 respondents answered this question related to partnership; which represent a higher level of participation and cooperation between citizens and government compared to consultation, and the answers of respondent were summarized into three different categories.

Firstly, three respondents explained that the citizens of Nijmegen were able to provide their plans, opinions, and initiatives through the advisory boards by proposing their alternative master plan, moreover, the plan proposed by citizens were brought to the board after being formulated with help of experts from Radboud University and other institutions. Therefore, the plan had to be taken seriously and legally at the national level, respondent D3 mentioned *"it was a completely different plan. And what I heard is that it was really taken into consideration. It was even legally considered."*

Secondly, three other respondents indicated the same ability but with different motives and a higher level of involvement, where the board represented an instrument for citizens for opposition, resistance, protests, and demonstrations. All of these have led to shifting the government attitude toward participation and enabling more citizen involvement. For instance, respondent D4 mentioned that *"They use all kinds of banners stop the stop this project. So they were very involved. So they were really organized well."*

Thirdly and lastly, an interesting point were brought up by respondent D5 that shed light on the formality of the advisory board, what's interesting that the respondent indicated that although citizens have had significant impact and could voice their opinions through the advisory board, he said *"but if the municipality at that time would have ignored the participation by that group, then the citizen advisory board probably would have had no legal basis to go against it."*

Finally, the survey results have shown divergence of opinions between citizens, where 61.70% of citizens had no opinion, and 20% of them both agreed and strongly agreed that they were able to provide their opinions and plans and proposals through the advisory boards. However, an almost similar percentage of 18.3% of citizens disagree of this statement.

Level of representativeness of citizens in advisory boards

The 8 respondents were asked about the level of representativeness, 5 of them were able to answer clearly, however, their answer were divided into two main categories.

What's interesting about their answers that it varies according to the respondents positions, meaning that respondents from the government were more likely to indicate high level of representativeness. Given that 3 respondents indicated that the advisory boards presented a delegation of citizens that sat through meetings with different government level; local through the Municipality of Nijmegen, Provincial through the regional water board Waterschap, and national through the Rijkswaterstaat.

For instance, Respondent D1 mentioned that "*delegation of this platform of citizens comes and sits on the table with us and with all the other authorities that we're involved in a project like Waterschap."*

On the other hand, 2 respondent questioned the level of representativeness claiming that it was, firstly, not accessible to all citizens, secondly, not open for everyone, thirdly, that being accepting in the board requires having the right connection, fourthly, that it was often an elite groups of society in the sense that it did not represent low income neighborhoods, and finally, that the government admitted citizens the loudest citizens to gain their support.

For instance, respondent D5 mentioned that "*one critical note, what was usually the case with this kind of consultancy groups is that it's often elite groups in society that are involved in this kind of consultation. if in a, in a low income neighbourhood With a lot of social housing, you probably wouldn't find this kind of yes neighbourhood platforms."*

Moreover, the survey results revealed that 70% of citizens had no opinion, while 18.4% of them agreed (both agree and strongly agree) that they were adequately represented through the advisory boards and committees, while 11.7% of them disagreed.

Mobilization of citizens resources for flood risk reduction

Three respondents argued that citizens of Nijmegen mobilized their resources to formulate an alternative plan that considers the technical aspects of flood risk reduction; human resources were harvested through their own knowledge, since there were well educated percentage of them who had law or engineering degrees.

Moreover, they spent financial resources to hire experts with the aim of helping formulate their plan. In addition to funding their opposition groups and the communication between citizens.

Furthermore, they had good networks through which they contacted technical universities and organization to aid them in their endeavor.

Respondent D6 confirmed these claims arguing that *"they all organized themselves. They try to fight these plans to stop these plans to hire experts to prove that these plans were really bad plans, they formed opposition groups, they formed all kinds of activities to raise their voice and to communicate that they don't like this plan."*

As for the survey, the questionnaires revealed that 58.30% had chosen to be neutral, yet 26.7% of citizens confirmed that they mobilized different resources towards achieving the objectives of the project and reducing the flood risk, however, about 15% of citizens (both disagree and strongly disagree) disagreed with this statement.

Level of Advisory Boards involvement in the decision making

This indicator bears particular relevance with the famous Arnstein ladder of participation, because it clearly shows the nature of partnership formed between citizens and government, and under which category it falls. 7 out of the 8 respondents were able to answer this question and all of them agreed on the same point with slight variations.

Nearly 88% of the respondents agreed that citizens were brought to the discussion table through the advisory boards and were treated as equals, during the meetings, the board was actively involved in the decision making. To illustrate, the board proposed an alternative plan to the governments original plan of dike relocation, the alternative did not include demolishing the 50 houses of citizens.

After which the alternative was brought to the discussion table of the national government and discussed thoroughly with prioritizing water safety in mind, then the municipality agreed to the plan and passed it to the national level, However, the plan crossed path with the shipping line and therefore the government decided to go with the original plan.

Respondent D1 said *"And they made it made a different plan than the plan we had now. And that plan was to lower the river foreland and to build small dikes around the houses that were there. So no house had to be demolished. And the local government thought it was a good, a good plan. And they went with the citizens to The Hague to the government to present it. But then it was said by a lowering river foreland, when there's low water, and there's, well it spreads over to large in areas so then the ships cannot pass the Waal anymore."*

And would have been such an economic disaster, the water gets too low. And the water reduction level wasn't enough. It wasn't it didn't reach the 27 that was the lowest that was needed. And so they said, We will not we want to make the side River and heighten up the ground behind the dike. So the original plan had to be realized. "

Accordingly, citizens were actively involved in the decision making through the board and were treated equally, in addition to being actively engaged with the Municipality. But the final decision making was made only by the national government, with the ability of providing their feedback on it. This strategy led to respondent D5 arguing that although the decisions were made jointly, the final decision was always made by the Rijkswaterstaat, and added that "*the role of this or the position that was given to this platform (citizen advisory board) was actually* ***was quite low on the participation ladder."***

However, the involvement in decision making did not take place only through meeting tables, respondent D7 argued that the resistance/opposition of citizens also influenced the decision makers, which forced them to be clear in explaining the reasons behind their decisions, and alter some of the decisions to fit the interests of the citizens, without affecting the water safety objectives.

Finally, despite the fact that the national government decided to go with its final original plan, and regardless of the citizens opposition in the beginning of the project, the original plan was not implemented without the modifications of the citizens; respondent D8 summarized the process by quoting the Alterman of Nijmegen who said *"if it has to be done, it had to be done on a right way"* Thereafter the citizens were more involved and the project was more open for influence of the city and interest groups.

Moreover, while the majority of interview respondents shared the same view on government involving the boards in decision making, the survey results show that 30% of citizens both agree and strongly agree that government did involve the advisory boards, while the remaining percentage is distributed over 8.4% of citizens who disagreed and strongly disagreed, and 61.7% of them who had no opinion.

Type of government response to advisory boards strategies

The interviews conducted shows that despite the final decisions made, all government levels (especially the local) have always shown positive response towards the board strategies, where 5 respondents confirmed that positive attitude of the government. For instance, respondent D1 mentioned that *"The local government agreed to the board alternative plan and went with the citizens to present it at the national government in the Hague."*

In addition, the municipality hired communication representatives to keep track of citizens strategies in order to find the best solution. However, the motive behind this positive response could lie in the pressure the board practiced over the government, since respondent D5 argued that *"the government had no choice but to show positive response to the board sine the latter had strong communications with the media and the newspaper."*

Nevertheless, the government have always shown a positive response in general with the aim of serving the interests of citizens without affecting the water safety objectives.

The survey results revealed that 21.7% of citizens agreed to the government showing positive responses to the board strategies, compared to 10% of them who disagreed. However, 68.30% of citizens chose to be neutral. But in general, double the disagreed percentage agreed, suggesting that government did show positive response in general.

Interest of the advisory board in reducing the flood risk in Nijmegen

From the interviews, 5 out of 8 respondents argued that the flood risk reduction was a common interest for both the government and the board, where the government launched the project as a flood risk management project aiming towards reducing the flood risk in Nijmegen, and that the board formulated an alternative plan keeping in mind adding more protection for the citizens and reducing the risk in the area.

Also, the board plans was technically supported by experts from Dutch universities. Therefore, It was a technical plan, with the flood risk in consideration. Respondent D2 mentioned that *"I think the flood risk is also in their own interest."*

However, it worth mentioning that citizens had conflict of interest and fought against the project at the beginning and made significant opposition, but later on, their stance changed towards protecting the city, to illustrate, Respondent D3 explained that *"then at some point, they realize this is going to happen. It is needed. There is the risk of flooding. It's going to happen. So if we cannot avoid it, let's work together and find the best solution possible."*

Furthermore, respondent D5 argued the advisory board indeed shared interest with the government towards flood risk reduction, they helped the government solve the problem and they later on overcame the conflicts of interest.

On the other hand, the questionnaires showed that 30% of citizens confirmed sharing interest with government towards reducing the flood risk in their city, compared to only 3.3% who disagreed, and 60% who had no opinion.

Summarizing the results from the interviews and questionnaires, it can be shown that partnership between the government and citizens played an effective role in flood risk reduction, since advisory boards were formulated by citizens and that such boards are one of the key instruments of partnerships according to (Bishop and Davis, 2002), in addition to the interest of these boards in FRR.

Building on literature, partnership represent a higher level of participation than consultation, where the government involves citizens in aspects of decision making through different instruments, including advisory boards (Bishop and Davis, 2002). Reflecting on this case study, the interviews show that decisions were indeed made jointly between government and advisory boards, also the questionnaires indicated 30% agreement with the statement that citizens had interest in FRR and their plans was considered in the decision making.

But some elements, according to the interviews, contributed to the obstruction of full partnership; such as the top down approach of government that held the final say, and the lack of accessibility to the boards.

Accordingly, partnership was observed to some extent in the project, and citizens through the advisory boards worked together with the government with the common interest of reducing the flood risk in Nijmegen, therefore, the results indicate that partnerships contribute to FRR if implemented to some extent, where the full implementation of partnership was not observed in this study.

4.3.3 The Influence of Standing on Flood Risk Reduction

The objective of this sub-sections is to answer the sub-research question: How did the standing of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

8 experts were interviewed to answer the question and were presented with 4 indicators of the question which are: Level of citizen involvement in the EIA through the AB, Impact of plans proposed by citizens on the EIA, Ability of citizens to propose their plans in the EIA, and the contribution of citizens plans in EIA towards FRR. The results can be seen in table 4-5.

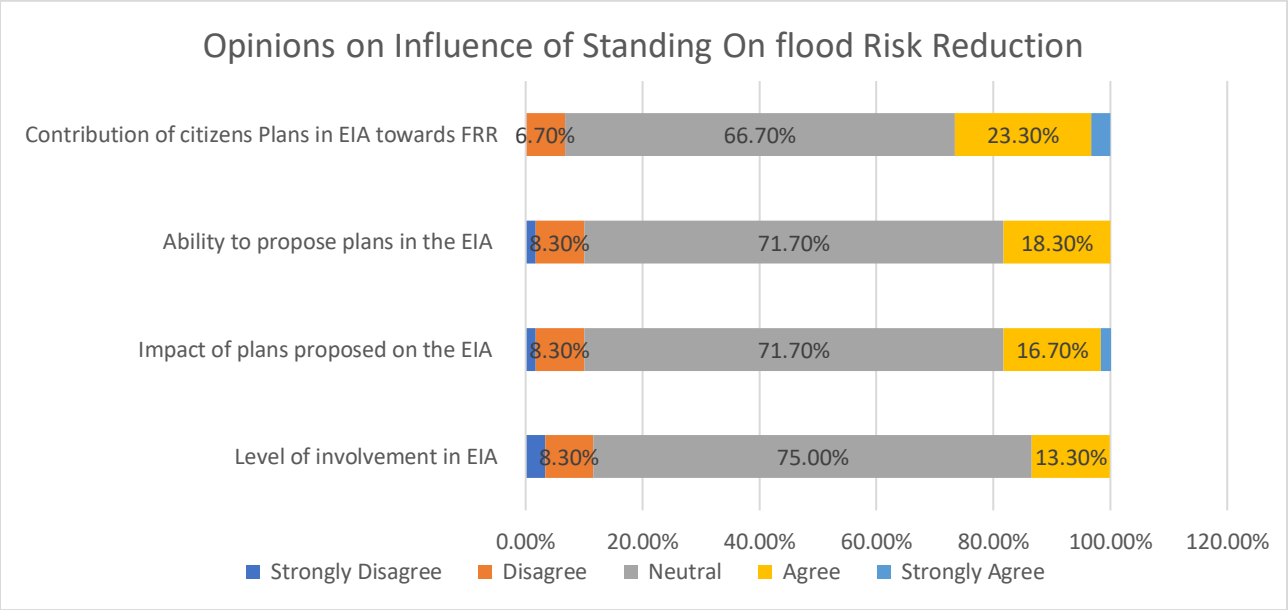
As well, 60 citizens were asked to capture their perception on the same indicators and question, which contributes to triangulation of data. The questionnaires were presented with Likert scale as shown in figure 4-4.

Table 4-5: frequency table summarizing the influence of standing on flood risk reduction in Nijmegen

Indicator	Summary of responses	Frequency
Level of involvement in EIA	Citizens among other parties were actively involved and through representatives during the planning phase	2
Impact of plans proposed on the EIA	The impact of citizens on the plans was relatively low in spite of their high level of involvement	2
Ability to propose plans in the EIA	Citizens were able to propose their plans formally in legal standing	2
Contribution of citizens Plans in EIA towards FRR	During the planning phase and EIA, citizens had no interest in FRR	1

Number of Respondents (N) = 8

Figure 4-4: Survey Results – Opinions of the Influence of Legal Standing on Flood Risk Reduction



Level of citizen involvement in the Environmental Impact Assessment

As large project has to go through an Environmental Impact Assessment, in addition to other assessments, the assessment in this project in particular created a window where citizens could participate and stand along the government in the decision making process, where the EIA presented a third party. However, since this assessment took place at the very early stages before the project commenced, and therefore, only 2 respondent out of the 8 were able to answer the questions related to it.

According to respondent D5, the planning phase of the project was subjected to the environmental impact assessment during which participation were included. Moreover, respondent D8 explained the involvement of citizens during this stage by mentioning *"SEA ad EIA were only one of the eight formal legal plans and assessments: besides for example Waterplan, local destination plan, nature plan. All those plans were discussed in a pre-version with citizens representatives to collect the opinions."*

Furthermore, the respondent carried on describing that the involvement was significant during that stage since it was formal, where citizens among other parties were actively involved.

However, the survey results indicates that 13.3% of citizens both agreed and strongly agreed that they were actively involved in the Environmental Impact Assessment through the advisory boards and committees. Where 11.60% citizens both disagreed and strongly disagreed with the before mentioned statement, and 75% of them had no opinion.

Impact of plans proposed by citizens on the Environmental Impact Assessment

From the interviews conducted, two respondents indicated high level of involvement but low impact, given that the nature of involvement were formal, and that citizens represented an interest group among other groups, each sought to achieve their best interest during that early stage.

For instance, respondent D8 explained that *"Involvement in phase before SEA and EIA was bigger than just formal moment. Of all interest groups (nature, cycling, citizens, history, business) were involved. Nature interest groups were highly involved in shape of whole new area."*

On the other hand, the questionnaires showed that 18.4% of respondents both agreed and strongly agreed with the opinion of citizens significant impact on the project. While 10% disagreed and 71.70% had no opinion on the matter.

Ability of citizens to propose their plans in the Environmental Impact Assessment

2 respondent indicated that citizens were able to involve and propose their plans in the environmental impact assessment and the strategic environmental assessment, through which their plans along the government plans is carefully assessed in legal standing, therefore, neither the government nor the citizens can make the final decisions. But their proposal would be assessed and weighed accordingly. To illustrate, respondent D8 argued that the involvement of all interest groups were formal, and all of them were involved.

However, the survey conducted show that 18.3% of citizens confirmed the opinion stating that they were able to propose plans In both the Strategic Environmental Assessment and Environmental Impact Assessment through the advisory boards and committees, given that 10% of them disagree and strongly disagreed with the opinion, and that the remaining 71.70 had no opinion.

Contribution of citizens plans in the Environmental Impact Assessment towards Flood Risk Reduction

Out of the 8 respondents interviewed, respondent D8 explained that during the EIA, each interest groups addressed their own interest, where nature groups addressed nature issues, and river experts addressed the flood risk and flood protect. Citizens on the other hand, addressed their own interest back then over the interest of Floor risk reduction.

For instance, when asked if the citizens plans back then contributed towards flood risk reduction, he answered *"Hardly to flood protection, that was more influence by river experts."*

On the other hand, the survey results showed that 26% of respondents agreed (both agree and strongly agree) that citizens plans and initiatives proposed in the EIA and SEA have considered flood risk reduction in Nijmegen, and only 6.75% disagree, and 66.70% were neutral.

Summarizing the interview results and questionnaires, legal of standing of citizens did leave a significant impact over the FRR.

Firstly, interviews indicated lack of citizens interest in FRR during the planning phase and EIA, and despite the contradiction observed in the questionnaires, which suggest that legal standing of citizens were made with the interest of FRR in mind, the researcher agrees with the interviews since that earlier stage had many parties and interest groups involved with each party addressing its own interest.

Secondly, the interviews indicated that the impact of citizens plans on the EIA was relatively low despite of the formal nature of involvement at that phase and its high engagement. Therefore, despite the high level of involvement and the fully realization of legal standing as a form of participation, the effect on FRR was not significant.

Thirdly, legal standing offers citizens access government information, which enables them to seek reasons for governmental decisions, and gives them the right to review these decisions by a third party, which in this project was implemented through EIA and SEA that introduced public interest when assessing government decisions (Bishop and Davis, 2002). Therefore, during such stage, citizens participate among other interest groups, each having their own interest rather that the project interest of reducing the flood risk.

These findings are consistent with the argument of respondent D4 who argued that citizens at earlier stages faced the project with opposition keeping their own interest in mind – which can be relatively understood when considering their houses being demolished – However, at later stages, opposition turned into support and citizens worked with the government towards reducing the flood risk in their city and achieving the projects objectives.

4.3.4 Flood Risk Reduction in Room for the Waal Project

The objective of this sub-sections is to answer the sub-research question: What flood risk management measures were implemented during the Room for the Waal project and its contribution to flood risk reduction in Nijmegen?

8 experts were interviewed to answer the question and were presented with 2 indicators of the question which are: Water level, and discharge capacity.

Moreover, the results will be compared with secondary data which would contribute to triangulation. The results are shown in table 4-6.

Table 4-6: frequency table summarizing Flood risk reduction taking place in Nijmegen

Indicator	Summary of Responses	Frequency
Water level	The project succeeded in lowering the river Waal maximum level up to 35 centimeters, which is more than the originally planned 27 centimeters.	3
Discharge capacity	Measures implemented led to increasing the peak discharge capacity by 3,000 cubic meters per second	5

Number of Respondents (N) = 8

The flood risk in Nijmegen was reduced through the implementation of two measures, which lowered the water level in the river Waal, and increased its maximum discharge capacity.

Water level reduction in the river level

The flood risk was centered at the bottleneck of Nijmegen, which resulted in large volumes of water having to force their way through the narrow passage at periods of high water and was one of the areas where the river is to be widened through relocation of the dikes. In addition to a new channel was excavated in the floodplain on the Lent side of the river.

3 respondent indicated that the project intended to lower the floodplain/river level 27 centimeters, but succeeded in lowering the level up to 31-35 centimeters. Respondent D8 illustrated saying "*the two measures increased flood protection through lowering of the water level in the Waal by 35 cm."*

Similarly, in an official statement, the Dutch Minister of Infrastructure and Environment Rijkswaterstaat stated that as a result of the Room for the River measures, the water river of the river Waal dropped by 34 centimeters, and that by widening the river, the flood risk has been considerably reduced in Nijmegen and the surrounding upriver area (Government of the Netherlands, 2015).

Increase in discharge capacity of the river

5 respondents indicated that the measures implemented led to increase of the peak discharge capacity of the river Waal by 3,000 cubic meters per second, given that the river before the measure was able to accommodate a peak discharge of 15,000 meters per second, and now it is able to handle 18,000 per second to meet the safety standards.

To put this into perspective, respondent D4 mentioned that the floods of 1995 peaked to a capacity of 16,000 meters per second, and added that "*as you can see in the year 2100 peak discharge will rise up to 18,000 cubic meters per second, so the measure taken would be to withstand this maximum capacity for 100 years."*

Correspondingly, the national Delta Programme; a governmental Dutch flood risk management program involves national government, provinces, municipalities, water boards, Rijkswaterstaat, and NGOs, explained that the Rhine river had been designed to withstand a peak discharge of 15,000 thousand cubic meters per second, however, Room for the River measures boosted that number up to 16,000 cubic meters per second. Given that the Waal is the largest branch of the river Rhine.

However, the Delta Programme addressed the recent national and international studies and climate scenarios, that addressed rising temperatures due to melting snow, additional precipitation, increment is Rhine discharge during winter, then translated these scenarios into discharge levels to find out that peak discharge in the Netherlands will range from 17,000 to 22,000 cubic meters per second or more by 2100.

Therefore, the Delta Programme incorporated the 18,0000 meters per second in the key planning decision of the Room for the river program. These findings are consistent with the interview results (Delta Programme, 2020).

Chapter 5: Conclusion

5.1 Introduction

In light of the findings discussed in the previous chapter, the aim of this chapter is to answer the main research question by presenting the answers for the sub-research questions. In addition to addressing the practical implications of the research, the limitations of the findings, and the recommendations for future research.

Based on the results from the interview and questionnaires, and linking with literature. This chapter will answer this question "to what extent have the stakeholder participation influenced flood risk reduction in Room for the Waal project in Nijmegen?"

5.2.1 Sub-research Question 1

How did the consultation of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

From the findings of the interviews, it is concluded that consultation of stakeholders ***strongly influences*** the flood risk reduction,

Firstly, the interviews results have shown that the citizens were actively involved and engaged through various consultation instruments, secondly, literature that defines consultation by (Bishop and Davis, 2002) suggest that this type of stakeholder participation implies that the government gather information from citizens and ensure that their feedback is considered when decision is made.

Therefore, the government gained more knowledge when considering reducing the flood risk in Nijmegen through consultation, through which it gained significant feedback and local experience from the well informed citizens living in the area.

Accordingly, the government's objective of reducing flood risk was effectively achieved without the obstruction or the impeding of citizens self-interest or opposition since this level of participation indicates that the final decisions will always be made by the government, that aimed at risk reduction as its ultimate goal.

Building on that, it is concluded that consultation of citizens can indeed influence flood risk reduction, given that through consultation, citizens provide their expertise and knowledge on the area, where in this case study citizens had provided opinions supported by experts, and had local knowledge in the flood risk of their city since they were living in the area.

To support these findings, literature shows that this type of participation in flood risk management is widely considered an effective component for efficient, effective, and inclusive disaster-risk reduction (Hore, Gaillard, Davies and Kearns, 2020).

As for the questionnaires, it was not possible to capture the perception of citizens on consultation as the majority were inclined to choose neutral in there responses. However, there is a remaining trend which shows consistency with the interviews findings.

Accordingly, in light of the interview results with experts supported by literature, and given the impossibility of capturing concrete citizens perception on participation through the questionnaires,

the researcher agrees with the interview findings and conclude that consultation indeed strongly influence flood risk reduction.

5.2.2 Sub-research Question 2

How did the partnership of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

Partnership is the second sub-variable of stakeholder participation where citizens had more authority in the decision making than consultation through boards and committees.

From the interview findings, it is concluded that partnerships between citizens and government ***moderately influences*** the flood risk reduction.

Firstly, partnerships influenced FRR because it shifts opposition into support that aims toward reducing the risk rather that aiming at self-interest. For this case study, the government had to demolish 50 households to achieve the project objectives, in order to reduce the flood risk in Nijmegen, given that the households cannot exist on the floodplain, they had to be demolished. Which created opposition and conflict of interest.

But the participative approach of the government shifted the opposition into support, after which the citizens were geared more towards flood risk reduction, respondent D2 mentioned *"I think the flood risk is also in their own interest."* Also respondent D3 said *"then at some point, they realize this is going to happen. It is needed. There is the risk of flooding. It's going to happen. So if we cannot avoid it, let's work together and find the best solution possible."*

Secondly, partnerships occur in more organized form than individual level, where citizens are presented through advisory boards, as shown in this case study, these boards had enough capability to mobilize different resources towards reducing flood risk, which was demonstrated through their alternative plan, which were support by water experts hired by citizens.

However, partnerships could face issues of accessibility of citizens to boards, which makes it hard for them to voice their concerns, in addition to the opposition that can gain more organizational stance through the board, which eventually might obstruct the implementation of FRM projects, Therefore, although partnerships can influence FRR, its influence is not as effective as consultation.

The results of the questionnaires, on the other hand, could not capture the perception of the citizens on stakeholder participation, since the majority of respondent of the survey were neutral. However, there is a remaining a trend that is consistent of the findings of the interviews.

Nonetheless, literature emphasize and affirms the importance of partnership between citizens and government in risk reduction, arguing that it is crucial for disaster risk reduction. For instance, Poterie and Baudoin (2015) concluded that partnerships and involvement of local stakeholders and communities is critical component for disaster risk reduction and successful development.

5.2.3 Sub-research Question 3

How did the standing of stakeholders influence the reduction of flood risk in Room for the Waal project in Nijmegen?

From the findings of interviews and questionnaires, it is concluded that the legal standing of stakeholders ***slightly influences*** the reduction of flood risk.

The linkage between legal standing and flood risk reduction was quite weak since according to the interview findings, citizens did not consider it on their agenda during the EIA. For instance, when respondent D8 was asked if citizens shared interest with government in FRR, he replied "*"Hardly to flood protection, that was more influence by river experts."*

Therefore, The interview results implies that there was no relationship between sub-variable legal standing and flood risk reduction, as citizens in the case study during the EIA phase did not consider flood risk reduction in their alternative plan.

In support of this argument, according to three room for the river case studies (Edelenbos et al, 2016) concluded that citizens plans during the EIA did not consider long term climate-effect, where the government plan had considered climate change in their flood risk reduction goal that aimed to cope with the changes for 100 years, in order to adapt to rising levels of water.

On the other hand, questionnaires could not lead to a concrete conclusion, yet there is a remaining trend that contradicts the results of the interviews, given that citizens were more inclined to express their interests in FRR during the EIA, however, the researcher agrees with the interview findings since it is impossible to capture the perception of citizens in the survey, who chose to be neutral.

However, the relatively strong relationship between consultation, partnership with FRR compared to weak relationship of standing and FRR could be interpreted, firstly, through (Arnstein, 1969) ladder of participation, that classifies participation according to its strength on the participation ladder: since the role that was given to this platform (citizen advisory board) was actually was low on the participation ladder, and since legal standing is relatively high level of participation where citizens take their proposal formally to courts and third parties, it did not play a crucial role since most of the participation in the project took place informally only in consultation and partnerships. Which legal standing insignificant in the project.

5.2.4 Sub-research Question 4

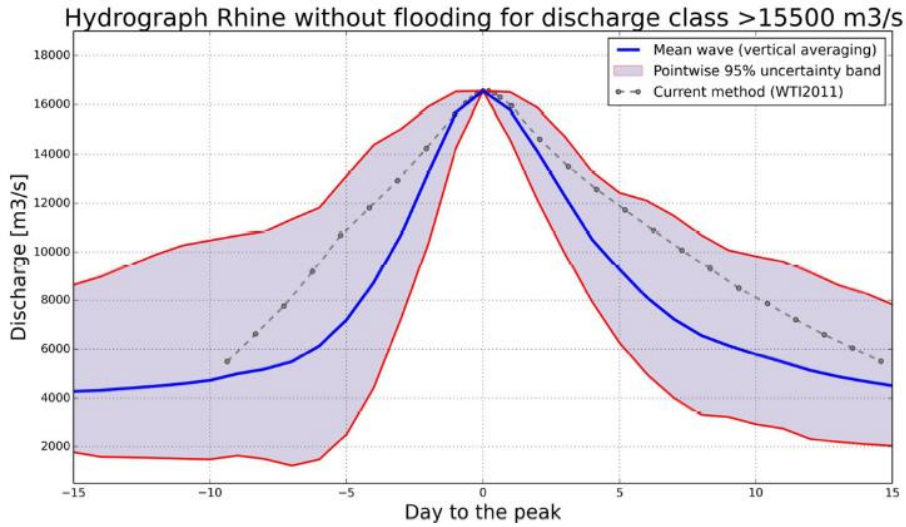
What flood risk reduction measures were taken during the Room for the Waal project and its contribution to flood risk reduction in Nijmegen?

From the findings of the interview and the secondary data, it is concluded that the measures implemented significantly reduced the flood risk in Nijmegen.

According to the interview findings, the project implemented two measures, Dike relocation and secondary channel digging, both measures implemented with the aim of reducing the flood risk in Nijmegen through reducing the river water level by 27 centimetres, but it was able in reducing the level 34 centimetres. Moreover, it succeeded in increasing the peak discharge capacity by 3,000 cubic meters per second, which can withstand flooding events up till the year 2100.

Based on literature, a report on discharge extremes of the rivers Rhine and Meuse was prepared for Rijkswaterstaat by both RIZA and KNMI institutions, which generated the following hydrograph (Hegnauer et al., 2014).

Figure 5-1: Flood Hydrograph for the Rhine.



Source: (Hegnauer et al., 2014)

As shown in figure 5-1, the peak discharge corresponds with the 1250-year discharge of 16,560 m3/s, while, the implemented measures increased the maximum discharge capacity to 18,000 m3/s, meaning that the capacity was increased above the peak value to withstand the flooding events, which concludes that the implemented measures significantly reduced the flood risk in Nijmegen in line with the literature (Delta Programme, 2020; Government of the Netherlands, 2015; Climate-Adapt, 2020).

5.2.5 Main Research Question

To what extent have the stakeholder participation influenced flood risk reduction in Room for the Waal project in Nijmegen?

In line with the findings from the sub-research question, it is concluded that stakeholder participation ***largely influences*** flood risk reduction, through consultation that made the most significant impact, followed by partnership with moderate influence, and finally legal standing that had slight influence.

This conclusion is based on the findings of the interviews since the survey results failed to provide a concrete standing on the perception of citizens on participation, as most of them were inclined to be neutral in their response.

However, literature shows that it is not possible to judge whether respondents choose neutral out of lack of knowledge or lack of point of view (Blasius and Thiessen, 2001).

Nonetheless, if respondents chose neutral due to lack point of view, literature suggests that this choice depends largely on the characteristics of the respondents themselves, such as educational level, political views, age, and the like. Therefore, the researcher thinks that the political views of respondents on this project, such as opposition could explain the major neutrality (Blasius and Thiessen, 2001).

On the other hand, if respondents chose neutral due lack of knowledge on this project, the researcher thinks that such results conclude that the government was not effective in its consultation instruments; newsletters and information meetings, as citizens did not show sufficient knowledge on the project

But regardless of the inability of capturing citizens perception on stakeholder participation through the survey, due to the neutral majority, there is a remaining trend in the questionnaires that is consistent with the interviews results in both consultation and partnerships, the researcher agrees with the interview findings on legal standing because of the support of literature.

These findings are consistent with the literature as it shows that participation in flood risk management is widely considered an effective component for efficient, effective, and inclusive disaster-risk reduction (Hore et al., 2020; Edelenbos et al, 2016; Poterie and Baudoin, 2015).

Finally, Table 5-1 represents co-occurrence table generated with software Atlas.ti, which shows how many times codes of the sub-variables (consultation, partnership, standing) co-occurred with the codes of flood risk reduction. This table represents an interesting indicator on the relationship between these variables, where it counts the number of times when the respondents mentions both codes in the same sentence or response.

From the numbers of the tables, it can be seen how consultation is closely related with FRR (with 10 co-occurrences) followed by partnerships with FRR with 9, and finally standing that had only 1 co-occurrence.

This indicator points at the same strength of relationships as concluded in the study, as consultation had the biggest influence, followed by partnership, and finally with legal standing.

Table 5-1: Table of Co-occurrences

	Flood Risk Reduction Occurrence = 34
Consultation Occurrence = 36	10
Partnership Occurrence = 37	9
Standing Occurrence = 5	1

5.3 Practical Implications

Under the recent widespread recognitions of the importance of the stakeholder participation and the transition taking place in water management towards both participatory and more natural approach, the research results led the research into observing top down approaches in decision making at the national level.

In addition, although the local government levels were in continuous communications with citizens, the national levels of the government had not been following citizens' concerns and interests in the project taking place.

Moreover, the hierarchy of decision making at technical level in water management in the Netherlands is still taking place, which impedes the transition towards participatory approaches.

Furthermore, citizens still in favor of structural engineering measures over natural measures, which was observed during the planning phases in the EIA.

Therefore, it is crucial to highlight the importance of the transition towards adaptive water solutions rather than the Dutch dike heightening traditional solutions, given that citizens role in decision making will increase over the years in light of the growing role of participation. In

addition to emphasizing the importance of shifting toward natural and integrated approaches in water management, given that such knowledge should be spread to citizens and not be limited to water managers.

Finally, although the government did involve citizens in certain aspects of the decision making, citizens were not consulted on a national level, but rather were confronted with the government plan. Accordingly, it is recommended to involve citizens also on that level since the findings show that their involvement contribute to a better plan, and therefore better flood risk reduction, given that stakeholders may bring specific knowledge or specific local knowledge, experiential knowledge, which can be relevant to developing a better plan

5.4 Limitations and Recommendations for Future Research

Time posed a significant limitation to the researcher, as it restricted him in one case study rather than more, it would be interesting if a future research conducted two case studies of room for the river project, where participation varied in each, to compare how it affected the outcomes of each project.

Also, time forced the researcher into choosing the public as the stakeholder of the study, stakeholder participation is not limited by citizens, but other stakeholder are involved, therefore, it would be interesting if future research studied the influence of various stakeholders on flood risk reduction.

Moreover, The neutrality of the survey results posed a challenge of the researcher, which made it impossible to capture the perception of citizens. However, future research could use different form of Likert scale that would limit the respondent into choosing different responses other than neutral.

Furthermore, more research is required to study more variables that would influence flood risk reduction, such as opposition of citizens, and hierarchy of decision making. In addition to factors that would possibly influence participation in flood risk management projects, such as proximity to project, citizens enthusiasm, transparency of government decisions.

Finally, the results of this research cannot be generalized since it is a single case study, therefore, a future research could conduct a survey to generate more reliability for the research.

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Annex 1: Interview Questions

A. Introduction

Introducing the researcher's personal background and purpose of the study, in addition to reference for interview time and request to record the interview and use of data analysis.

B. Questions

1. From your position as an expert involved in the Room for the Waal project, can you please give a brief description about Room for the Waal project in Nijmegen and Room for the River program in the Netherlands?
2. Room for the Waal project objective was reducing flood risk in Nijmegen, can you please explain how did the project contribute towards flood risk reduction, and to what extent it reduced the frequency and magnitude of floods in Nijmegen?
3. Stakeholder participation played a crucial role in the project, and citizens were involved and consulted through various instruments, to what extent were the citizens involved through these instruments; interactive workshops, meetings, and newsletters?
4. From you own perspective, to what extent have the citizens input from the workshops have had an influence on the final decision making?
5. What do you think about the citizens understanding of the project and its objectives in terms of flood risk reduction?
6. Would you consider that the citizens have provided opinions and feedback and plans on how to reduce the flood risk in Nijmegen during the project?
7. Citizen Advisory board and committee were formed to present citizens interests and concerns in the project, to what extent have citizens been involved and represented through these boards and committees? And have they had significant affect on the final decision making?
8. How did the government react to citizens strategies and initiatives during the project?
9. Do you think that the advisory boards shared interest with the government towards reducing the flood risk and achieving the project goals?
10. Can you give a brief description on the Strategic Environmental Assessment and Environmental Impact Assessment and the influence of stakeholder participation?
11. What was the level of citizens involvement in Strategic Environmental Assessment and Environmental Impact Assessment and the impact of their proposed plans on it?
12. Were the citizens able to propose their plans through the EIA, if yes, please explain?
13. To what extent did the citizen propose plans in the EIA that would have contributed towards flood risk reduction?
14. Much obliged, Would you like to share other information with me regarding the project and the influence of stakeholder participation on it?

Annex 2: Questionnaires in Dutch

Hoi!

Mijn naam is Qusai, student van de Erasmus Universiteit aan het Instituut voor Wonen en Stedenbouwkunde, ik onderzoek hoe burgerparticipatie het Ruimte voor de Waal project in Nijmegen beïnvloedde; onderdeel van het nationale programma voor waterveiligheid Ruimte voor de Rivier.

Jouw deelname aan deze enquête zou moeten helpen om mijn Master's degree in Urban Management and Development te behalen. Naast het geven van aanbevelingen aan regeringen om uw betrokkenheid bij vergelijkbare projecten te verbeteren om betere resultaten te behalen.

Hartelijk dank voor uw deelname.

	Algemene informatie	
1	Hoe oud ben jij?	☐ <20 ☐ 20 - 30 ☐ 30 - 40 ☐ 40 - 50 ☐ >50
2	Woon je in Lent (Nijmegen)?	☐ Ja ☐ Nee
3	Kent u het Project Ruimte voor de Rivier Waal?	☐ Ja ☐ Nee
Neem de volgende verklaringen door en selecteer de optie waarmee u het meest akkoord gaat		
	Raadpleging van belanghebbenden	
5	Burgers waren actief betrokken bij de interactieve werkplaats en vergaderingen van het project	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
6	De informatie tijdens de informatiebijeenkomsten was voldoende en van hoge kwaliteit	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
7	Bijeenkomst en werkplaats van het project waren frequent en voldoende	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn

		☐ Helemaal mee oneens
8	Invoer en feedback van burgers tijdens de werkplaats en bijeenkomsten hadden invloed op de uiteindelijke besluitvorming	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
9	De overheid heeft de kennis van de burgers in het project erkend	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
10	Burgers hadden voldoende kennis en begrip van het project en de doelstellingen ervan	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
11	Burgers hebben tijdens werkplaats en bijeenkomsten hun mening en mening gegeven over de beperking van het overstromingsrisico	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
	Partnerschap met belanghebbenden	
12	Adviesraden en commissies van burgers hebben invoer geleverd die invloed heeft gehad op de uiteindelijke besluitvorming	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
13	Burgers waren adequaat vertegenwoordigd via de adviesraden en commissies	☐ Sterk mee eens ☐ Mee eens

		☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
14	Tijdens het project zijn middelen van burgers ingezet om de doelstellingen te bereiken en het overstromingsrisico in Nijmegen te verminderen	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
15	Overheid heeft positief gereageerd op strategieën en initiatieven van burgers	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
16	De adviesraden en commissies hebben samen met de overheid belangstelling voor het verminderen van het overstromingsrisico in Nijmegen	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
17	Adviesraden en commissies waren tijdens het project significant betrokken bij het besluitvormingsproces	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
	Status van belanghebbenden	
18	Burgers waren via adviesraden en commissies actief betrokken bij de strategische milieueffectbeoordeling en milieueffectrapportage	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
19	Plannen die door burgers via adviesraden en commissies werden voorgesteld, hadden een impact op het project	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens

20	Burgers konden hun plannen voorstellen in de strategische milieueffectbeoordeling en milieueffectbeoordeling via adviesraden en commissies	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens
21	In de Strategische Milieubeoordeling en Milieueffectrapportage voorgestelde burgerplannen en initiatieven is overwogen om het overstromingsrisico in Nijmegen te verminderen	☐ Sterk mee eens ☐ Mee eens ☐ Neutrale ☐ Het oneens zijn ☐ Helemaal mee oneens

Annex 3: Questionnaires in English

Hi!

My name is Qusai, a student of Erasmus University at Institute for Housing and Urban Development Studies, I am researching how citizen participation influenced Room for the River Waal project in Nijmegen; part of the national flood risk management program Room for the River.

Your participation in this survey should help fulfil my Master's degree in Urban Management and Development. In addition to providing recommendation to governments on improving your engagement in similar projects to achieve better outcomes.

Thank you for your participation.

	General Information	
1	How old are you?	☐ <20 ☐ 20 - 30 ☐ 30 - 40 ☐ 40 - 50 ☐ >50
2	Do You live in Lent (Nijmegen)?	☐ Yes ☐ No
3	Are you familiar with Room for the River Waal Project?	☐ Yes ☐ No
Please go through the following statement and select the option you agree with the most		
	Consultation of Stakeholders	
5	Citizens were actively engaged in the interactive workshops of the project	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
6	Information provided in the information meetings were sufficient and of a high quality	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
7	Meeting and workshops of the project were frequent and sufficient	☐ Strongly Agree ☐ Agree ☐ Neutral

		☐ Disagree ☐ Strongly Disagree
8	Citizens input and feedback during the workshops and meetings had influence on the final decision making	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
9	The government have recognized the citizens knowledge in the project	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
10	Citizens had sufficient knowledge and understanding of the project and its objectives	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
11	Citizens have expressed opinions and views on flood risk reduction during workshops and meetings	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
	Partnership with stakeholders	
12	Citizens advisory boards and committees have provided input that had influence on the final decision making	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
13	Citizens were presented adequately through the advisory boards and committees	☐ Strongly Agree

		☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
14	Resources of citizens were mobilized during the project towards achieving the objectives and reducing the flood risk in Nijmegen	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
15	Government have shown positive response to citizens strategies and initiatives	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
16	The advisory boards and committees have shared interest with the government on reducing the flood risk in Nijmegen	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
17	Advisory boards and committees were significantly involved in the decision making process during the project	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
	Standing of stakeholders	
18	Citizens were actively involved in the Strategic Environmental Assessment and Environmental Impact Assessment through advisory boards and committees	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
19	Plans proposed by citizens through advisory boards and committees had an impact on the project	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

20	Citizens were able to propose their plans in the Strategic Environmental Assessment and Environmental Impact Assessment through advisory boards and committees	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
21	Citizens plans and initiatives proposed in the Strategic Environmental Assessment and Environmental Impact Assessment have considered reducing flood risk in Nijmegen	☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Annex 4: SPSS Results

Reliability Test

Cronbach Alpha test results

Consultation

Reliability Statistics	
Cronbach's Alpha	N of Items
.746	7

Partnerships

Reliability Statistics	
Cronbach's Alpha	N of Items
.848	6

Standing

Reliability Statistics	
Cronbach's Alpha	N of Items
.689	4

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Annex 6: List of Respondents

Code	Position	Organization	Source	Interview Duration
D1	Communications representative	Local Government (Municipality of Nijmegen)	Snowball	45 Min
D2	Academic Research Expert involved in the project	Erasmus University/ Academic Expert	Snowball	32 Min
D3	Academic Expert who conducted case study on the project	Erasmus University/ Academic Expert	Secondary Data	33 Min
D4	Stakeholder Manager	Local Government (Municipality of Nijmegen)	Snowball	58 Min
D5	Academic experts involved in the project	Erasmus University/ Academic Expert	Snowball	37 Min
D6	Academic Expert involved in the project	Radboud University/ Academic Expert	Snowball	48 Min
D7	Program leader	Regional Government (Gelderland Province)	Secondary Data	36 Min
D8	Environment Manager for the Room for the Waal Nijmegen project	National Government (Rijkswaterstaat)	Secondary Data	41 Min

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