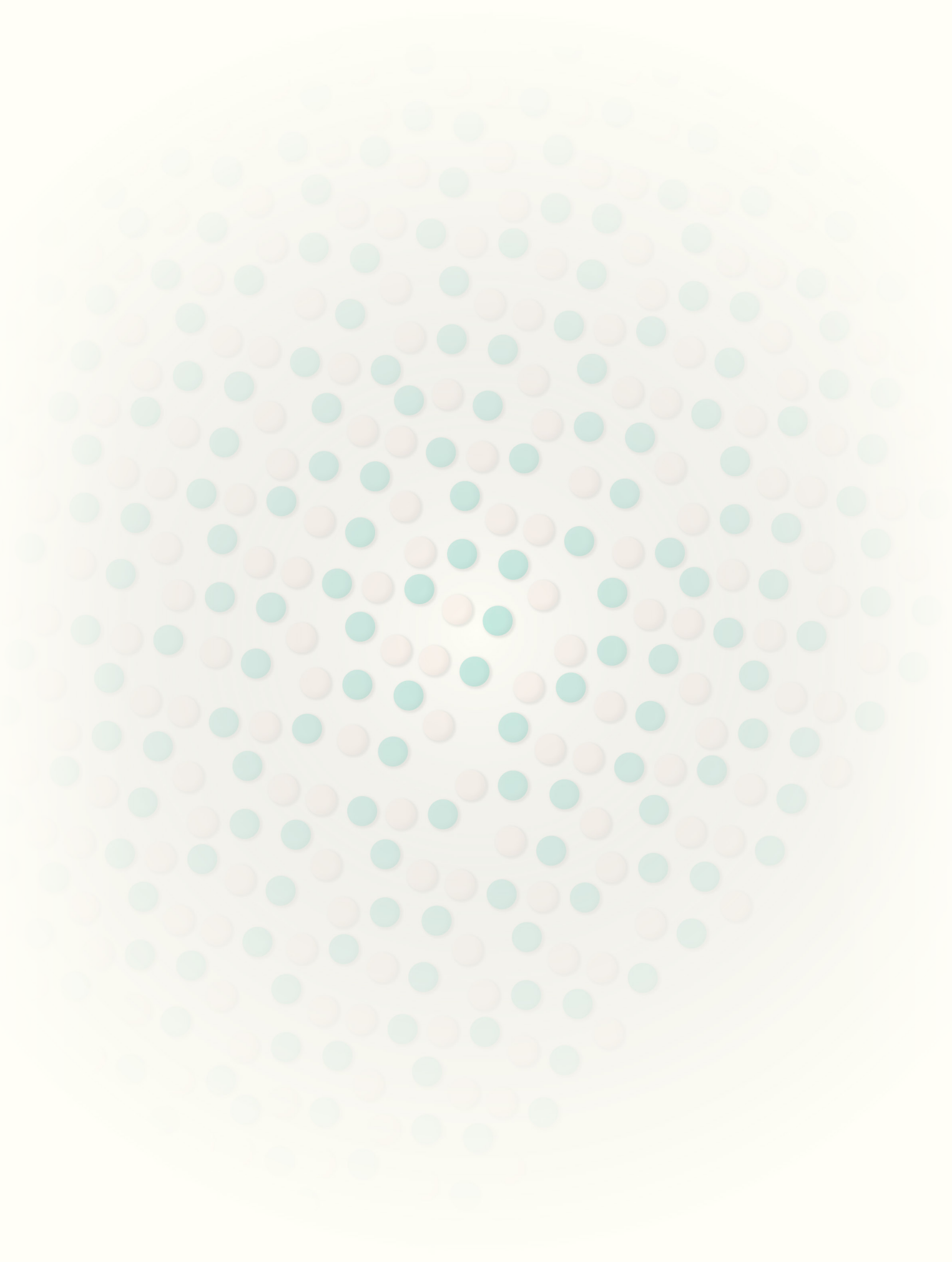


Local Voices, Lasting Change

Green Space as a Tool for Climate Justice in
Rotterdam's Oude Noorden



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Master Thesis

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PREFACE

Dear reader,

This thesis marks the conclusion of my master’s journey in Strategic Product Design at Delft University of Technology.

Over the past months, I have been immersed in the neighbourhood of Oude Noorden in Rotterdam, working with residents, community organisations, and multiple stakeholders on the question of how climate justice can be made tangible at a local scale.

What began as an interest in the intersection of design, justice, and climate became an opportunity to work closely with residents and local organisations. Spending time in the neighbourhood, learning from everyday practices, and engaging with different perspectives proved invaluable.

These experiences not only deepened my understanding of systemic design, but also strengthened my belief in the importance of modest, community-rooted interventions that can contribute to broader transitions.

I would like to express my gratitude to all those who supported me along the way. First and foremost, I thank the residents and organisations in Oude Noorden for their openness, time, and contributions, which gave this project its meaning.

I am grateful to my supervisors, Jotte and Sine, for your guidance throughout this process. Your feedback, encouragement, and sharp questions pushed me to reflect critically and to stay focused, even when the scope of the project felt overwhelming at times.

A special thanks to Seline, who guided me through the neighbourhood and supported me in building connections. Your local knowledge and commitment were inspiring and made it possible to engage with residents and stakeholders in meaningful ways.

Thank you, Debbie and Adam, for always having my back and supporting me whenever I needed it. Your patience, encouragement, and belief in me made all the difference during this journey.

Finally, I want to thank my friends, family members, and everyone who has supported me along the way. Your encouragement gave me the energy to complete this project and to enjoy the process from beginning to end.

I hope you enjoy reading this thesis as much as I enjoyed creating it.

Fred Nyarko
Delft, August 2025

EXECUTIVE SUMMARY

Cities are increasingly confronted with the impacts of climate change, yet the burdens of these impacts are not shared equally. Neighbourhoods with fewer resources, higher levels of precarity, and weaker institutional support are often the most exposed while having the least influence in shaping adaptation measures. This thesis explores how design can contribute to advancing climate justice in such contexts, with Rotterdam’s Oude Noorden serving as the case study.

The project was guided by the question: How can systemic design contribute to making climate justice tangible at the neighbourhood scale? The work builds on a literature review of climate justice, systemic design, and resilience, combined with extensive field research in Oude Noorden, including interviews, participatory workshops, and stakeholder mapping. Together, these insights highlighted persistent dynamics of power imbalance, procedural injustice, and constrained community capacity that limit just adaptation.

From these findings, the project focused on designing a modest but intentional intervention: De KlimaatKalender. Developed as a low-barrier, analog resource, the calendar translates abstract ideas of climate adaptation into weekly, locally relevant actions. It incorporates stories and practices from residents, connecting them with neighbourhood green spaces and seasonal rhythms. The design choices were deliberate: using an analog format to lower barriers for participation, valuing lived experience to support recognition justice, and fostering collective ownership through co-created content.

Testing of the KlimaatKalender revealed that while it cannot on its own overcome structural barriers or shift institutional priorities, it plays a valuable role in making climate action tangible, accessible, and rooted in daily life. Residents appreciated its simplicity and local relevance, and it showed potential for strengthening

community identity, building trust, and creating entry points for broader coalitions of change. At the same time, limitations were observed: engagement could have been more diverse, the evaluation period was short, and long-term sustainability requires stronger partnerships without undermining local ownership.

The thesis concludes that modest, community-rooted interventions like the KlimaatKalender can serve as prefigurative steps toward climate justice. They do not solve systemic problems, but they can seed recognition, foster participation, and build momentum for wider transitions. Pathways forward include deepening community co-creation, embedding interventions in co-governance structures, and exploring networked adaptation across Rotterdam neighbourhoods. These directions align with municipal strategies such as Resilient Rotterdam 2022–2027, Rotterdams WeerWoord 2030, and Klimaatrechtvaardig Rotterdam, while contributing to the broader literature on systemic design and justice.

Ultimately, the project demonstrates that design’s contribution lies not in grand solutions but in opening spaces where residents and institutions can meet, experiment, and imagine together. By translating abstract climate challenges into everyday practices, tools like the KlimaatKalender help bridge the gap between justice as a principle and justice as lived experience.

GUIDELINES

DEFINITIONS

- Climate Justice**
Fair treatment in climate action, making sure that communities most affected, often low-income or marginalized, are centered in adaptation decisions. Climate injustice refers to the opposite, where vulnerable groups bear the greatest risks with the least resources.
- Distributive Justice**
The fair allocation of environmental benefits and burdens such as access to green space, shading, and flood protection.
- Green Expert**
A professional with expertise in sustainable urban design, ecology, or environmental planning who guides and supports community-based green initiatives.
- Green Space**
Elements and areas including trees, gardens, and green roofs that provide shade, cooling, biodiversity, and social value.
- Procedural Justice**
Fairness in decision-making processes, including who participates, how they are involved, and how their perspectives are incorporated.
- Recognition Justice**
The inclusion and valuing of diverse identities, histories, and lived experiences in climate-related decisions and policies.
- Systemic Design**
A design approach that addresses interconnected challenges through systems thinking, stakeholder collaboration, and iterative prototyping.
- Vulnerability**
The degree to which people or places are exposed and sensitive to climate risks, shaped by social, economic, and physical conditions.

REPORT STRUCTURE

- 1.0 Introduction**
Introduces the urgency of climate injustice in Oude Noorden and outlines the project’s aim, research questions, and systemic design approach.
- 2.0 Reviewing the Background**
Presents key theories on climate change, justice, and systemic design, and connects them to the Dutch and Rotterdam-specific policy context.
- 3.0 Context Analysis**
Analyzes the neighbourhood’s spatial, environmental, and social conditions, identifying climate vulnerabilities and gaps.
- 4.0 Empathizing with the Community**
Presents insights from community engagement, including interviews and observations, highlighting lived experiences and barriers to participation.
- 5.0 Defining the Design Space**
Reframes the design challenge based on systemic insights, identifies leverage points, and establishes a vision to guide the intervention.
- 6.0 Bringing the Intervention to Life**
Introduces multiple design concepts, shares community feedback, and details the development of the final intervention, including prototyping.
- 7.0 Evaluation and Feedback**
Presents feedback from residents and experts to understand how the intervention is received, what works, and identifying lessons for refinement and scaling.
- 8.0 From Prototype to Practice**
Outlines a phased implementation plan, including roles for community actors, partnerships, and funding pathways.
- 9.0 Future Directions and Reflection**
Reflects on personal and project learnings, remaining challenges, research and policy impact, and future collaboration.

VISUAL ELEMENTS

- In this report, recurring visual elements are included to reinforce and clarify the written content. The most common of these cues are outlined and explained below.
- **Yellow Background**
Intermediate findings that emerged during the research process. These highlight patterns, observations, and early conclusions that guided the next steps in the design process. They provide a bridge between raw data and final insights, allowing the reader to follow the evolution of the project’s thinking.
- **Dark Green Background**
Section findings or takeaways that summarize the key conclusions at the end of each major section. These statements reflect the most important learning points into messages that connect to the project’s objectives.
- **Highlighted Text**
Quotes gathered during the design research are highlighted in green to draw attention to lived experiences and personal perspectives. This visual emphasis increases the communicative power of qualitative findings and ensures that the voices of community members remain central throughout the report.
- **Light Green Boxes**
Statements, project directions, analytical insights, or major decisions made during the course of the project. These highlight pivotal points in the process where choices were made that shaped the direction and outcome of the work.

TABLE OF CONTENTS

1.0 INTRODUCTION	10	6.0 BRINGING THE INTERVENTION TO LIFE	102
1.1 INTRODUCTION		6.1 CONCEPT DEVELOPMENT	
1.2 THE PROJECT		6.2 CONCEPTS	
1.3 PROJECT APPROACH		6.3 IMPRESSION OF THE NEIGHBOURHOOD (SUMMER)	
1.4 FROM BROAD TO FOCUSED		6.4 FROM IDEA TO INTERVENTION	
		6.5 THE FINAL DESIGN	
2.0 REVIEWING THE BACKGROUND	16	7.0 EVALUATION AND FEEDBACK	124
2.1 CLIMATE CHANGE		7.1 EVALUATION AND FEEDBACK	
2.2 CLIMATE JUSTICE		7.2 REFLECTING ON THE DESIGN REQUIREMENTS	
2.3 ROLE OF SYSTEMIC DESIGN IN ADDRESSING LOCAL CHALLENGES		7.3 FEEDBACK AND INSIGHTS	
2.4 CASE STUDIES		7.4 EVALUATION LIMITATIONS AND NEXT STEPS	
		7.5 OPPORTUNITIES FOR SCALING	
3.0 CONTEXT ANALYSIS	32	8.0 FROM PROTOTYPE TO PRACTICE	140
3.1 IMPRESSION OF THE NEIGHBOURHOOD (FALL/WINTER)		8.1 PHASED ROLLOUT AND KEY ACTORS	
3.2 NEIGHBOURHOOD PROFILE: OUDE NOORDEN		8.2 FUNDING AND PARTNERSHIPS	
3.3 CURRENT CLIMATE RISKS IN OUDE NOORDEN		8.3 MEASURING SUCCESS AND ENABLING LASTING CHANGE	
3.4 INTERCONNECTED RISKS			
4.0 EMPATHIZING WITH THE COMMUNITY	56	9.0 FUTURE DIRECTIONS AND REFLECTION	150
4.1 METHODOLOGY		9.1 JUSTICE BEYOND DESIGN: POWER AND RESISTANCE	
4.2 COMMUNITY PERSPECTIVES		9.2 CHALLENGES AND LIMITATIONS	
4.3 STAKEHOLDER AND POWER DYNAMICS		9.3 PATHWAYS FORWARD FOR COMMUNITY, RESEARCH, POLICY	
4.4 LOCAL VOICES: INTERVIEWS		9.4 JUSTICE, SYSTEMS, AND DESIGN: WHAT I LEARNED	
4.5 PRIVILEGED VS DISADVANTAGED			
4.6 SYSTEMIC BARRIERS TO CLIMATE JUSTICE IN OUDE NOORDEN			
5.0 DEFINING THE DESIGN SPACE	88	10.0 REFERENCES	162
5.1 CREATIVE SYNTHESIS SESSIONS			
5.2 REFRAMING THE SCOPE		11.0 APPENDIX	166
5.3 DESIGN VISION			
5.4 THE DESIGN GUIDELINES			
5.5 MALMÖ UNIC CONFERENCE			

SECTION 1.0

INTRODUCTION

This section will introduce the research topic, outlining the importance of climate justice in Oude Noorden. It will present the research problem, objectives, and key questions guiding this project. Additionally, it will provide an overview of the approach taken towards solving the described problem.



SECTION 1.1

INTRODUCTION

Climate change is one of the most pressing global challenges of our time, causing rising temperatures, unpredictable weather patterns, and increasing sea levels that profoundly impact our living environment. Cities like Rotterdam encounter problems due to climate change, with neighbourhoods experiencing a range of environmental stresses, from intensified flooding and extreme heat to strains on infrastructure.

For Rotterdam, addressing climate adaptation is not just an environmental issue, it is also a crucial step toward ensuring the city's long-term sustainability and resilience. As climate impacts worsen, certain communities within the city face heightened vulnerabilities, with low-income and marginalized neighbourhoods bearing a disproportionate share of the burden. This phenomenon, often referred to as "climate injustice," manifests as an unequal distribution of climate impacts across different social and geographic landscapes, creating disparities in the experience of environmental challenges.

This project focuses specifically on addressing climate injustice in Oude Noorden, a neighbourhood in Rotterdam Noord, by using a systemic design approach. Recognizing that the impacts of climate change are not evenly spread, this project aims to discover the underlying causes of vulnerability unique to Oude Noorden, taking into account its social, economic, and physical landscape. Climate adaptation strategies are essential but often overlook the unique challenges faced by communities like Oude Noorden, where socioeconomic factors can worsen environmental vulnerabilities. In these contexts, systemic design offers a framework for understanding the interconnected layers of risk and resilience, allowing for a holistic approach to climate adaptation that is rooted in both environmental and social dimensions.

By exploring the neighbourhood's specific needs, this project aims to uncover not only the direct environmental threats but also the broader systemic factors, such as economic inequality, limited access to resources, and community engagement, that influence how climate impacts are experienced. A primary goal of the project is to develop an actionable intervention that is community-driven and tailored to the local context of Oude Noorden. Such an approach is intended to enhance both the quality of life in the neighbourhood and its long-term resilience, ensuring that the intervention addresses immediate needs while promoting sustainable practices for the future.

Ultimately, this design project seeks to create an intervention towards a more just climate adaptation, one that gives back to the community in meaningful way, not only by improving environmental resilience but also by promoting social equity. Through an inclusive design process that prioritizes local voices, the project aims to deliver solutions that are as practical as they are equitable, contributing to a more resilient and just Rotterdam.

SECTION 1.2

THE PROJECT

This project tackles the challenge of fostering climate justice / mitigating climate injustice in Oude Noorden, a neighbourhood in Rotterdam Noord, amid intensifying climate impacts. While climate adaptation is recognized as essential across Rotterdam, there exists a critical gap in how these efforts consider the unique needs of communities disproportionately affected by climate change. Currently, adaptation strategies in urban areas often prioritize physical infrastructure improvements but lack a focus on localized, community-driven solutions that account for the specific social, economic, and environmental dynamics of neighbourhoods like Oude Noorden. This disconnect results in interventions that may overlook the everyday experiences and needs of residents, leading to solutions that are less effective in building true resilience or empowering the community. This design project seeks to address this gap by exploring how a systemic design approach can identify and respond to the underlying causes of climate injustice. Specifically, this project aims to answer the following research questions:

Q1. *How are local communities in Oude Noorden currently engaged in climate adaptation efforts, and what barriers do they face?*

Q2. *How do current municipal policies influence and to what extent do they contribute to or mitigate climate injustice?*

Through a comprehensive analysis of the neighbourhood's unique challenges, this project will develop a practical, community-focused intervention that addresses climate injustice.

The goal is to design an intervention tailored to Oude Noorden's needs, equipping the neighbourhood with sustainable, long-term resilience solution that can also be scaled and adapted to other neighbourhoods in Rotterdam and possibly beyond.

SECTION 1.3

PROJECT APPROACH

To do so, a mixed-method approach combining literature review and systemic design framework (double diamond), will be used to develop a tailored intervention for the neighbourhood.

First, a literature and desk research will be conducted to establish a foundational understanding of climate injustice and recent developments on local adaptation strategies. This research will analyze academic papers, policy documents, and case studies to identify key themes, challenges, and actionable insights for addressing climate inequities in urban neighbourhoods and specifically Rotterdam.

Following the literature review, design thinking methodologies will be applied, beginning with qualitative collection. This includes semi-structured interviews, observations, and discussions with key stakeholders such as residents, community groups, and local experts to discover latent insights and perspectives specific to Oude Noorden.

Next, ideation sessions will be held to collaboratively generate ideas with stakeholders, making sure their input directly shapes the intervention. It is important to visualize the complex social and environmental interconnections, helping identify leverage points for interventions.

Concepts generated during these workshops will be translated into prototypes. These prototypes will be iteratively refined through feedback from community members and experts, ensuring the final intervention is both effective and aligned with local needs and priorities. Through continuous feedback and iteration, the intervention will evolve into a practical, community-centered solution.

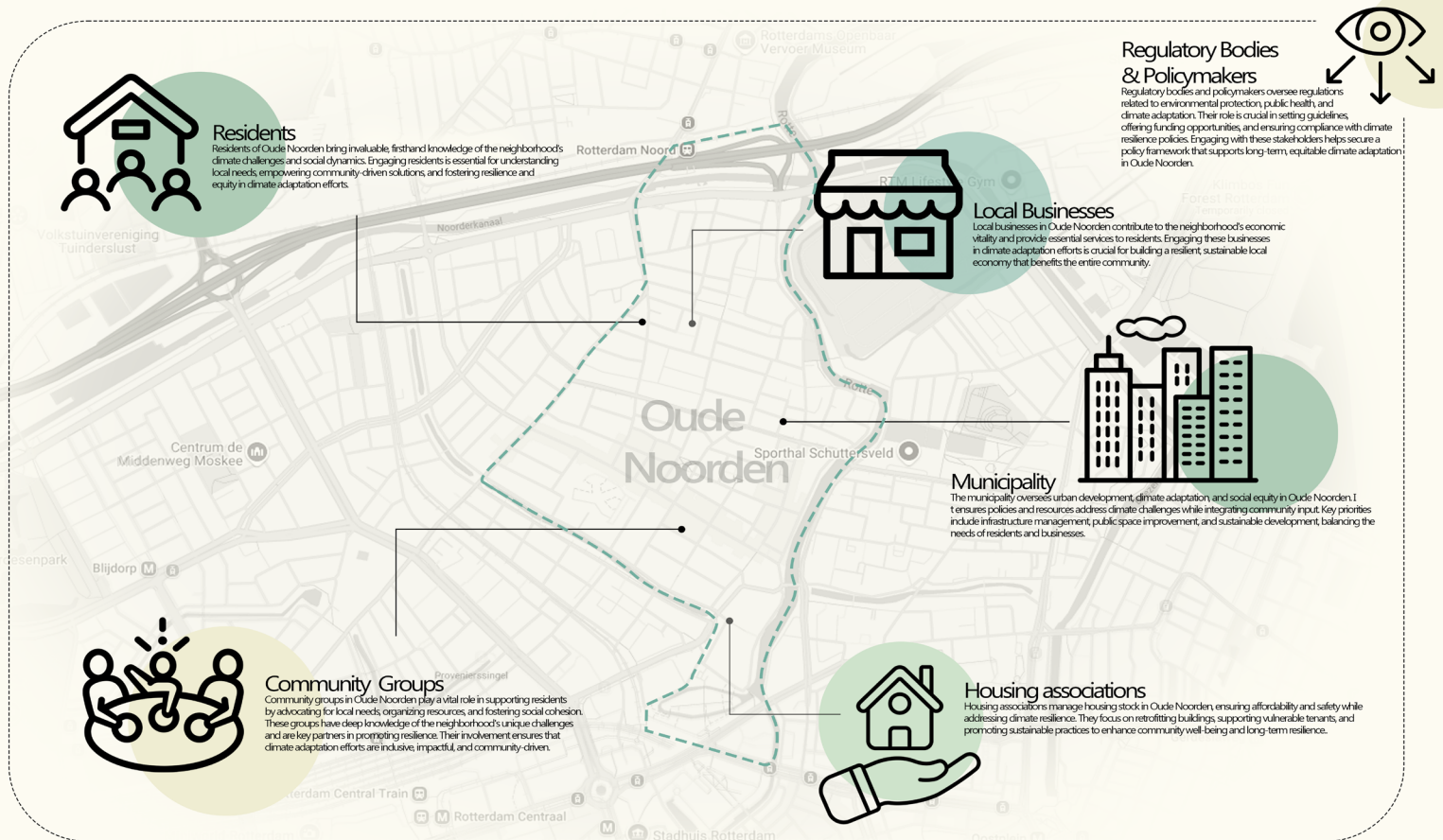


Figure 01. Initial Stakeholder Map (November 2024): As part of the initial orientation phase, a basic stakeholder map was created to outline the key actors involved. This version was based on early assumptions and desk research, prior to conducting interviews or fieldwork. While limited in scope, it helped guide the first site visits and the focus for more in-depth engagement.

SECTION 1.4 FROM BROAD TO FOCUSED

Initially, the project considered a broader range of climate risks, including heat stress, flooding, and biodiversity loss. However, during this exploratory phase, green space emerged as a recurring theme that linked these issues together. It was mentioned not only in relation to heat and precipitation, but also as a symbol of inequality, neglect, and contested public space. Green space and infrastructure offered a way to address multiple climate risks simultaneously, while also opening up questions of access and inclusion. This issued the deliberate narrowing of the focus: the project would center around green space as a lens to investigate climate injustice at the neighbourhood level.

As mentioned, this design project uses the Systemic Design Framework to structure both the process and the report itself (See Figure 2). The approach

combines systems thinking, stakeholder engagement, and iterative design to address climate injustice in Oude Noorden. Each phase builds on the previous one to move from understanding the system to proposing grounded, practical interventions.

Orientation And Vision Setting

This phase defines the project's starting point and overall direction. It establishes the focus on climate justice, connects environmental risks to social inequality, and sets a vision for inclusive, community-centered adaptation in Oude Noorden.

Explore

The exploration phase focuses on building a grounded understanding of the neighbourhood. By examining existing literature, analyzing

policies, and engaging directly with the community, the goal is to identify the neighbourhood's specific challenges and opportunities. This comprehensive understanding ensures that subsequent design interventions are rooted in the actual experiences and needs of the residents, leading to more effective and accepted solutions.

Reframe

This phase questions initial assumptions and redefines what the project is really about. It focuses the direction by identifying where the biggest impact is possible and what matters most to residents. Green space becomes the lens, not just for climate risk, but for inclusion and access.

Create

This phase will outline how insights are translated into a design intervention. Based on

the needs, barriers, and opportunities identified earlier.

Catalyse

This phase will consider how the intervention could be implemented, scaled, or tested in practice. It identifies enabling conditions, necessary partnerships, and institutional collaboration needed for change.

Continuing the Journey

The final phase will reflect on what has been learned and where the project could go next. It will explore opportunities for iteration, deeper collaboration, and continued engagement.

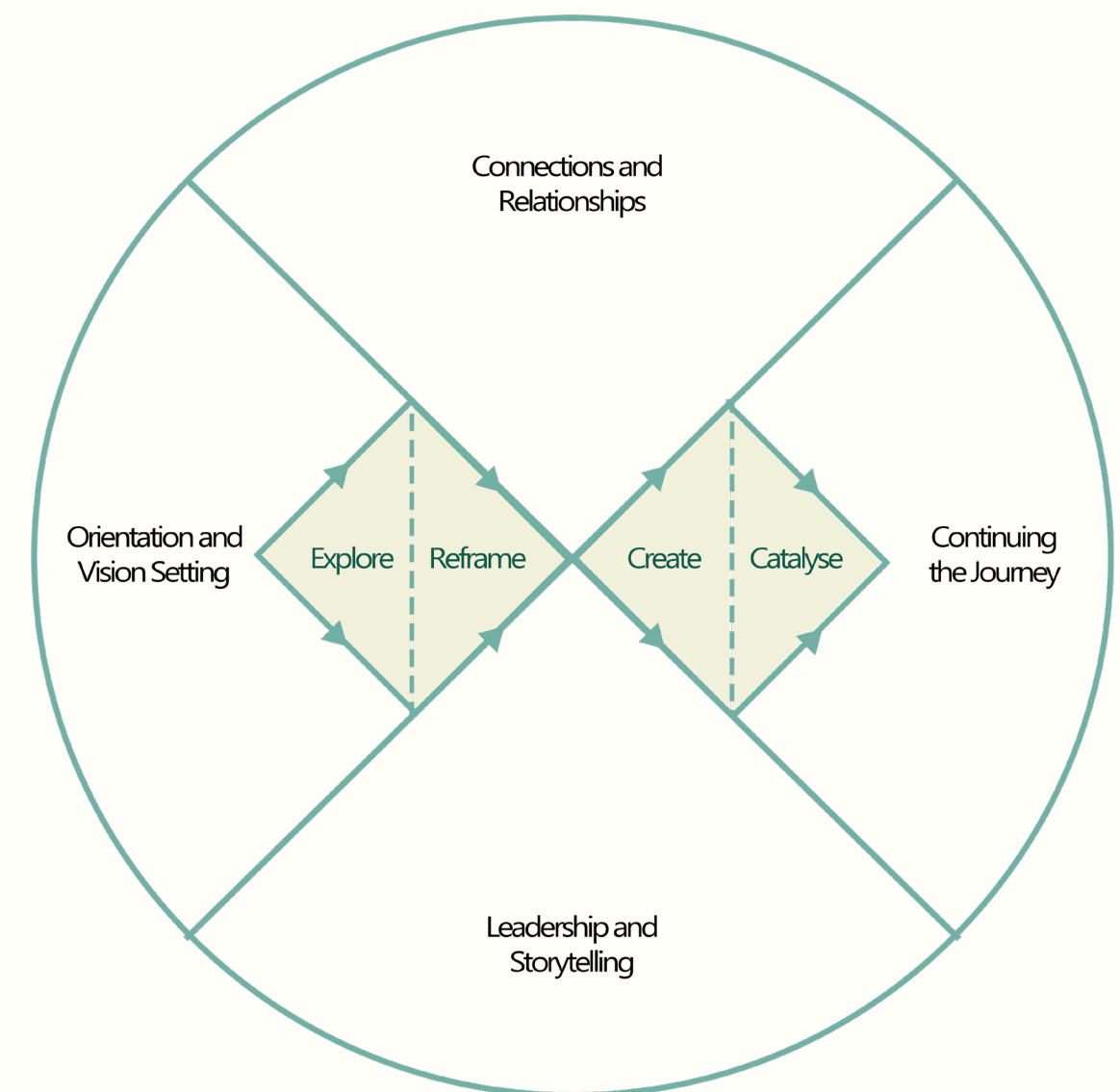


Figure 02. The Systemic Design Framework

SECTION 2.0

REVIEWING THE BACKGROUND

This section will review key literature on climate change, climate justice, and systemic design. The chapter will serve as a foundation for analyzing stakeholder dynamics and identifying leverage points for later on.



CLIMATE CHANGE

Climate change is no longer a distant threat; it is already and has been altering weather patterns, ecosystems, and urban environments worldwide. Global temperatures have risen by approximately 1.1°C since pre-industrial levels. According to the Intergovernmental Panel on Climate Change (IPCC), the past decade has been the warmest on record (IPCC, 2021). This warming trend has intensified heatwaves, extreme precipitation, and long periods of droughts, all of which directly impact cities worldwide. Sea levels have risen by over 20 cm since 1880, increasing the risk of flooding in low-lying urban areas (NASA, 2023). The frequency of extreme rainfall events has increased heavily, with the likelihood of heavy downpours now 50% higher than in the early 20th century (KNMI, 2020). These shifts show the need for climate adaptation strategies, particularly in cities and urban areas that are densely built.

2.1.1 DEFINITION OF CLIMATE CHANGE

That the climate is changing significantly has become an undeniable reality we face with growing frequency. These realities highlight the importance of tackling climate change. Recent data from the European State of the Climate 2024 report reveals that Europe is warming rapidly, with a sharp contrast between the wet west and the hot, dry east. However, defining climate change itself is not entirely straightforward. Defining climate change is complex and often a subject of debate.

The term climate change is frequently used with a degree of vagueness, leaving its precise meaning unclear (Scott & Kettleborough, 2002). This lack of clarity can create confusion, particularly when it comes to understanding the reality and scale of issues that come from it. The United Nations Framework Convention on Climate Change refers to climate change as a "change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods."

This definition, though, has been criticized for excluding natural climate variability, which is a significant factor in understanding climate dynamics, and for creating a bias against adaptation policies by narrowly focusing on greenhouse gas emissions as the only driver of climate change (Pielke, 2005). Considering this, and for the purpose of this design project that focuses on the experience of people dealing with climate change in Rotterdam, the definition of the IPCC is used (IPCC, 2021) as a starting point:

"Climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity"

2.1.2 GLOBAL IMPACT OF CLIMATE CHANGE

Climate change has far-reaching consequences. Global implications affect and reshape entire ecosystems, economies, and communities worldwide. Rising temperatures and extreme weather events disrupt ecosystems, threatening biodiversity and natural habitats. Coral reefs are dying from ocean warming, and forests face risks from wildfires and pests, leading to imbalanced ecosystems and diminished resilience. Economically, agriculture is under threat from abnormal and unpredictable weather, prolonged droughts, and heatwaves.

In 2023 alone, climate-related disasters displaced over 25 million people worldwide. Agricultural losses topped €13 billion in the EU due to drought, while for instance Canada saw over 18 million hectares burned by wildfires. The largest in recorded history. These figures show the scale of disruption now facing everyone across the globe.

To illustrate the real-world impact of these changes even more, we can look to recent events that show how climate extremes are already affecting daily life in very different parts of the world.

2024 Spanish Floods

In September 2024, the city of Valencia was hit by one of the worst floods in recent history. Within just 12 hours, over 270mm of rain fell. This is more than three times the monthly average, turning streets into rushing rivers. Schools closed, highways got submerged, and over 5,000 people were evacuated from their homes. The storm caused power outage to entire neighbourhoods, and damages were estimated at €890 million. Cars floated through city centers, and ground-floor shops and homes were left destroyed. Locals described it as "apocalyptic" rain that wouldn't stop and drains that couldn't cope.

This wasn't just bad weather; it was a reminder of how climate change is amplifying extreme rainfall. For many in Europe, it marked a turning point: the moment the climate crisis arrived at their doorstep.



Figure 03. Aftermath of Flooding in the Valencia Region

2025 Los Angeles Fires

Just months later, Los Angeles faced one of its most destructive wildfire seasons to date. Fueled by prolonged drought, heatwaves, and strong winds, the fires spread rapidly through residential areas and natural reserves. Close to 200,000 people were forced to evacuate, air quality plummeted, and large areas of nature and wildlife habitats were destroyed. While wildfires are not new to California, their increased frequency and severity reflect the growing risks tied to climate change.

These events, happening just months apart in very different parts of the world, depict how climate change is already creating more intense, unpredictable, and interconnected crises. From floods in European cities to wildfires in North America, the global impacts of climate change are becoming part of everyday reality affecting ecosystems, infrastructure, and people's sense of safety and stability.



Figure 04. Extinguishing of LA Fires

2.1.3 CLIMATE CHANGE ON LOCAL LEVEL

However, these changes are not just global phenomena. They have significant implications for cities and urban areas, home to over 55% of the global population, mainly due to their geographical location, overcrowded populations, reliance on infrastructure, and resource consumption (Revi et al., 2014; Rosenzweig et al., 2018). These communities, particularly in vulnerable regions or so-called hotspots, are greatly affected. They are more susceptible to the effects of climate change and the associated effects on public safety, health, and other sectors (Wardekker, 2021).

In the Netherlands, and specifically in Rotterdam, the impacts are also felt. With its low-lying geography and dense population, the city faces acute risks, including flooding, heat stress, and disruption of its infrastructure. The city's position in the Dutch river delta, with 85% of its area below sea level, amplifies its vulnerability to climate change (See Figure 5). Intensified rainfall and extreme heat events already impact daily life, from occasional floodings in low-lying areas like Noordereiland to health crises during summer heatwaves. The compounded effects of drought and subsidence worsen the structural stability of buildings and infrastructure (Resilient Rotterdam Strategy 2022–2027, 2022).

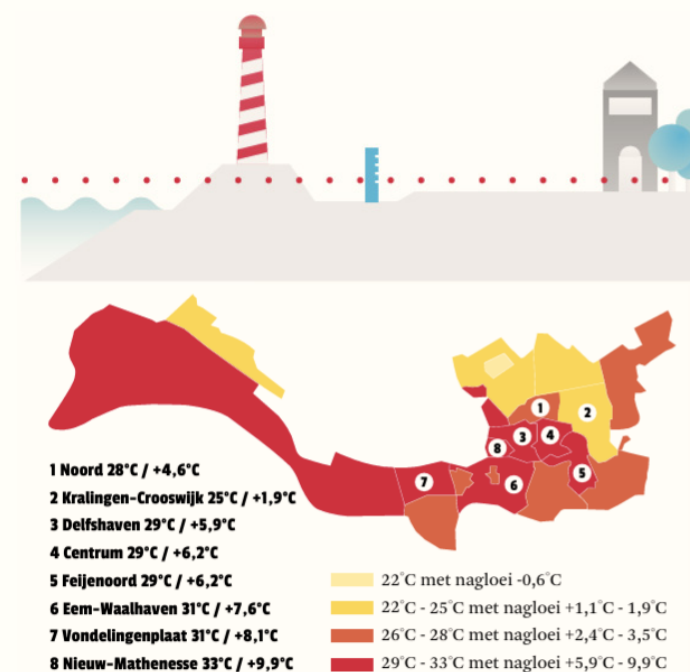


Figure 05. Climate Vulnerability of Rotterdam

The city has been responding proactively, implementing measures such as water squares, green roofs, and permeable pavements to tackle climate change. These initiatives, combined with innovative planning strategies like the Programmakader WeerWoord 2030, aim to integrate climate adaptation into the city's design. The strategy includes building climate-resilient housing, improving water management, and increasing collaboration among municipal authorities and residents. (Programmakader WeerWoord 2030, 2024). Their effectiveness will be discussed in later sections.

2.1.4 THEMES FOR FRAMEWORK

The province of Zuid-Holland has identified critical climate challenges, known as climate tasks "klimaatopgaven" (Zuid-Holland, n.d.). Rotterdam has used these as a foundation to form their climate adaptation efforts. These themes highlight the complicated nature of climate change impacts and lead as strategic guide (Programmakader WeerWoord 2030, 2024). Their themes are:

Precipitation

Increasing intense rainfall events lead to flooding, overloading drainage and outpouring on sidewalks and road infrastructure.

Flooding

Rising sea levels and increased river discharges add to the risk of flooding, particularly for low-lying areas like Rotterdam. Strengthening flood defenses and integrating water-resistance in planning are critical.

Heat

The urban heat island (UHI) effect increases rising temperatures, impacting public health and reducing liveability, especially during summer heatwaves. The heat retention of buildings can cause evening temperatures to be up to 8°C higher than in areas outside the city. In the city center, this difference can reach as much as 10°C according to the KNMI (See Figure 5). Expanding green infrastructure, such as parks and providing shades, is important to cooling the city.

Drought

Prolonged dry periods threaten water availability, biodiversity, and the vitality of green spaces. Creating landscapes that are efficient against drought and managing water use are essential strategies for sustaining ecosystems.

These themes not only define the city's climate adaptation priorities but also serve as a foundation for the framework of this design project by addressing interconnected challenges. However, given the broader impact of climate change, a fifth theme must be considered: Biodiversity

Biodiversity

The ever-growing expansion of cities and effects of climate change threaten local ecosystems, reducing species diversity and habitat availability. Creating better connections between green spaces and rooftops, and integrating nature-based solutions can support biodiversity.

Initially, the five prior themes were identified to address climate adaptation and therefore injustice. However, it became clear that certain

challenges were inherently linked and could be more effectively addressed together. Drought and heat were merged due to their shared impact on temperatures, water retention, and public health. Similarly, precipitation and flooding were combined, as extreme rainfall, in combination with poor drainage, contribute directly to flooding risks.

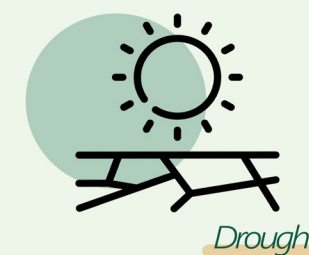
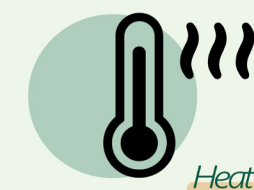
By structuring the project around these relationships, three main themes emerged. These themes serve as the foundation for exploring complications, perceived barriers, and engaging stakeholders (See Figure 6).

Rotterdam is taking steps to adapt, but climate change increases pressure and demands more integrated and also local action. Beyond physical impacts, it also worsens social and economic inequality. To create a just intervention, it is also a must to understand how climate risks and injustice are connected, especially at the neighbourhood level.

Water Management



Heat



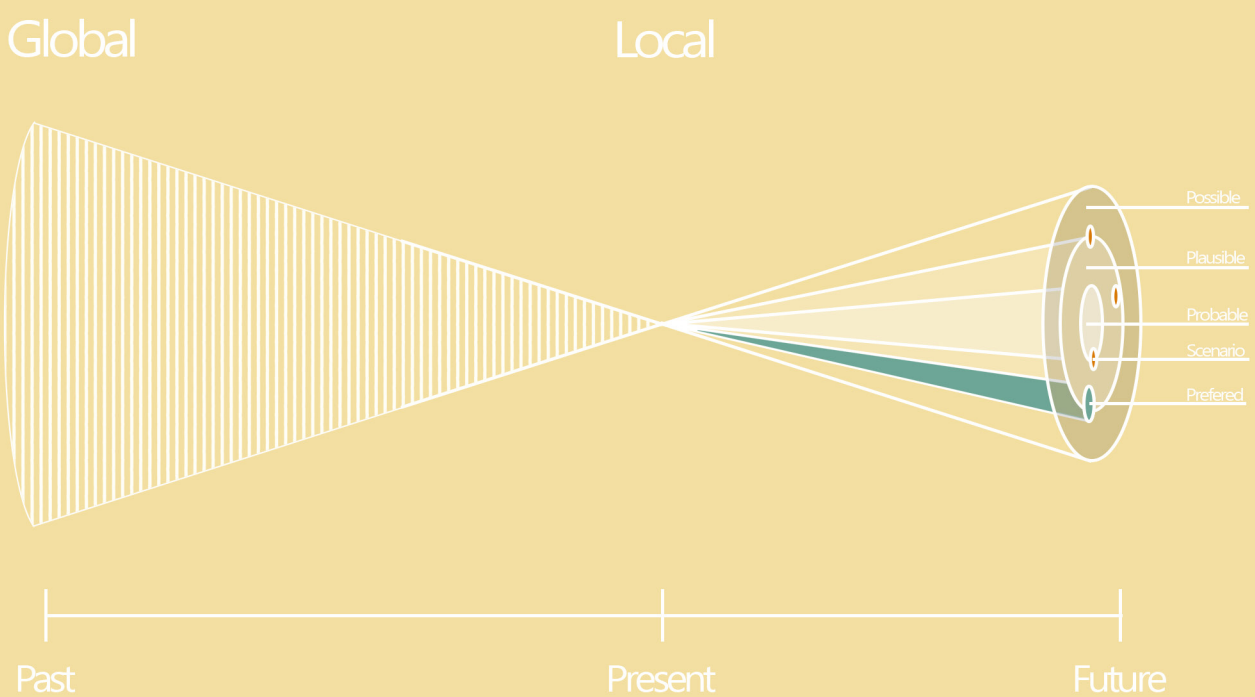
Biodiversity



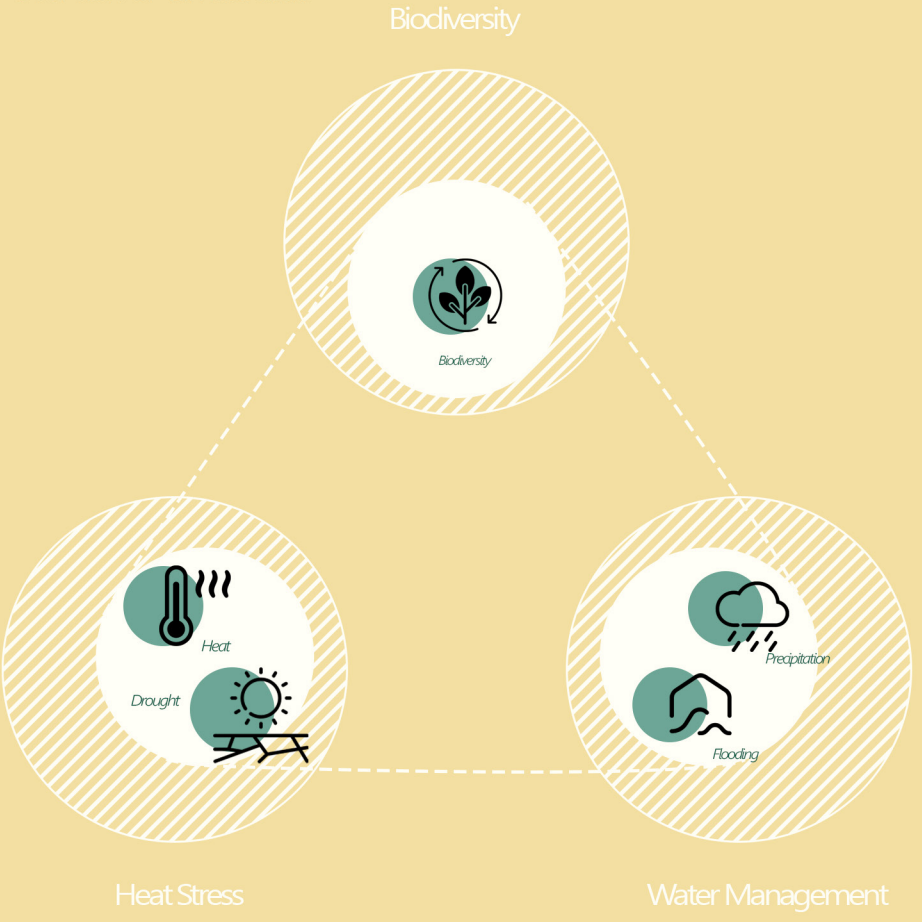
Figure 06. Themes for framework

INTERMEDIATE FINDINGS

Ripple Effects: From Global to Local



Over view of Climate tasks



Due to the above findings, it can be concluded that climate change is a systemic and escalating reality that heavily impacts both global and local environments. While its definition remains complex and debated, its consequences reaching from rising temperatures to extreme weather events are felt by all. It is important to address the course it could take in the future and steer the local impacts toward a preferred future scenario (See section 5.4).

That is also why it becomes essential in this project to move beyond isolated technical solutions and instead also address interconnected challenges holistically. The three themes will serve as a starting point for this. The next section will explore how the concept of climate justice emerges as a response to these disproportionate impacts, especially in vulnerable communities.

SECTION 2.2

CLIMATE JUSTICE

2.2.1 DEFINITION OF CLIMATE JUSTICE

Climate justice is a concept that emerged from activists in the Global South in response to the growing threats of climate change. It draws attention to the unequal distribution of climate burdens and efforts to mitigate climate change, urging that those most exposed to risk, who also often contribute the least to climate change, are disproportionately impacted by it.

As the IPCC defines it, “climate justice links development and human rights, aiming to achieve a human-centred approach that safeguards the rights of the most vulnerable people” (IPCC, 2023). By focusing on this, the concept encourages the fair distribution of the positive and negative impacts of climate change.

The most troubling impact of climate change is how its effects are distributed unevenly across the world. This distribution is deeply tied to historical patterns of development, industrialization, and global inequality. Marginalized communities, particularly in populated cities, are disproportionately affected by climate change, yet these groups often have the least capacity to respond or adapt.

Climate injustice makes it clear: those who have contributed the least to carbon emissions are facing the most severe consequences. For instance, Indigenous communities and low-income urban neighbourhoods around the world are often located in high-risk areas such as floodplains, coastal regions, and industrial zones, where they face the most frequent and intense environmental hazards.

These same communities often don’t have the resources needed to protect themselves, with poor housing or restricted access to support (Roberts & Parks, 2007). In Jakarta, for example, many low-income residents live in informal settlements along polluted canals that flood regularly (See Figure 7). Yet they have limited legal rights, poor drainage, and barely any access to relocation.



Figure 07. Community in Jakarta with high-risk area

The principle of common but differentiated responsibilities, introduced by the United Nations Framework Convention on Climate Change (UNFCCC), states that while all countries must work together to address climate change, wealthier nations bear a larger responsibility due to their historical emissions (Saraswat & Kumar, 2016). However, many of the most affected nations and communities have contributed little to the crisis but face the worst consequences.

Climate justice is not a singular concept but rather a complex framework that incorporates various principles aimed at addressing the disparities caused by climate change. Two fundamental dimensions within this framework are distributive justice and procedural justice. Distributive justice concerns the perceived fairness in the distribution of outcomes or resources (Adams, 1965; Walster, Walster, & Berscheid, 1978), while procedural justice focuses on the fairness of the processes and rules that govern decision-making (Lind & Tyler, 1988; Thibaut & Walker, 1975).

2.2.2 DIMENSIONS OF CLIMATE JUSTICE

The principle of distributive justice highlights the unfair distribution of the impacts of climate change. For example, small island nations like the Maldives and Tuvalu face the existential threat of rising sea levels, while those in wealthy, industrialized countries such as the United States or Europe often live in regions less directly affected by such risks (Avelino et al., 2024).

The impacts of climate change are not just physical but social. As these communities suffer from the effects of climate change, they are forced into displacement or migration, worsening and increasing cycles of poverty, and leading to loss of land, livelihood, and cultural heritage. Those who are displaced by climate change often face challenges in accessing asylum, and their legal status often fails to grant them protection (Saraswat & Kumar, 2016). As can be seen, distributive justice addresses who gets what and whether resources, risks, and benefits are shared fairly amongst all.

Addressing these imbalances requires not only resource redistribution but also international and legal reforms. To address the resulting uneven outcomes fully, we must also make certain that those most affected have a seat at the table when climate policies are made. This is where procedural justice becomes critical.

Procedural justice emphasizes the need for marginalized groups to have a voice in climate decision-making. Climate justice is not only about the fair distribution of the risks but also about making sure that those most affected are supported and included in the process of creating and implementing climate policies. Historically, these groups have been excluded from policy-making processes, despite being the ones suffering the most (Schlosberg, 2007).

To achieve climate justice, all parties must be directly involved in shaping climate policy, so strategies reflect all needs and also draw on the knowledge of disadvantaged groups for adaptation (Anguelovski et al., 2016).

2.2.3 CLIMATE JUSTICE IN LOCAL SETTINGS

In urban areas, climate injustice becomes even more pronounced due to the intersections of socio-economic inequality, racial injustice, and environmental degradation. Low-income communities, communities of color, and for example renters often live in areas with poor infrastructure and higher exposure to environmental hazards. Urban heat islands, poor drainage systems, and inadequate access to clean water and sanitation are just a few of the issues that worsen exposure in these neighbourhoods (Avelino et al., 2024).

For example, in the Netherlands, cities like Rotterdam with low-income communities and people of color face higher risks to the effects of the climate. Urban heat islands worsen heatwaves, making neighbourhoods significantly hotter in comparison to affluent areas which deal to a lesser extent with these problems. Increasing health risks such as heat stroke, cardiovascular strain, and respiratory problems (Bullard, 1990). Similarly, inadequate infrastructures like poor drainage systems can lead to chronic flooding in neighbourhoods where marginalized populations live (Carmin et al., 2013).

While many traditional adaptation strategies focus on large-scale infrastructure projects, such as sea walls or energy-efficient offices, these efforts often fail to account for the needs of local communities in neighbourhoods. Despite growing awareness of climate inequalities, there is still limited research on how climate injustice plays out at the local level in neighbourhoods within specific streets, communities, or even housing blocks. Most studies focus on national or global disparities, leaving a gap in understanding how climate adaptation can work or plays out in everyday city life.

By understanding this, affected local communities can thrive. Climate justice means putting communities most affected by climate change in control of how they adapt by shaping solutions based on their needs, priorities, and experiences (Avelino et al., 2024).

2.2.4 KLMAAT RECHTVAARDIG ROTTERDAM

In Rotterdam, the Klimaatrechtvaardig Rotterdam (Climate Justice Rotterdam) initiative, previously known as ICAR, expresses the need for local climate policies to address inequalities in the city. The initiative emphasizes the importance of creating a “climate-resilient” city that not only focuses on reducing emissions but also on improving social equity, by focusing on the needs and voices of the most vulnerable residents. This with the aim not to further increase socio-economic inequalities (Rotterdams Weerwoord, n.d.). Their approach to climate justice is framed in four aspects:

1. Social Exclusion and Discrimination

In Rotterdam, social exclusion and discrimination are significant barriers to effective climate adaptation. Marginalized groups, including but not limited to migrant communities, low-income residents, and people of color, often experience distrust toward governmental organizations. This mistrust can undermine collective efforts to address climate risks. To overcome this, the Climate Justice Rotterdam initiative calls for inclusive engagement and collaboration with these communities, making sure that they have a voice in shaping the city’s policies.

2. Information and Communication

Effective communication is essential in providing all residents with awareness of the risks posed by the climate and what measures can be taken to protect themselves. The initiative emphasizes the need for tailored communication strategies that account for linguistic, cultural, and social differences.

3. Impact on Well-being

The effects of climate change vary across Rotterdam’s residents. For some groups, such as the elderly, children, or those with health conditions, extreme weather events like heatwaves, flooding, and storms can have more severe consequences. These groups often experience a lower quality of life due to increased health risks and the lack of climate-

resilient infrastructure. The initiative stresses the need for climate policies and measures that address their specific needs and prioritize their well-being.

4. Capacity to Act

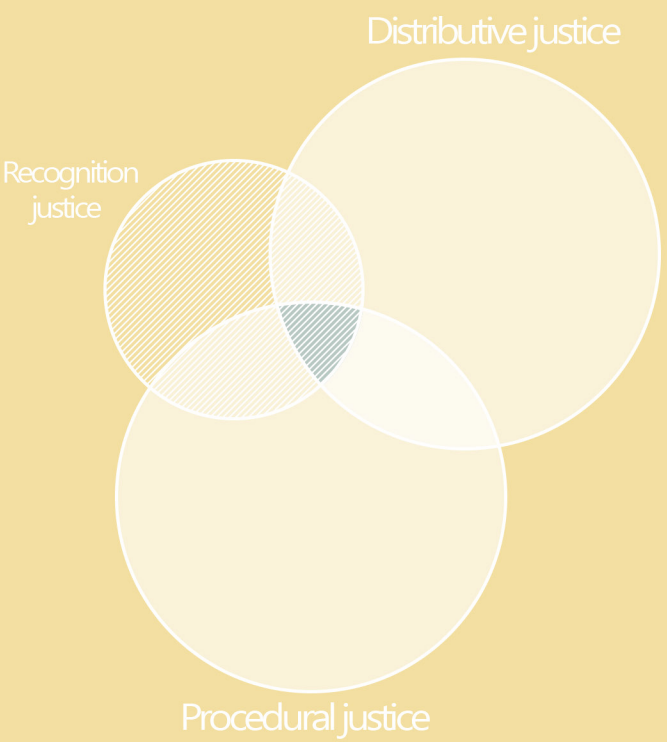
All residents need to have the capacity to act and adapt to changing climate conditions. This includes access to affordable housing, resilient infrastructure, and a voice in local decisions. By enabling residents to take an active role, Rotterdam can create an environment where all people, regardless of socio-economic status, are equipped to face the challenges of a changing climate.

These four dimensions will serve as a framework for analyzing findings later on in this report. By measuring insights from community experiences and stakeholder dynamics against these aspects, the analysis will highlight the specific ways in which climate injustices manifest in Rotterdam. This will also help identify gaps in current climate adaptation strategies and opportunities for improved policies.

2.2.5 ROLE OF POWER IN CLIMATE JUSTICE

The structural and systemic nature of climate injustice cannot be understood without addressing the role of power and inequality. As Avelino et al. (2024) argue, global disparities in wealth and resource distribution determine who suffers and who benefits from climate change. Those with economic and political power are better equipped to shield themselves through investments in infrastructure, technology, and private wealth measures. Marginalized communities, by contrast, often lack access to these protections. This pattern of power appears not only at a global level but also within cities and neighbourhoods. Section 4 will return to this tension in a local context. As For now, what matters is recognizing that achieving climate justice requires more than isolated technical fixes. It calls for structural change in how cities approach both environmental and social challenges.

INTERMEDIATE FINDINGS

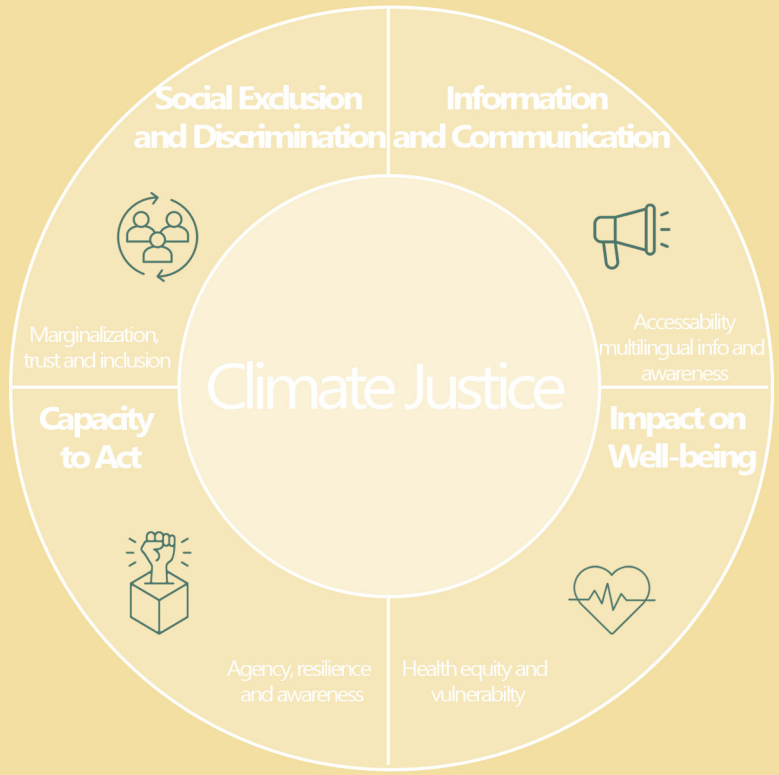


Addressing Dimensions of Injustices

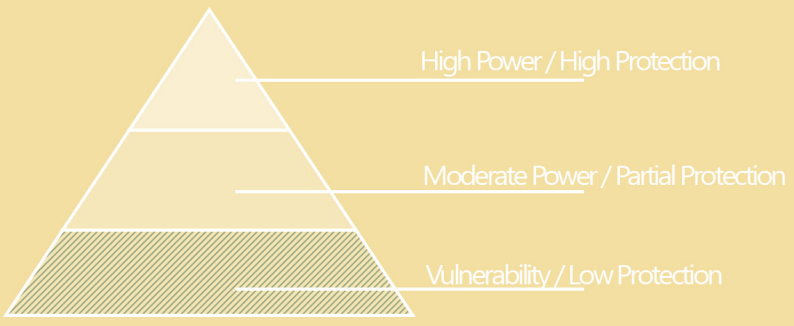
Based on the previous findings, it can be seen that addressing different forms of injustice is essential for fair and effective climate adaptation. While distributive justice focuses on the fair sharing of risks and resources, and procedural justice emphasizes inclusive decision-making, another to also consider is recognition justice. Recognition justice involves acknowledging the identity, dignity, and lived experiences of communities. It ensures their values and knowledge are respected in shaping solutions. Although not explicitly named, recognition justice must also be embedded further in this project's approach. Together, these three dimensions form a foundation.

The Climate Justice Compass

To tackle these injustices (distributive, procedural, and recognition) the project will draw on the four key aspects outlined by the Climate Justice Rotterdam initiative: social exclusion, access to information, impact on well-being, and capacity to act. These dimensions reveal how the climate tasks intersect with social inequality. Marginalized residents often lack access to climate knowledge, face exclusion from decision-making, and experience greater health impacts with fewer resources to adapt. By addressing these issues directly, the objective is to create inclusive, community-centered solutions that not only reduce environmental risks but also strengthen the community.



Unequal Power, Unequal Protection



It can also be concluded that power plays a central role in climate injustice, exposing who faces the greatest risks and who holds the means to adapt and to be protected. Structural inequalities allow privileged groups to shield themselves, while marginalized communities remain exposed and excluded. Addressing this calls for systemic change. The next section will take a closer look at why systemic design is needed to create inclusive, long-term interventions for this project.

SECTION 2.3

ROLE OF SYSTEMIC DESIGN IN ADDRESSING LOCAL CHALLENGES

2.3.1 WHY SYSTEMIC DESIGN?

Systemic design integrates systems thinking with design methodologies to tackle complex challenges by recognizing how different elements interact within a larger system. Unlike conventional design, which often isolates problems, systemic design takes a holistic approach, identifying root causes and developing long-term solutions. In urban contexts, where climate change, social inequalities, and infrastructure challenges overlap, systemic design provides a structured way to address these interconnected issues.

Sevaldson (2011) highlights the flexibility of systemic design, its ability to include diverse stakeholders, and its focus on long-term impact as key strengths in building sustainable and just cities. By engaging governments, businesses, and communities, systemic design facilitates collaborative processes that address both visible climate risks and the underlying socio-economic factors that shape vulnerability.

2.3.2 POLITICAL NATURE OF SYSTEMIC DESIGN

Systemic design is not just a technical approach, but it is inherently political. As Avelino et al. (2024) argue, achieving transformative change requires challenging existing power structures and addressing structural injustices. Without directly confronting political resistance and conflicting stakeholder interests, sustainability efforts risk reinforcing existing inequalities rather than solving them.

In cities like Rotterdam, systemic design must navigate tensions between economic growth and social equity. Municipal policies and private-sector interests often prioritize large-scale infrastructure and commercial development, while climate adaptation efforts remain disconnected from community needs. Ensuring that adaptation strategies also benefit vulnerable populations requires inclusive decision-making processes that promote

local voices. If these political dimensions are ignored, powerful stakeholders may shape climate responses in ways that maintain existing inequalities rather than addressing them.

2.3.3 SYSTEMIC CAUSES OF LOCAL CLIMATE INJUSTICE

Urban and local climate injustice is deeply rooted in long-standing social and environmental inequalities. Many low-income communities have faced decades of underinvestment and exclusion from planning processes, increasing their exposure to climate risks (Satterthwaite, 2011). These vulnerabilities are further increased by governance structures that fragment responsibilities, preventing effective and total climate adaptation (Avelino et al., 2024).

Gentrification also plays a role in climate injustice. In many cities, profit-driven development displaces lower-income and longtime residents to areas with fewer resources (Anguelovski et al., 2016). This cycle only elevates inequalities, as wealthier neighbourhoods receive investments for climate adaptation, while the marginalized communities face increasing environmental and economic stressors.

2.3.4 SCALABLE INTERVENTIONS

For systemic design interventions to create lasting impact, they must be scalable, extending beyond individual projects to benefit larger communities. One key approach to achieving this is prefiguration, where small-scale experimental projects act as models for wider implementation. These localized prototypes demonstrate principles of justice, sustainability, and alternative social structures, allowing them to be tested, refined, and expanded over time (Avelino et al., 2024). In the context of urban

climate adaptation, prefiguration helps bridge the gap between high-level strategies and on-the-ground realities, allowing for solutions that are both practical and widely applicable.

2.3.5 FRAMEWORKS FOR SCALING

Scaling interventions tailored to climate change and adaptation requires structured approaches that not only balance local specificity but also broader applicability. Several models for scaling successful climate interventions:

Pilot-and-Scale Approach

Small-scale projects are tested before being expanded across a city. A notable example is Portland's "Green Streets" initiative, where rain gardens and permeable pavements were first introduced in limited neighbourhoods before being expanded citywide (Rodriguez-Valencia & Ortiz-Ramirez, 2021). This model relies on iterative testing and community feedback to adapt interventions to diverse urban settings.

Modular Design

Adaptable components allow climate strategies to be customized to different environments. Neighbourhoods can choose which components to implement. Copenhagen's cloudburst management system, for instance, integrates green roofs, retention basins, and permeable pavements—all elements that can be applied individually or together, depending on local needs (City of Copenhagen, 2016).

Network-Based Scaling

Community-driven models, such as the Transition Towns initiative in the UK and in the Netherlands, promote local sustainability efforts that can spread organically through knowledge-sharing networks (Hopkins, 2011). These decentralized approaches allow local communities to adapt solutions to their specific contexts, improving nationwide adaptability in diverse cities.

Public-Private Partnerships (PPPs)

Large-scale adaptation efforts often require collaboration between governments, private companies, and civil society. Rotterdam's Blue-Green Infrastructure projects, like the one found at the Benthemplein (close to Oude Noorden), showcase how PPPs can fund and implement climate adaptation on a citywide scale while supporting local participation (Deltares, 2021).

2.3.6 CHALLENGES IN SCALING

Scalability comes with challenges. Resource gaps can prevent under-resourced neighbourhoods from replicating successful models. Political resistance may come from stakeholders who benefit from keeping things as they are (Avelino et al., 2024). Differences in governance, infrastructure, and local climate add complexity when adapting solutions to new settings.

As mentioned, balancing local specificity with broad applicability is important. Local interventions work because they fit a community's unique geographic, social, and economic conditions. But scaling requires pinpointing and leveraging the core principles that drive successful interventions, and also making sure they stay intact during adaptation (Elmqvist et al., 2019).

SECTION 2.4

CASE STUDIES

To better understand how climate adaptation can be both effective and especially just, this section explores real-world case studies from around the globe. Each example highlights different approaches to addressing climate risks. Whether through green infrastructure, community engagement, or policy innovation. These cases reveal not only the challenges cities face, but also the creative and often community-led solutions that are making a difference.

Building Community Trust Through Storytelling

In Kerourien, Brest, where social hardship often overshadows climate concerns, researchers and artists used storytelling and art to link personal struggles to climate adaptation. By co-producing narratives rooted in community memory and identity such as families rebuilding their lives after the 1944 destruction of Brest, the transition from emergency barracks to social housing in the 1970s, and migrants' journeys from Mali and the Comoros, researchers and artists helped residents connect their everyday struggles to climate injustice. These stories grounded climate adaptation pride and shared history.

Greening as a Path to Climate Justice

Majora Carter's "Greening the Ghetto" initiative transformed an illegal dump in the South Bronx into Hunts Point Riverside Park—the neighbourhood's first waterfront park in decades. Starting with a \$10,000 grant, the project secured \$3 million in funding and launched job training programs like the Bronx Environmental Stewardship Training (BEST). By combining green infrastructure with economic opportunity, the initiative improved public health, created local jobs, and became a model for addressing environmental and social injustice in underserved communities.

Cooling Cities with Equitable Solutions

Los Angeles' Cool Streets initiative applied solar-reflective coatings to over 700,000 square feet of pavement, lowering surface temperatures by up to 4.9°C in heat-vulnerable areas like Pacoima. What set the project apart was its community-driven approach. Residents helped shape and implement solutions that addressed their needs. In addition to cooling, the initiative built social cohesion and local advocacy, showing that effective climate adaptation must be inclusive, equitable, and rooted in community engagement.

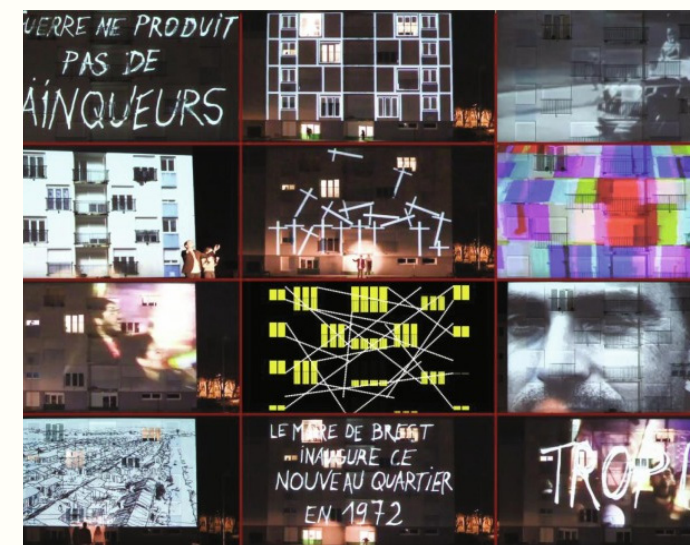


Figure 08. Overview of Local artists work in Brest



Figure 09. Result of Greening the Ghetto Project in South Bronx



Figure 10. Poster Campaign for Cool Streets LA

SECTION FINDINGS

The above section provides an overview of climate change, climate justice, the role of systemic design, and some global case studies. Several takeaways can now be noted:

1. **Climate change is a worsening systemic reality that impacts global, regional, and local environments.** Its consequences range from rising temperatures to extreme weather events, directly shaping urban life and increasing risks in vulnerable cities such as Rotterdam.
2. In response to Rotterdam's specific vulnerabilities, the five initial climate tasks have been merged into three interconnected themes: **Precipitation & Flooding, Heat & Drought, and Biodiversity.** This structuring emphasizes the compound nature of risks and forms the basis for the framework used in this project.
3. **Climate justice** highlights the uneven distribution of climate risks and adaptation capacities. **Those who contribute the least to emissions often face the greatest impacts, while also having fewer resources to respond.** Local initiatives, such as Klimaatrechtvaardig Rotterdam, stress the need for inclusive policies that address social equity alongside environmental resilience.
4. **Systemic design is identified as a necessary approach to address these overlapping challenges.** By moving beyond isolated technical solutions, it provides a holistic framework that connects climate adaptation to wider social, economic, and political structures.
5. **Scaling adaptation requires structured and collaborative approaches.** Pilot projects, modular strategies, and public-private partnerships can expand impact, but challenges of resource inequality, political resistance, and governance remain. This highlights the importance of designing with scalability in mind during this project.
6. **Case studies demonstrate that community-driven and inclusive approaches deliver the most durable results.** From Brest's storytelling methods to Los Angeles' Cool Streets and the South Bronx's Greening the Ghetto, each example shows how climate adaptation can succeed when rooted in community, participation, and local capacity.

Together, these insights stress that climate adaptation cannot be reduced to technical fixes. It requires structural change, redistribution of power and resources, and meaningful inclusion of marginalized voices.

These findings act as a foundation for analyzing how these dynamics unfold in Rotterdam's Oude Noorden and for identifying leverage points for a sustainable intervention.

SECTION 3.0

CONTEXT ANALYSIS

This section will examine the geographical, socio-economic, and environmental context of Oude Noorden. It will provide essential background on the neighbourhood's climate vulnerabilities, demographic trends, and development patterns. This analysis will serve as a foundation for understanding stakeholder dynamics later on and identifying key factors that influence climate issues in the area.



Figure 11. Impression of Oude Noorden during Fall/Winter



SECTION 3.2

NEIGHBOURHOOD PROFILE: OUDE NOORDEN

3.2.1 GEOGRAPHIC AND ENVIRONMENTAL CONTEXT

Oude Noorden was developed in the 1870s to ease overcrowding in Rotterdam's city center. Located in Rotterdam Noord, it is bordered by the Noorderkanaal, the Rotte River, the Noordsingel, and Bergweg. Its historic layout and dense urban fabric shape both its identity and its environmental challenges, particularly in the context of climate change.

The neighbourhood consists of narrow streets, residential blocks, and mixed-use spaces. Many buildings are old, usually poorly insulated, and reliant on outdated energy systems, which leads to high heat retention, poor air circulation, and increased energy costs. While some modern developments have emerged, much of the neighbourhood reflects 19th-century city planning, highlighting both its architectural heritage and infrastructure limitations.

Development and Density

Originally designed with spacious streets and large housing blocks, Oude Noorden became crowded following the opening of the Nieuwe Waterweg in 1872, which spurred industrial growth and migration. As land speculation intensified, housing became more compact, creating tightly built streets with limited open space.

This high-density layout restricts natural light, ventilation, and public green spaces. While Noordsingel and Bergsingel provide some relief, much of the area faces environmental stressors such as heat buildup and poor rainwater drainage. Limited open spaces make it harder for residents to access nature or escape extreme weather conditions.

Gentrification and Social Change

In recent years, Oude Noorden has undergone gentrification, with rising property values and shifting demographics. New businesses, cafes, and boutique shops have revitalized certain

areas, attracting higher-income residents. While these changes have improved infrastructure and economic activity, they have also displaced long-time residents who struggle with rising rents and housing costs.

This is also in part due to tourism and the fact Oude Noorden is close to the city center. As neighbourhoods like Zwaanshals attract more visitors and investment. Due to the "live like a local" trend:

"If tourists are drinking coffee in Zwaanshals, that won't concern you if you live in Zuid."

As tourism and investment grow, so do concerns about affordability and social equity. While the area appeals to visitors seeking an authentic, non-touristy experience (Nieuwland, 2022), long-term residents face economic pressures and shifting community dynamics. This is important to note, as the challenge lies in balancing development with affordability to make sure Oude Noorden remains accessible to everyone.

Climate Risks

Like much of Rotterdam, Oude Noorden faces significant climate risks, particularly loss of biodiversity, flooding and rising temperatures.

Its low-lying location near the Rotte River makes it vulnerable to water accumulation and flooding during heavy rainfall. Despite Rotterdam investing in water management systems, the chance of localized flooding still persists, particularly in streets with aging drainage infrastructure.

At the same time, the neighbourhood's high building density and lack of green space intensify the urban heat island effect, making heatwaves more severe. Streets lined with concrete and asphalt trap heat, increasing discomfort and health risks for residents, especially elderly, children, and those with respiratory conditions. (More on this in section 3.3)

Air Quality and Pollution Exposure

Poor air quality is also an issue in the Rotterdam. Being the eighth worst municipality in the Netherlands for air quality (Pointer, 2025), pollution levels frequently exceed recommended health limits (WHO, 2025). Oude Noorden's dense layout and older infrastructure contribute to poor air circulation, trapping pollutants from traffic, local businesses, and household energy use. Narrow streets and high building structures create corridors where air pollution remains, affecting residents' health.

Additionally, construction and redevelopment projects, such as those currently in Bleiswijkplein and Heer Kerstantstraat, increase dust and particulate matter, further degrading air quality.

Green Spaces and Public Areas

Noordsingel and Bergsingel provide some green relief, but much of the neighbourhood lacks accessible open spaces. Zwaanshalspark and other small areas offer limited outdoor recreation, while street trees and vegetation remain sparse. Increasing urban greenery could help reduce heat stress and improve air quality.

Renewal and Adaptation Efforts

Efforts to modernize Oude Noorden's infrastructure and public spaces have been ongoing. Projects like the redevelopment of Zwaanshals aim to stimulate local economic activity while improving living conditions.

Municipal initiatives focus mainly on housing and some improving energy efficiency and upgrading drainage systems. Public transport and cycling and walking infrastructure are currently also being adapted to provide sustainable mobility options, though further improvements are needed.

3.2.2 SOCIOECONOMIC CONTEXT

Oude Noorden is a really densely populated and socially diverse neighbourhood that has undergone shifts in its economic and demographic regard. While recent years have brought growth in creative industries, small businesses, and cultural spaces, challenges related to income inequality, housing affordability, and mobility continue to shape the daily lives of residents.

Demographics and Population Trends

Between 2013 and 2024, Oude Noorden's population grew from 16,785 to 17,365 residents, reflecting a 3.46% increase over a decade. Despite this slow growth, the neighbourhood remains one of the most densely populated areas in Rotterdam, with 17,193 people per square kilometer, compared to the national average of 533 people per square kilometer. This extreme density puts pressure on housing, infrastructure, and public services.

Oude Noorden is home to a highly diverse population. Only 34% of residents were born in the Netherlands, while the remaining 66% have international backgrounds. The largest communities include Moroccan (24%), Turkish (17.7%), and Surinamese (12.8%) residents, shaping the cultural and commercial character of the district. While this diversity fosters a vibrant community, it also presents the challenge of social cohesion, economic mobility, and equitable access to resources.

Housing and Living Conditions

The neighbourhood's 8,705 housing homes are primarily rental properties, with 58% owned by housing associations, 21% privately rented, and 21% owner-occupied. The majority of homes (94%) are multi-family dwellings, with only 6% built after the year 2000.

Housing quality remains quite a concern, as 61% of homes have an energy label of C

or lower. This could be indicating at poor insulation and high energy costs. With demand for social housing exceeding supply, lower-income households face limited options for affordable, energy-efficient housing, making them more vulnerable to rising living costs.

Economic Profile and Income Levels

While Oude Noorden has seen an increase in small-scale retail, hospitality, and creative industries over the years, many residents still experience economic hardship. The average income per resident is €26,400. Despite some improvements, 19% of households still live at or near the social minimum, reflecting ongoing financial struggles.

Although commercial areas like the more recent Noorderboulevard and Zwaanshals have attracted investment and traffic by locals and tourists, these developments have not necessarily translated into broader economic security for all residents living in the area. Many continue to work in low-wage sectors, and unemployment remains higher than the average in Rotterdam.

Education and Social Mobility

The level of education among residents in Oude Noorden is fairly evenly distributed across levels. Around 30% of residents have a low level of education, while 32% have a medium level, and 38% hold a higher education qualification. This balance suggests that the neighbourhood has a mix of skilled and less-skilled workers, but it does not necessarily indicate that residents have equal access to job opportunities or career progression.

The extent to which education translates into economic stability varies, as factors such as language barriers, industry demand, and job accessibility play a role in determining career prospects. While a good amount of the population has higher education qualifications, the local economy still relies on low-wage service jobs, which limits social mobility for those without specialized skills or professional networks.

Mobility and Sustainability Trends

Oude Noorden aligns with Rotterdam's sustainability goals through high public transport and cycling usage, but car dependency remains significantly higher than national averages. With 4,441 fuel-powered cars per square kilometer, congestion and parking shortages continue to be a problem. This is intensified due to the density of the neighbourhood.

Efforts toward sustainable transport have made limited progress. Although electric vehicle ownership has "increased by 50%" since 2022, this growth is marginal in the broader context. The number of electric cars rose from 35 to 69 vehicles, a small fraction compared to the thousands of fuel-powered cars dominating the streets. Without further incentives and improved infrastructure for electric mobility, this shift remains insufficient to meaningfully reduce emissions or improve air quality.

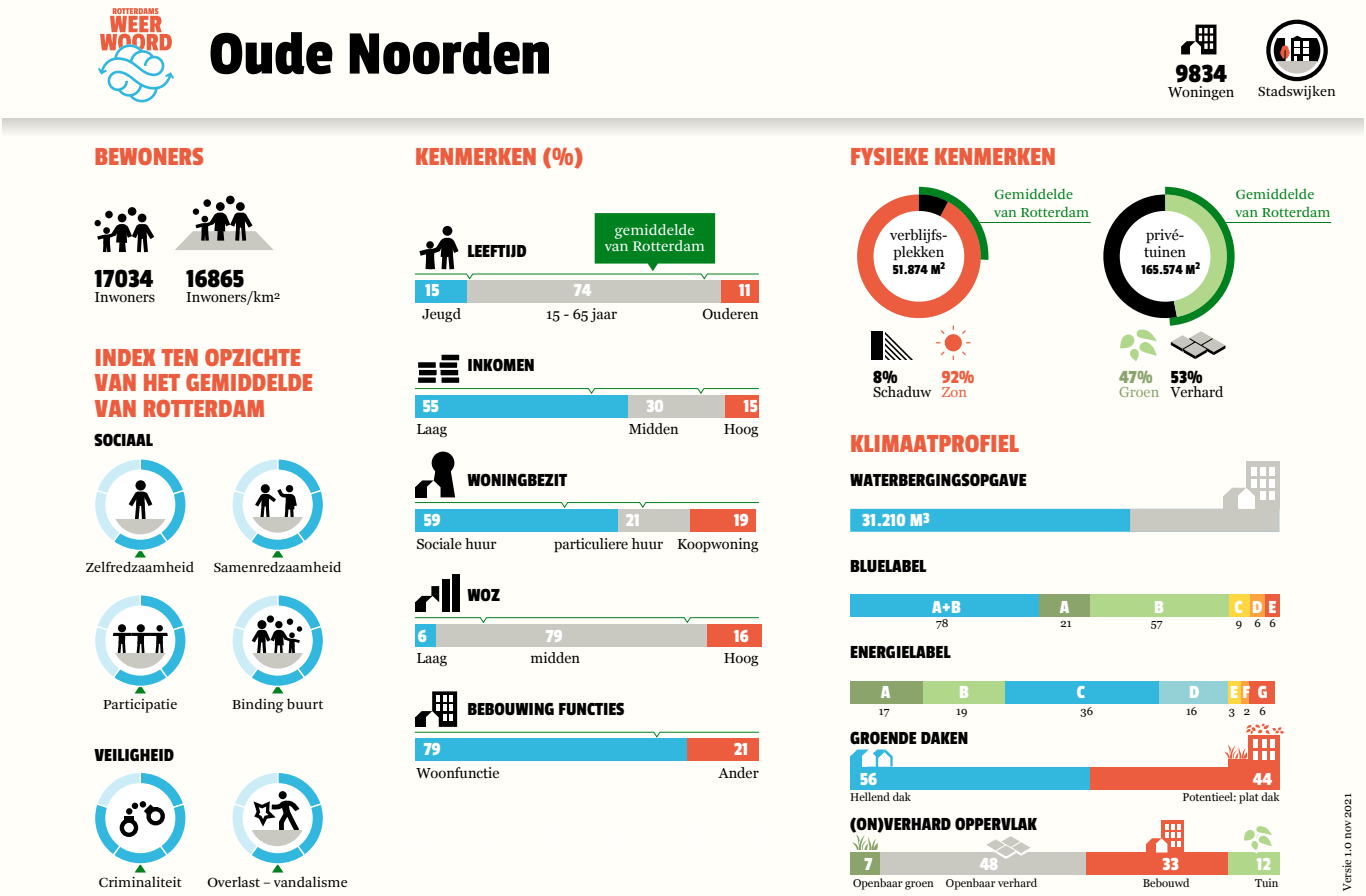


Figure 12. Factsheet of Oude Noorden, retrieved from RotterdamsWeerWoord

INTERMEDIATE FINDINGS

Oude Noorden is a neighbourhood full of contrasts. Its historic layout, with narrow streets and old buildings, gives it character but also creates real challenges. Poor insulation, little greenery, and high density mean residents deal with heat, flooding, and poor air quality. These issues point to a need for design that makes the area more climate-just and healthier to live in. At the same time, gentrification has brought new businesses and investment, but also higher rents and pressure on long-term residents. This makes it important for a design of an intervention to find ways to balance improvement with affordability. The neighbourhood's cultural diversity is one of its strengths, but it also means that the intervention has to respond to many different needs and ways of living. Finally, mobility is a daily concern: the area is walkable and well connected, yet cars still dominate, causing congestion and pollution. In doing so, the intervention can not only tackle environmental risks but also help strengthen community life and preserve the unique identity of Oude Noorden.

Sense of the Neighbourhood: Oude Noorden



SECTION 3.3

CURRENT CLIMATE RISKS IN OUDE NOORDEN

3.3.1 OVERVIEW OF CLIMATE RISK FACTORS

Climate risks are shaping daily life in Oude Noorden. This section evaluates these risks based on the key climate themes outlined in Section 2.1.4.

Precipitation

In 3.3.2 effects of precipitation will be discussed. Oude Noorden's low-lying location near the Rotte River and high percentage of paved surfaces make it vulnerable to flooding. Streets, squares, and public spaces struggle to absorb excess water, leading to frequent pooling and property damage. Rainwater flooding into homes is not uncommon. The neighbourhood's drainage systems cannot handle intense rainfall, causing water to build and overflow in areas where infrastructure falls short.

Flooding disrupts mobility, businesses, and daily life, with certain streets becoming entirely impassable. Water pooling against building facades increases moisture damage and structural decay, while repeated flooding increases soil instability and weakens infrastructure as time goes on.

Heat Stress

In 3.3.3 effects of heat stress will be discussed. Oude Noorden's high-density layout and excessive pavement create heat retention zones, making summer heatwaves more extreme. Lack of shade and poor air circulation contribute to increasing temperatures, with many buildings trapping heat due to poor insulation and ventilation.

Certain streets and public spaces experience severe heat stress, particularly in areas with little greenery. Without tree cover or shade, residents face prolonged exposure to high temperatures. Nighttime cooling is also insufficient, worsening risks for vulnerable groups such as elderly residents, children, and those with health conditions.

To reduce heat stress, the neighbourhood needs

targeted urban cooling interventions. Expanding the number of trees, integrating green roofs, and improving building ventilation can help regulate temperatures. Shaded pedestrian routes and cooling zones in high-traffic areas would also provide necessary relief.

Biodiversity

In 3.3.4 effects of green and biodiversity will be discussed. Oude Noorden lacks sufficient green infrastructure to support biodiversity and climate adaptation. Greenery plays a crucial role in cooling, air purification, and water absorption, yet much of the neighbourhood remains highly paved. Tree coverage is scarce, and many older trees suffer from drought stress and soil instability, increasing the risk of collapse.

The few public green spaces like Noordsingel and Bergsingel provide ecological benefits, but they are not evenly distributed across the neighbourhood. In areas with limited greenery, biodiversity is declining, leaving the area vulnerable to climate-driven ecological imbalances.

These risks are interconnected. Heat intensifies the effects of poor air quality. Flooding strains infrastructure already weakened by overheating. The absence of greenery affects multiple aspects from physical comfort to mental health and neighbourhood cohesion.

As mentioned, the following maps provide a visual overview of the neighbourhood's climate vulnerabilities, highlighting flood-prone areas, heat stress zones, and biodiversity loss hotspots. These insights will help identify key areas for intervention.

Figure 13. Flooding Map Oude Noorden

3.3.2 PRECIPITATION

Flooding Map

The flooding map to the right (See Figure 13) highlights flood-prone areas where rainwater accumulates due to poor drainage and excessive pavement. This map is based on a periodic stress test for extreme rainfall, simulating 100 mm of rain falling within two hours.

The darker the blue areas, the more severe the flooding risk, indicating where water struggles to drain away. These areas act as collection points, turning streets into temporary waterways.

Most Vulnerable Areas

Several locations in Oude Noorden experience severe flooding due to their lack of drainage capacity:

- Blommerdijkslaan (1), Bleiswijkplein (2), and the square at Touwbaan/Woelwijkstraat (3) are among the most affected areas.
- Bergweg (A) and Hooglandstraat (B) act as water channels during heavy rainfall because their paved surfaces prevent rain from soaking into the ground.

Impact

Flooding weakens roads and sidewalks, increases building deterioration, and causes moisture damage and mold growth. High-risk zones (Yellow and red zones on the map) indicate frequent and severe water buildup, increasing property damage.

Prevention

To mitigate this, water absorption must be increased by implementing permeable pavements, rain gardens, and bioswales for example. As well as encouraging residents to replace paved areas with green spaces, such as their front yard, for better water retention.

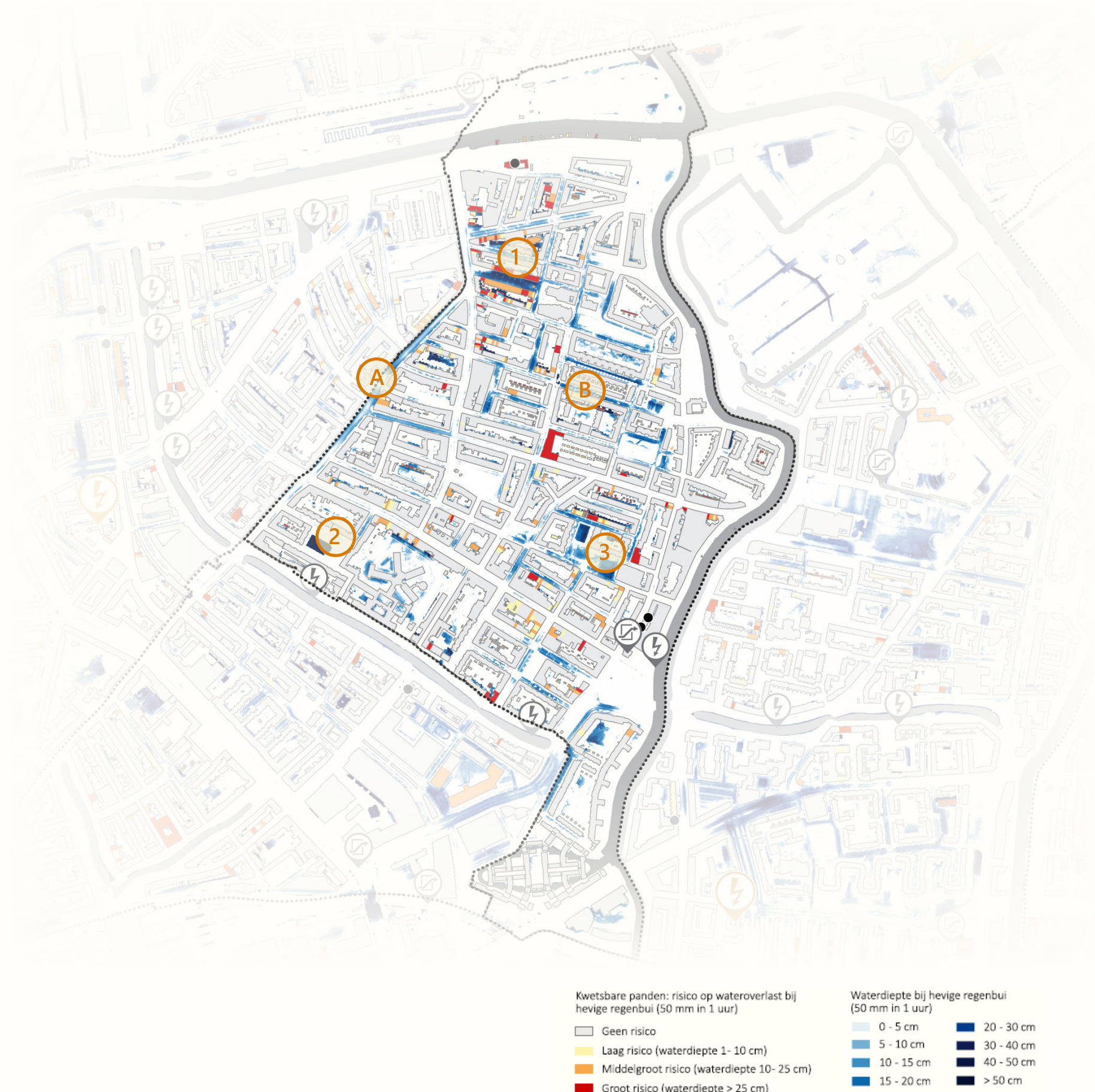


Figure 14. Road Accessibility Map Oude Noorden

Road Accessibility Map

The Road Accessibility map (See Figure 14) highlights streets in Oude Noorden that become impassable during a 50 mm rainfall event within one hour. Roads are classified as inaccessible when water depth exceeds 15 cm, significantly disrupting traffic flow and emergency services (Veiligheidsregio Rijnmond). At this depth, ambulances, fire trucks, and public transport struggle to navigate, leading to delayed response times and increased safety risks.

Mobility Bottlenecks

Flooding on main roads and access routes poses a major challenge for mobility in Oude Noorden. These streets are important for daily traffic, connecting residents to surrounding neighbourhoods, public transport, and emergency services. When these key routes flood, the entire transportation network is disrupted, making movement difficult for residents, businesses, and emergency responders.

Most Vulnerable Areas

Two main areas in Oude Noorden experience severe inaccessibility due to poor drainage capacity:

- Bloklandstraat and Hooglandstraat serve as a key north-south connection within Oude Noorden. Flooding in this area isolates large sections of the neighbourhood, impacting both local and through traffic.
- The area surrounded by Wiekstraat, Woelwijkstraat, and Zwaanhals also suffers from severe water accumulation, further limiting access to services.

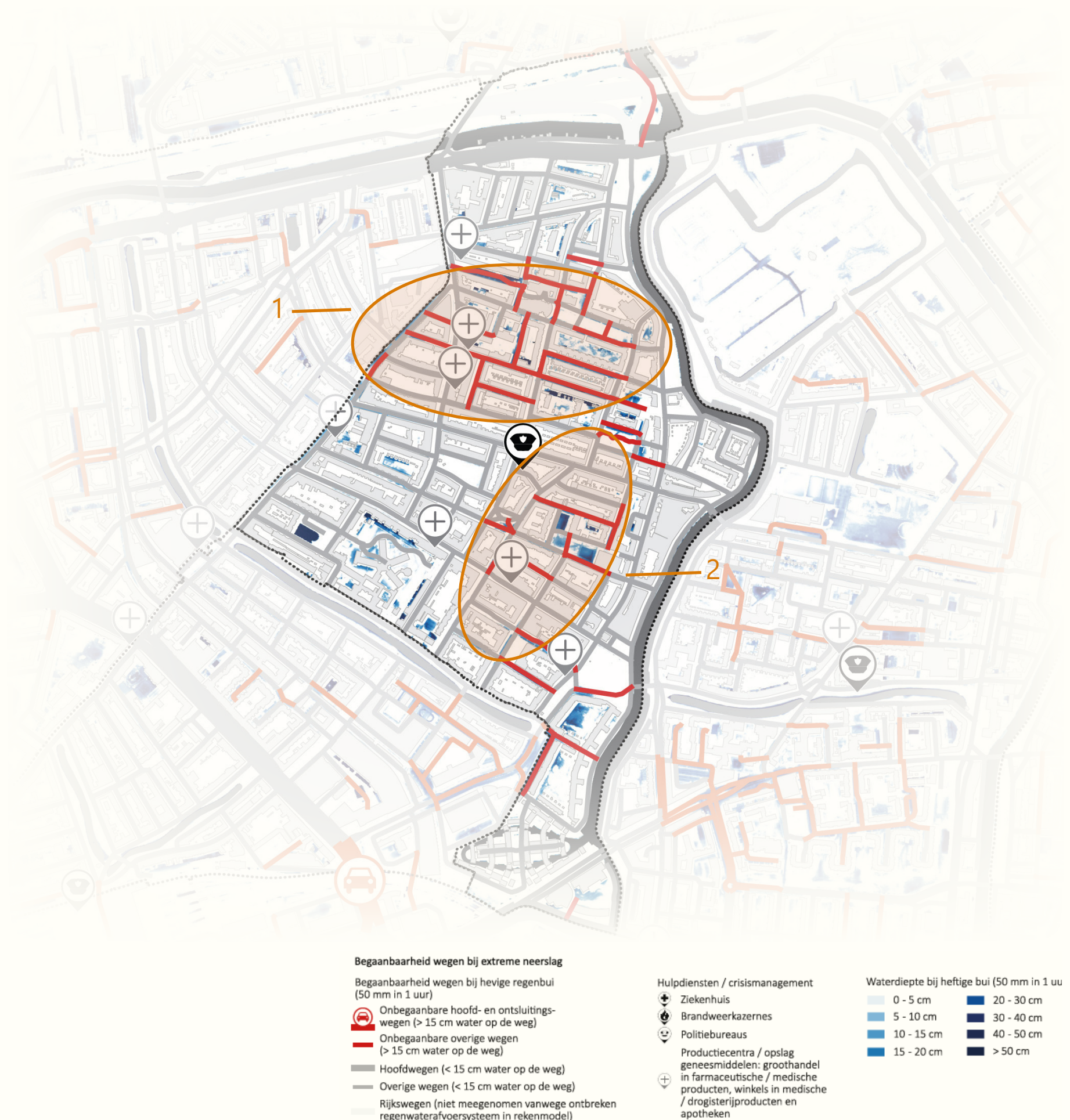


Figure 15. PET Map Oude Noorden

3.3.3 HEAT STRESS

The PET Map

The Physiological Equivalent Temperature (PET) map (See Figure 15) illustrates how heat stress is distributed across Oude Noorden during hot summer days. PET measures perceived temperature, incorporating air temperature, wind, and humidity to reflect how heat is actually felt by residents. The map shows that nighttime heat stress, which makes opening windows essential for cooling, is evenly distributed across the neighbourhood and persists for approximately one and a half to two weeks each year. The southern area around Hofdijk (A) experiences the worst conditions.

Neighbourhood-Wide Heat Challenges

Due to high-density paved streets and limited airflow, nearly all areas of Oude Noorden retain heat well into the evening. The combination of concrete, asphalt, and brick facades absorbs and slowly releases heat, keeping temperatures elevated even after sunset. This urban heat island effect is worsened by the lack of cooling infrastructure, such as shaded public spaces or water elements.

Most Vulnerable Areas

Additionally, the map identifies specific locations where residents struggle to cool their homes due to poor ventilation conditions:

- Jan Zwartstraat (1) and Zwaanhals (2) – Noise pollution from nightlife and traffic prevents residents from keeping windows open at night.
- The entire neighbourhood, except the area around Hooglandstraat (3) – High fine dust concentrations reduce air quality, making ventilation difficult.

In these areas, effective cooling solutions must offer more than outdoor interventions and include indoor climate control measures, such as air conditioning. However, some residents lack with acquiring these measures.

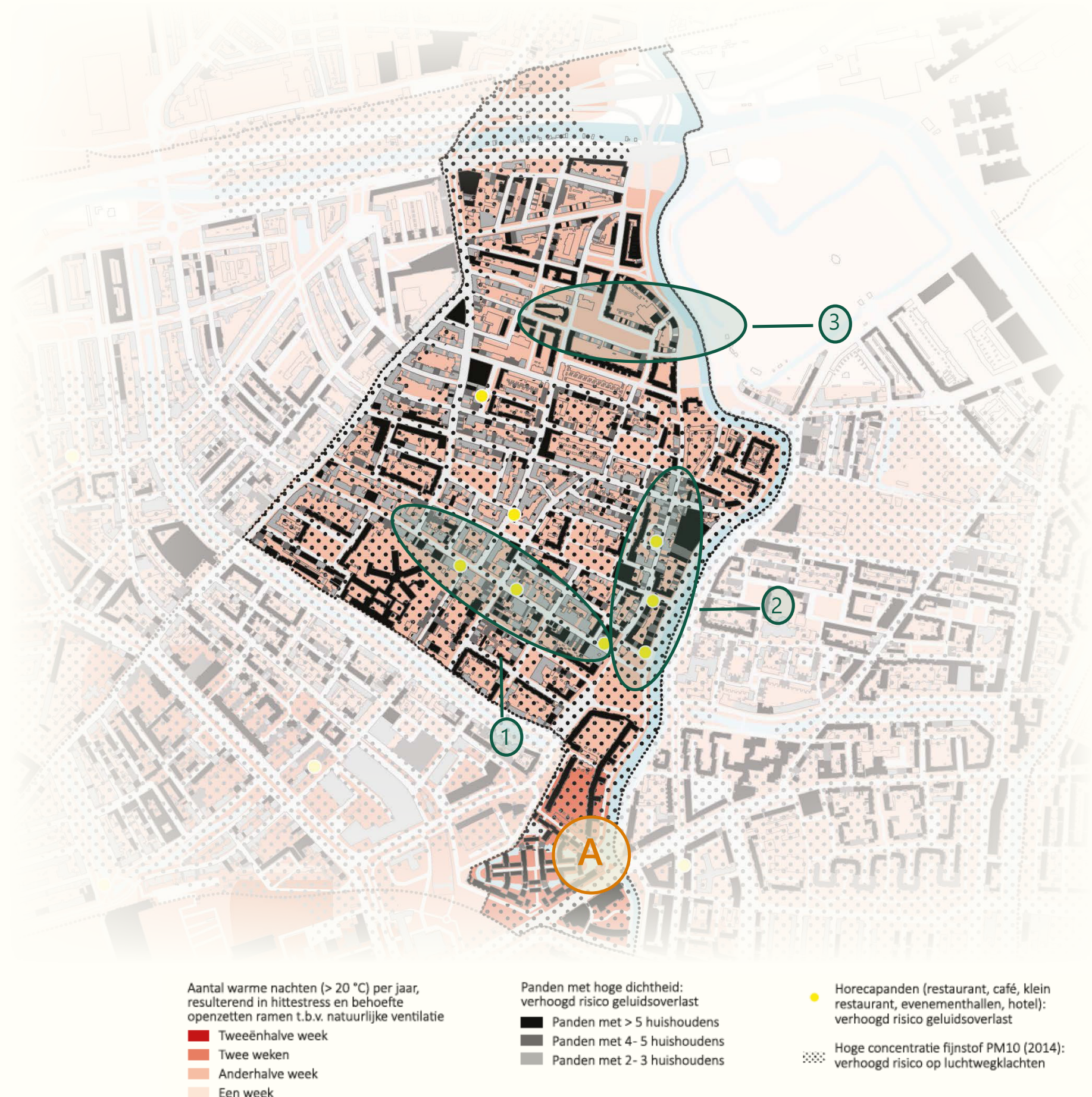


Figure 16. Cool Spaces Map Oude Noorden

The Cool Spaces Map

The Cool Spaces Map on the right (See Figure 16) identifies existing cooling areas and highlights gaps where residents lack access to nearby shaded or cooled public spaces. A cool space is defined as a 200 m² public area where the perceived temperature (PET) stays below 38°C, on average, more than once every 5.5 years.

Ideally, every resident should live within 300 meters of a cooling space, but the map reveals gaps, especially in high-density residential areas. Namely (1) the buildingblock between Meidoornstraat and Bloklandstraat. Another is a (2) schoolyard at Wiekstraat where shaded areas and cooling infrastructure are scarce.

Challenges in Cooling Public Spaces

- Limited Green Areas – Some parks and public squares exist but provide little shade, failing to offer meaningful heat relief. To improve cooling, these spaces should be redesigned to be more accessible and multifunctional, offering for instance both heat relief and opportunities social interaction.
- Lack of Shaded Gathering Spaces: Many public squares and pedestrian areas are fully paved, offering no escape from extreme heat.
- Heat-Trapped Streets: Streets with heat-absorbing materials like asphalt and concrete retain warmth well into the evening,

Without access to shaded, well-ventilated cooling spaces, vulnerable groups endure prolonged heat exposure.



Prioriteit creëren koele plekken

- * Prioriteit creëren koele plek (huidige loopafstand tot koele plek is > 300 m)
- * Prioriteit creëren koele plek (huidige loopafstand tot koele plek is 150-300 m)

Verkoelen bestaande verblijfsplekken

- Bestaande koele verblijfsplekken
- Kans verkoelen bestaande warme verblijfsplekken
- Ontwikkelen openbare ruimte (geen verblijfsplek) tot koele verblijfsplekken
- Kans ontwikkelen bestaande koele plek tot verblijfsplek

Kans benutten semi-openbare plekken (normaal gesproken niet voor iedereen toegankelijk) voor alle Rotterdammers tijdens extreme hitte

- Kans benutten bestaande koele semi-openbare plekken
- Kans verkoelen en benutten warme semi-openbare plekken

3.3.4 BIODIVERSITY

The Water Demand of Green

Green infrastructure in Oude Noorden is essential for cooling, air purification, and water absorption but remains vulnerable to prolonged drought. The “Watervraag Groen map” (See Figure 17) pinpoints areas most at risk of drought stress. When trees lack sufficient water, they lose their cooling ability, worsening heat stress and increasing vulnerability to disease and collapse.

The map highlights both young and monumental trees, which hold ecological and historical significance. Monumental trees have stricter protection than “regular” trees. However without adequate hydration, their structural integrity weakens, resulting in safety risks. Their loss significantly reduce biodiversity and the cooling capacity in the area. Private green spaces, such as gardens and courtyards, also contribute to the ecological balance and can support drought resilience efforts.

It is also notable that residents in the northern part of the neighbourhood have significantly less greenery in their gardens compared to those in the southern part (see dotted line), contributing to the overall 53% average of paved gardens in Oude Noorden

Challenges For Green Spaces

- Drought stress weakens trees, especially in areas with low soil moisture retention, reducing their cooling function and increasing the risk of collapse.
- Many green spaces lack drought resilience, limiting their effectiveness.
- The compact built environment and limited open space restrict opportunities to expand green or connect existing green spaces.

Improving green infrastructure in Oude Noorden requires more than technical fixes. Public spaces should be redesigned as multifunctional cooling zones with shade, seating, and biodiversity. Monumental trees need active protection through targeted watering and soil recovery. Residents should be supported to de-pave and green these spaces through incentives, shared tools and for instance workshops for knowledge sharing.

Figure 17. Water Demand Map Oude Noorden



Figure 07. The Systemic Design I

Watervraag en kwetsbaarheid groen bij droogte

Percentage groen in tuinen

- 0 - 20 % groen
- 20 - 40 % groen
- 40 - 60 % groen
- 60 - 80 % groen
- 80 - 100 % groen

Openbaar groen

- Bepantingen
- Grassen
- Hagen
- Overige

Bomen

- Monumentale bomen
- Droogtegevoelige bomen
- Oude bomen
- Overige bomen

Water Retention Potential Map

In Oude Noorden, excessive pavement limits the ground's ability to absorb rainwater, increasing runoff, flood risks, and restricting groundwater replenishment. The Soil absorption potential map (See Figure 18) shows locations where soil has the highest potential to retain water, offering opportunities to relieve pressure on drainage systems while supporting greenery.

A major issue in the area is the dominance of hard surfaces, which prevent natural infiltration of water and channel rainwater directly into the sewer system. This overwhelms drainage infrastructure, leading to water pooling in streets and squares. At the same time, too little rainwater reaches the ground to refill the soil, leaving trees and plants without enough moisture and making them more likely to suffer during dry periods.

The map pinpoints key areas for de-paving, where removing excess concrete and asphalt could significantly improve water absorption. These are indicated by the red zones on the map. These include private gardens, public squares, and schoolyards, where shifting to permeable surfaces or green would help retain rainwater.

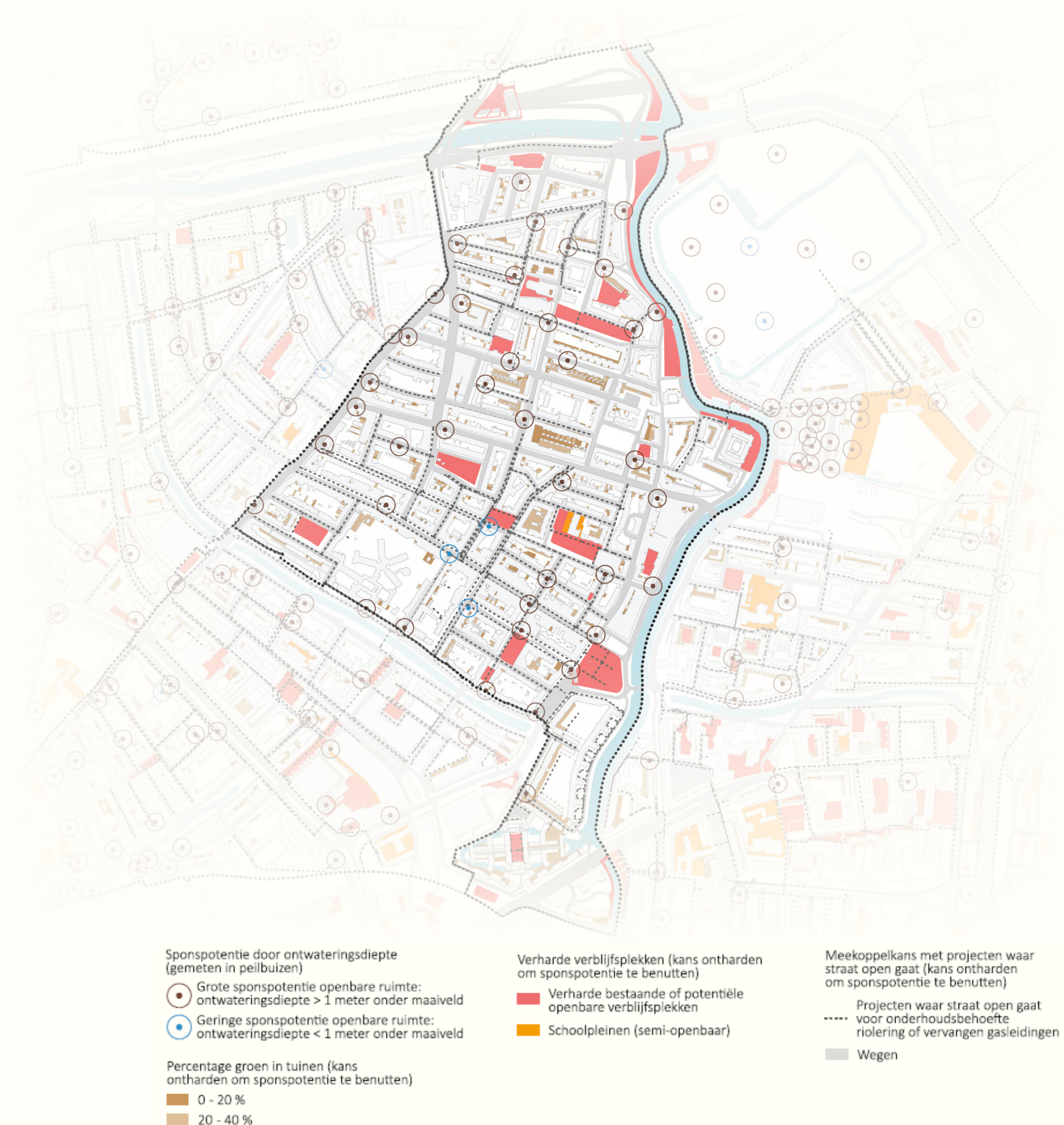
Improvement

Open spaces that currently act as heat traps could be redesigned to integrate green infrastructure, reducing surface temperatures while improving water retention.

A combination of de-paving, permeable pavement, and rainwater harvesting systems can maximize the soil's sponge function, helping capture and reuse rainwater more effectively. Strengthening coordination between the municipality and water boards will be essential to ensure these strategies are implemented effectively.

By transforming paved areas into water-absorbing landscapes, Oude Noorden can reduce flood risks and enhance greenery. These interventions will not only help manage extreme rainfall but also create a healthier, more livable neighbourhood.

Figure 18. Water Retention Map Oude Noorden



INTERCONNECTED RISKS

The climate risks in Oude Noorden are not isolated issues. They overlap and reinforce one another, creating a layered system of vulnerability. This section describes how these risks interact, who is most affected, and what these patterns reveal about justice and the need for adaptation.

Climate Risks Are Systemic and Interconnected

Extreme precipitation overwhelms Oude Noorden's drainage infrastructure, leading to water accumulation that damages homes and blocks mobility. At the same time, paved surfaces that contribute to flooding also amplify heat stress. Heat retention in dense, shaded streets is made worse by poor air circulation and the lack of cooling green infrastructure. Prolonged drought weakens the few trees that do exist, reducing biodiversity and stripping the area of its natural buffers.

The result is a reinforcing loop: flooding weakens infrastructure; heat undermines health; biodiversity loss removes protective systems. These impacts are not distributed randomly. They tend to align with areas marked by low-income housing, limited political voice, and minimal investment.

Justice Is Not Just About Risk It's About Capacity

Climate injustice in Oude Noorden is not only about who experiences environmental stress. It's about who has the resources, information, and influence to respond. Renters cannot easily modify their homes. Elderly residents cannot reach distant parks. People with limited Dutch proficiency or digital access are excluded from consultations. These groups live with the highest exposure and might have lowest capacity to adapt (More on this in Section 4.4)

Meanwhile, recent investments tend to focus on "visible" streets and commercial zones, reinforcing aesthetic upgrades rather than addressing systemic vulnerability. The result is

a spatial divide: green is more likely to appear where risk is lowest, while high-risk zones demand attention.

Justice in this context means not only reducing exposure but is about giving access, voice, and design power.

Green Space as a Leverage Point

Throughout reviewing the literature, gathering the environmental data and initial community conversations, one theme consistently surfaced: green space.

It is not a superficial concern. Green affects heat stress, water retention, air quality, and public well-being. It also serves as a physical space where social interaction, safety, and inclusion can occur. For many residents, the absence of greenery is both a symbol and a source of inequality.

Green space offers a rare and good opportunity to intervene across multiple climate risks with one approach. But to do it right, it must be done objectively. If green becomes a vehicle for gentrification or branding, it can worsen displacement.

Implications

This interlinked understanding of climate risks and justice calls for an integrated response. The next section focuses on analyzing community insights. These perspectives reveal how systemic injustices are experienced in daily life and help understand the gap between policy intentions and lived realities. By examining how residents, experts, and institutional actors perceive green space, climate adaptation, and systemic barriers, the following analysis builds a grounded foundation for identifying priorities and leverage points.

SECTION FINDINGS

This section has outlined the geographical, environmental, and socio-economic context of Oude Noorden and examined the current climate risks in the neighbourhood. Several conclusions can be drawn:

1. Oude Noorden's dense 19th century urban layout, narrow streets, and limited open spaces increase its exposure to climate risks. Poor ventilation, heat retention, and inadequate drainage directly affect residents, while aging housing and infrastructure further reduce resilience.
2. The neighbourhood already faces multiple overlapping risks. Heavy rainfall overwhelms drainage systems and disrupts mobility. Heat stress is intensified by paved surfaces and scarce greenery. Biodiversity is under pressure as drought weakens trees and reduces natural buffers.
3. These risks interact and reinforce each other. Flooding damages infrastructure already strained by heat, while biodiversity loss reduces the ecological systems that support cooling and water absorption. The combined effects disproportionately affect low income households, elderly residents, and those with limited mobility.
4. Green space has emerged as a crucial leverage point. Expanding and connecting greenery can provide cooling, water retention, and improved air quality while also supporting social cohesion. However, the unequal distribution of green areas reflects wider patterns of inequality.
5. Current investments often prioritise visible or commercial streets over vulnerable communities. A just approach to climate adaptation requires more than technical fixes. It must enable a fair distribution of resources, equitable access to green infrastructure, and the meaningful inclusion of residents in decision making.

These findings highlight the systemic and interconnected nature of the climate risks in Oude Noorden. Together with the insights from Section 2, they form the foundation for Section 4, which will shift focus to community perspectives. It will explore how residents and local stakeholders experience these challenges in daily life and where they see opportunities for change.

SECTION 4.0

EMPATHIZING WITH THE COMMUNITY

This section will present insights gathered from stakeholder interviews and community engagement efforts. It will highlight main concerns from residents, local experts and neighbourhood council members regarding climate and green. By identifying common themes and governance gaps, this section will provide a deeper understanding of the systemic barriers affecting climate justice in Oude Noorden.



METHODOLOGY

Data Collection Methods

Community insights were collected through interviews, stakeholder meetings, casual conversations, and event observations. Semi-structured interviews were held with experts, residents and members of the neighbourhood council from diverse backgrounds. Casual conversations took place in public spaces and also during local events, offering unfiltered perspectives on daily struggles, climate concerns, and neighbourhood life. Events like the Cultuurborrel and Winterfeest revealed how residents engage with local governance as well as climate topics. Meetings with neighbourhood councils, and environmental (green) groups helped contextualize these experiences. To identify broader patterns, existing reports, online discussions and community-led initiatives, were also reviewed.

Participant Selection & Diversity

Since Section 3.5 outlined green space as a leverage point for climate injustice, the rest of this chapter centers on that theme. Because of this, participants were selected based on their involvement in the area and their relation to climate and environmental issues. Interviews included residents, members of the neighbourhood council, municipality, and experts in green infrastructure and city development. The goal was not to represent all demographic groups, but to gather insights from people directly engaged with or affected by local climate and green space challenges.

Interview Themes & Key Questions

Interviews were thoughtfully tailored to reflect each participant’s role, background, and lived experience, making sure that questions felt relevant and created space for personal insights, professional expertise, and grounded reflections on the neighbourhood’s environmental and social challenges.

Experts on green infrastructure were asked about the current state of greenery in Oude Noorden, climate injustice, and barriers to adding green space. Topics included access, usage, policy limitations, and conflicts between economic development and greening efforts. They also reflected on existing initiatives, municipal policy, and what needs to change to ensure a fairer distribution of green access in the future.

For residents and neighbourhood council members, questions focused more on daily experiences, including heat stress, flooding, housing conditions, and the availability of green space. Trust in the municipality and housing associations was a recurring topic, along with how included people felt in local decision-making.

Across all groups, interviews explored barriers to participation in climate initiatives. These included financial limitations, lack of access to information, or a general sense that policies are made without community input. Together, these conversations helped clarify how systemic challenges show up in everyday life and where residents see room for change.

Activity	When & Where	Participants	Focus
Community Events	Nov-Dec 2024	General Public, Local Stakeholders	Engagement, perceptions, trust in government
Desktop Research	Jan–Mar 2025 / policy documents	Municipal reports, community-led initiatives	Climate policy, public perception, adaptation strategies
Site Visits	Dec 2024 –Mar 2025/ multiple locations	Residents, Observation-based	Green infrastructure, accessibility, public use
Interviews	Jan–Mar 2025 / multiple locations	Residents, Experts, Council Members	Green space, climate risks, trust, participation

COMMUNITY PERSPECTIVES

4.2.1 COMMUNITY EXPERIENCES IN OUDE NOORDEN

To truly grasp the character of Oude Noorden and the perspectives of its residents, it was essential to engage with the neighbourhood firsthand. Multiple visits were made to observe daily life, interact with locals, and understand what they value.

Cultuurborrel Event

One key engagement opportunity was the “Cultuurborrel”, organized by the Wijkraad Oude Noorden, Cultuur Concreet, and Gemeente Rotterdam. The event aimed to bridge cultural differences and generate ideas for social and cultural initiatives within the neighbourhood. Several notable observations emerged during the event:

1. Homogeneity in Participation
Despite being open to all ethnicities, the majority of attendees shared similar backgrounds and seemed to already know each other. The group primarily consisted of Dutch elderly residents, who were vocal about the issues they faced in the neighbourhood.
2. Niche Audience
The event’s focus on culture and creativity attracted participants who were already involved in workshops, arts, or community activities. As a result, broader representation from the wider Oude Noorden community was lacking.
3. Food as a Social Connector
Food played an important role in lowering



Figure 19. Cultuurborrel Event

barriers for discussion, encouraging residents to share their thoughts on cultural diversity, social challenges, and neighbourhood dynamics. Conversations flowed naturally, revealing valuable community insights.

Resident Perspectives

During discussions, various topics surfaced. One older female attendee reflected on the changes she had witnessed over the past 35 years, noting both improvements and concerns about gentrification:

“I have seen the neighbourhood change over the years, both positively and negatively.”

She expressed appreciation for certain developments:

“I’m really happy with what Zwart Janstraat has become.”

At the same time, she expressed the longing to variety of cultural events

“I miss events like the Dunya Festival. We should have such events in Oude Noorden”

Her reflections highlight the dual impact of urban development. While some improvements are welcomed, others contribute to a sense of cultural loss and displacement.



Figure 20. Cultuurborrel Event

Winterfeest

Another key event attended was the “Winter Feest”, organized by Havensteder, one of the two main local housing associations. The event was intended as a goodwill gesture for residents, aiming to make up for past inconveniences caused by housing-related disruptions. While the gathering provided a space for community interaction, several notable observations emerged.

1. Strong but Limited Community Bonds

A sense of community was present, but primarily among close neighbors who already knew each other. While some residents engaged warmly, the event did not foster broader connections across different social groups within Oude Noorden.

2. Mistrust Toward Housing Associations

Despite Havensteder’s role as the event organizer, many attendees expressed skepticism toward the housing association. Complaints about neglected maintenance, slow responses to tenant concerns, and unfulfilled promises contributed to a widespread feeling of frustration. As one attendee put it:

“They only do this to keep us quiet.”

3. Mistrust in the Municipality

Beyond housing concerns, residents also voiced distrust in the local government. Many felt overlooked in city-wide development plans, expressing frustration over the lack of direct engagement from policymakers. This sentiment reinforced the perception that urban



Figure 21. Winterfeest Event

improvement efforts often fail to address the real needs of the community.

4. Visible and Hidden Poverty

The event also highlighted economic disparities within Oude Noorden. While some signs of poverty were visible, such as reliance on free provisions, other struggles were less immediately apparent. Residents spoke about rising living costs, housing affordability issues, and energy insecurity. Some mentioned:

“I’ve had my heating low at home for weeks.”

The winter season made these issues more openly discussed, as many residents shared experiences of cutting back on heating costs due to financial strain.

These economic pressures shape daily life and influence how residents engage (or disengage) with broader community initiatives. While these events revealed social challenges, they also exposed deeper concerns about climate risks, which residents experience in different ways.

Beneath the surface of food stalls and friendly conversations, deeper patterns became visible. Who shows up, who feels heard, and who is missing altogether. These details reflect broader systemic gaps in representation, trust, and access.



Figure 22. Winterfeest Event

4.2.2 COMMUNITY PERSPECTIVES ON CLIMATE CHANGE AND INJUSTICE

Oude Noorden faces a range of social and environmental challenges, but do residents see climate risks as an issue? While flooding, heat stress, and declining biodiversity are well-documented concerns (Section 3.3), most people don’t talk about them in those terms. Instead, they describe everyday struggles like overheating in summer, lack of trees, and worsening air quality. To understand how people experience these challenges, 25 residents from different age groups, backgrounds, and education levels were approached on the street. Conversations focused on what they liked about the neighbourhood, what they saw as the biggest environmental problems, and whether they had heard of climate injustice.

What Do People Love About Oude Noorden?

Despite its challenges, many love living in Oude Noorden. They talked about the diverse mix of people, creative energy, and a strong sense of community. Some mentioned the vibrant secondhand shops and cozy cafes, while others valued the neighbourhood’s cultural events and open, welcoming feel.

“I like that so many young families and creative people live here.”

“There’s always something happening, from neighbourhood festivals to art projects.”

For many, Oude Noorden feels alive. A place with a unique identity where different cultures mix. But alongside that appreciation, there was also concern: the fear that the neighbourhood is changing too fast, and not always for the better.

The Most Pressing Climate Related Problems

When asked about environmental challenges, the most common response was the lack of green spaces. The neighbourhood is heavily paved, with little room for trees or shaded areas. On hot days, people struggle to find relief.

“Summers are getting hotter, and there are too few places to cool down.”

“The streets need to be broken open for greenery. There are too many paved surfaces.”

Air quality was another concern, particularly among older residents. Many pointed to pollution from cars, scooters, and waste left on the streets. Some worried about how these issues affect their health, but they weren’t sure what could be done about it.

“I’m worried about air pollution from old cars and scooters.”

There was also frustration with how little green space is accessible to those who need it most. One resident mentioned how difficult it is for elderly people with limited mobility to reach larger parks like Kralingse Plas, meaning they are stuck in the overheated streets of Oude Noorden.

“Kralingse Plas is beautiful, but elderly people with mobility issues can’t get there easily.”

Do Residents Recognize Climate Injustice?

When asked about “klimaatonrechtvaardigheid” (climate injustice), most people had never heard the term. Only about 30% of residents had a clear idea of what it meant, while others associated it with vague ideas of fairness and responsibility.

“I’ve never heard of it, but it seems like something about unequal distribution.”

“Climate injustice? That sounds like something rich people worry about.”

Those who did understand the concept pointed out that poorer neighbourhoods often have more pollution, fewer trees, and less government investment. They recognized that wealthier areas of Rotterdam get more funding for green infrastructure, while places like Oude Noorden are left behind.

“It means poorer neighbourhoods experience more pollution and have fewer resources to deal with it.”

One resident connected it to government priorities:

“The municipality builds beautiful parks everywhere, but not here. Why do we always get less?”

4.2.3 COMMUNITY STORIES YOU DON'T SEE ON MAPS (OR DO)

In collaboration with an artist, stories were collected from residents through a temporary street intervention at multiple locations (see Figures 23 and 24). The goal was to listen closely to lived experiences, focusing on how people relate to climate, change, and inclusion in Oude Noorden and map these. About ten residents shared perspectives on issues ranging from green space to social dynamics.

What Do People Notice About the Neighbourhood?

Residents reflected on how the neighbourhood changes in summer. While they appreciate the liveliness, several noted that it now feels overcrowded and less comfortable.

"There are so many buildings now that it gets too crowded in summer. You can't really enjoy the area anymore."

Public squares were described as active but not always functional for all age groups. Parents mentioned the lack of space designed for children.

"There are lots of people in the squares, but not many places for children to actually play."

Who Belongs and Who Doesn't?

Some residents voiced concerns about newcomers, especially people from Amsterdam who now live near the Noordsingel. The issue was not just about people relocating, but about how they interact with existing communities, or choose not to.



Figure 23. Story Collection Oude Noorden

"Amsterdammers live here now, but they don't really become part of the neighbourhood."

This reflects a broader tension around identity, connection, and ownership. Several residents also mentioned an increase in tourism, with visitors coming from as far as Antwerp to shop on Zwart Janstraat, visit family, or simply and quite annoyingly just drive through the area.

Rather than a clear divide, these stories point to the more complex social landscape. In which different groups coexist, but do not always connect.

Greening as Resistance

One resident shared how he and neighbors tried to green their street. They approached the municipality several times for support. Each time, the response was dismissive or delayed.

"They didn't want to help us at all. We had to push, fight, and eventually just do it ourselves."

Eventually, the group planted greenery on their own. This not only improved the space but also strengthened social ties. Still, the lack of support was disheartening.

"It's nice now, but it took so much effort. Why didn't they just support us from the start?"

What These Stories Show

These conversations reveal the friction between improvement narratives and lived reality. Residents are observant, active, and often forced to take initiative. When small acts of greening require struggle, it signals a system not meeting people where they are.



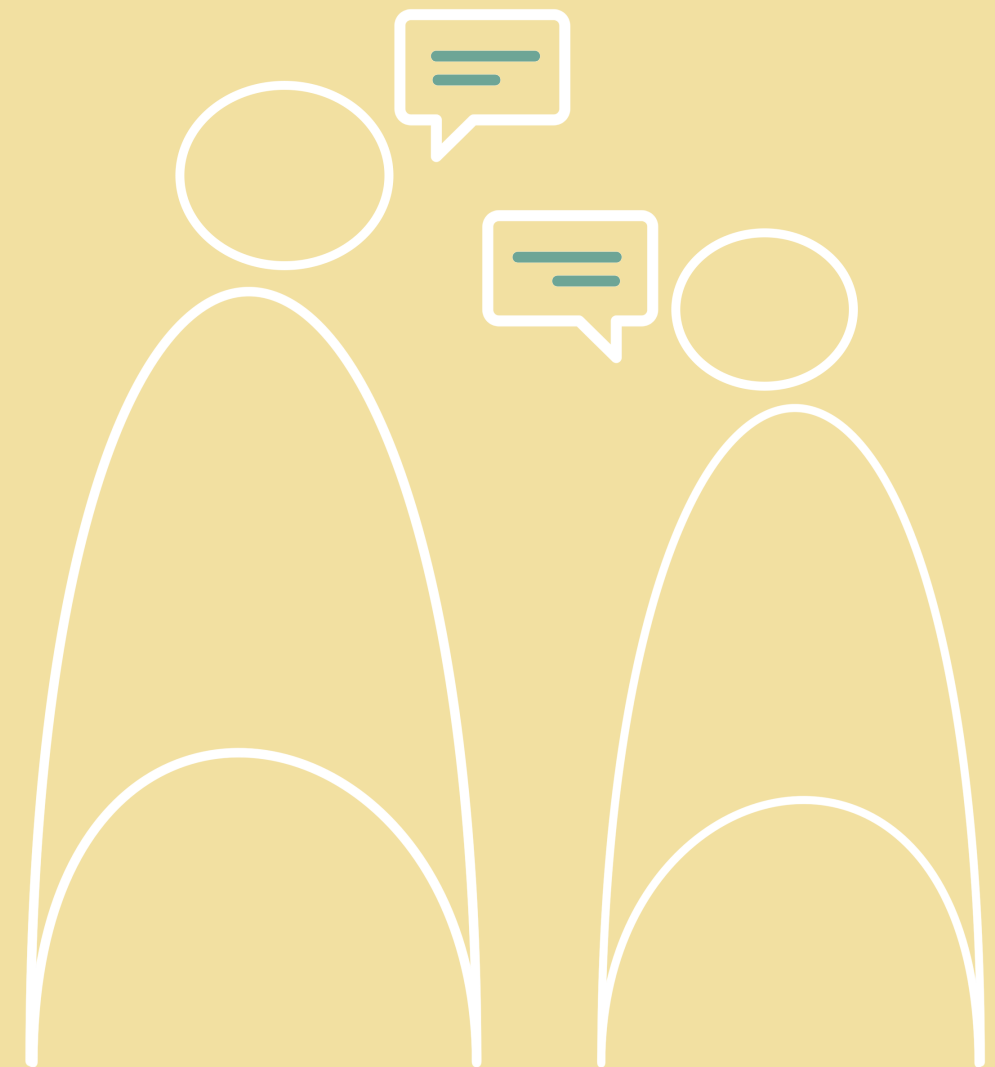
Figure 24. Story Collection Oude Noorden

INTERMEDIATE FINDINGS

What Life in Oude Noorden Reveals

The engagement with residents and local stakeholders in Oude Noorden shows that climate and social challenges are deeply felt at a personal and everyday level. People rarely speak in terms of "climate risks" or "injustice," but instead describe overheating in summer, too much paving, difficulty accessing green space, and the strain of rising living costs. These lived experiences reveal that environmental vulnerability is inseparable from social inequality. Events like Cultuurborrel and Winterfeest also highlight who participates and who is excluded, exposing a gap between official narratives of improvement and how residents actually experience change. Mistrust toward housing associations and the municipality runs deep, as many feel overlooked in decisions and forced to take matters into their

own hands, such as greening streets without institutional support. For the intervention, this means that the design cannot only address physical space. It must also work to rebuild trust, broaden participation, and acknowledge the cultural identity of the neighbourhood. A green intervention, for example, should not just mitigate heat and pollution but also create shared spaces where different groups feel they belong. Similarly, an intervention should be co-created with residents, making sure they respond to daily struggles rather than top-down priorities. These findings suggest that the design project must combine ecological resilience with social justice, positioning design as both a spatial and relational tool to bridge divides and empower the community.



SECTION 4.3

STAKEHOLDER AND POWER DYNAMICS

4.3.1 STAKEHOLDERS

Understanding climate injustice means identifying both who is affected and who holds decision making power. While climate risks are relatively widespread across the neighbourhood (see Section 3), the ability to act, shape outcomes, and influence policy is not. This section maps the main stakeholders involved in climate adaptation and green space development, and examines the power dynamics that determine whose interests are prioritized. Across interviews, events, and background research, a recurring theme was returning: control. Who decides? Who is included? And who remains excluded?

Figure 25 on the following page illustrates the stakeholder relationship network map visualizing the main actors involved in climate adaptation and green space development.

Institutional and Local Actors

At the center of green and climate-related decisions sits the Municipality of Rotterdam (*Gemeente Rotterdam*), particularly departments like Municipal Public Works (*Stadsbeheer*), Rotterdams WeerWoord, and the Klimaatrechtvaardig Rotterdam team. These actors set the strategic direction, manage funding, and coordinate large-scale planning. Their priorities often shape where and how climate adaptation and green in public spaces happens.

Housing associations, especially Havensteder and Woonstad, play a key role at the housing level. They manage a large portion of the neighbourhood’s housing and are responsible for energy efficiency upgrades, maintenance, and renovation plans. However, residents report that these improvements often come slowly and are rarely designed with climate resilience in mind.

At the community level, residents remain central, yet their influence is uneven. While some are active in initiatives or councils, many are renters with limited means, digital access, or language skills. They are often consulted late in the process, if at all.

Intermediaries and External Institutions

Wijkhub, Huis van de Wijk, and Opzoomer Mee represent locally grounded efforts to activate residents and bring neighbourhood priorities into broader planning. These organizations work closely with residents and serve as entry points for community engagement. Still, their capacity to influence formal decision-making remains limited. The Wijkraad plays an advisory role and connects residents with the municipality, but its impact depends heavily on how seriously city departments take its input.

“Green experts” contribute critical knowledge on climate adaptation, biodiversity, and local greening. While some work with government bodies or housing associations, others operate independently. Their ideas often remain stuck at the concept level if they are not embedded in institutional processes or supported with funding.

At the higher governance level, the Province of South Holland (*Provincie Zuid-Holland*), Rijkswaterstaat, the National Institute for Public Health and the Environment (*RIVM*), and the Water Board (*Waterschap HHSK*) set regional policies on water safety, public health, and environmental data. While these institutions hold broad authority, their presence is less directly felt in the daily lives of residents. Their influence becomes visible through infrastructure projects, water management standards, and technical frameworks that shape what the municipality can or cannot implement. These actors were taken into account, though the focus remained on local dynamics.

Local businesses are also part of the neighbourhood and play a role in how public space is shaped. However, like the regional and national institutions, they were not entirely included. Their priorities often lean toward economic activity and street-level improvements, rather than long-term climate adaptation.

The Power Imbalance

Together, these actors form a complex system of overlapping responsibilities. But complexity is not the same as balance. Influence remains concentrated among institutions, while many residents feel their role is limited to reacting to decisions already made.

4.3.2 INFLUENCE

This stakeholder relationship network map also visualizes how influence over climate adaptation and green space is distributed across key actors in Oude Noorden.

Each stakeholder was assigned a score from 1 (one) to 4 (four), which determines the size of their node in the map. These scores reflect how much each actor is perceived to shape decisions, set priorities, and influence outcomes. That includes setting the agenda, steering planning processes, allocating resources, and deciding how participation is structured.

In this context, influence refers to the power to decide what happens, where it happens, how it happens, and for whom. These dynamics tie directly into the concept of procedural justice discussed in Section 2.2.5 highlighting the importance of an inclusive processes

The scale used is as follows:
1 = Low influence, 2 = Medium influence, 3 = Medium–High influence, 4 = High influence.

These scores (See Appendix 2) are based on a systemic view that combines:

- Top-down authority (such as who controls land, budgets, or policy)
- Bottom-up experience (how included or excluded different actors feel)
- Practical system functioning (who actually shapes outcomes, even if unofficially)

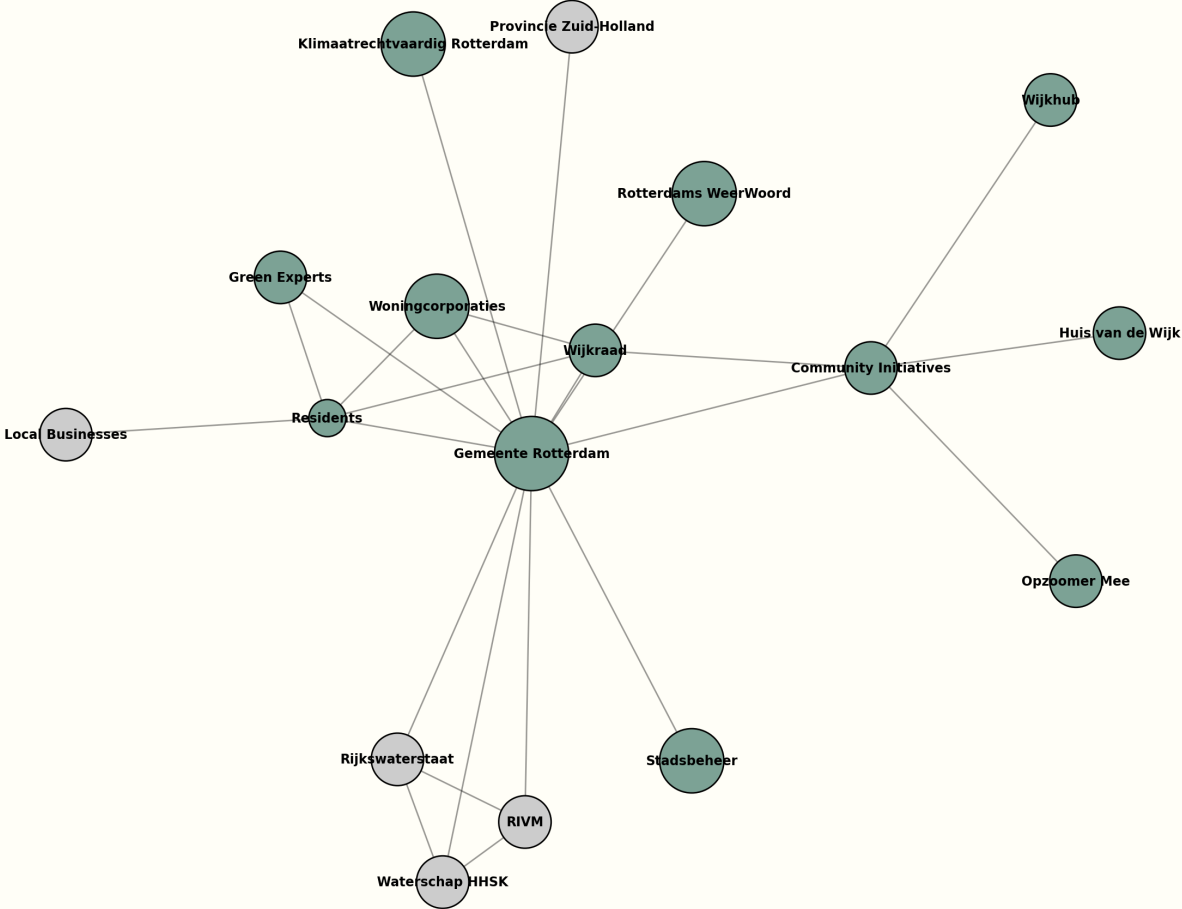


Figure 25. Stakeholder Relationship Network

Reading Between the Lines

At the top of the scale sits the Municipality of Rotterdam. It manages climate strategy, controls funding, and oversees long-term planning that directly affects public space. Just below that are housing associations like Havensteder and Woonstad. They are responsible for large portions of the housing and make decisions about maintenance, insulation, and renovation all of which influence local climate resilience.

Institutions like Waterschap HHSK, Rijkswaterstaat, RIVM, and the Province of South Holland were rated with medium influence. They set regional frameworks and technical standards, but their presence in daily neighbourhood life is limited. Their influence is structural but not always visible to residents.

Residents received the lowest score. Although they live with the direct consequences of heat stress, poor air quality, and flooding, their ability to shape interventions is limited. Many are not included early in planning, and some face barriers related to language, digital access, or financial pressure. The same applies to local organizations like Wijkhub, Opzoomer Mee, and Huis van de Wijk. These groups are deeply connected to neighbourhood life and serve as trusted intermediaries, but they lack formal authority to steer design or policy.

This map is not about how things should be. It shows how things currently are. It exposes where influence is concentrated and where it is missing. Moreover, the map does not only visualize roles it reveals critical mismatches within the system. Often, the most impacted communities have the least power to shape what happens in their environment.

These tensions show that climate injustice in Oude Noorden is not only about environmental stress (heat stress or green) but about who gets to shape the response. As a design tool, the map identifies where influence should be redistributed: residents and community-based organizations need to be brought closer to the center, relationships between institutional and community actors must be strengthened, and existing power holders must be responsible for local needs.

4.3.3 DYNAMICS

Beyond static influence levels, the dynamics between stakeholders reveal deeper tensions, gaps in communication, and misalignments in priorities. While some stakeholders, such as the municipality and housing associations, collaborate regularly on formal planning, others operate in isolation or with minimal coordination. Community organizations often act as connectors between residents and institutions. Residents may participate through channels like the Wijkraad, but they frequently report that their concerns lead to little visible change.

One common frustration is the absence of meaningful follow-through from the municipality after consultations, which reinforces the feeling that participation is symbolic rather than impactful. Greening projects are discussed and planned, but often lack proper follow-up, funding, or implementation. (Jaaractieplan 2024, R'dam Wijkraad Oude Noorden).

Another is lack of feedback to the residents from the municipality. Decision-making processes often move in a straight line from input to output without having a meaningful and working feedback loop. This linear thinking overlooks the need to return to communities, reflect on outcomes, and adjust course if needed. It's precisely this gap that weakens trust and limits the effectiveness of local interventions. As a member of the neighbourhood council put it:

"What usually happens is input, throughput, output. And that's it. There's no real feedback. And that's where things go wrong. That's where the thinking is fundamentally flawed."

Institutional thinking needs to shift. A persistent top-down mentality continues to shape how decisions are made in Oude Noorden. Many institutions operate with rigid hierarchies and predefined agendas, often designing policies or interventions before fully understanding the local context. This approach assumes that solutions can be delivered from above, rather than developed in dialogue with residents. It

overlooks the knowledge and capacity that already exists within communities. The same member shared the following:

"The challenge is bringing top-down and bottom-up together. And that's exactly what often fails. Institutions are all doing their own thing, but they don't connect."

This quote reflects a broader pattern. Institutions often operate in silos, each pursuing its own mandate without aligning efforts or sharing information. This isolation limits their ability to address the neighbourhood as a whole and undermines the impact of even well-funded initiatives. Unless this top-down, fragmented approach is challenged, adaptation efforts risk staying disconnected from residents' lived experiences.

The result is not only weakened coordination but also the fragmentation that residents regularly observe in planning processes. While collaboration does occur in certain areas, it remains inconsistent. There is still much to gain from bringing actors together in a more intentional and sustained way. Another reflection from the neighbourhood council member addressing this issue:

"It feels like there are all these dividing lines between different groups: the municipality, housing associations, residents, the neighbourhood council, public services. And nothing really comes together. Why don't we bring it together? I don't know. But we just don't.."

Many actors do support climate goals in theory but in practice usually avoid taking responsibility. Roles remain vague. Housing associations blame the municipality. The municipality cites funding or jurisdiction. Residents are caught in the middle with no clear accountability. As one official mentioned:

"At a conference, an official of the Rijkswaterstaat said in public, 'I don't want to be called a frontrunner, because then I'm held responsible. I want to be called a motivator but not a frontrunner.' There's something about responsibility. People find it uncomfortable."

Communication issues also highlight systemic divides. Digital platforms are now the primary mode for updates and participation, but some residents rely on analog forms, including verbal updates or printed flyers. These mismatches exclude key groups and reflect deeper patterns of procedural injustice.

The relationships and tensions are visualized in the stakeholder dynamics in Figure 26 on the following page.



Stakeholder Ecosystem in Oude Noorden

An overview depicting the stakeholder ecosystem within the neighborhood. It highlights how various stakeholders interconnect through their roles, interests, and interactions.

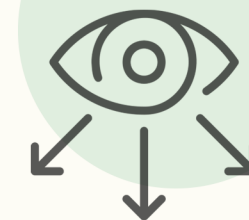
Regulatory Bodies & Policymakers

Rijkswaterstaat

RIVM

Provincie ZH

Waterschap HHSK



Digital

Digital

Analogue

Digital/Analogue

Digital

Digital



Residents



Green Experts



Wijkhub
Huis van de wijk
Opzomer mee



Wijkraad



Gemeente Rotterdam



Housing associations



Local Businesses

Figure 26. Stakeholder Dynamics

INTERMEDIATE FINDINGS

The stakeholder analysis makes clear that climate adaptation in Oude Noorden is shaped as much by environmental urgency as by unequal power. While the municipality and housing associations decide where resources go, the people who feel the heat, flooding, and poor air quality most directly have the least say in shaping solutions. Local groups like Wijkhub and Opzoomer Mee work hard to connect residents, but their influence stops short of real decision-making power. This imbalance creates a cycle where residents are asked for input but rarely see results, which deepens mistrust and weakens collective action. For the intervention, this means the challenge is not only to design a solution but also address political and relational issues. The design must help open up decision-making, create visible feedback loops, and show residents that their voices lead to tangible change. The projects' aim should be to rebalance influence by treating community groups as equal partners and by making room for residents to co-create and guide interventions. If design can play this bridging role, it has the potential to do more than add greenery. It can repair broken trust, connect fragmented institutions, and give the neighbourhood a stronger sense of ownership over its climate future.

Who Decides? Design as a Bridge



SECTION 4.4

LOCAL VOICES: INTERVIEWS

4.4.1 SETUP

Interview Goals

Besides community events, informal conversations on the street and site visits, interviews were conducted. Duration ranged from 45 to 60 minutes depending on the participant's availability and comfort. A semi-structured and adaptive approach was used to reflect the exploratory, community-centered nature of this phase.

Participants included residents, so called "green experts" and local governance actors. Tailored prompts were prepared for each group, while maintaining consistent themes to enable comparison across perspectives. This allowed for flexibility while keeping the overall focus coherent.

The primary aim was to discover how people experience environmental challenges in their daily lives, particularly around green space and participation. A secondary goal was to explore whether and how people related to the concept of climate injustice, (and how language and visibility played a role in shaping those perceptions).

Interview Objectives

The interviews were designed to partly inform the research questions developed initially (see section 1.2), and also partly from the findings during the informal conversations, these include:

- *What are their perceptions of green infrastructure and who it is for?*
- *How do they view the institutions that shape their neighbourhood?*
- *In what ways do they feel/are they included or excluded in decisions about their environment?*

In addition to these core objectives, the conversations often touched on broader reflections about neighbourhood change, trust, and institutional responsibility. Participants also responded to the idea of climate injustice, either directly or through related language and stories.

Interview Guide

Each conversation began with informal introductions, allowing participants to share their connection to the neighbourhood. This helped ground the discussion in personal experience and build trust. Interviews then explored daily environmental challenges and green spaces. Some participants reflected on neighbourhood changes and expressed concerns about being excluded from recent improvements.

Trust in institutions came up frequently. Participants shared frustrations with housing associations, the municipality, and local decision-making processes, often feeling ignored or dismissed.

Interviews ended with open space for participants to share anything they felt was important. This allowed unexpected insights and personal reflections to emerge, deepening the understanding of climate-related experiences

Data Analysis

All notes and quotes from interviews and conversations were analyzed using thematic analysis, following the method outlined by Braun and Clarke (2006). Repeated patterns, emotional language, and shared concerns were organized and clustered into thematic categories. These were refined into five main themes:

- Perceived Lack of Green Space
- Daily Stress and Survival Pressures
- Mistrust in Institutions
- Incomplete Access to Green Information
- Economic Development vs. Green.

These themes are presented in the next section, supported by direct quotes and reflections. Together, they help reveal how climate injustice through green infrastructure is lived and perceived in Oude Noorden.

4.4.2 EXPERTS

Seven experts and residents were interviewed to reflect the project’s three core themes: unequal access to green space, climate risks and systemic injustice, and as both a vulnerability and opportunity for adaptation.

They were contacted through a mix of in-person conversations, phone calls, and emails, depending on the context and their availability. Each participant was selected for their active involvement in Oude Noorden and their connection to local projects, support networks, or initiatives.

Figure 27 below illustrates how these individuals are positioned based on their background and the role that was most prominent in their interview. The profiles on the following page introduce each expert and summarize the unique perspectives they contribute to the broader conversation on climate justice, local greenery, and change within the neighbourhood.

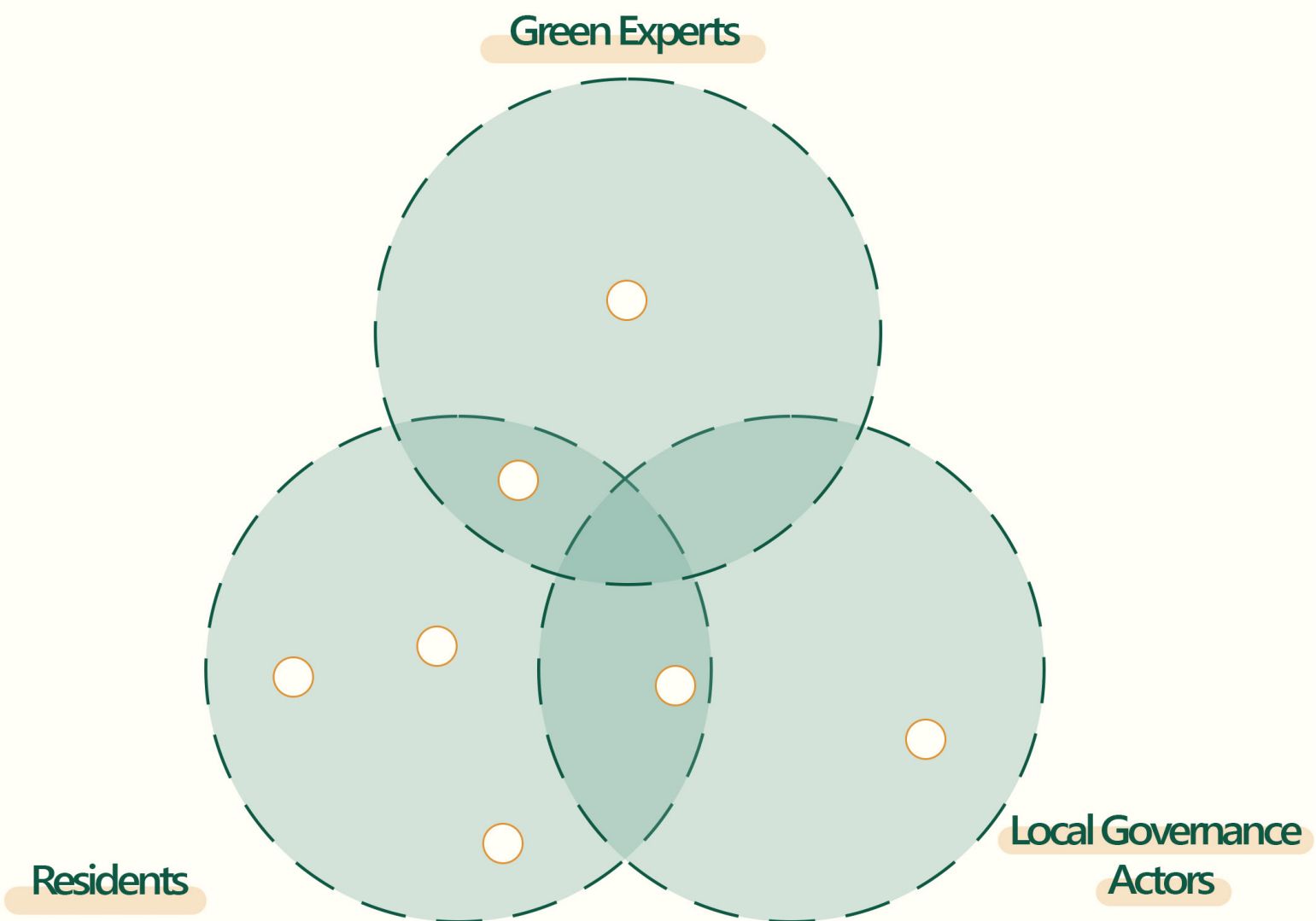


Figure 27. The distribution of participants against their background

Neighbourhood Council Member & Cultural Connector

A council member who has lived in Oude Noorden for over 35 years, this expert combines experience in education, research, and community building. She co-created Picnic Island, a cultural event that activated the Rotte waterfront, and has led initiatives that link art, play, and public space. Her work bridges institutional processes and resident energy.

Community Gardener & Greening Organizer

A longtime greening advocate in Oude Noorden, this green expert helps residents transform paved streets into climate-friendly shared spaces. From gardens like the Wilgenplantsoen to de-paving efforts on the Moerkapellestraat, he combines hands-on action with coaching. He works with everyone from bakfiets veggie couriers to first-time seed planters. His projects make green space social, visible, and practical.

Community Social Worker

A social worker and resident rooted in Oude Noorden, this expert has supported both youth and older artists through hubs like the Jan van der Ploeghuis and Piet Roovershuis. He focuses on linking indoor environments with public life, strengthening community through shared space and cultural programming

Greening Entrepreneur & Change maker

An urban greening entrepreneur and resident based in Oude Noorden, this green expert co-founded Marvy Green, a social enterprise helping residents turn balconies, facades, and streets into green spaces.

With a background in area development and a passion for food, architecture, and public life, she focuses on local impact. Through projects like the Buurttuin Brigade, she connects ecological action with social well-being.

Community Greening Organizer

An engaged resident and designer in Oude Noorden, this expert links greening with material reuse. She co-led the creation of a shared wormenhotel (wormhotel) and compost art installation, and scouts reclaimed building materials for sustainable construction.

Through CityLab010, she supports experimental initiatives that combine design, waste reduction, and neighbourhood collaboration to create greener public space

City Services Coordinator & Green Project Supporter

As area coordinator for city services in Oude Noorden, this expert helps connect resident ideas with what’s needed to make them work in practice. She stays in touch with local gardeners and city teams, and steps in when green plans become more concrete. Making sure they’re realistic, maintainable, and a good fit for the neighbourhood in the long term.

Circular Coordinator & Sharing Space Organizer

As circular coordinator in the neighbourhood, this expert founded the “delen is helen” Weggeefwinkel, where neighbors freely share items, services, and ideas. She builds the community by making reuse tangible and accessible.

Drawing from her experience in circular research and neighbourhood initiatives, she transforms overlooked spaces into hubs of participation, where sharing becomes both a climate solution and a way to meet local social needs.

4.4.3 ANALYSIS

The seven interviews were analyzed using a grounded theory approach, following the methodology outlined by Charmaz (2006).

Each interview was reviewed to generate initial issues, which were noted down on separate post-it notes. When an issue appeared more than once, it was added to the existing note. Once all interviews were completed, the notes were sorted into groups based on similarities, allowing for focused coding. This was done until five main categories were found.

These included themes that surfaced across interviews, such as ‘Daily Stress and Survival Pressures’ and ‘Mistrust in Institutions.’ Rather than being isolated, these categories interact and together shape (and often restrict) how residents relate to greening initiatives.

To keep the overview of clear, the categories were defined broadly. This made sub-categories necessary for depth. In total, 13 sub-categories were created. Alongside their main categories, these are presented in the overview in Figure 28.

Following this, the relationships between categories and sub-categories will be discussed, along with an analysis of each sub-category.

Integrative diagram

An in-depth integrative diagram was created to map out the relationships between the main categories, subcategories and issues. This visual synthesis, shown in Figure 29 on the following page, provides an overview of how the different

insights connect and interact with one another. Several key insights emerged through the interview coding and thematic analysis. For example, reinforcing the literature in Section 2.2, many residents and experts emphasized the importance of procedural justice, particularly the lack of feedback loops and how this shapes trust.

Furthermore, certain themes seemed to contradict yet complement one another. For instance, while green infrastructure was generally seen as desirable, several residents expressed that new greenery mostly benefits newcomers.

A number of categories reinforced each other, such as limited head space for climate concerns and financial stress overshadowing green participation. This also tied to a recurring belief that “green feels like a luxury.” The insight that local knowledge is underused appeared consistently in both ‘not easy to get involved’ and ‘green updates don’t reach residents’, emphasizing the systemic disconnect.

The sub-categories

In the next section, each sub-category is explained in greater detail, illustrated with quotes from experts and residents. To highlight their interconnectedness, the closely related sub-categories are organized and discussed jointly.

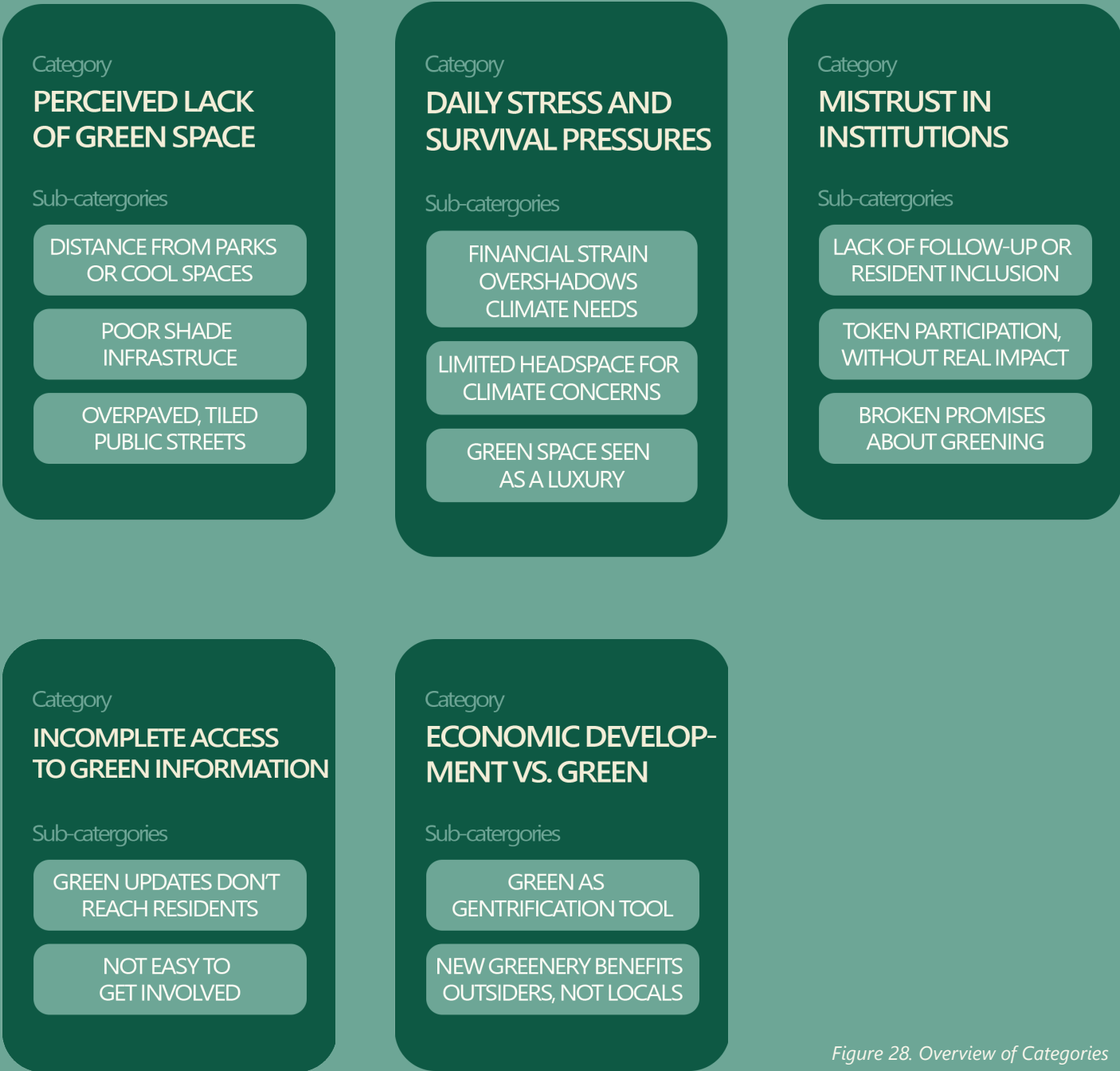
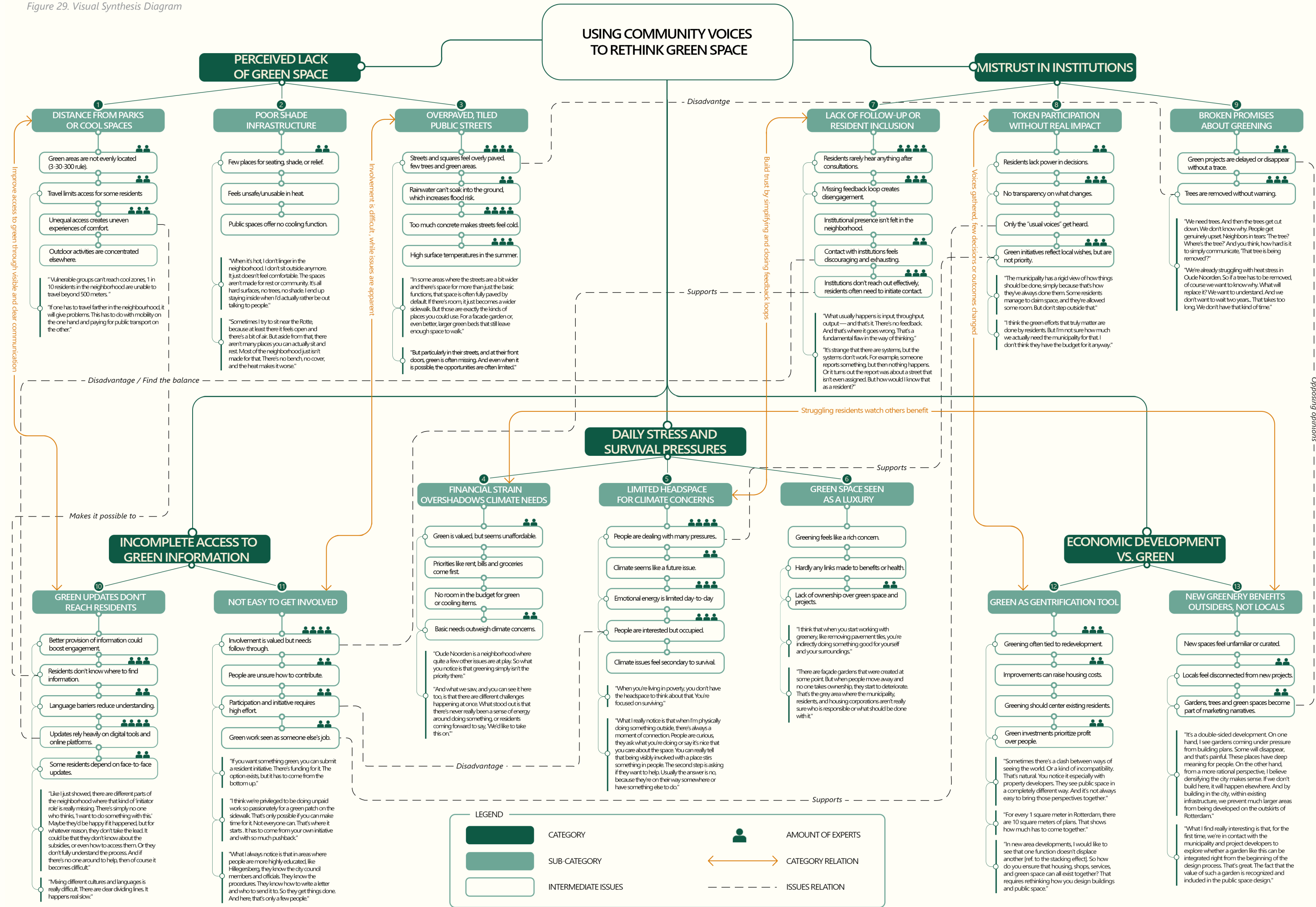


Figure 28. Overview of Categories

OVERVIEW OF CATEGORIES

Figure 29. Visual Synthesis Diagram



3 OVERPAVED TILED, PUBLIC STREETS

11 NOT EASY TO GET INVOLVED

Supporting earlier remarks and findings, both residents and experts pointed out the excessive tiling of streets and squares in Oude Noorden and the limited presence of green spaces. Pijnackerplein and Brancoplein were especially mentioned.

Although most agree that improvements are needed, the willingness and ability to take part in such efforts is discouraging. This aligns with the subcategory 'Not easy to get involved,' in which several residents and experts described the involvement process as tedious and, for some, rather inaccessible.

Getting involved demands significant effort and persistence. As one expert explained: "I think we're privileged to be doing unpaid work so passionately for a green patch on the sidewalk. That's only possible if you can make time for it. Not everyone can. That's where it starts. It has to come from your own initiative and with so much pushback."

This also reflects the reality that many residents are unsure how to contribute, lacking clear information about available processes even when options do exist. One resident confirmed this, stating: "What I always notice is that in areas where people are more highly educated, like Hillegersberg, they know the city council members and officials. They know the procedures. They know how to write a letter and who to send it to. So they get things done. And here, that's only a few people."

Experts agree that the municipality should take a more proactive role in bridging this gap, by making procedures clearer, providing direct support, and actively reaching out to residents who are typically underrepresented in decision-making processes.

7 LACK OF FOLLOW-UP OR RESIDENT INCLUSION

5 LIMITED HEAD SPACE FOR CLIMATE CONCERNS

Experts agreed that in Oude Noorden, concern for addressing climate issues remains relatively low. While there is interest, many residents are preoccupied with day-to-day survival. This connects to the subcategory 'Limited head space for climate concerns.' As one expert stated: "When you're living in poverty, you don't have the headspace to think about that. You're focused on surviving."

Despite limited capacity, some residents make efforts to stay engaged but face recurring setbacks. A common theme among experts was the importance of maintaining resident involvement throughout processes. This stems from the fact that residents are often excluded or, when included, receive no follow-up or feedback. As one expert explained: "What usually happens is: input, throughput, output and that's it. There's no feedback. And that's where it goes wrong. That's a fundamental flaw in the way of thinking."

Experts also agreed that to build trust, these feedback loops must be closed by ensuring residents not only have a say but also see how their input influences decisions and outcomes, and hear back from institutions about what has been done with their contributions.

1 DISTANCE FROM PARKS OR COOL SPACES

10 GREEN UPDATES DON'T REACH RESIDENTS

There is a guideline that parks and green spaces should be within 300 meters of residents. This links to the Cool Spaces map in section 3.3.3, which shows that this standard is not always met. Given this, along with the fact that "Vulnerable groups can't reach cool zones. 1 in 10 residents in the neighbourhood are unable to travel beyond

500 meters," it becomes crucial to ensure these spaces are accessible and that this is clearly communicated to residents.

Communication, however, remains a complex challenge. The subcategory 'Green updates don't reach residents.' outlines several key issues, including language differences and the heavy reliance on digital tools from institutions. Many residents are unsure where to find relevant information and often prefer face-to-face contact.

Experts agree this needs to be improved in order to boost engagement and make green initiatives more inclusive. One expert also raised concerns about the lack of initiative in certain parts of Oude Noorden, suggesting that creating more 'initiator roles' could help bridge these gaps.

8 TOKEN PARTICIPATION WITHOUT REAL IMPACT

12 GREEN AS GENTRIFICATION TOOL

Residents and experts also expressed that even when resident voices are gathered, the outcomes are rarely visible. Green initiatives proposed by the neighbourhood council to the municipality often receive little to no funding or support. This fuels discouragement and a sense of powerlessness in decision-making.

It also pushes residents to take matters into their own hands and come up with solutions independently. As one resident stated: "I think the green efforts that truly matter are done by residents. But I'm not sure how much we actually need the municipality for that. I don't think they have the budget for it anyway."

At the same time, there is a sharp contrast when green is used for redevelopment purposes. In these cases, green elements are added to attract newcomers. As an expert said: "For every 1 square meter in Rotterdam, there are 10 square meters of plans. That shows how much has to come together." This highlights the challenge of working within the limited possibilities of public space.

The same expert also mentioned the idea of a "stacking effect," which refers to using the same space for multiple functions: "In new area developments, I would like to see that one function doesn't displace another [ref. to the stacking effect]. So how do you ensure that housing, shops, services, and green space can all exist together? That requires rethinking how you design buildings and public space."

By doing this, more inclusive and space-efficient solutions can be created that reflect the actual needs of the neighbourhood.

4 FINANCIAL STRAIN OVERSHADOWS CLIMATE NEEDS

13 NEW GREENERY BENEFITS OUTSIDERS, NOT LOCALS

An expert stated that "Oude Noorden is a neighbourhood where quite a few other issues are at play. So what you notice is that greening simply isn't the priority there."

While this may be true, green is still valued by residents. Another effect tied to the tension between economic development and green, seen in the subcategory 'New greenery benefits outsiders, not locals,' is that struggling residents often see newcomers as the main beneficiaries of new green areas. This reinforces the finding that green is valued, but in some ways feels 'unaffordable' to those already living in the neighbourhood.

9 BROKEN PROMISES ABOUT GREENING

Also, existing greening is a recurring issue in Oude Noorden. Residents often complain that promises are made but not kept.

A common concern is that trees are removed without any warning or clear explanation. As one resident stated: "We're already struggling with heat stress in Oude Noorden. So if a tree has to be removed, of course we want to know why. What will replace it? We want to understand. And

we don't want to wait two years... That takes too long. We don't have that kind of time."

This highlights how the streets are overly paved and have limited greenery. Communication around these changes is also lacking, as another resident explained: "We need trees. And then the trees get cut down. We don't know why. People get genuinely upset. Neighbors in tears: 'The tree? Where's the tree?' And you think, how hard is it to simply communicate, 'That tree is being removed'?" Communication and involvement also remain limited when it comes to decisions about maintaining or removing already existing green areas in the neighbourhood.

2 POOR SHADE INFRASTRUCTURE

There are few opportunities for shade, especially during hot weather, making it difficult for residents to find relief or cooling. As one resident shared: "When it's hot, I don't linger in the neighbourhood. I don't sit outside anymore. It just doesn't feel comfortable. The spaces aren't made for rest or community. It's all hard surfaces, no trees, no shade. I end up staying inside when I'd actually rather be out talking to people."

An example of where residents can find shade on the Pijnackerplein can be seen in Figure 30.



Figure 30. Music Dome at Pijnackerplein

6 GREEN SPACE SEEN AS LUXURY

Based on the previous insights and current conditions, green space can sometimes be perceived as a luxury. Residents may not always recognize the direct health benefits and other associated advantages of greenery. However, one resident shared: "I think that when you start working with greenery, like removing pavement tiles, you're indirectly doing something good for yourself and your surroundings."

This comment reflects a deeper awareness that green interventions, even small ones, can improve both physical and social environments. It also hints at a desire for more local ownership of green efforts where greenery is not something imposed from above, but something people co-create and maintain within their communities.

4.4.4 REFLECTION

Following the analysis, the interview objectives outlined in Section 4.4.1 can now be revisited to assess whether the key questions were adequately addressed. Before doing so, it is important to reflect on potential bias, validation, and limitations.

To interpret the coded responses meaningfully, it was necessary to account for the fact that it was gathered through a green lens. This included being aware of how question framing, and the green background context of experts and residents may have influenced the responses.

The insights drawn from this analysis will be translated into concrete design requirements (Section 5.3). These preliminary requirements should be validated through iteration and by including other residents, experts and municipal actors in later stages, to align with both local needs and systemic feasibility.

As mentioned, it should be also noted that only one representative from the municipality and a neighbourhood council member was interviewed. Also representatives from housing associations were not interviewed. This limits the depth of institutional perspective and should be taken into account in later stages. Additional voices need to be incorporated later on, to strengthen the inclusivity of the design outcomes.

Now to shed light on the interview objectives:

What Are Their Perceptions Of Green Infrastructure And Who It Is For?

Residents and experts agree that green infrastructure is lacking in Oude Noorden or at least perceive it this way and suggest that improvement urgently needed. However, perceptions about who benefits are mixed. While greenery is valued for improving livability, many feel it is not designed for them. Initiatives are often seen as part of gentrification, with improvements like parks and trees appearing

in areas targeted for redevelopment. This reinforces the belief that new green spaces are meant to attract outsiders. Financial strain, overpaving, and limited access deepen this divide. Although people want more greenery, it often feels out of reach, either physically or symbolically. Green is something others receive. Future efforts must be designed with, not just for, the community.

How Do They View The Institutions That Shape Their Neighbourhood?

Institutional trust is low. Residents and experts highlighted a persistent disconnect between the community and institutions like the municipality. While the neighbourhood council proposes green initiatives, there is little visible follow-through. Feedback loops are broken. Residents give input but rarely hear back. This fuels mistrust and discouragement. Accessing institutional support requires time, energy, and procedural knowledge that many lack. As one resident noted, other neighbourhoods understand the system and get things done, while Oude Noorden does not. Experts called for clearer communication, more outreach, and stronger follow-up. At present, institutions appear passive or favor better-connected areas.

In What Ways Do They Feel/Are They Included Or Excluded In Decisions About Their Environment?

Inclusion is often superficial. Residents described participatory processes as unclear, demanding, and difficult to access. Many feel they are asked to participate without having any actual influence. Barriers such as poverty, language, and digital exclusion further prevent involvement. Even when people contribute, they rarely see results. A common sentiment was that input disappears without feedback or action. Communication failures make things worse. Green updates often do not reach residents. Many prefer face-to-face contact over emails or online tools. Experts stressed the need for better communication, more local support, and real decision-making power. Otherwise, participation remains empty.

PRIVILEGED VS
DISADVANTAGED

To place the interview findings from Oude Noorden in the right light, they must be viewed through the lens of structural injustice. The table in Figure 31 to the right offers a clear overview of how privilege and disadvantage manifest across four dimensions: Demographic, Social, Spatial, and Institutional. It highlights which groups have access to resources, influence, and resilience, and which are consistently excluded. Privileged groups such as Dutch-born, highly educated homeowners with digital access are better positioned to benefit from green initiatives and influence decisions. In contrast, low-income renters, elderly residents, migrants, and those with limited Dutch or digital access face barriers like poor housing, limited mobility, and exclusion from planning. These patterns were heard repeatedly in the interviews, where some residents and experts described green as symbolic and participation as frustrating.

The table will also guide the next design phase by identifying who must be prioritized. For instance, two key contrasts stand out: homeowners versus renters, and digitally connected residents versus those without access. Homeowners have more control and visibility in planning outcomes, while renters rely on institutions that often overlook their needs. Similarly, digital access determines who stays informed and engaged. These distinctions will shape the criteria for an inclusive and just intervention.

DEMOGRAPHIC

PRIVILEGED GROUP	DISADVANTAGED GROUP	REASON
YOUNG RESIDENTS	ELDERLY RESIDENTS	Young people have more mobility and access to climate resources, while older people are at higher risk of heat stress. Also 1 in 10 has limited mobility (500m).
NEWCOMERS	LONG-TERM RESIDENTS	Newcomers benefit from urban renewal, while long-term residents face displacement. Mostly people from Amsterdam living along Noordsingel, often in their own bubble.
DUTCH-BORN RESIDENTS	MIGRANTS	Dutch residents often have better access to municipal resources. Migrants may face language barriers in accessing (climate- or green related) programs.
HOMEOWNERS	RENTERS AND SOCIAL HOUSING TENANTS	Homeowners can adapt their homes to climate change, while renters depend on housing corporations. Housing corporations are also hard to influence.
HIGH-INCOME GROUPS	LOW-INCOME GROUPS	Wealthier residents can invest in private green spaces, shade structures, or green roofs, while lower-income groups rely on scarce and unevenly distributed public greenery. Access to time, money, and property determine capacity to act.

INSTITUTIONAL

PRIVILEGED GROUP	DISADVANTAGED GROUP	REASON
HOUSING ASSOCIATIONS	SOCIAL HOUSING TENANTS	Associations (Havensteder and Woonstad) focus on cost-efficient renovations, while tenants demand better climate-resilient measures.
PROJECT DEVELOPERS	ADVOCATES FOR AFFORDABLE HOUSING	Developers focus on profitable projects, often increasing gentrification.
MUNICIPALITY OF ROTTERDAM	NEIGHBORHOOD COUNCILS	The municipality prioritizes large-scale climate adaptation or unrelated projects. Neighborhood councils advocate for local, green solutions that often get delayed.

SPATIAL

PRIVILEGED GROUP	DISADVANTAGED GROUP	REASON
RESIDENTS IN WELL-MAINTAINED AREAS	RESIDENTS IN UNDERFUNDED AREAS	Some streets benefit from climate investments like tree planting and green infrastructure, while others remain neglected.
RESIDENTS WITH ACCESS TO GREEN SPACE	RESIDENTS IN HEAT-STRESSED AND AREAS WITH LACK OF GREEN	Trees and cooling infrastructure are unevenly distributed.
HOMEOWNERS WITH PRIVATE GARDENS	APARTMENT RESIDENTS WITH NO GARDENS AND IN HEAT-STRESSED AREAS	Some benefit from personal green space (gardens, shade), while others have limited cooling and green options.

SOCIAL

PRIVILEGED GROUP	DISADVANTAGED GROUP	REASON
DUTCH-SPEAKING RESIDENTS	ELDERLY RESIDENTS	Climate adaptation and green programs are often inaccessible due to language barriers. Cultural differences also create barriers to participation.
DIGITAL GENERATION	LONG-TERM RESIDENTS	Online information about green initiatives, subsidies, and participation opportunities often excludes residents without digital access, limiting their ability to engage in or benefit from neighborhood greening efforts.
HIGHLY EDUCATED RESIDENTS	LOW-EDUCATED RESIDENTS	Access to green and climate knowledge is unevenly distributed. However, higher education doesn't always mean more involvement (Time also plays a role).
ENVIRONMENTAL ACTIVISTS (DRIVERS AND "PIRATES")	RESIDENTS FOCUSED ON DAILY SURVIVAL	Activists focus on long-term solutions (requires time, energy, network), while others focus on housing and basic needs.
POLITICALLY ENGAGED RESIDENTS	POLITICALLY INACTIVE RESIDENTS	Those active in local councils and climate groups influence policy, while the rest remains fairly unheard.

Figure 31. Privileged vs. Disadvantaged across four dimensions

SYSTEMIC BARRIERS TO CLIMATE JUSTICE IN OUDE NOORDEN

Based on insights from residents, experts, and other actors, four systemic barriers came out on top as especially critical in shaping the neighbourhood's position in relation to climate justice. These barriers are not isolated, as they overlap, reinforce one another, and are also encapsulated in broader governance, socio-economic, and spatial dynamics. Addressing them requires a shift in how climate adaptation is designed, funded, and governed at the local level in Oude Noorden.

4.6.1 THE FOUR BARRIERS

Disconnection between Policy and Lived Realities

A recurring concern throughout interviews, fieldwork is the perceived gap between municipal climate strategies and the lived experiences of residents. Climate adaptation and policies are often framed in technical or top-down terms, while residents struggle with daily challenges such as heat stress or poorly maintained green spaces. This disconnect is further

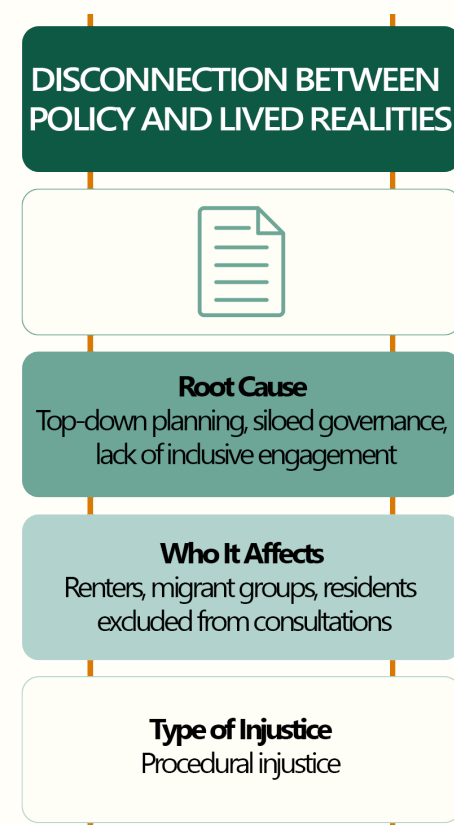


Figure 32. Barrier 1

Eroded Trust in Institutions

Across multiple engagements, (long-time) residents expressed mistrust in municipal institutions, citing broken promises, symbolic participation, and inaccessible communication as key frustrations. Efforts to involve the community are often perceived as box-ticking exercises, especially when feedback is not visibly incorporated into decision-making. This eroded trust has real implications. It can reduce willingness to participate in new programs, deepens feelings of exclusion, and weakens the social cohesion needed for collective climate action. This barrier is best understood as a combination of procedural and recognition injustice, where residents feel both unheard and undervalued.

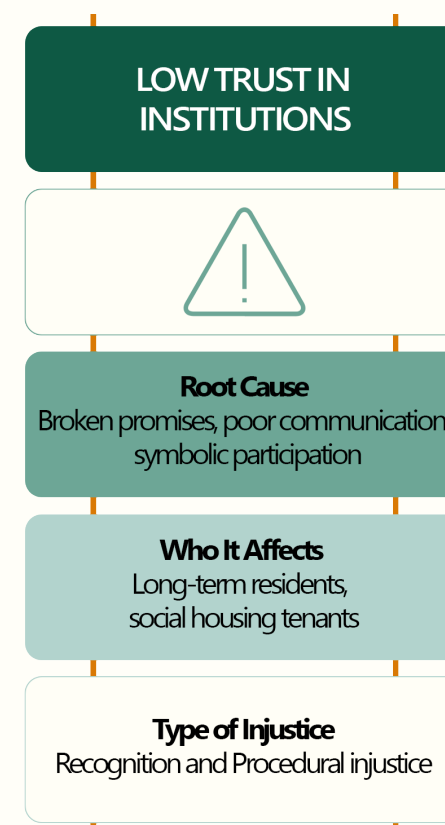


Figure 34. Barrier 3

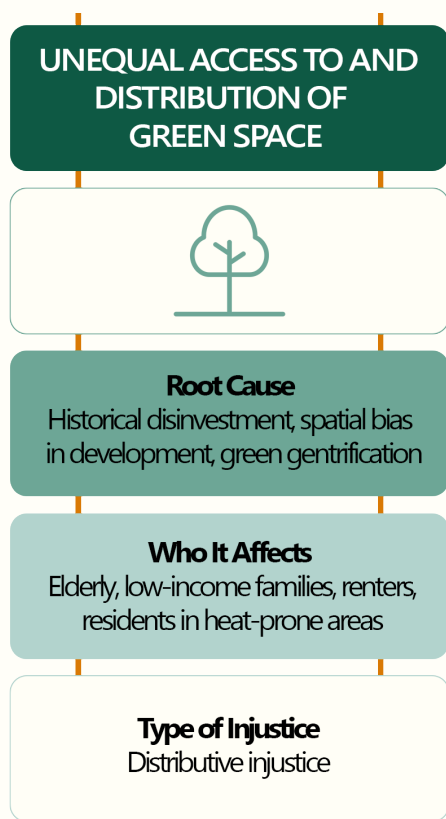


Figure 33. Barrier 2

worsened by fragmented governance, where overlapping responsibilities between the city, housing associations, and external contractors create confusion and limit accountability. As noted in an interview, residents feel policies are "done to them" rather than shaped with them, which undermines both trust and effectiveness. This reflects a clear case of procedural injustice.

Unequal Access and Distribution of Green Space

A major concern raised by residents is the unequal presence of green space across the neighbourhood. Many expressed frustration that while certain areas, often near commercial sites or recent developments, have received upgrades, other parts of Oude Noorden are perceived visibly as neglected. Residents perceive this uneven distribution as more than an aesthetic issue. Green space can be understood as a symbol of care, health, and investment. Its absence is experienced as exclusion, a sign that certain streets or communities are deprioritized in municipal planning. This perceived inequality reinforces a sense of distributive injustice.

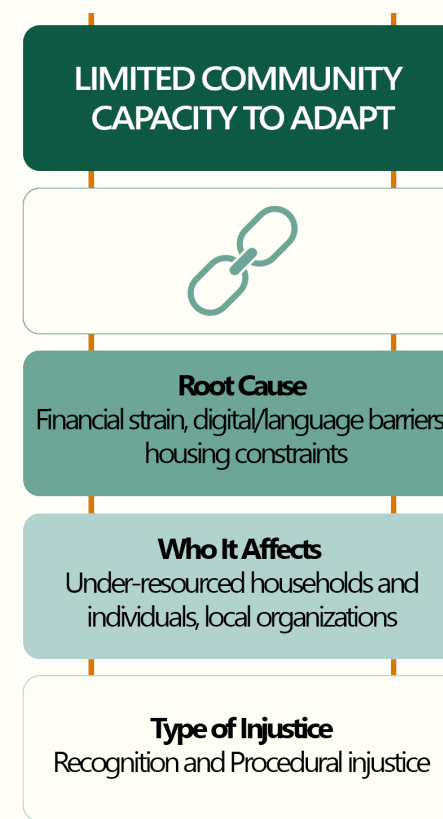


Figure 35. Barrier 4

Limited Community Capacity to Adapt

While some residents may wish to make their homes or streets more climate-resilient, they often lack the means to do so. This includes financial limitations, lack of ownership (as most are renters), and barriers to information access due to language, digital exclusion, or bureaucratic complexity. Even when small subsidies or toolkits are available, many are unaware of them or unable to navigate the process. Sometimes they are even hindered, although this is only always the case. As detailed earlier these constraints are not personal, but could be seen as structural. They reflect deeper inequalities in how resources, opportunities, and decision-making power are distributed. This barrier exemplifies recognition and also procedural injustice. It can be found rooted in structural disempowerment of limited acting ability.

4.6.2 CONNECTING THE FOUR BARRIERS BACK TO THE COMMUNITY

The four barriers identified in Section 4.6.1 are not abstract problems. They are the same struggles that came up again and again throughout the stories, interviews, and observations in this section. Together, they show how climate injustice in Oude Noorden is woven into daily life and local dynamics, not just into policy papers.

Policy Disconnection and Everyday Struggles

Residents often spoke about the very tangible challenges of heat, lack of shade, and poorly kept streets. These are the issues they live with day to day, yet they rarely see them reflected in the language or priorities of climate policies. The municipality talks in technical terms, while residents talk about trying to cool their homes in summer or losing a tree without warning. This mismatch leaves many people feeling that policies are done to them, not with them, echoing the sense of distance and disconnection described throughout this section.

Unequal Distribution of Green as Symbol of Exclusion

Where greenery appears, it is often in areas linked to redevelopment or commerce, while other streets remain bare and overheated. For residents, this difference is more than an aesthetic matter. Green signals care, health, and belonging. Its absence feels like being overlooked. These feelings were clear in the privilege and disadvantage patterns discussed earlier, where those already facing social or economic stress are also those with the least access to cooling, safe, and welcoming green spaces.

Trust Shaped by Broken Promises

Mistrust in institutions came up repeatedly during community events and interviews. People talked about being asked for input, but then never hearing back or seeing results. They

described this as token participation, more about ticking boxes than making change. These broken promises add up, leaving residents discouraged and reinforcing the power imbalance mapped out in the stakeholder analysis. Without trust, even well-meaning initiatives struggle to gain support.

Structural Inequalities and Limited Capacity

Many residents want to improve their homes or streets, but simply cannot. Renters lack control, while poverty, language barriers, and digital exclusion block access to funding or support. For people already focused on surviving rising costs and housing problems, greening feels like a luxury. This connects directly to the survival pressures highlighted earlier, showing how systemic inequalities limit the ability of residents to take part in climate adaptation, even when they want to.

Bringing It Together

Taken together, the four barriers are another way of telling the same story. Climate injustice in Oude Noorden is not only about heat stress or flooding. It is about who gets listened to, who gets investment, and who has the power to act. These barriers highlight that the real challenge is not just technical but social: rebuilding trust, sharing resources more evenly, and creating space for residents to shape their own neighbourhood.

SECTION FINDINGS

This section synthesized community insights from interviews, events, and site visits in Oude Noorden, highlighting how residents experience climate and green space issues. The main findings are:

- 1. Relevance of lived experience. Residents did not often use the term “climate injustice” but their concerns reflected it.** Overheating, lack of trees, and air pollution were recurring issues. About 30% understood climate injustice explicitly, while others described it in terms of unfairness and neglect. .
- 2. Trust and participation gaps. Institutional trust is fragile.** Housing associations and the municipality were criticized for broken promises, symbolic participation, and absent feedback loops. Residents often give input but see no results. Reliance on digital tools excludes elderly and low-income groups. Participation is widely perceived as tokenistic, reinforcing disempowerment.
- 3. Social fabric and representation.** Events like Cultuurborrel and Winterfeest revealed community bonds but also systemic exclusions. Attendance skewed toward older Dutch residents, limiting diversity. While strong neighbor ties exist, (visible) poverty, economic pressure, and mistrust in institutions reduce wider engagement. Financial stress, such as unaffordable heating, sometimes overshadow green or climate concerns.
- 4. Power imbalance.** Decision-making power is concentrated at the **municipality (4/4 influence)** and **housing associations (3/4)**. **Residents and local organisations scored lowest (1/4)** despite experiencing the strongest impacts. This highlights procedural injustice, where the most affected groups have the least say.
- 5. Systemic barriers. Four critical barriers emerged:**
 - Disconnection between policy and lived realities.
 - Unequal distribution of green space.
 - Eroded trust in institutions.
 - Limited community capacity due to financial, digital, and language constraints.

Overall, Section 4 shows that residents value greenery, but also that climate justice in Oude Noorden will require redistributing power, resources, and accountability toward those most affected.

SECTION 5.0

DEFINING THE DESIGN SPACE

This section outlines how the project reframes the initial challenge based on findings from earlier phases. It explores how climate justice, green space, and systemic barriers intersect in Oude Noorden, and how these insights inform the direction of the design. By identifying key leverage points and translating the community needs into actionable focus areas.



CREATIVE SYNTHESIS SESSIONS

As part of the transition from research to intervention, two creative synthesis sessions were conducted. These sessions were instrumental in collectively reflecting on the insights gathered so far and sharpening the direction of the design framework (See Figure 36). The aim was not only to analyze what had come through research, but also to clarify what was still missing and what needed refinement. Importantly, both sessions emphasized the need to give something meaningful back to the neighbourhood of Oude Noorden. A principle that underpins the systemic and justice-oriented nature of this project.

- OBJECTIVES
1. To COLLECTIVELY REFLECT ON AND STRUCTURE THE INSIGHTS GATHERED SO FAR IN ORDER TO IDENTIFY SYSTEMIC BARRIERS AND OPPORTUNITIES FOR DESIGN INTERVENTION WITHIN THE NEIGHBOURHOOD.

2. To ALIGN THE TEAM AROUND SHARED INTENTIONS FOR GIVING BACK TO THE COMMUNITY BY AMPLIFYING EXISTING LOCAL INITIATIVES.

Session 1: Group Reflection with the Team

The first session took place in collaboration with the broader RDI group involved in the project. It was structured as a collective reflection on the insights collected to date. This included mapping the contacts established in the neighbourhood, reviewing community feedback, and discussing shared intentions for the project's next phase. A key motivation for the session was the group's shared ambition to contribute something of lasting value to Oude Noorden.

Through open discussion, it became clear that the neighbourhood is already home to a range of community-led initiatives related to sustainability, social cohesion, and local identity. However, these efforts are often fragmented and not easily visible to the wider community. This note led to the insight that rather than introducing entirely new interventions, amplifying existing community assets, strengthen their visibility, and create channels for mutual recognition.

In this context, climate justice was reframed not only as an environmental or infrastructural issue, but also as a relational one. Closely linked to how residents see each other, how their contributions are valued, and how knowledge is shared across different layers of the system.

Session 2: Strategic Framing with Supervisors

The second session was held in a smaller setting with academic supervisors. Its purpose was to critically examine the state of the project and identify areas that required further development. The focus here was more strategic, involving questions such as: ? What is clear? What needs sharpening? And What is still missing?

One of the key outcomes of this session was the recognition that climate justice and green is connected to shared experiences and also daily rituals. Green spaces, and particularly trees, hold not only environmental value but also emotional and symbolic meaning in residents' lives. They provide shade, calm, and brief moments of relief within stressful urban routines. However, the limited visibility and accessibility of green infrastructure currently restrict this potential. This highlighted the need for design interventions that emphasize the educational and informational aspects of climate and green transitions. By doing so, residents can better understand how nature-based solutions influence their well-being and support the resilience of their neighbourhood.

The session also underlined the importance of recognition, both of the neighbourhood and its people, in the context of climate and sustainability initiatives. For participation to be meaningful, residents need to see their environment represented in these efforts and feel that their knowledge, experiences, and contributions are respected. This connects directly to procedural justice. It is not enough to involve residents in processes; their lived expertise must be actively acknowledged and embedded into how green transformations are communicated and designed.

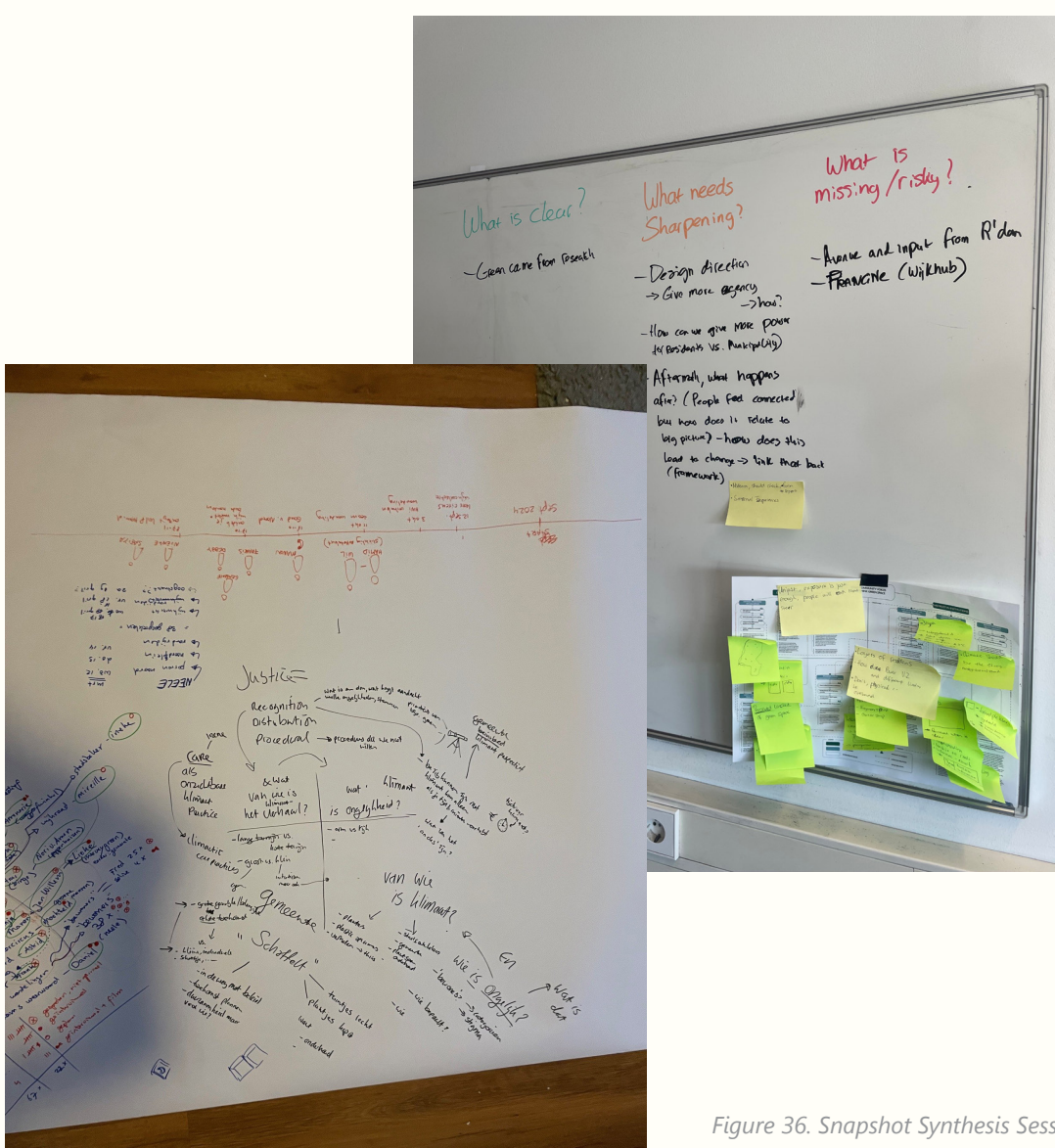


Figure 36. Snapshot Synthesis Sessions

Synthesis and Design Implications

Combined, these two sessions helped to shape the direction. The insights can be summarized in the areas:

- Visibility of existing initiatives:** There is value in what already exists. The design should highlight and support these efforts rather than duplicate them.
- Strengthening educational and informational aspects:** Climate and green transitions should be made more understandable and relatable. Design should help translate technical solutions into everyday relevance, supporting residents in linking nature-based interventions to their health, comfort, and collective resilience.
- Redistribution of power and knowledge:** Residents need tools and spaces that make institutional processes transparent and accessible.

- Fostering collective ownership and appreciation:** Design interventions should support residents in developing a shared sense of pride and responsibility for their neighbourhood, reinforcing long-term engagement and place-based connection.
- Recognition as a design function:** Appreciation of the neighbourhood and its value is not symbolic. It can be operationalized and made concrete through feedback loops, storytelling, and spatial interventions that acknowledge community contributions.

These outcomes have been embedded into the development of the design requirements and direction moving forward. They ensure that the design process stays connected to the lived reality of Oude Noorden while opening systemic pathways for climate justice.

REFRAMING THE SCOPE

To guide the next phase of the design project, the scope of has been narrowed down to three key focus areas (See Figure 37): Green Space, Trust, Ownership & Governance, and the Access Divide. These themes reflect the leverage points that will be used for the intervention.

Within **green space** the focus is on its role as a systemic tool for both environmental adaptation and social equity. The following insights led to this:

1. Green space was shown to reduce multiple risks, including heat stress, flooding, and biodiversity loss.
2. Residents and experts described greenery as a visible indicator of care or neglect in the neighbourhood and perceived it to be lacking.
3. Mapping revealed that areas with the highest exposure to climate risks often had the least access to quality green space.

Therefore, green space will serve as both a physical and symbolic lens through which adaptation challenges and solutions are explored.

Within **trust, ownership & governance** the emphasis is on the relationship between residents and institutions responsible for adaptation. This was shaped by:

1. Repeated expressions of mistrust towards local authorities and housing associations.
2. A lack of visible outcomes following participation efforts, leading to disengagement.
3. Confusion among both residents and stakeholders about who is responsible for what.

As a result, this topic area focuses on building more accountable, transparent, and co-owned governance processes for climate action.

Within the **access divide** the attention is on the unequal ability of residents to engage with and benefit from adaptation efforts. Key insights were:

1. Renters, elderly people, and low-income groups often lack the means or autonomy to implement changes,
2. Barriers such as language, digital access, and limited outreach exclude key groups from participating,
3. Those most affected by climate risks frequently have the least influence over the solutions.

This topic area highlights the need to address not only physical vulnerabilities but also the social and systemic barriers that prevent equal access to adaptation resources.

With this refined scope, the next phase will focus on translating these findings into design opportunities.

In the illustration on the next page can be seen how these interrelate.

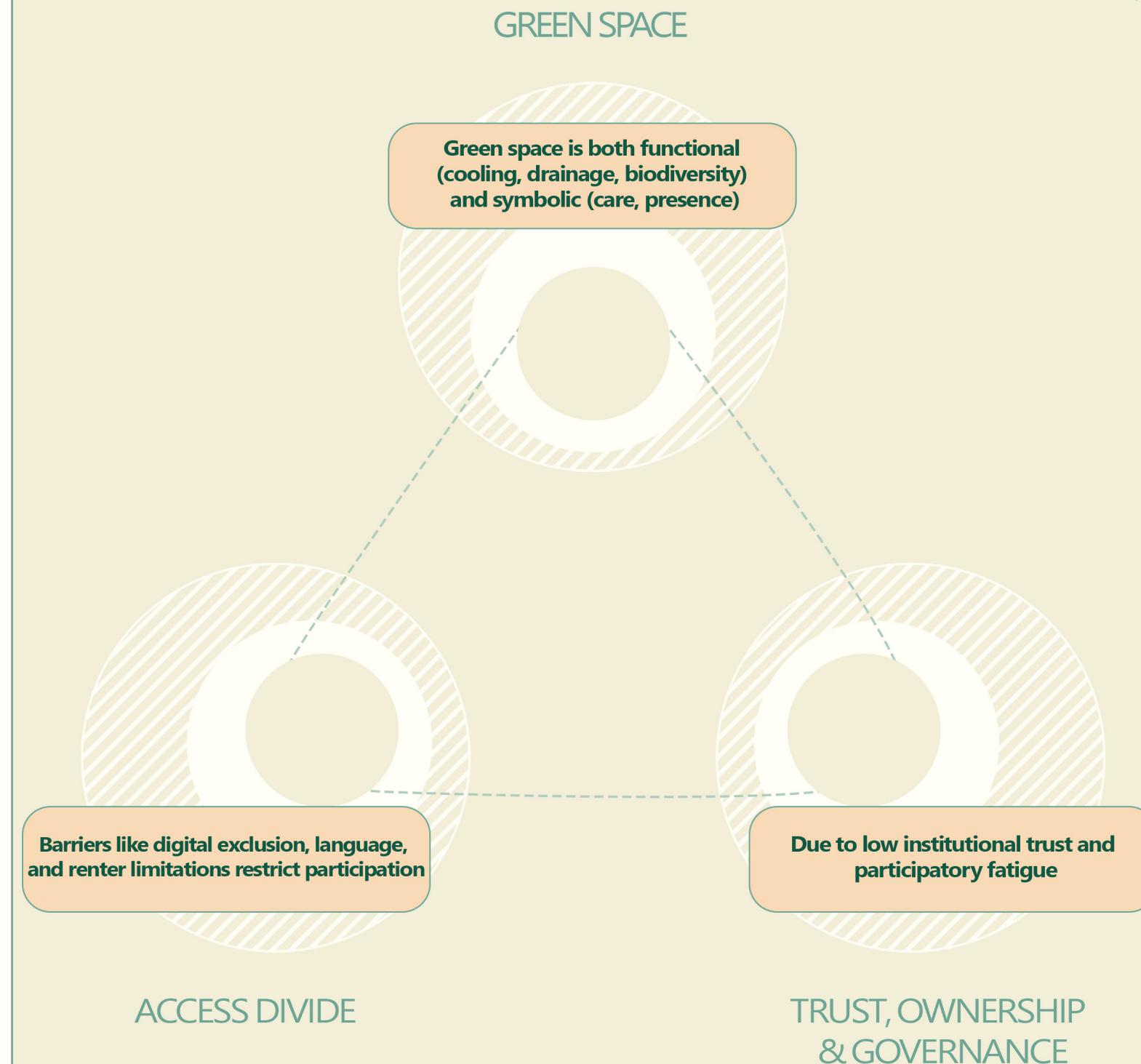


Figure 37. Scope with Focus Areas

DESIGN VISION

By combining the insights from Section 4, the reframed scope, and the key outcomes of the creative synthesis session, a clearer direction for the intervention has taken shape. The solution lies in small-scale, community-driven green space interventions that aim to address climate injustice by improving spatial equity and rebuilding trust. To support and guide the next phase of the design process, a design vision was formulated. The positioning statement method by Van der Vorst (2017) was used as a starting point and adapted to fit the systemic nature of the project. The following statement captures the intended role of the intervention within the context of Oude Noorden:

5.3.1 DESIGN STATEMENT

For residents of Oude Noorden who face daily challenges from climate stress, social exclusion, and limited access to decision-making¹, This project offers a modular educational/informational green infrastructure tool² that is co-created with the community³, responds to local biodiversity needs while reinforcing green spatial belonging⁴, builds trust and strengthens neighbourhood identity⁵, and enables residents to take visible, collective ownership of their environment⁶.

1. target group | 2. product category | 3. product attribute | 4. functional benefit | 5. emotional benefit | 6. self-expressive benefit

THE DESIGN GUIDELINES

5.4.1 REQUIREMENTS FOR THE FUTURE

The future of Oude Noorden lies in creating a more inclusive community that can effectively address climate risks while dealing with the daily issues. To achieve this, the design must focus on closing the gap between institutions and marginalized communities. A key requirement is creating an inclusive governance that gives residents the ability to actively participate in decision-making processes, ensuring that climate adaptation strategies reflect their needs.

Furthermore, green spaces must be reimagined as multi-functional resources, offering not only environmental benefits like cooling and water retention but also spaces for social interaction and community well-being. Furthermore, the design should ensure equitable access to these green spaces for everyone. Building trust between residents and institutions through transparent, responsive engagement is essential to overcoming barriers to climate injustice.

Future Stakeholder Dynamics in Oude Noorden

The Power-Interest (PI) matrix below (See Figure 38) visualizes the current stakeholder dynamics in Oude Noorden, highlighting the imbalance between high-power institutions (such as the Municipality of Rotterdam) and lower-power actors (like residents and local organizations). This matrix underlines the urgent need for a shift towards more inclusive governance, where institutions actively engage with and empower residents of the community. The intervention must address this gap by realigning power structures, ensuring that strategies reflect the needs and priorities of those most affected by climate risks. This realignment is crucial to closing the gap in influence and fostering equitable solutions.

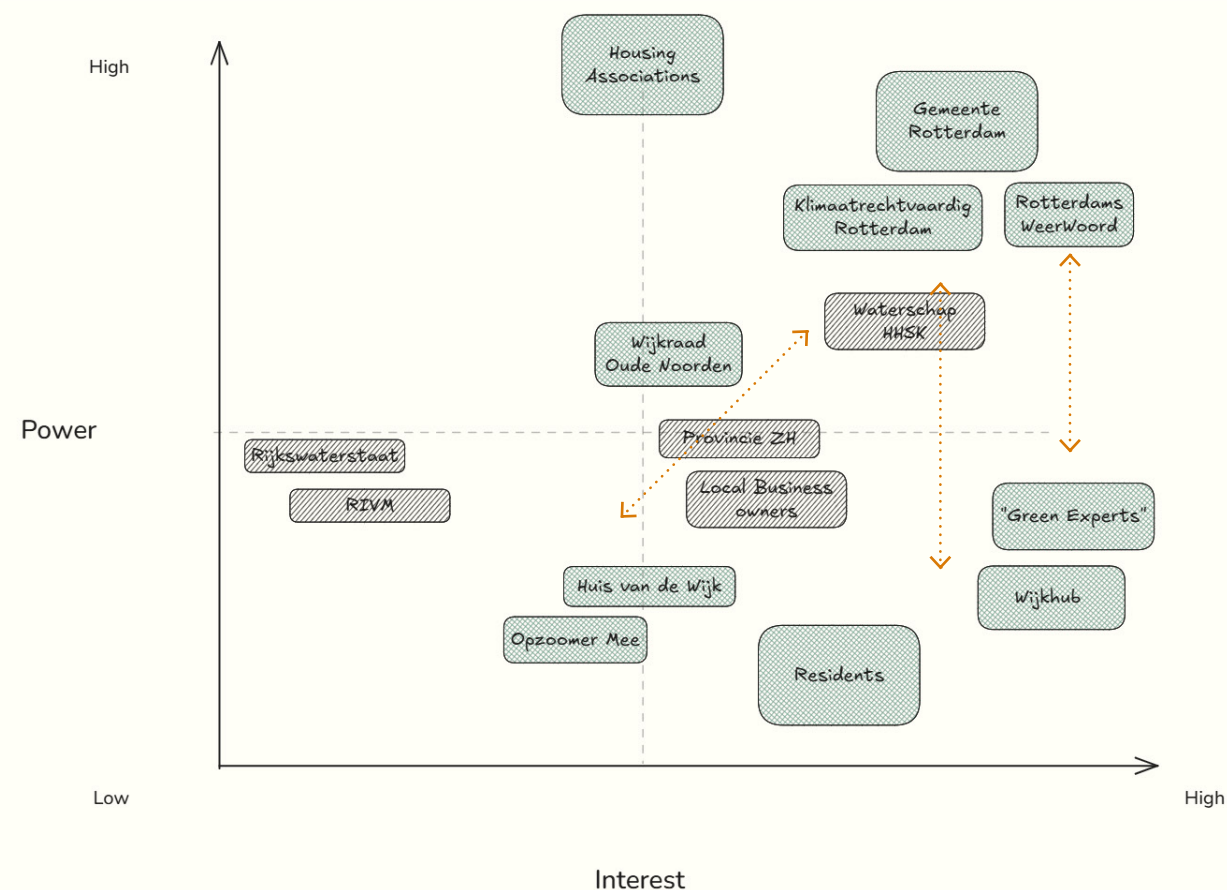
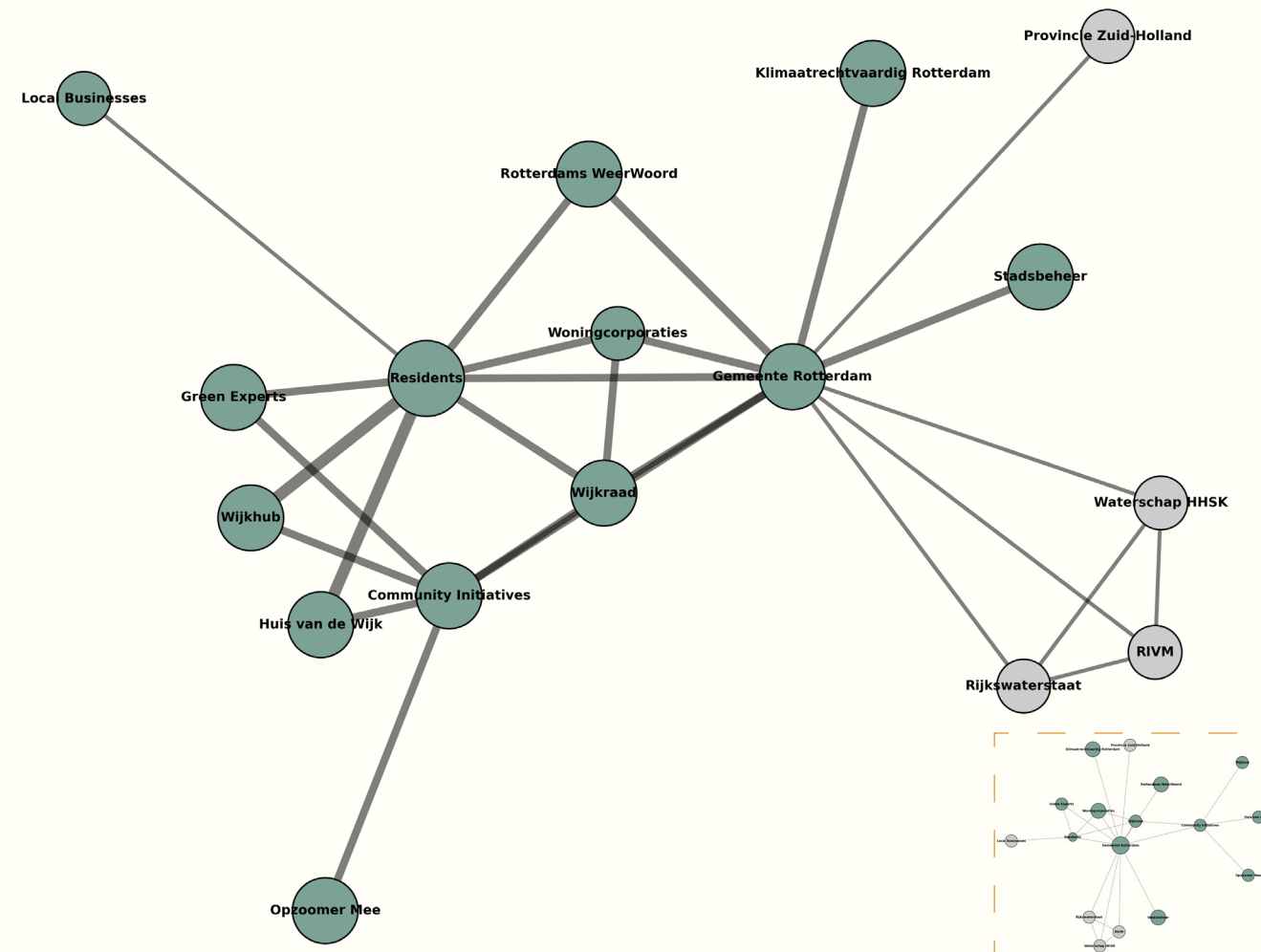


Figure 38. Power-Interest Matrix

Figure 39. Envisioned Future Stakeholder Relationship Network



A possible more just future of climate adaptation and strategy in Oude Noorden envisions a more balanced distribution of influence, addressing the gaps found in Section 4.3.2. Currently, municipal institutions hold most decision-making power, while residents and community-based actors are often sidelined. In the future scenario (See Figure 39 above), governance shifts towards a more inclusive and responsive model, where local voices guide both planning and implementation.

Community intermediaries, such as the Wijkhub and Huis van de Wijk, could assume formal roles as co-design partners. Their deep understanding of neighbourhood dynamics and strong local networks will be essential in shaping interventions that reflect the community's realities and priorities. The municipality could transition into a more supportive role, enabling community initiatives while making sure of the coordination with broader policies are intact.

This envisioned shift addresses a core issue identified in Section 4.3.2: the exclusion of marginalized groups from influence, which sustains climate injustice. New participatory structures (such as decentralized planning processes, iterative design, and continuous feedback loops) can ensure that residents move beyond consultation and gain real decision-making power.

By embedding power and agency within community structures for residents, this envisioned future supports climate justice through meaningful inclusion.

5.4.2 DESIGN CARDS

Now that the design direction is clearer, the insights from section 4.4.3 can be revisited and transformed into actionable design guidelines. These are made into design cards seen on this page. For each core issue, a set of tailored requirements has been developed (Boeijen et al., 2014), with each one linked to its respective category and visually represented on individual cards (See Figure 40).

Figure 40. Overview of Design Cards

Relationship Network

Category : Perceived Lack of Green

01 /

Provide green spaces within walking distance

so that every resident, regardless of age or mobility, has nearby access within 300 meters to shade, rest, and nature.

Category : Perceived Lack of Green

02 /

Embed greenery into everyday routines

by making sure contact with green becomes part of daily life, not a destination. Like, integrating plants, trees, and shade along walking routes, school paths, and shopfronts

Category : Perceived Lack of Green

03 /

Make use of underused spaces

by reimagining areas, alleys, rooftops and paved streets as valuable places for community and/or green interventions

Category : Daily Stress & Survival Pressures

04 /

Connect green space to daily needs

so it offers real-life benefits like food, comfort, cost savings, or relief from heat. Not just visual appeal

Category : Daily Stress & Survival Pressures

05 /

Minimize financial and bureaucratic barriers

to make participation in green initiatives free, simple, and accessible to all residents

Category : Daily Stress & Survival Pressures

06 /

Simplify maintenance tasks for residents

through easy and low-effort upkeeping that respect people's time and capacity

Category : Mistrust in Institutions

07 /

Communicate project updates clearly and publicly

using on-site signage and digital tools to keep residents informed and included throughout the process

Category : Mistrust in Institutions

08 /

Share decision-making power with residents

by formally involving them in final planning stages and giving them real authority and not just token participation

Category : Mistrust in Institutions

09 /

Track and display commitments transparently

so promises made, like planting dates, maintenance plans, or tree removals are logged, visible, and accountable

Category : Mistrust in Institutions

10 /

Involve trusted community experts

like caretakers, green experts or local leaders who already hold social trust and can bridge gaps in communication and influence horizontally and vertically

Category : Incomplete Access to Green Information

11 /

Translate all communication into multiple languages

to make sure key updates and instructions reach people who speak Dutch, Arabic, Turkish, English, and other local languages

Category : Incomplete Access to Green Information

12 /

Prioritize information through face-to-face contact

using trusted local messengers to go beyond digital contact and explain plans, support participation, and build trust

Category : Incomplete Access to Green Information

13 /

Visualize information with clear, inclusive design

by using simple graphics and visual cues that make project information easier to understand for everyone, regardless of language or literacy level

Category : Incomplete Access to Green Information

14 /

Centralize access to 'green-related' services

by creating one clear location (preferably physical or online) where people can find permits, subsidies, events, and support without confusion

MALMÖ UNIC CONFERENCE

Key Insights from Conference Participation

The UNIC Thematic Conference in Malmö provided a valuable platform for knowledge exchange on climate transformation, adaptation, and social inclusion. Within the panel Post-Industrial Cities, Demographic Change and Shrinking Regions, a collaborative paper addressing climate injustice in Rotterdam, which this project is part of, was presented (See Figure X). The discussion hereafter highlighted the importance of recognizing structural inequalities and the need to embed lived experiences into urban adaptation strategies. Feedback from researchers and practitioners helped reinforce the core argument of this thesis: that systemic issues must be addressed through design processes that are inclusive and grounded in community knowledge.

In the workshop 'A Systems View on Inclusive Prosperity', ideas were explored on how cities such as Rotterdam, Oulu, and Liège are integrating economic, social, and environmental goals into their adaptation efforts. The session emphasized that prosperity should be reframed as a holistic measure of well-being rather than purely economic growth. This perspective aligns with the thesis's reframing of green space as not only an ecological intervention, but also as a means of promoting health, inclusion, and spatial justice.

Practical and Methodological Inspiration

An insightful moment arose during a presentation on urban research, where was discussed how creative methods such as storytelling, mapping, and installations are used to engage diverse communities. This highlighted the role of design as both analytical and participatory. It inspired a reconsideration of engagement strategies in Oude Noorden, suggesting the value of more expressive, culturally grounded formats that better capture local voices and lived experiences.

Alignment with Participatory Adaptation Frameworks

Also during this conference, the guide Participatory Urban Adaptation to Climate Change (Rzeńca et al., 2024) was presented at a panel. It offers strategies for creating meaningful collaboration between local governments and communities. Its focus is on co-creation, trust-building, and flexible governance that directly supports the participatory and the design-led approach found up till now in this project. Drawing on these principles will hopefully provide a framework for developing local engagement that eventually leads to procedural justice. If this guide's insights are incorporated, it will strengthen the theoretical foundation and practical application of the final intervention.



Figure 41. UNIC



Figure 42. UNIC

SECTION FINDINGS

The above section outlines how the initial challenge was reframed and narrowed into a design space for intervention. Several decisions were made:

1. **The scope was narrowed to three leverage points.** These are: (a) **green space** as a systemic and symbolic tool for adaptation and care, (b) **trust, ownership, and governance** to address institutional mistrust and lack of accountability, and (c) **the access divide**, recognising that those most exposed to climate risks often have the least ability to participate in or benefit from adaptation.
2. **A design vision was formulated.** This positioned the intervention as a modular, educational and co-created tool that fosters visible ownership, strengthens neighbourhood identity, and connects climate adaptation with justice.
3. **Design cards were designed to structure the exploration of ideas.** By translating abstract justice levers into tangible guidelines, the cards provide a concrete method for ideation

Overall, Section 5 reframed the challenge into a concrete vision, scope, and set of actionable guidelines, laying the foundation for ideation and concept development in Section 6.

SECTION 6.0

BRINGING THE INTERVENTION TO LIFE

This section outlines how the systemic insights are translated into ideas and concrete interventions. It introduces early design concepts that address climate risks and social inequities through green space as a leverage point. These interventions move the project from understanding to action, forming the basis for prototyping and community testing.



CONCEPT DEVELOPMENT

The concept development phase built on the findings from the previous research and analysis sections. Using design cards, justice levers (voice, access, recognition, capacity to act) and the local climate challenges, a series of ideas were generated (See Figure 43). The aim was to respond directly to the design requirements identified in earlier sections.

Low-Barrier Participation

Concepts must be easy to join without prior knowledge, digital skills or complex procedures. This ensures that residents who are often excluded, such as elderly people, renters or newcomers, can take part.

Recognition Of Informal Green Care

Everyday actions such as watering a tree pit or planting herbs along the sidewalk are often invisible. The concepts should make these quiet contributions visible and valued, building pride and trust in local green efforts.

Analog And Multilingual Accessibility

Many residents rely on physical, printed materials and speak different languages. Tools and communication must therefore be analog, non-digital or available in multiple languages to ensure inclusivity.

Opportunities For Both Symbolic And Practical Green Action.

Interventions should balance symbolic actions such as storytelling, memory and identity with practical actions such as planting, de-paving and maintenance. This combined approach allows residents to connect emotionally and act physically on green justice.

Over several creative sessions, the initial ideas were reduced to fifteen by combining and refining them with the help of design cards, justice levers and the findings from earlier research (See Figure 44). These ideas ranged from playful neighbourhood games to more infrastructural or storytelling interventions. They were then clustered into thematic groups based on their primary function. Some focused on participation and learning, others on recognition and storytelling, while a few explored maintenance and collective care.

The full set of ideas was presented in a work-in-progress feedback session. The discussion focused on which concepts felt most relevant, feasible and engaging for residents of Oude Noorden.

When developing and clustering ideas, the three focus areas from Section 5.2 remained a reference point. These were *green space*, *trust*, *ownership and governance*, and *access divide*.

As the concepts took shape, the emphasis shifted. The final selection of ideas focused most strongly on green space as a lever for climate injustice and on addressing the access divide in participation. Trust, ownership and governance received less direct attention. This was partly the result of the creative process and the interviews with residents and experts, who consistently called for bottom up interventions.

Working closely with residents and informal networks naturally generated ideas that centred on physical green space, daily accessibility and visible action rather than on changing institutional structures. While some elements of trust building are present, such as recognition of local care and co creation, the governance dimension will need to be addressed through follow up or complementary measures alongside this initial intervention (more on this in Section 8).

Out of these ideas, four concepts were selected for further development. The selection was based on their relevance to the design requirements, their potential to address local climate justice challenges, taking into account the type of intervention (soft, hard, or medium) as well as whether it would operate on an individual or collective level.

Chopped Tree: Losing Everyday Shade

The removal of a mature in Bergweg tree showed how the sudden loss of shade and greenery affects not only resilience but also residents' daily sense of care and belonging.



Chair and Table: Simple Comforts Matter

Residents asked for the return of a simple chair and table, showing how justice is also about meeting everyday needs for shade, rest, and being together.



Figure 43. Initial generated Ideas

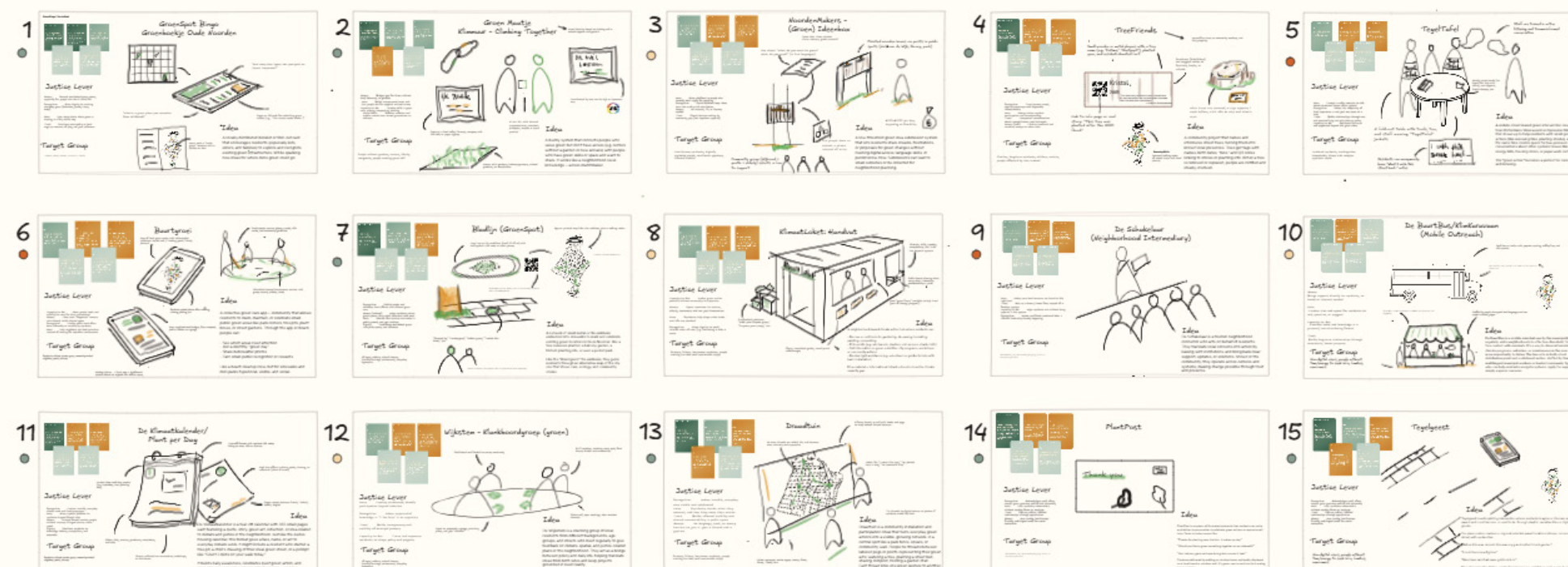


Figure 44. Refined set of Ideas

CONCEPTS

As mentioned, four concepts were developed further from an initial set of fifteen ideas created through creative sessions with design cards, justice levers and research findings (See Figure 45). The selection focused on representing different types of interventions: playful discovery, social connection, storytelling and ongoing engagement. GroenBoekje (GroenSpot Bingo) encourages residents to explore and notice existing green in a playful way. Groen Maatje connects people without access to gardens to neighbors with green space or knowledge, building skills and social trust. Bladlijn uses small emblems in sidewalks to make informal green care visible and celebrate local stories. De Klimaatkalender shares daily tips, quotes and reflections to help residents build a routine connection to green.

These four concepts were then assessed on five key questions: **visibility** (how well it makes green care seen and valued), **sustainability over time** (can it continue or grow), **feasibility** (how realistic it is to implement), **resident and neighbourhood fit** (is it accessible and relevant) and **justice impact** (how it addresses voice, access, recognition or capacity to act). This assessment made it possible to identify which ideas had the most potential for both immediate use and long-term impact.

Based on this assessment, GroenSpot Bingo and De Klimaatkalender were combined into one concept to increase feasibility and long-term engagement. **De KlimaatKalender** format provided a clear structure, while the seasonal **GroenBINGO** pages offered playful, low-barrier interaction. Together they balance discovery, storytelling and action in a way that can reach a wide audience.

Finally, this combined concept was reflected against existing green in the neighbourhood. By mapping where green is already present, the concept can guide residents toward these spaces, encourage recognition of local care and highlight streets that may also lack access to green, strengthening its relevance to the neighbourhood (See Figure 46).

CONCEPT 1 – GroenBoekje (GroenSpot Bingo)

GroenSpot Bingo is a playful, analog booklet that invites residents to explore and notice existing green in their own neighbourhood. Using bingo-style prompts, it encourages people to walk, observe and reflect on local green spaces, while also marking areas that need more care or planting. It supports low-barrier participation and recognition of informal green care, making green exploration accessible for children, families, adults and newcomers.

CONCEPT 2 – Groen Maatje

Groen Maatje is a buddy system that connects people without access to green space with neighbors who have gardens or green knowledge to share. Renters, newcomers and first-time gardeners can learn and participate, while elderly residents with unused gardens can receive help and company. The concept builds capacity to act, increases access to green activities and strengthens trust and social connection through shared care.

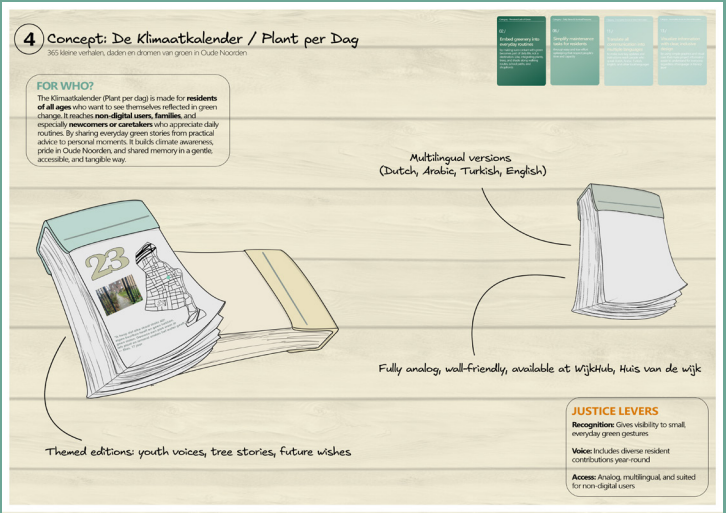
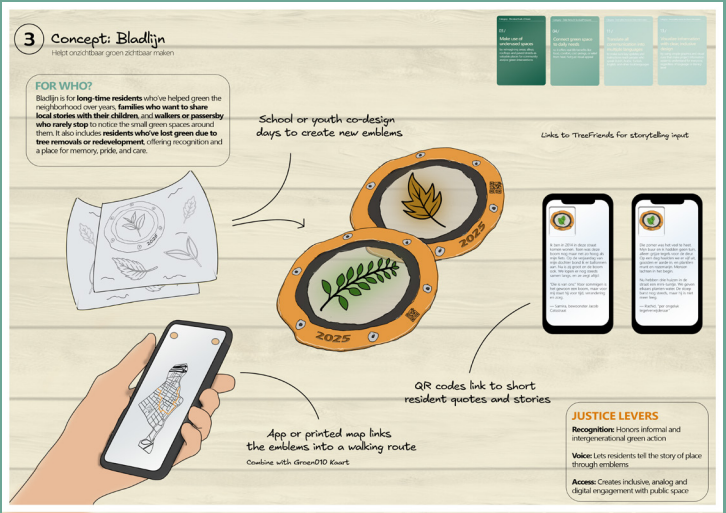
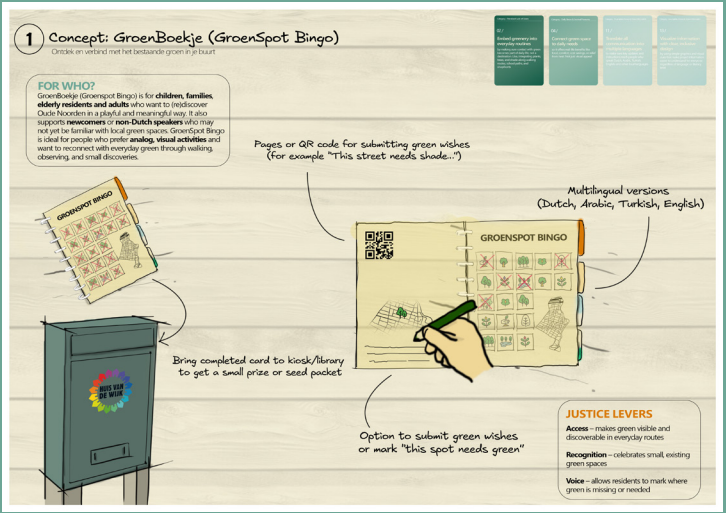
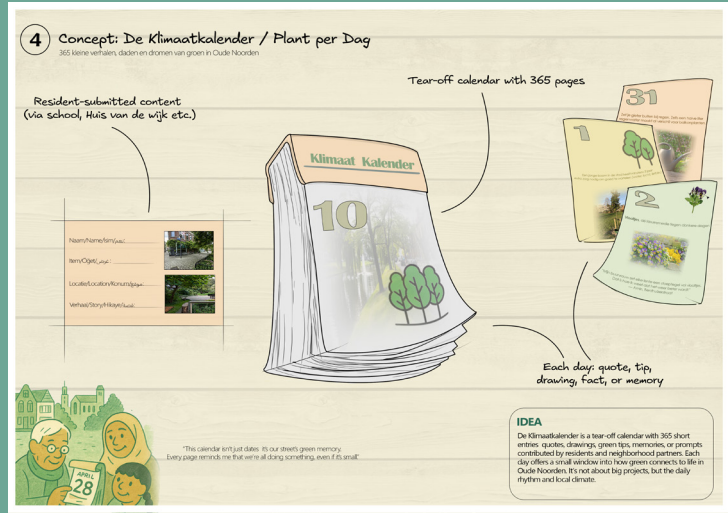
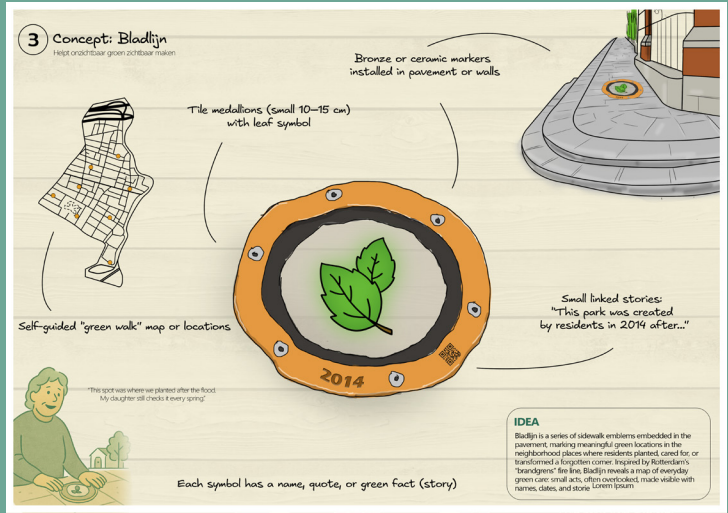
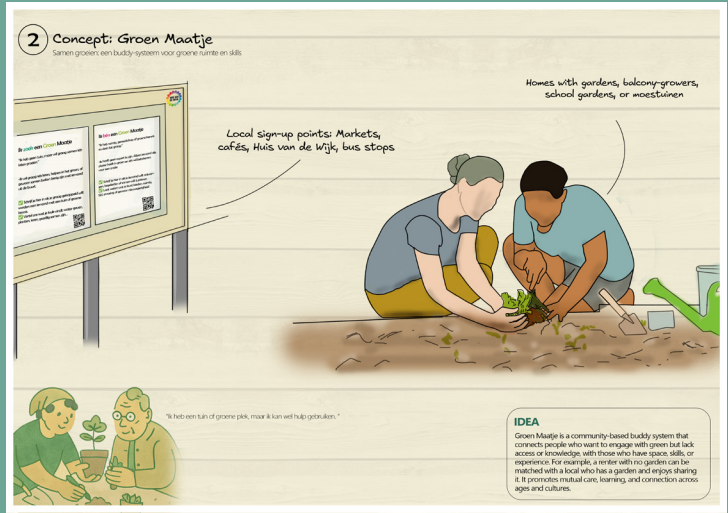
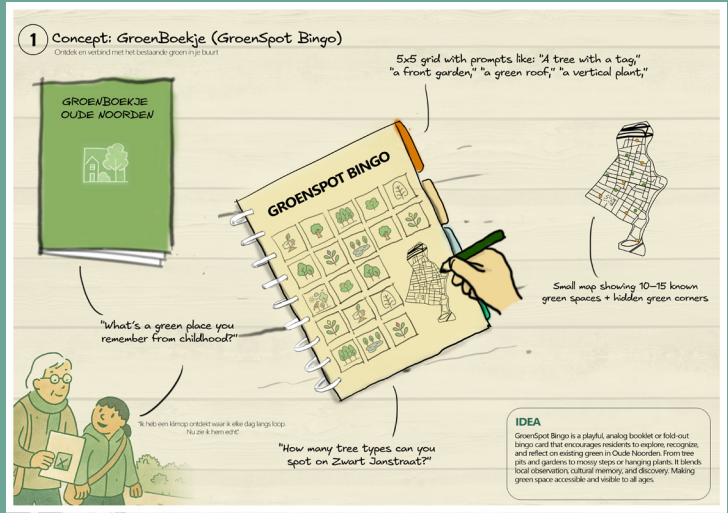
CONCEPT 3 – Bladlijn

Bladlijn is a series of small emblems placed in sidewalks to mark meaningful green spots in the neighbourhood. Each emblem shares a name, date or short story, turning quiet acts of green care into a visible and walkable narrative. It honors residents who have contributed to local green, invites curiosity and builds recognition and pride. Bladlijn mainly addresses recognition and voice while being fully analog and low-barrier. A simple green walk can tell many hidden stories.

CONCEPT 4 – De Klimaatkalender / Plant per Dag

De Klimaatkalender is a 365-day printed calendar with daily green tips, resident quotes, memories and small reflective prompts. It supports analog accessibility, recognition of everyday green care and builds a routine connection with climate and nature. Each week brings a small story or action that makes green care feel personal and shared.

Figure 45. Overview of 4 Main Concepts



IMPRESSION OF THE NEIGHBOURHOOD (SUMMER)

Figure 46. Impression of Oude Noorden during Summer



FROM IDEA TO INTERVENTION

To move from idea to a concrete intervention, several main features of the chosen concept were defined based on the findings from the earlier phases of the project. The daily calendar was converted to a 52-week calendar. The seasonal bingo was selected because it encourages people to act and balances playful discovery with routine engagement and recognition of informal green care.

6.4.1 SKETCHING IT OUT

Firstly, the weekly calendar pages were designed to feature short resident quotes, green tips, memories or reflective prompts. These weekly entries were chosen as they directly address recognition and justice impact by making local green care visible while inviting small-scale action. Seasonal bingo pages were integrated at the start of each season to encourage playful neighbourhood exploration, Depending on user feedback these might later on move to mid-season to enhance the

experience of residents. This feature builds on the idea of low-barrier participation and helps residents notice existing green while identifying areas still lacking green access.

The decision to use A4 landscape pages flipped on the long edge was made to ensure analog accessibility and to allow for clear, bold visuals suitable for children, youth and adults. Initially the content was structured so that the front page shows the weekly story or tip, while the back page invites interaction, for example through, local images, reflection questions or small action prompts or quotes.

A simple content hierarchy was then sketched to organize these features: seasonal pages act as entry points, while weekly pages create routine and continuity. These sketches guided the transition from research insights to the first physical prototype, which will now be tested and refined with residents in the neighbourhood.

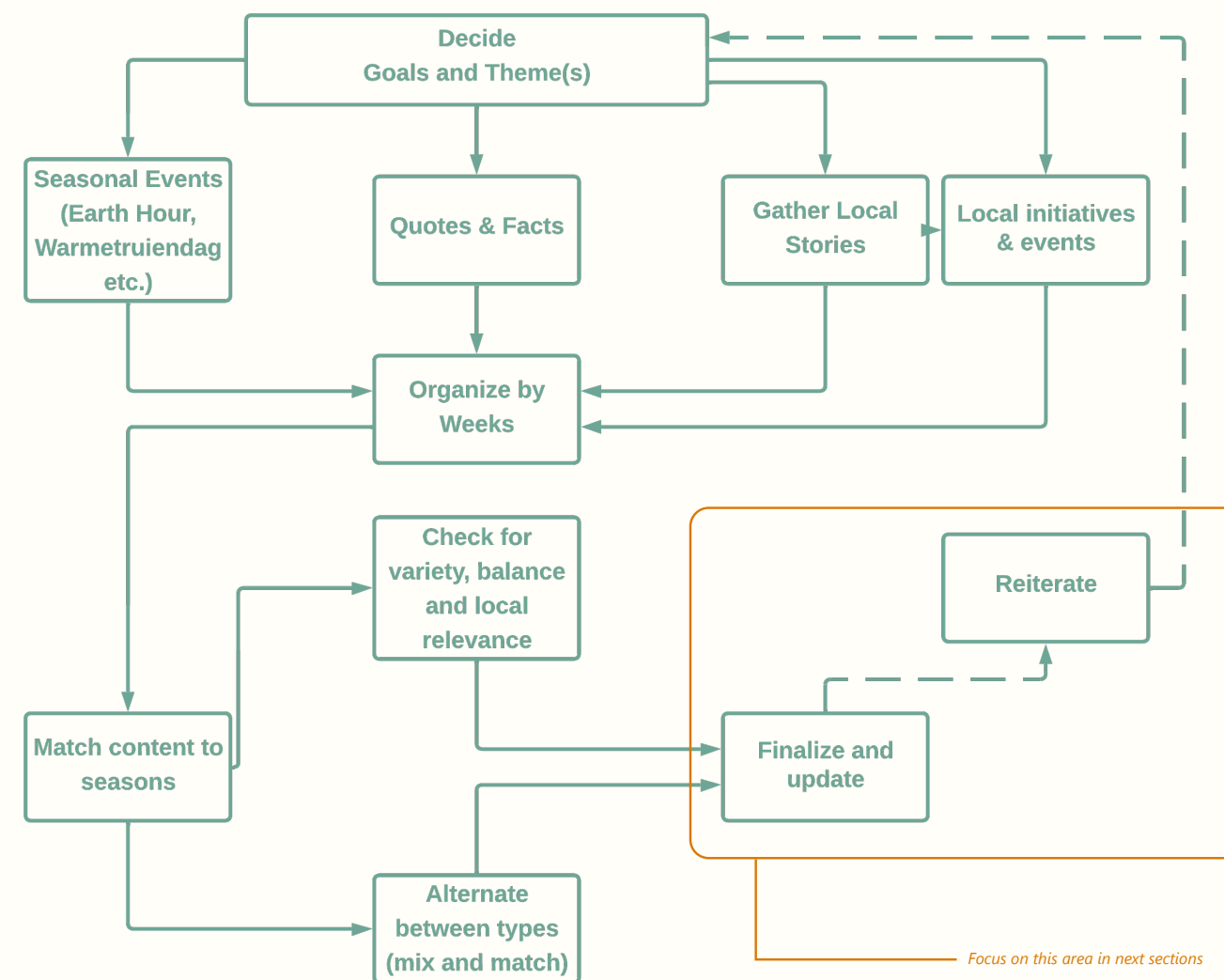


Figure 48. Flowchart of expected flow between features of the intervention

6.4.2 FLOWCHART

A clear content hierarchy and flow was developed (See Figure 48) so the calendar engages residents from the start and keeps interest throughout the year. The process begins with defining goals and themes for the year, shaped by the project's focus areas and earlier research. This step sets the direction and keeps the content aligned with the vision of climate justice in Oude Noorden.

Next, seasonal events such as Earth Hour and Warmetruiendag are identified as fixed anchor points, linking local action to wider climate awareness days. At the same time, local stories are gathered from residents, along with information on community initiatives and events. Combining global and local perspectives makes the calendar relevant and rooted in place.

Quotes and facts are collected to add variety and inspiration. Content is then organised by weeks to create a steady rhythm. The draft

structure is reviewed to check for variety, balance and local relevance, making sure different content types (tips, stories, activities, facts) are well distributed and reflect the diversity of residents' experiences.

Seasonal content is then matched to the time of year, aligning activities and stories with natural and social rhythms. Content types are alternated and mixed, blending playful elements with practical advice and reflective prompts. The process allows for iteration, using feedback to reiterate and adapt content so it stays relevant. Once refinements are made, the calendar is finalised and updated for production and distribution.

This flow gives the calendar a clear start, middle and end each year, with a lot of engagement at the start of each season and a consistent thread of weekly content to build routine connection to green care and climate awareness.



Figure 47. Snapshot of Intervention Sketching

6.4.3 DESIGN

The design of the first version of the calendar was developed to be clear, playful and inviting while remaining reflective enough to highlight the value of local green care (See Figure 49). The design follows a consistent weekly layout that combines photos of green spaces. The goal was to balance text and visuals so that each page is accessible for children, youth and adults. Seasonal color palettes were developed to visually guide the user through the year, making it immediately clear when a season begins or changes. This use of color also reinforces the rhythm of nature in the urban environment. The design will be tested with residents to assess whether it feels inviting, clear and relevant and whether it effectively motivates interaction and weekly use.



Figure 49. Design of First Version of Intervention



6.4.4 PROTOTYPE

This first version of the prototype translates the combined concepts into a tangible product that can be tested with residents. It is designed as a 52-week calendar, printed on sustainable 350-gram paper in an A4 landscape format, flipped on the long edge, similar to a wall calendar (See Figure 50). The decision to make the calendar weekly rather than daily was based on feasibility and sustainability.

A weekly rhythm is easier for residents to follow, reduces production costs and environmental impact, and supports long-term engagement without becoming overwhelming.

Each week features a carefully composed mix of photos of local green spaces, short resident quotes, practical tips and small reflective facts or prompts. The use of seasonal colour palettes makes the passing of time and the changes in the local environment visually engaging and easy to follow for all ages.

Four seasonal bingo pages are not yet included in this prototype but will serve as activating moments, encouraging playful exploration of the neighbourhood and helping residents discover green areas or notice where green is still missing. Additional dedicated information pages will also be added to provide practical details on where information, subsidies and green spaces are located in the neighbourhood, how to access them, and how to care for them.

The calendar also highlights climate-related days such as Warmetruiendag, Earth Hour and Fiets naar je werk dag, along with other relevant dates to connect local green to broader climate awareness. The layout and design of this first version of the prototype will be tested directly with users in a quick and informal manner to refine tone, usability, relevance and visual clarity before moving to a larger roll-out.



Figure 50. Look and Feel of Printed Prototype

6.4.5 QUICK FEEDBACK SESSION

Quick feedback sessions were held to collect first impressions of the initial prototype before moving to more extensive testing. The first session was held with academic supervisors, focusing on whether the overall concept matched the project’s aims and how the structure could be strengthened. They confirmed that combining weekly content with seasonal activation elements offered a strong balance between steady engagement and moments of focused attention. Supervisors also advised improving the visual hierarchy so that essential elements stand out more clearly and are easier to navigate.

A second quick session took place informally with local residents (See Figure 51). Residents appreciated the mix of local photos, short quotes and practical tips, saying these features made the calendar feel connected to the neighbourhood and relevant to everyday life. They valued the focus on local identity and the recognition of small-scale green care, such as tending a tree or planting along the sidewalk. Seasonal bingo was not yet included in the prototype but was discussed as a key addition. The idea was received positively and seen as a playful way to encourage interaction with local green spaces.

From both sessions, several improvement points emerged. These included reducing the bulkiness of the calendar (See Figure 52), adding a cover page, enlarging and clarifying visuals, refining the layout for better readability (See Figure 53), and adding more variety to the tips and prompts so the content stays engaging across the year. There was also interest in including a small number of new content types, such as an annual reflection page or an overview at the start of the calendar.

Residents also suggested dedicating a section to acknowledge active community members or local green initiatives, making contributions more visible and celebrated. In addition, creating a digital version of the calendar was seen as a way to make updates easier and allow broader access beyond printed copies.

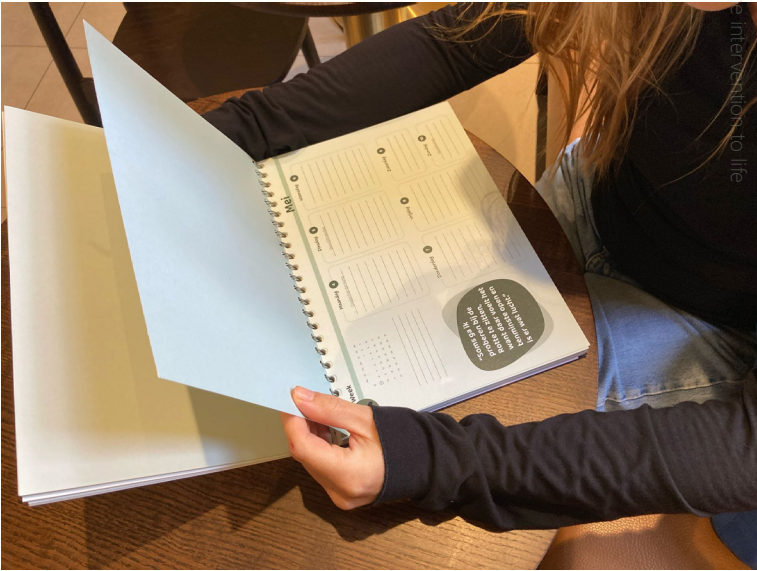


Figure 51. Quick Feedback Session

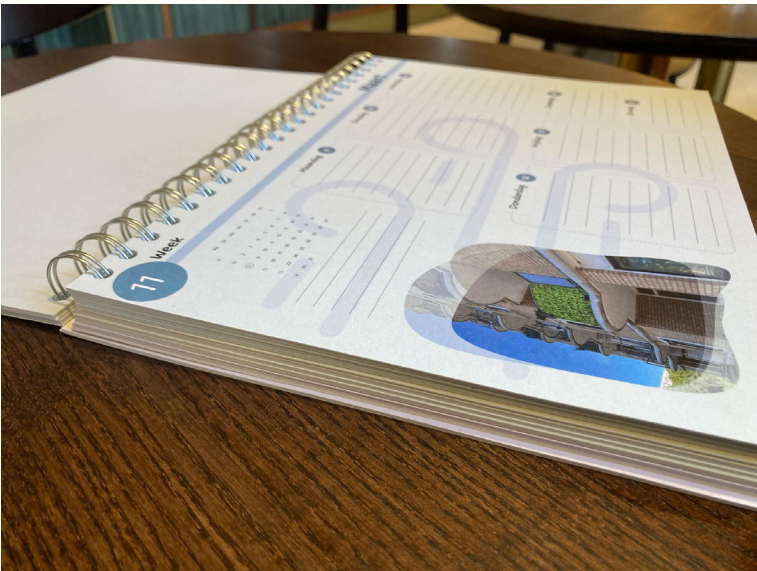


Figure 52. Quick Feedback Session: Impression of thickness



Figure 53. Quick Feedback Session: Small Font Size Worsen Readability

Let's build on this!

The quick session's insights were converted into a list of improvements and additions for the intervention. The ranking on the right page reflected the importance assigned to the adjustments. All key elements and helpful additions identified in the previous section were incorporated into the final design, while the bonus features items are included in the phased rollout plan that will be outlined in a later section.

Key Elements

- ▶ **Content Diversity and Specificity:** Include a wider range of weekly stories, tips and prompts that reflect different resident experiences, cultural backgrounds and seasonal activities.
- ▶ **Visual Design and Readability:** Improve the calendar's layout (bigger visuals), typography and images so it is clear, easy to read and appealing for all ages.
- ▶ **GroenBINGO:** Make and add seasonal bingo for more variety and make it action focused.
- ▶ **Location Mapping:** Make and add (GroenSpots) map to include chosen green areas and those that are less visible.
- ▶ **Recognition of Local Care:** Add more ways to show and celebrate informal green maintenance by residents.
- ▶ **Physical Usability:** Improve paper quality (too thick currently), foldability, and durability for a year-long lifespan and use in diverse home conditions.

Helpful Additions

- ▶ **Helpful Tips:** Add more tips throughout the calendar to give residents practical ideas they can try straight away.
- ▶ **Action-inspiring Imagery:** Use images that motivate residents to take action and get involved in local green care.
- ▶ **Annual Reflection Page:** Include a page where residents can note their own achievements, favourite moments and observations from the year.
- ▶ **Year Overview:** Add an overview page at the start of the calendar showing the full year at a glance.
- ▶ **Information Sheet:** Include a page with clear information on available subsidies, locations of green spaces, and other useful local resources.

Bonus Features

- ▶ **Multilingual Support:** Expand translations to cover the more languages spoken in the neighbourhood.
- ▶ **Wasgras010:** Use local grass that is turned into hay and then into paper as the material for the calendar.
- ▶ **Recognition Space:** Dedicate a section to acknowledge active community members or green initiatives.
- ▶ **Digital Version:** Create an online version of the calendar for easier updates and wider access.

THE FINAL DESIGN

The final version of De KlimaatKalender builds on the prototype and incorporates the key elements discussed earlier. Several additions and adjustments were made to ensure the calendar is accessible, engaging, and relevant to life in Oude Noorden.

The cover page (see Figure 54) introduces the calendar as a neighbourhood initiative and sets the tone with recognisable visuals from the area. Inside, visuals have been enlarged to improve clarity and readability, responding to feedback that images needed to stand out more. The font size has also been increased, making the content easier to use for a wider audience, including children, elderly residents, and people with limited literacy.

To strengthen the link between knowledge and action, facts and tips were refined and rewritten to directly prompt behaviour rather than simply inform. Additional climate-related days (such as Global Recycling Day and World

Cleanup Day) and local events were integrated, ensuring the calendar reflects both global and neighbourhood contexts.

At the front, the calendar now includes an information sheet (see Figure 55) with practical resources such as local organisations, subsidy opportunities, and points of contact. A year overview and a map of the green locations depicted in the images were also added, making it easier for residents to connect the content to their surroundings.

A further feature, GroenBINGO (see Figure 56), was designed and included in the final version. The seasonal activity that invites residents to explore neighbourhood green spaces.

Altogether, the final design balances inspiration, recognition, and usability, resulting in a modest yet meaningful tool that makes climate justice visible and actionable at the neighbourhood scale.

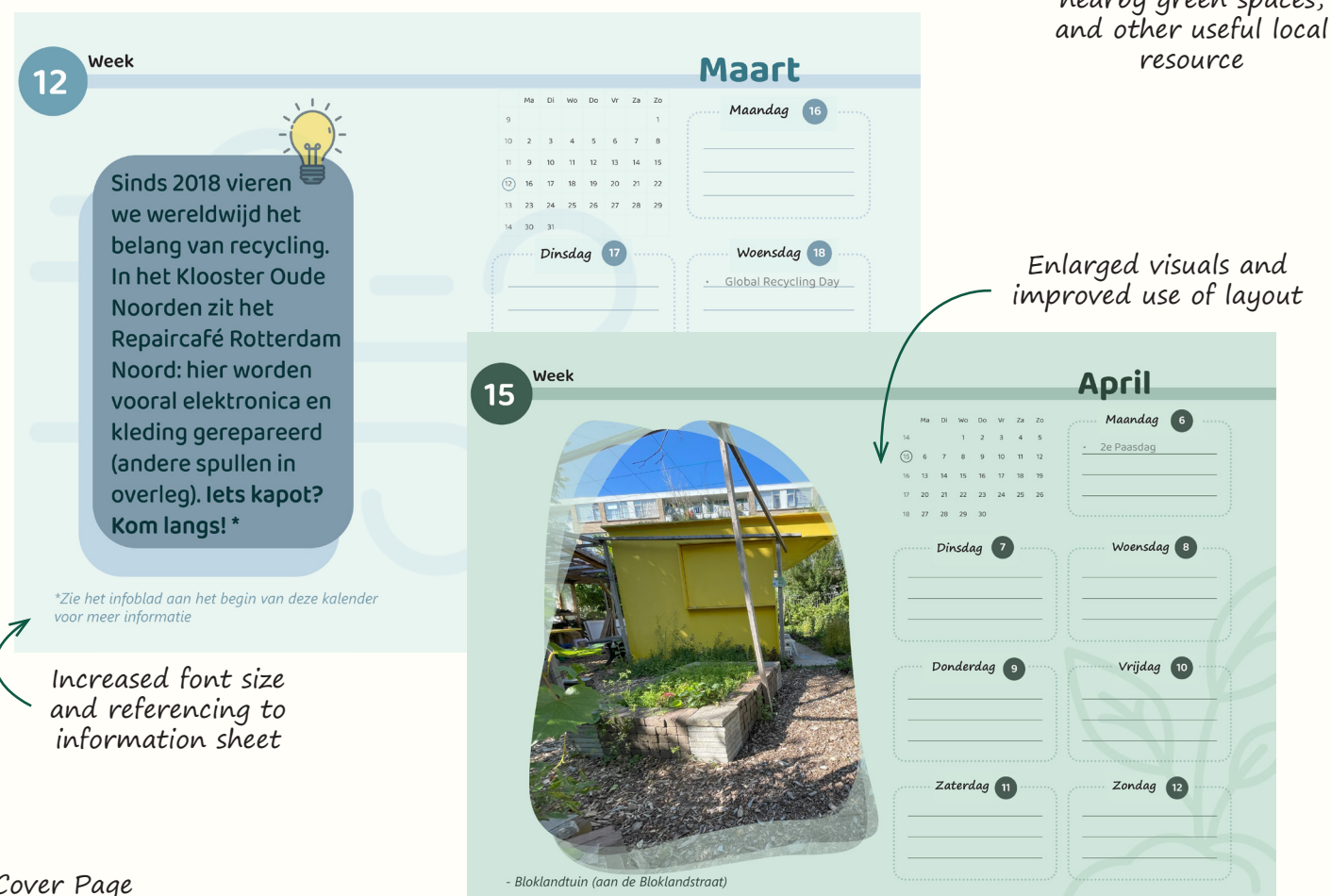


Figure 54. De KlimaatKalender 2026 Cover

Figure 55. De KlimaatKalender 2026



An information sheet that clearly presents available subsidies, nearby green spaces, and other useful local resource



Enlarged visuals and improved use of layout

Increased font size and referencing to information sheet

Cover Page

Figure 56. De KlimaatKalender 2026

GroenBINGO WINTER

Ga op zoek naar:

- Groenblijvende klimop op een muur of schutting
- Een roodborstje in een boom of tuin
- Kale boomtakken tegen de winterlucht
- Mos dat op stenen of muren groeit
- Een plantenbak of pot voor iemands huis
- Voorjaarsbollen die al beginnen uit te komen
- Groen hoekje op het Luchtpark Hofbogen
- Bezoek de Bloklandtuin (ook in rust nog groen)
- Krans als versiering bij een deur of raam
- Buurtmoestuin (Wilgenplantsoen) met wintergroenten
- Vogels horen zingen op een koude ochtend
- Eenden of meerkoeten in de singel zien
- Iemand die kamerplanten water geeft
- Een buur die bladeren of sneeuw veegt
- Regen die druppelt van takken na een bui
- Ontdek een nieuw groen plekje dat je nog niet eerder had gezien

29 Week

Juli

Ga op zoek naar:

- De eerste bloesems in de straatbomen
- Sneeuwklukjes of krokussen in bloei
- Een hommelt of bij op zoek naar nectar
- Vers groen in de Tuin van Noord
- Kleine groene blaadjes aan bomen of struiken
- Vogels die druk nestmateriaal verzamelen
- Een buur die bloempotten vult met lentebloemen
- Spreeuwen of gierzwaluw terug in de wijk
- Een geveltuintje of groen dak dat weer opleeft
- De wormhotel in de Bloklandstraat
- Een buur die regenwater opvangt of planten water geeft
- Oogstmarkt of andere kraampjes in de wijk
- Plotselinge regenbui of plassen op de stoep
- Groen dak of geveltuintje die weer opleeft
- Vlinder (citroenvlinder, daupauwoog) zien vliegen
- Regenboog na een stevige lente-bui

Seasonal colour palette

14 Week

Maart

Ga op zoek naar:

- Bijen gaan vliegen zodra de temperatuur boven de 10°C komt. Laat vroegbloeiende bloemen staan.

Maandag 30

Dinsdag 31

Woensdag 1

Donderdag 2

Vrijdag 3

Zaterdag 4

Zondag 5

Februari

Maandag 28

Dinsdag 29

Woensdag 30

Donderdag 1

Vrijdag 2

Zaterdag 3

Zondag 4

Een insectenhotel in een boom langs de Rotte. Een veilige plek voor bijen en andere insecten die bijdragen aan een groen en gezond Oude Noorden

Facts and tips linked to the season and tailored to green found in neighbourhood

30 Week

Juli

Ga op zoek naar:

- Tijdens Earth Hour ga wereldwijd 1 uur het licht uit, om aandacht te vragen voor natuur en klimaat. Het kan tot 10,2% elektriciteit worden bespaard. Bekende gebouwen, van de Eiffeltoren tot het Empire State Building, doven hun lichten als krachtig signaal. Ook in honderden andere steden wereldwijd.

Maandag 20

Dinsdag 21

Woensdag 22

Donderdag 23

Vrijdag 24

Zaterdag 25

Zondag 26

Maandag 27

Dinsdag 28

Woensdag 29

Donderdag 30

Vrijdag 31

Zaterdag 1

Zondag 2

Een insectenhotel in een boom langs de Rotte. Een veilige plek voor bijen en andere insecten die bijdragen aan een groen en gezond Oude Noorden

Highlights climate-related days and other relevant dates

SECTION FINDINGS

The above section presents how the intervention was developed from an initial set of ideas into the concrete prototype of De KlimaatKalender. The process moved from concept generation and selection, to prototyping, quick feedback, and an iteration. While bringing the intervention to life, several insights and decisions stood out:

1. **From all ideas fifteen were chosen and refined with design cards and justice levers, then grouped into thematic sets.** This filtering resulted in diversity of ideas while keeping focus on climate justice challenges in Oude Noorden.
2. **Four key concepts were chosen for further development.** These were GroenBoekje (playful discovery of local green), Groen Maatje (a buddy system for green care), Bladlijn (recognition of existing green), and De KlimaatKalender (daily green tips and stories). Together, they reflected complementary angles of exploration, connection, recognition, and engagement.
3. **A key decision was to merge GroenBoekje and De KlimaatKalender.** This consolidation balanced the playful nature of seasonal discovery with the steady rhythm of weekly engagement. The merged concept offered stronger feasibility and broader appeal while retaining the justice values of recognition, access, and voice.
4. **Prototyping translated the concept into a tangible format.** The decision to use a 52-week rhythm rather than a daily calendar made it more feasible, sustainable, and created a manageable level of engagement.
5. **Feedback from residents and supervisors guided concrete adjustments.** Residents valued recognition of informal green care, local identity, and practical tips, while raising concerns about bulkiness, readability, and content variety. This led to clearer layouts, larger visuals and fonts, more diverse prompts, and the inclusion of seasonal activation moments.
6. **The final design incorporated several additions, compared to the prototype.** An information sheet on subsidies and local resources, a yearly overview, a map of green locations, and GroenBINGO pages were added to strengthen usability.

Overall, Section 6 demonstrates how systemic insights from the previous sections were translated into a concrete prototype. Due to De KlimaatKalender not yet being finalized, Section 7 evaluates the initial prototype to assess its accessibility, relevance, and potential for long-term impact.

SECTION 7.0

EVALUATION AND FEEDBACK

This section reflects on how the intervention was tested and received. It reviews feedback gathered during evaluation moments, focusing on how people engaged with De KlimaatKalender. The evaluation offers insight into what resonated, what could be improved, and how well the intervention supports the broader goals of green justice in daily life.



EVALUATION APPROACH AND SET-UP

The evaluation phase of the intervention was set-up to assess the usability, clarity, and community resonance of De KlimaatKalender before committing to a wider rollout. The first initial prototype and was used in this phase. The goal was to gather actionable feedback from a sample of six residents in Oude Noorden and a green expert, making sure that it aligns with both climate adaptation goals and local needs.

on whether the calendar inspired people to try actions immediately or engage with neighbours.

4.Recognition: Does it make local green efforts visible? Feedback examined whether residents noticed and valued the inclusion of local photos, stories, and examples of green care.

5.Scalability: Can it be maintained or expanded over time? Residents were briefly asked about this but mainly the Green Expert’s input considered the feasibility of keeping the calendar going, adapting it to other areas, and linking it to broader climate initiatives.

7.1.2 WITH RESIDENTS

Feedback was gathered at Perron Noord, a local meeting spot in Oude Noorden, by approaching residents and inviting them to test the prototype (See Figures 57 & 58). Residents were invited to explore the calendar on-site. They navigated the different sections, responded to targeted questions about specific features, and were encouraged to provide open comments on the design and content.

Feedback was collected through a mix of observation, short conversations, and more focused questions. This approach allowed for both spontaneous reactions and considered reflections, capturing how first-time users interacted with the intervention.

Based on the interviews, some key insights are worth mentioning, structured around to the evaluation criteria:

Relevance To Local Needs

Residents recognised the calendar as closely tied to Oude Noorden’s climate and social context. Many felt the tips, stories, and activities were useful in their daily lives. A few suggested adding content that responds to seasonal changes more directly to keep it fresh. “It’s nice because it doesn’t just tell you something, it also asks you to do something. That makes it more fun.”

“This one about watering plants early in the morning... I can do that tomorrow already.”

This validated that combining practical information with small, actionable steps increases relevance and encourages use.

Ease Of Use

Most residents could navigate the calendar quickly and without assistance. They were able to find information, follow the weekly prompts, and understand the layout with minimal explanation. A few again, suggested that increasing font size and improving contrast between text and background would make it even easier to read, particularly for older residents.

“The colours make me want to look at it But I need my glasses for the small print.”

This confirmed that while the structure is clear and intuitive, small adjustments to visual design could further improve accessibility for all users.

Participation

Residents felt the weekly prompts and local tips encouraged action and conversations with neighbours. When the idea of the GroenBINGO pages was discussed as a current addition, it was received positively as a playful way to explore green spaces. Some suggested making challenges diverse and occasionally collaborative to maintain interest.

“If I show this to my neighbour, maybe we can go and check these spots together.”

This indicated that playful, low-barrier activities could strengthen engagement if added in future versions.

Recognition

Participants valued the local photos, stories, and references to neighbourhood green efforts, saying it made the calendar feel connected to their own environment.

“I didn’t know this small garden even existed... now I want to see it.”

This indicated that highlighting local care builds pride and awareness of existing green spaces.

Although based on a small sample, Figure 59 provides an overview of how the prototype performed on the first four evaluation criteria, offering an initial indication of its strengths and areas for improvement.



Figure 57. Resident interacting with the Prototype



Figure 58. Evaluation Set-up

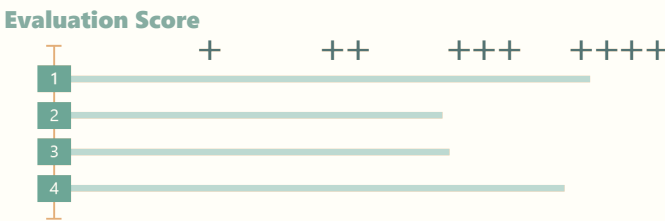


Figure 59. Performance based on evaluation criteria

- OBJECTIVES**
- 1. TO SEE HOW EASILY RESIDENTS CAN FIND THEIR WAY THROUGH DE KLIMAATKALENDER AND UNDERSTAND THE INFORMATION IT GIVES. MAKING SURE THE DESIGN IS ACCESSIBLE FOR FIRST-TIME USERS.
 - 2. TO LEARN WHETHER THE CALENDAR FEELS RELEVANT AND INSPIRING FOR RESIDENTS IN THE OUDE NOORDEN.

7.1.1 EVALUATION CRITERIA

The evaluation of De KlimaatKalender prototype was guided by five clear criteria, each reflecting the project’s design vision and the ambitions outlined earlier (See Sections 6.2 and 6.4.5). These helped determine not just how the calendar looked, but how well it worked for residents of Oude Noorden.

1.Relevance to local needs: Does it address Oude Noorden’s specific climate and social context? This was explored by asking residents if the tips, stories, and activities felt meaningful and connected to their daily lives.

2.Ease of use: Can residents understand and navigate it quickly? This was tested by observing how easily participants could find information, follow instructions, and join in without extra help.

3.Participation: Does it prompt residents to take part in activities? Conversations focused

7.1.3 WITH GREEN EXPERT

An interview was conducted with a local green expert who has experience in community-based greening projects and works closely with municipal climate adaptation initiatives. The interview took place at Bonza in Oude Noorden and aimed to understand how De KlimaatKalender could align with professional knowledge on sustainable urban development, and whether it could realistically support long-term climate adaptation goals.

OBJECTIVES

1. TO CHECK WHETHER DE KLIMAATKALENDER FITS WITH PROFESSIONAL KNOWLEDGE ON SUSTAINABLE URBAN DEVELOPMENT AND RESPONDS TO THE REAL CLIMATE CHALLENGES OF OUDE NOORDEN.
2. TO EXPLORE HOW THE CALENDAR COULD GROW OVER TIME BY HIGHLIGHTING LOCAL EXAMPLES AND LINKING TO OTHER NEIGHBOURHOOD PROJECTS. THIS HELPS TEST WHETHER IT CAN REALISTICALLY BE SCALED UP AND KEPT RELEVANT IN THE LONG TERM..

Relevance To Local Needs

The expert's first reaction to De KlimaatKalender was one of recognition. The mix of local photos, seasonal prompts, and small-scale green actions resonated with his experience in Oude Noorden. "I like that it doesn't tell people to fix the whole climate problem. It's showing things you can actually do here, in this street, in this season." He stressed that grounding in everyday life is essential for relevance: "If you show that watering a street tree is part of a bigger climate story, people start to see their role differently. It becomes personal."

Ease Of Use

While the overall structure felt intuitive, the expert suggested improving navigation by centralising images so readers' eyes land in the same place each week. "It's like giving people a steady handrail." Consistent visual placement, he argued, would make flipping through the calendar quicker and help keep attention on key content.

Participation

The expert felt the calendar should be more explicitly action-based so that "People actually go out there and do something." He recommended pairing every week with a clear, physical task that could be done individually or with others, and linking these to visible neighbourhood changes such as a communal planting day or seasonal clean-up. Immediate feedback, where residents can see and acknowledge results, would also help participation.

Recognition

The use of local photos, quotes, and references to green care was described as "A simple but powerful way to say: this is ours, we did this together." The expert suggested dedicating space each season to highlight an active resident or local group, alongside a call-to-action inviting others to join. "People respond when they see faces they know. It makes them think, 'If they can do it, so can I.'"

"It's not just a calendar, it's a conversation starter. What I like is that it connects what's already happening in the neighbourhood with new ways for people to take part."

Scalability and Longevity

On scalability, the expert supported using *Wasgras010*, locally produced grass paper, as both a sustainable material and part of the narrative. "If the paper comes from our own city, you're not just telling a story, you're holding it." He also raised the idea of timelessness, encouraging a flexible framework with evergreen tips and adaptable local activities so the calendar could be reused and adapted annually. "It should have traction beyond a single year. People should keep interacting with it."

To strengthen its reach and avoid double work, the expert recommended linking with other neighbourhood projects, such as the green walk route currently being developed by another green expert that was also interviewed earlier. By tapping into an existing network, the calendar can promote collaboration and give residents a richer, more connected experience.

Finally, he suggested adding a layer of local events and workshops to connect weekly tips to real happenings: "If the calendar says, 'This Saturday, meet us at the square to plant herbs,' people have a reason to leave the house. That's where behaviour changes."

He later on also provided additional content which can be found in the final prototype of the intervention. Figure 60 provides an overview of how the prototype performed on all evaluation criteria, based on his expertise:

Evaluation Score

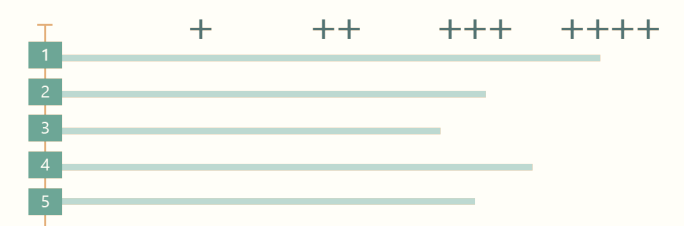


Figure 60. Performance based on evaluation criteria

REFLECTING ON THE DESIGN REQUIREMENTS

This section reflects on how the final intervention aligns with the design requirements defined earlier in the project. By revisiting the initial intentions and values, it examines how the reframed scope shaped the criteria for success, how those criteria guided design decisions, and how well they were addressed through the developed concepts. The reflection highlights which requirements were met, which were challenged, and how priorities shifted throughout the process.

7.2.1 SHIFTING SCOPE, SHIFTING NEEDS

The reframed scope in Section 5.2 emphasized three key focus areas: *green space, trust, ownership and governance, and access divide*. The final intervention, responds most strongly to the first and third.

It engages green space as both theme and tool, encouraging care, visibility, and reflection through seasonal activities and storytelling. The analog, low-barrier format addresses the access divide by being inclusive, accessible without digital tools, and simple enough for a wide range of residents to engage with.

While trust, ownership and governance were important in earlier stages, they played a smaller role in the final design. Rather than addressing governance structures, the intervention focused on what could be supported locally: informal participation, shared stories, and neighbourhood-based action. This reflects a pragmatic shift toward what is feasible, tangible, and resonant with residents and with everyday life.

This was also later supported by the decision to focus on soft to medium interventions, which are symbolic, expressive, cultural, and emotional. These include means such as storytelling, raising awareness, or increasing knowledge, rather than hard interventions, which are more physical, infrastructural, and material in nature.

7.2.2 REVISITING THE DESIGN CARDS

The final intervention was shaped by the design cards from Section 5.4.2. These cards translated research insights and justice concerns into practical design guidelines. From the full set of cards, six played a particularly central role: cards 2, 4, 6, 10, 11, and 13 (See Figure 61).

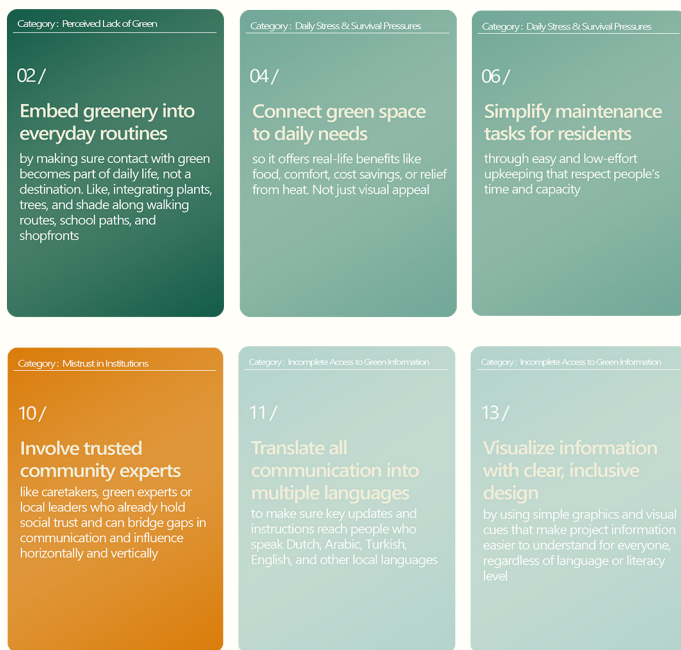


Figure 61. Design Cards that strongly shaped the intervention

Card 02 / Embed green into daily routines

The weekly calendar structure encourages residents to notice and engage with local green in small, regular ways. By connecting greenery to common routes, seasonal changes, and local tips, the intervention helps shift green from a destination to part of everyday life. For example, one resident remarked that they “didn’t realise how many small gardens are tucked between streets”.

What doesn’t work (yet)

While the calendar encourages regular interaction, building long-term habits could be strengthened. Future versions could explore features like progress tracking, check-off elements, or prompts that invite reflection across multiple weeks to support ongoing engagement.

Card 04 / Connect green to daily needs

Rather than framing green space as just aesthetic, the calendar links it to comfort, social interaction, health, and routine. By highlighting shade, local rest spots, and small maintenance actions, it reframes green as a tool for real-life support, especially during hot seasons.

Card 06 / Simplify maintenance tasks for residents

Tips like “water the tree pit near your door” or “pull one weed per week” are intentionally kept light, making green care feel manageable. This aligns with feedback from both experts and residents who emphasize that people are already overwhelmed with daily stress and activities. These suggestions respect people’s time, resources, and energy levels, while still encouraging them. Maintenance is presented as achievable rather than burdensome.

What doesn’t work (yet):

Some actions still assume residents have access to tools, time, or physical ability. For example, a resident with limited mobility who can’t bend in his garden anymore. There is no differentiation in suggestions for different capabilities as of yet. A future version could include variations for low-energy or possibly seated tasks.

Card 10 / Involve trusted community experts

The calendar actively draws on input from local green experts and community figures. Their contributions are valuable and play a key role in shaping the tone, imagery, and relevance of the content. The featured quotes and visual references reflect this local knowledge and help to build trust and recognition within the neighbourhood. Maintaining these connections is essential for the calendar to keep evolving in over time and in line with community needs.

What didn’t work

While horizontal trust within the community is strengthened, the vertical connection to institutions remains relatively weak, as the focus on governance and the procedural injustice faced by residents was reduced in later stages and in the final intervention. This is an area that should be strengthened in the future (see

Section 9), particularly by involving institutional actors not just as funders but preferably also as visible collaborators. Though this may take time, it is necessary due to this barrier being more deeply rooted.

Card 11 / Translate into multiple languages

While the prototype is not yet multilingual, this card highlights the importance of designing the format in a way that can be translated easily in the next phase. The use of short, clear language, visual cues, and an analog format helps support future accessibility and translation into languages common in Oude Noorden and other neighbourhoods.

Card 13 / Visualize information with clear, inclusive design

The calendar is designed with clarity and accessibility in mind. The consistent weekly layout, use of seasonal colour palettes, and typography help make the content easy to follow for a wide range of users. Photos of local green spots provide visual anchoring, and the playful layout of the seasonal bingo offers a low-barrier, interactive experience. Residents responded positively to the visual rhythm and structure, describing it as “inviting” and “easy to use,” even without prior context

What was addressed

Some users, particularly older residents, found the initial font size too small and the certain contrast insufficient. The final design addressed these concerns by increasing text size, improving contrast and overall readability.

Together, these six cards made sure that the intervention responded to the lived realities of residents in Oude Noorden. They supported a design that prioritises accessibility, encourages small-scale participation, and respects both the limitations and capacities of residents. While not all challenges were fully addressed, the cards provided a strong foundation for design cycle.

7.2.3 TESTING THE REQUIREMENTS THROUGH DESIGN

The evaluation of the intervention offered a valuable opportunity to reflect on how well the original design requirements (See Section 5.3) were addressed in practice. Through informal testing moments, community interactions, and feedback collected, it became clear which requirements were successfully translated into the final design, which ones still need development, and which remained unaddressed (See Figure 62). This reflection helps reveal how the shift from concept to implementation impacted the priorities and assumptions behind the requirements.

Figure 62. Evaluation of design requirements in progress

Not meeting the requirement at this point

Not yet fully meeting the requirements

Fully meeting the requirements

Shared ownership and co-governance

While resident input was part of the earlier design process, the final format does not offer mechanisms for residents to take long-term ownership or shape future iterations. The intervention at this stage is partly delivered as a on-going product rather than an evolving tool. To address this in future versions, a more modular format or open contribution process could allow residents to add their own content, create their own versions, and organize calendar-based events (See Section 8).

Institutional embedding

The intervention was primarily developed and created through community channels. While this supports local ownership and informal access, it also means that the design remains somewhat disconnected from formal systems such as the municipality, schools, or housing associations. This limits its reach and potential influence at a policy level. Closer collaboration with institutions could help expand the intervention's impact, integrate it into existing programs, and open up possibilities for funding, continuity, and broader outreach (See Section 8).

Continuity and long-term engagement

While the calendar supports seasonal reflection, it lacks follow-up strategies to maintain momentum or deeper involvement. There is a risk that its impact remains short-lived. Follow-up editions, neighborhood meetups, or a shared archive of completed GroenBINGO could help create continuity and deepen involvement over time. (More on this in Section 8)

Support for neighbors to connect

The calendar supports connection with some tasks that can spark conversation, however the format could more actively encourage residents to meet or collaborate. Actions to foster neighbor-to-neighbor interaction, would be a good additional feature.

Representation of diverse voices

The calendar includes elements drawn from community input, including visual images and accessible language. However, a truly diverse range of voices was not fully represented. Future editions could involve more intentional outreach to underrepresented groups.

Multilingual accessibility

The intervention is currently only available in Dutch. Content in other languages is limited. Since not all residents may feel fully supported in Dutch as their preferred or strongest language, offering translations or adding symbol-based instructions could make it more accessible to a wider group.

Low-barrier access

The intervention was intentionally designed to be accessible across ages, backgrounds and education levels. Its analog format, simple instructions, and visual language makes it easy to understand and use, even for those with limited literacy or digital access.

Encouraging local exploration

This is one of the calendar's distinctive features. Many of the prompts, such as visiting a green space or mapping nearby trees, invite users to explore their own neighborhood. This helps activate a sense of place and increases awareness of local resources.

Playfulness and invitation

The GroenBINGO format encourages curiosity and light interaction rather than performance or pressure. Participants can approach tasks in their own way and pace, supporting different levels of engagement.

Connection to daily life

The weekly format and seasonal themes supported ongoing reflection without demanding too much time or effort. By aligning with everyday rhythms, the calendar helped people integrate green action into their routines rather than treating it as a separate or additional task.

Supporting informal learning

The calendar functions as an educational tool without being didactic. Residents learn about nature, care practices, and local green challenges through doing and observing rather than only reading instructions or facts. This subtle form of learning was well received during testing.

Flexibility of use

The intervention could be used in different ways: hung up at home, used as a conversation piece, or brought along to outdoor activities. This flexibility allows users to shape their own engagement with the material.

Relevance to local context

Due to the specificity of the tips, stories, and activities, these feel familiar and closely tied to daily lives of residents. The intervention aligns in this manner with the neighborhood's risks, context, and social challenges.

Visual communication

Icons, layout, and illustration reduce the need for long explanations. This makes the tool intuitive for people with different literacy levels or backgrounds.

Offline accessibility

In a digital-first world, the choice to create a fully analog tool made the intervention more accessible to people without smartphones, internet access, or digital literacy. Residents valued having something they could hold, hang, and share physically, without needing a device. However, some did note that a digital version later on, would be a welcomed bonus feature along the analog version.

FEEDBACK AND INSIGHTS

The evaluation of the prototype in Section 7.1 and the analysis of the design requirements in Section 7.2 revealed several strengths and limitations in how the intervention performs. Figure 63 brings those insights together through three lenses: desirability, viability, and feasibility. These criteria reflect not only how well De KlimaatKalender and GroenBINGO engaged residents but also whether it can realistically be sustained, expanded, and improved

7.3.1 DESIRABILITY

- ♥ The intervention is widely seen as accessible, relatable, and visually inviting by both residents and experts.
- ♥ The focus on green space as a central theme emerged directly from earlier research and is what residents themselves prioritised during interviews and conversations.
- ♥ The analog format, combined with local photography, help ground the intervention in daily life and makes it feel familiar to residents.
- ♥ The emphasis on small-scale actions, such as watering a tree or noticing green in public space, makes climate-related participation feel manageable and rewarding.
- ♥ The seasonal colour palette and changing themes create visual variation and align with how residents experience time and nature across the year.
- ♥ Quotes from residents and references to specific green areas add a layer of recognition and belonging, inviting residents to see their own surroundings reflected or through the eyes of other residents.

Opportunities for improvement

- ♥ Some participants note the risk of repetition over time. Adding more varied or interactive elements may help sustain engagement across seasons.
- ♥ Residents should also be able to contribute their own stories, tips, or green actions, allowing for a more participatory format that evolves with the neighbourhood.

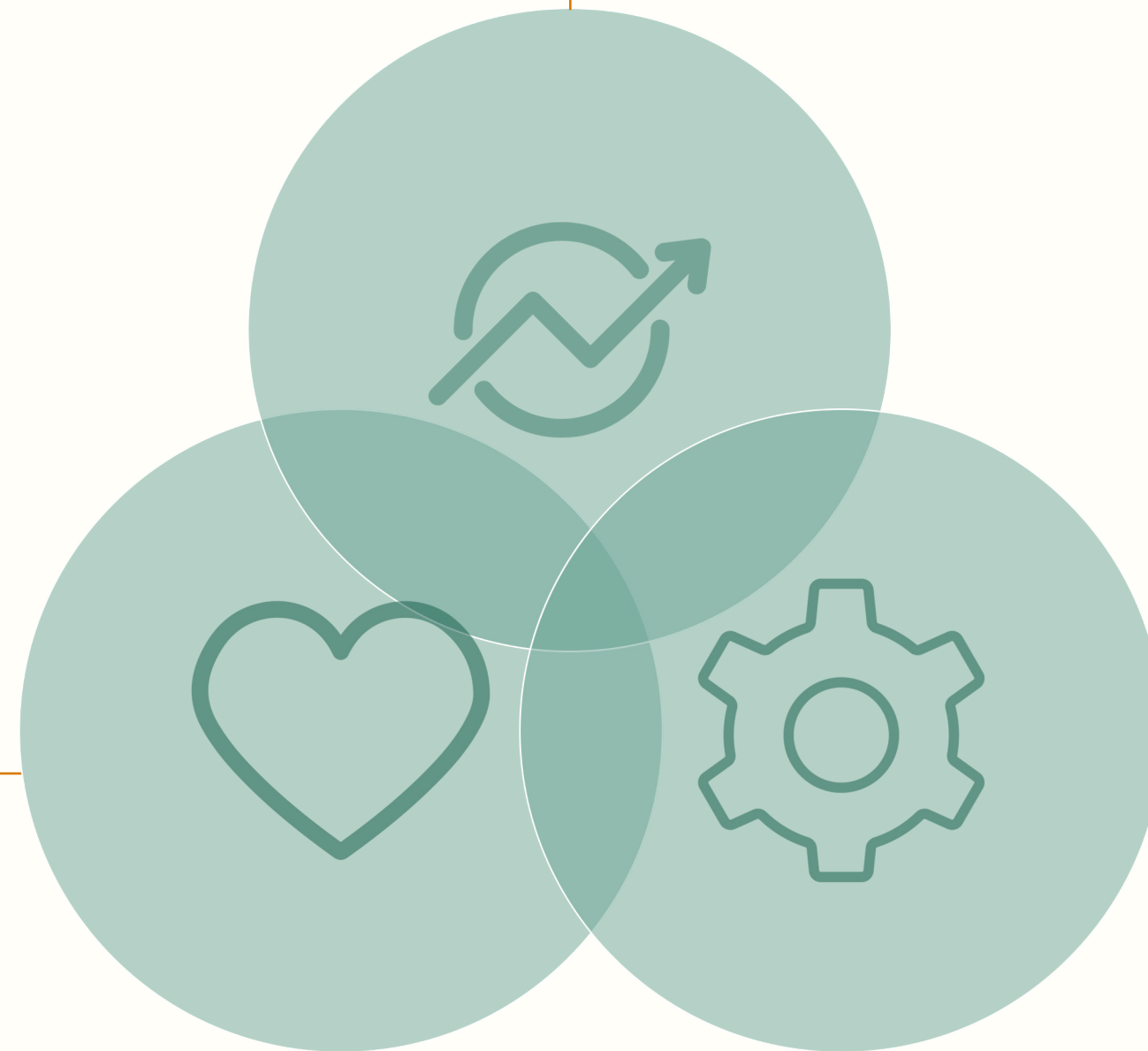


Figure 63. Evaluation based on desirability, viability, and feasibility

7.3.2 VIABILITY

- ↻ The seasonal, modular format makes it easy to update the calendar each year without needing a full redesign.
- ↻ Community content can help the project evolve with the neighbourhood.
- ↻ The simplicity of the format makes it easy to adapt for other neighbourhoods, with content tailored to each context.

Risks and challenges

- ↻ Without integration into local systems, the calendar risks becoming a one-time effort rather than an ongoing tool.
- ↻ Linking the calendar to existing green networks or public programming could enhance its visibility and long-term impact.

7.3.3 FEASIBILITY

- ⚙ The physical calendar is simple and affordable to produce on a small neighbourhood scale.
- ⚙ The A4 landscape format, flipped on the long edge, is intuitive, visually clear, and suitable for hanging or displaying at home or taking along.
- ⚙ During testing, participants were able to interact with the content easily, requiring no explanation or onboarding.

Suggestions for improvement

- ⚙ The initial prototype was printed on heavy paper, which users found too bulky. A lighter, more foldable version would be better suited for everyday handling.
- ⚙ Using sustainable local materials, such as Wasgras010 paper, increases the local context.
- ⚙ Coordinating with local social enterprises or green-focused initiatives.
- ⚙ Including copies in welcome packages for new residents.
- ⚙ A digital version could serve as a useful complement for some users.

EVALUATION LIMITATIONS AND NEXT STEPS

While the evaluation provided valuable insights, it also had several limitations. The nature of the prototype, the available time, and the informal structure of testing all shaped what could and could not be assessed at this stage. It is important to recognise these constraints to clarify what future development and testing should focus on.

7.4.1 SHORT-TERM AND INFORMAL FEEDBACK

The evaluation took place over a short period of time, with a small group (7 in total) of participants. This approach was helpful for gathering impressions and identifying early strengths and weaknesses, but it did not allow for deeper testing. Because the calendar is meant to function over the course of a year, with new content unfolding weekly, it needs to be used over time to fully understand its impact.

Residents engaged with the calendar in a one-time setting, flipping through the pages and discussing what stood out. While this provided useful first reactions, it did not show how the calendar would actually be used in the flow of everyday life. Important questions remain about how it fits into household routines, how long it holds attention, and whether people return to it regularly.

Another key element of the design is the potential to encourage green care habits. Many of the weekly tips are small, practical suggestions, intended to build a sense of agency over time. Without testing the calendar across several weeks or months, it is difficult to say whether these suggestions lead to action or simply get overlooked. A future pilot should focus on tracking this kind of interaction.

7.4.2 GAPS IN REACH AND REPRESENTATION

The people who participated in this evaluation represented a variety of backgrounds and perspectives. While not all were actively involved in green or community initiatives, they provided thoughtful and constructive feedback that helped confirm the strengths of the concept and identify areas for improvement. However, the group still reflects only a small portion of the broader population of Oude Noorden.

The intervention aims to be low-barrier and widely accessible. To fully evaluate whether it reaches this goal, it is important to include residents who may not typically engage with sustainability efforts, who feel disconnected from local decision-making, or who face higher levels of stress, time pressure, or digital exclusion. These voices remain underrepresented in this first phase of testing and should be prioritised in future rounds.

Language and literacy are also important factors that could not be tested at this stage. The calendar was designed to be translation-friendly and includes short, simple text supported by visual cues. Still, it is only presented in Dutch, and there was no opportunity to evaluate how it works for residents who speak another language at home, or who face reading difficulties.

Some features of the calendar were also not fully developed when the prototype was tested. The GroenBINGO, was still under construction. These elements are important for strengthening visibility, encouraging activity, and recognition in the neighbourhood. Its absence limited the opportunity to see how they might affect participation or emotional connection, though when it was discussed it was received positively.

7.4.3 LIMITED INSTITUTIONAL INVOLVEMENT

While the intervention primarily supports informal, bottom-up engagement, it also exists within a broader system of neighbourhood governance and climate adaptation. To be viable over time, the project benefits from connections to institutions such as the municipality, Wijkhub and other local intermediaries. So far, the evaluation has focused almost entirely on resident feedback. Any form of input from institutional actors has not yet been gathered.

As discussed in Section 7.2.2, the vertical connection to formal systems remains relatively weak. The current intervention does not explicitly address governance structures, policy, or institutional trust. Future versions could help bridge this gap by involving institutional actors more directly. Not just as funders, but as possibly visible collaborators who support resident-led action. Their perspectives will also be necessary for understanding the intervention's potential for scaling, funding, and integration into existing programs. Opzoomer Mee can act as a good entry point for this.

7.4.4 PRIORITIES FOR FUTURE DEVELOPMENT

Even with its early limitations, the prototype shows strong potential. It resonates with residents, fits into the local context, and offers a tangible, low-tech way to encourage small-scale green care. Building on what has already been done, there are several practical steps that can be taken next.

The most important next step is to test the calendar over time. A pilot that runs for at least one full season would show how residents use the tool week by week. It would help reveal whether they act on the tips, return to the content regularly, or share it with others.

This kind of pilot could also include short check-ins with users to collect feedback in real time (See Section 8.1).

Involving residents more directly in the next edition is another key opportunity. Many expressed interest in contributing content, whether that means a tip, a story, or a favourite green area. Creating space for this kind of contribution would strengthen local ownership and help the calendar reflect a wider range of experiences.

Expanding access is also essential. Translations into commonly spoken languages, simpler layouts, larger text, and printed symbols could help make the calendar usable for more people. In addition, a basic digital version could be created as a supplement to the printed one. This could allow residents to access updates, submit content, or connect with green events online, while still keeping the analog version central.

Finally, working with local partners will be key for future growth. Social organisations, schools, and neighbourhood hubs all have something to offer, from printing support to outreach to content collaboration. Building these partnerships early on can help make the calendar sustainable and allow it to grow into a trusted and recurring neighbourhood tool.

In short, while the early evaluation confirms the concept's potential, more time, broader inclusion, and enhancing collaboration are needed to bring the calendar from a promising prototype to a fully embedded, scalable neighbourhood tool.

OPPORTUNITIES FOR SCALING

De KlimaatKalender and GroenBingo are intentionally light and flexible, designed to fit local routines and the neighbourhood dynamics in Oude Noorden. At the same time, it holds potential for scaling, not through top-down replication, but through adaptation and shared learning. This approach reflects the concept of prefigurative design (Section 2.3.4), where small-scale pilots act as models for broader change by demonstrating sustainable practices in action.

Neighbourhood-to-Neighbourhood Adaptation

The seasonal and modular format of the calendar lends itself well to horizontal scaling. While the structure remains stable, the content such as stories, green areas, and prompts for residents can be adapted to different neighbourhoods. This aligns with the logic of modular design (Section 2.3.5), enabling other communities to tailor the tool to their local needs without losing its core function.

Such adaptation does not weaken the intervention; instead, it strengthens its relevance. By embedding shared values like accessibility and recognition into diverse contexts, the calendar supports local realities in other contexts.

A Shared Platform for Local Variants

Rather than scaling as a centralised product, the calendar could evolve into a shared platform with local variants. This reflects a network-based scaling model (Section 2.3.5), where communities use shared templates and tools while developing their own content. Each neighbourhood version could involve local artists, schools, their local green experts, creating a sense of ownership and creative autonomy.

This decentralised approach encourages peer-to-peer learning, builds local capacity, and strengthens cross-neighbourhood connections. It allows for growth while keeping flexibility and relevance intact.

Institutional Collaboration

To scale meaningfully, collaboration with institutional partners is important, not for control but for support. This follows a pilot-and-scale logic (Section 2.3.5), where early interventions are tested and then backed by city systems. Municipal departments or social initiatives could help fund, distribute, or integrate the calendar into wider outreach or adaptation efforts.

The tool could, for example, be included in seasonal communications or distributed through the Wijkhub, Huis van de Wijk and other intermediaries. Institutional involvement also opens up pathways for visibility, exercises trust-building, and can maintain continuity while keeping community ownership at the centre.

Scaling Through Values

Finally, scaling should prioritise values over volume. The impact of the De KlimaatKalender comes not from mass distribution, but from how it encourages residents to observe, reflect, and care for their green-environment. As noted earlier scaling requires balancing specificity with applicability. Maintaining that balance means sharing not only outputs but also core principles as creating, gathering information, documentation, and flexible design guidance.

Scaling becomes not about standardisation, but about supporting others to create their own version, guided by the same justice oriented intent.

In this way, the calendar can act as a networked prefigurative tool: a small-scale prototype with the potential to create broader change.

The next section outlines how this potential becomes actionable. It proposes a phased implementation strategy, practical funding, feedback mechanisms, and success indicators to guide the rollout of the intervention from pilot to citywide adaptation.

SECTION FINDINGS

This section assessed how residents and a local green expert engaged with De KlimaatKalender, and whether the intervention aligned with its design vision and justice-oriented intentions. Most notable conclusions are:

1. **The calendar was seen as relevant and relatable.** Residents appreciated tips and activities connected to their daily lives, while the expert emphasized that linking small, local actions to broader climate narratives helps people see their role more clearly.
2. **Relevance and recognition were among its strongest assets.** Residents valued the playful prompts, seasonal rhythm, and inclusion of neighbourhood stories and photos, which created a sense of identity and pride.
3. **Scalability and long-term relevance remain to be discussed.** The green expert mentioned the need for flexible content and links to local initiatives to prevent the calendar from becoming a one-off product.
4. **Design requirements were mostly partially fulfilled.** While the calendar successfully promoted local relevance, low-barrier access, and informal learning, further development is needed in governance, multilingual accessibility, and shared ownership.

Overall, Section 7 demonstrates that De KlimaatKalender resonates strongly at the community level, but sustaining and expanding its impact will depend on iterative testing, broader inclusion, and meaningful partnerships. Section 8 will dive deeper into these aspects outlining the phased rollout.

SECTION 8.0

FROM PROTOTYPE TO PRACTICE

This section outlines a practical implementation strategy for bringing the Klimaatkalender and GroenSpot Bingo to life in Oude Noorden and potentially beyond. It defines a phased rollout plan, key stakeholders, funding pathways, and success indicators.



SECTION 8.1

PHASED ROLLOUT AND KEY ACTORS

For lasting relevance and community ownership, De KlimaatKalender (GroenBINGO) will be introduced through a phased rollout. This structured approach allows for learning, feedback, and iterative refinement while scaling from a neighborhood prototype to a broader city-level intervention. The rollout begins with a public engagement moment during Klimaatweek in November 2025, followed by a focused pilot in early 2026 and a full neighborhood rollout later in the year. Figure 64 illustrates this phased process, showing how the intervention grows step by step from local testing to wider adoption.

8.1.1 FROM PROTOTYPE TO CITYWIDE INTERVENTION

Pre-Phase: Klimaatweek Test and Activation (November 2025)

The intervention will be informally introduced during Klimaatweek, a nationwide climate awareness initiative held each November. This moment provides an ideal opportunity to share the first edition of De KlimaatKalender with the public and observe how it is received in a real-world setting. A limited number of calendars and GroenBingo cards will be distributed at a local event and possibly neighborhood hubs.

During this test phase, feedback will be gathered through short conversations, short surveys, and informal observations. The goal is to gauge resident interest, assess which features resonate most (e.g., tips, visuals, seasonal prompts), and understand how people interact with the format. This early engagement also serves to build awareness among potential partners, including municipal and social organizations. Insights from the Klimaatweek test will directly inform the final design adjustments before the formal pilot phase can begin.

Phase 1: Pilot Implementation (January–March 2026)

Based on the Klimaatweek learnings, a refined version of De KlimaatKalender will be

printed and distributed in a small-scale pilot rollout. Approximately 200 calendars will be shared through trusted local hubs, including community centers, neighborhood councils, and active green groups. These organizations already have strong relationships with residents, particularly those who may not typically engage with digital tools or formal climate programs. As these residents also prefer face-to-face contact.

This pilot will lead a better evaluation focus on assessing:

- Usability and clarity of the weekly prompts
- Accessibility across age, language, and education levels
- Residents' willingness to engage in small green actions or community discussions

Feedback mechanisms could include QR codes printed on this version linking to short surveys, and conversations during (green)related events where these organizations are active.

This early phase also allows for testing the impact of the GroenBINGO, and how it encourages residents to explore their neighborhood through a green lens. Since the initial evaluation in was necessarily short-term and informal (See Section 7.4.1), this pilot window becomes important for tracking longer-term patterns: Do residents continue using the calendar after the first week? Does the Bingo get shared among the community or completed collaboratively? Does the act of "spotting" green elements increase recognition or even inspire new green actions? Outcomes of this stage will inform any final adjustments before broader rollout.

Phase 2: Neighborhood Rollout (April–December 2026)

Once the calendar has been validated through pilot feedback, the project can scale to a full neighborhood rollout. Distribution will expand through local schools, the Wijkhub, libraries, and organizations such as Opzoomer Mee. Community events, including planting days,

guided green walks, and events around the GreenBINGO, will help generate interaction with the content and with each other.

This phase is not just about wider distribution, but also deeper embedding. The calendar will evolve to become part of neighborhood routines: something that is seen on walls, on shelves, talked about, and used as a conversation starter around shared green care.

Phase 3: Citywide Adaptation and Scaling (2027 and beyond)

In the longer term, the intervention is designed to be modular and adaptable to other neighbourhoods in Rotterdam. While the core format remains consistent, each edition can be customized to reflect the specific conditions of the neighborhood. Whether that's language, green infrastructure, or community composition.

Each neighborhood begins with co-creation workshops involving residents, Huis van de Wijk, and local greening groups. Together, they localize green tips, GroenBINGO prompts, and green areas. Content is translated into locally relevant languages if needed (e.g., Turkish, Arabic, Surinamese). Photos and quotes are gathered from residents. Calendars are then distributed via schools, libraries, and community centers, ensuring each edition reflects the neighborhood's social realities.

Rotterdam is not one city but many overlapping worlds, each with different languages, migration histories, and relationships to public and green space. A green intervention that works in Oude Noorden may not work or be rather ineffective in Charlois or Delfshaven unless it is re-anchored in their local identity.

By 2028 or 2029, multiple neighbourhoods may have their own editions of De KlimaatKalender, each with distinct content but united under a common motto: climate adaptation must be inclusive, visible, community-rooted, and justice-oriented. This network of calendars

could become a living archive of Rotterdam's climate future as told by its residents, street by street, season by season.

Key Actors and Their Roles

The success of the intervention depends on the coordinated efforts of multiple actors (both formal and informal) each contributing from their respective strengths and responsibilities.

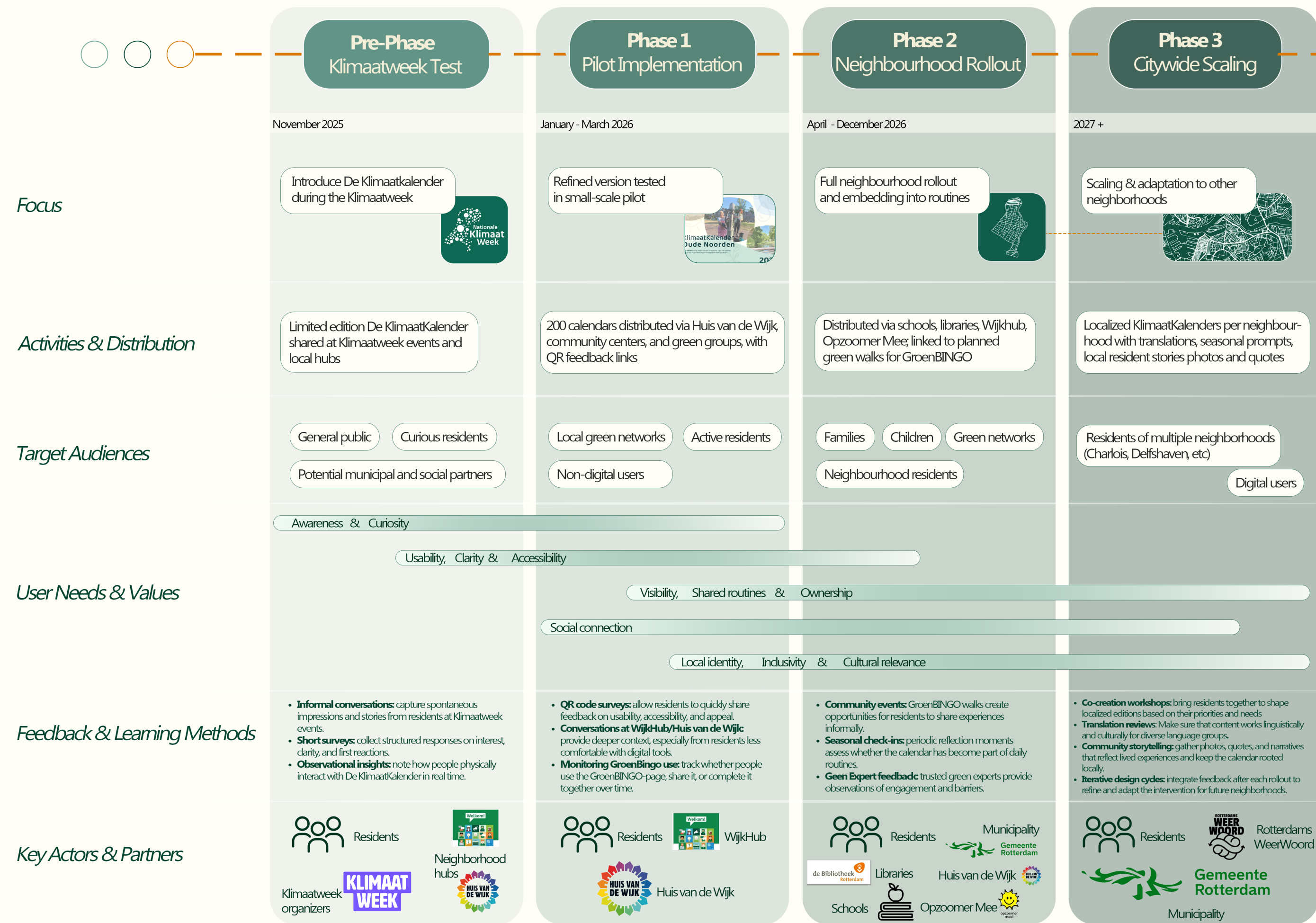
Residents play the most essential role as both users and co-creators. They are invited to explore, contribute, and shape the project as it evolves. Whether through sharing stories, participating in GroenBINGO walks, or initiating local green actions.

The Municipality (Gemeente Rotterdam) supports implementation through alignment with broader climate policies, such as Rotterdams WeerWoord 2030 and Klimaatrechtvaardig Rotterdam. It may also provide funding, legitimacy, and institutional visibility for the project. As the intervention scales, municipal support can help embed the calendar into city programs and other outreach strategies.

WijkHub, Huis van de Wijk, and other local intermediaries serve as the connective tissue between institutions and communities. These actors will be responsible for distributing the calendar, organizing local events, collecting feedback, and facilitating long-term neighborhood engagement. Their trusted presence allows the intervention to remain low-barrier, culturally responsive, and genuinely grounded in local needs.

8.1.2 PHASED ROLLOUT OF DE KLIMAATKALENDER

Figure 64. Phased rollout of De KlimaatKalendar from prototype to city-level implementation



FUNDING AND PARTNERSHIPS

When speaking with a local green expert during the evaluation phase, a central question emerged: How can we ensure continuity? While early-stage enthusiasm is often strong, many community projects struggle to maintain momentum beyond the first year. To address this challenge, a funding and partnership approach is proposed that supports both the initial rollout and long-term sustainability of De KlimaatKalender. Rather than depending on a single funding source or central institution, the approach combines modest funding sources, in-kind contributions, and neighborhood-based partnerships that are already active and trusted. This approach is designed to keep the project accessible, adaptable, and locally co-owned. An overview of potential partners and funders that can support both the initial rollout and long-term sustainability is shown in Figure 65.

8.2.1 FUNDING STREAMS

The calendar's rollout, first in Oude Noorden, and eventually in other neighborhoods, will be supported through small, layered funding streams.

One key source could be CityLab010, which supports resident-led initiatives that aim to improve Rotterdam. Its structure is well suited to this project, especially in the pilot and early rollout phases. Funding could be used for things like printing, event materials, design work, and coordination time. The program also encourages experimentation, which aligns with the calendar's iterative and neighborhood-based character.

As the project expands, there is potential for alignment with broader municipal programs like Rotterdams WeerWoord 2030 or Klimaatrechtvaardig Rotterdam. These initiatives already support efforts around climate resilience and social equity. While the calendar remains a community-first tool, its goals are closely connected to these city-level ambitions, and that alignment opens doors for support whether financial, logistical, or in visibility.

Lastly, small-scale sponsorships from local businesses, green social enterprises, or green NGOs can provide added flexibility. This might include a local garden center (Marvy Green or other centers) funding a seasonal print run. These relationships not only help cover costs but also build local pride and connection.

8.2.2 IN-KIND CONTRIBUTIONS

One of the calendar's strengths is that it doesn't require expensive infrastructure to exist. Many of the most valuable contributions are in-kind, and already embedded in the neighborhoods themselves.

Printing could be supported through local print studios, municipal hubs, or even student networks. Using sustainable materials, like Wasgras010 (paper made from local grass), reflects the project's ecological values while also connecting it to local production. Seasonal editions or short print runs keep costs lower and make updates more manageable.

Design and storytelling support can come from local artists, or students working on climate-related themes. The visual identity of each calendar matters. Not only in readability, but in how it reflects the diversity of each neighborhood. Inviting illustrators, translators, and young creatives into the process makes the tool more vibrant and more representative of those who use it.

Distribution and hosting can happen through familiar, welcoming places like Huis van de Wijk, libraries, schools, community gardens, and local events. These are the spaces where people already gather. By keeping the calendar visible and available in everyday places, it becomes a shared resource rather than a formal program.

8.2.3 PARTNERSHIP AND COORDINATION

Instead of building a new organization or relying on top-down management, the calendar can grow through a decentralized network of partnerships. Coordination can be anchored within an existing neighborhood platform like a WijkHub or local coalitions. With one or two facilitators helping to guide the process. Their role is to listen, adapt, and support local teams as they bring the calendar to life in their own ways.

A shared toolkit and visual identity will make it easier to replicate the format across different neighborhoods while still allowing for customization. This might include editable templates, translation guidance, examples of GroenBINGO cards or storytelling formats, and inspiration from other communities.

The coordination is intentionally light and rooted in trust. It invites collaboration without requiring heavy bureaucracy. By focusing on relationships and shared values, rather than formal roles or long-term contracts. It also supports a way of working that is more human, more local, and more likely to endure.

The goal is not just to fund the calendar once, but to create the conditions that allow it to return, year after year. Ultimately, growing with the community, and shaped by those who live there.

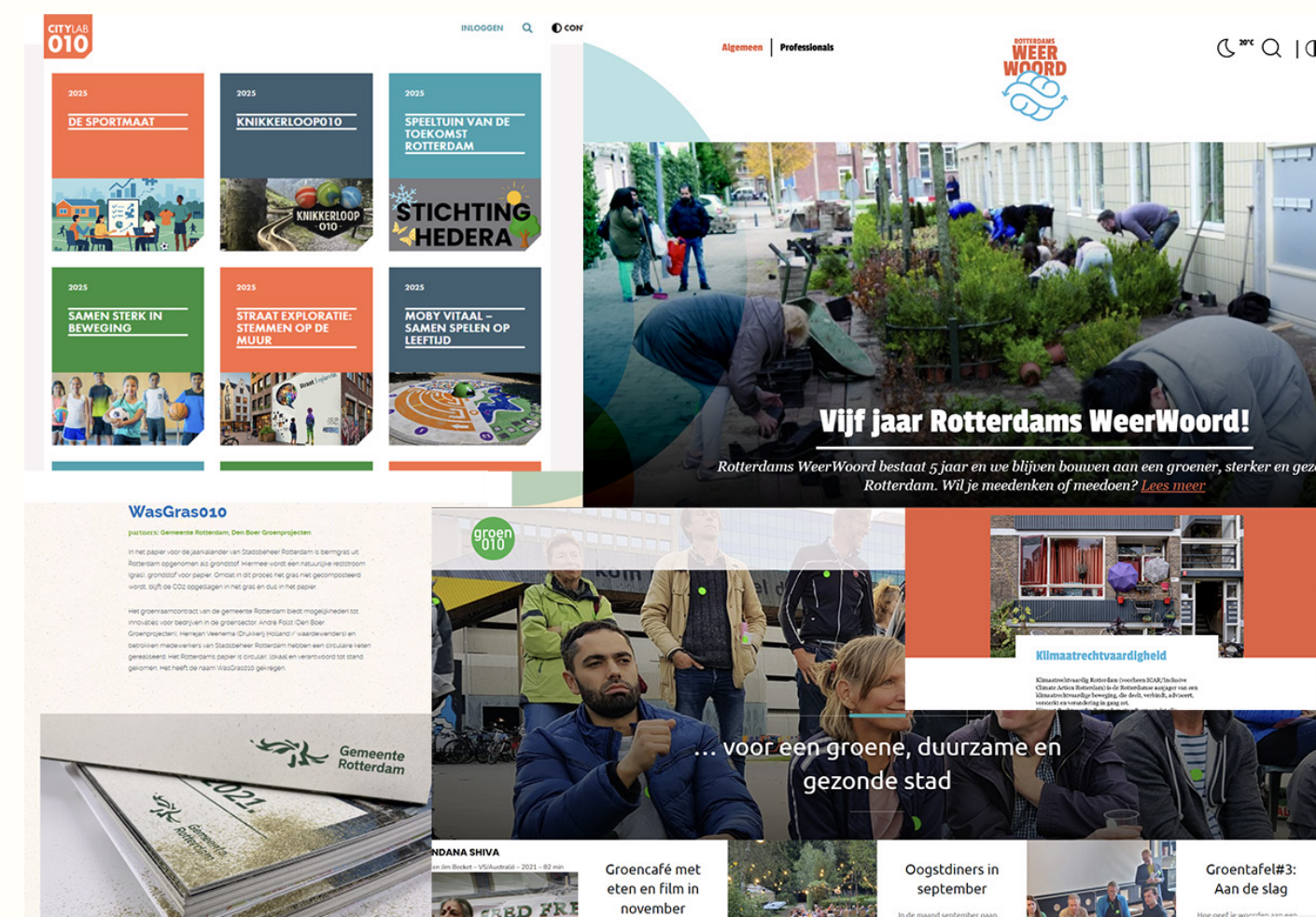


Figure 65. Overview of Potential Partners and Funders

MEASURING SUCCESS AND ENABLING LASTING CHANGE

Success of this intervention cannot be measured only by numbers or outputs. The value of De KlimaatKalender and GroenBINGO lies in whether they become meaningful tools for residents in their daily lives, and whether they help create the conditions for lasting climate justice in Oude Noorden. To do so, success must be understood across different layers: how the tool works in practice, how it resonates over time, how it embeds in wider systems, and whether it enables durable change.

8.3.1 IMMEDIATE USABILITY

The first step is whether the intervention is easy to use and feels relevant. This is about clarity, low-barrier access, and the ability to spark curiosity without demanding prior knowledge. Success here is visible when residents can navigate the calendar with ease, recognise themselves in the images and quotes, and engage with the GroenBINGO in a playful, accessible way. Informal conversations, quick feedback moments, and observation during events provide useful signals to measure this.

8.3.2 COMMUNITY RESONANCE AND CONTINUITY

The second layer looks at whether the intervention moves beyond novelty and becomes part of everyday routines. Success means residents continue to interact with the calendar across weeks and seasons, share it with neighbours, and use it to recognise green spaces they might not have noticed before. GroenBINGO sheets can also function as collective memory, showing where residents explored, which streets were valued, and where gaps remain. Reflection pages or seasonal check-ins can make this continuity visible and help contributions to be acknowledged.

8.3.3 SYSTEMIC EMBEDDING

Lasting change requires embedding the tool into broader neighbourhood and city structures while keeping it community-first. This

includes alignment with municipal initiatives such as Rotterdams WeerWoord 2030 and Klimaatrechtvaardig Rotterdam, but distribution should remain grounded in trusted and local places like Wijkhub, Huis van de Wijk, and schools. Success here, is when the calendar is recognised as part of neighbourhood culture, supported by modest recurring funding, and adapted by other neighbourhoods in ways that reflect their own identities. Scaling here is not replication but adaptation: each place creating its own version while sharing the same justice-oriented values.

8.3.4 ENABLING LASTING CHANGE

The final measure of success is whether the tool helps to build capacity for climate justice over time. This means residents feeling recognised in its stories, everyday green care being celebrated, and groups often excluded finding an easy entry point to participate. Safeguards against short-lived enthusiasm include evolving content each year, multilingual formats, and spaces for residents to add their own stories and tips. Ultimately, success is not about distribution numbers but whether the intervention fosters recognition, agency, and resilience.

These four layers together illustrate how the intervention can move from a local prototype to an instrument for systemic change (See Figure 66).

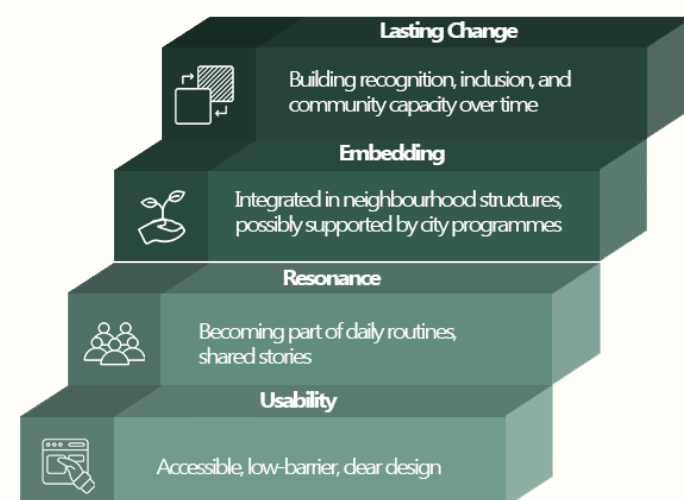


Figure 66. Success Ladder for Measuring Lasting Change

SECTION FINDINGS

This section outlines how De KlimaatKalender and GroenBINGO can move from prototype to practice through phased implementation, partnerships, and success indicators. Important take aways include:

- 1. The design of a phased rollout makes iterative learning possible.** Beginning with a soft launch during Klimaatweek 2025, followed by a small pilot in early 2026 and a full neighbourhood rollout later that year, the staged approach allows testing, refinement, and scaling. This is deliberately chosen to gradually embed De KlimaatKalender in daily routines.
- 2. Scaling will require local adaptation.** While the core format remains consistent, citywide expansion (2027 onwards) depends on neighbourhood-specific customization. Each edition must reflect local languages, stories, and green spaces. Without this anchoring, the intervention risks becoming generic and ineffective.
- 3. Though De KlimaatKalender is resident focused, partnerships and funding are a must to make continuity possible.** Funding sources, such as CityLab010, municipal programs, and local sponsors in combination with in-kind contributions (design, printing, distribution) make the project more sustainable in the long run. It is important to note however, that partnerships with trusted intermediaries like Wijkhub and Huis van de Wijk are key to keep it accessible and community-driven.
- 4. Measuring success requires more than numbers.** Evaluation spans four layers: immediate usability, community resonance, systemic embedding, and capacity for lasting change. This broad lens shifts attention away from outputs and numbers and toward whether residents feel recognised, connected through the calendar.

Overall, Section 8 shows that the transition from prototype to practice depends not only on distribution but on whether the intervention plants itself as a locally owned, justice-oriented tool.

SECTION 9.0

FUTURE DIRECTIONS AND REFLECTION

This section reflects on the broader implications of the project, including lessons learned, unresolved tensions, and opportunities for further collaboration. It considers how the intervention might evolve or inspire policy change. By assessing both the limitations and potential of the work, this section positions the project within ongoing efforts toward climate justice and systemic transformation in local contexts.



JUSTICE BEYOND DESIGN: POWER AND RESISTANCE

Addressing climate injustice through design requires more than creative solutions and participatory processes. It demands a confrontation with the broader power structures that shape neighbourhoods like Oude Noorden. The following analysis explores the institutional, political, and community-based dynamics of power and resistance encountered during the project, and why meaningful change requires working beyond the boundaries of design practice alone.

9.1.1 THE INVISIBLE HAND OF POWER

In the context of climate adaptation, power often operates in subtle forms, embedded in agendas, funding arrangements, and governance structures. In Oude Noorden, municipal departments and housing associations, acted as gatekeepers, holding authority over which initiatives were legitimised, resourced, or scaled.

Stakeholder mapping in Section 4.3 revealed a persistent imbalance: municipal and housing associations scored highest in influence, while that of residents and local organisations remained limited. This reflects procedural injustice, where those most affected by climate risks have the least capacity to influence adaptation. Fragmented governance further complicates this picture, with overlapping responsibilities, unclear accountability, and siloed working cultures.

For residents, this often translated into policies implemented on their behalf rather than with them, reinforcing mistrust and weakening community ownership. As outlined in Section 2.3, systemic design is inherently political. Sustainability transitions are contested terrains where institutional inertia, economic imperatives, and equity concerns intersect. Without addressing these dynamics, design risks reproducing inequalities instead of tackling them.

Recognising this invisible hand is a step toward giving back agency. It means not only identifying who holds influence but also questioning the legitimacy of existing arrangements and opening ways for communities to shape decisions from the outset.

9.1.2 PROCEDURAL INJUSTICE AND PARTICIPATION

Participation is frequently described as a cornerstone of a just climate transition, promising empowerment and shared decision-making. In practice, findings from Section 4.4 indicated that participation in Oude Noorden was often symbolic, limited to late-stage consultations or narrowly framed feedback.

Residents described broken feedback loops, where their input was collected but seldom acknowledged or incorporated into outcomes. This absence of follow-through increased frustration and disengagement. Structural barriers such as language differences, digital exclusion, and everyday survival pressures further constrained who could participate. This resulted in mostly the same voices being heard.

Institutional communication strategies rely mainly on digital platforms and formal language. They often clashed with residents' preference for face-to-face and informal interactions. This is not a matter of logistics alone but reflects procedural injustice in deciding who is invited, how they are engaged, and under what conditions.

Addressing this requires rethinking participation as iterative, accessible, and accountable. Moving beyond consultation as a formality, community engagement should provide tangible evidence of residents' influence. Leading to building trust over time and creating collective ownership of adaptation processes.

9.1.3 COMMUNITY CAPACITY AND LIMITS OF ADAPTAION

While residents expressed willingness to act, Section 4.6 showed that capacity is constrained by structural barriers. Capacity here refers to financial resources, autonomy over the living environment, access to information, and supportive networks.

In Oude Noorden, the predominance of rental housing limits control over property-level improvements. Financial pressures further constrain the ability to invest in greening or climate-resilient measures. Even when subsidies exist, bureaucratic complexity and limited awareness discourage their use.

These constraints are not individual shortcomings but outcomes of systemic exclusion, intensified by poverty, language barriers, and digital divides. They challenge the narrative that adaptation is primarily a matter of personal responsibility or community willpower.

This raises central questions for climate justice: How can interventions avoid placing additional burdens on those already most affected? What forms of structural support and redistribution are necessary to enable meaningful adaptation?

9.1.4 THE ROLE OF THE KLIMAATKALENDER

Within this context of power imbalances, procedural barriers, and constrained capacity, De KlimaatKalender was developed as a modest yet intentional contribution to climate justice.

As an analog, low-barrier resource, it translates abstract themes of climate adaptation into locally relevant weekly actions, linked to neighbourhood green spaces and resident experiences. Its participatory development process integrates local knowledge, supporting recognition justice by valuing lived experience.

The analog format also addresses language and digital divides, widening access for groups often excluded from formal processes.

While the calendar cannot on its own restructure governance or alter institutional priorities, it builds horizontal trust, strengthens community identity, and provides visible entry points into climate action. By recognising informal care for local green spaces and everyday practices, it nurtures pride and a sense of shared responsibility. These are foundations on which deeper structural change can grow.

De KlimaatKalender also acknowledges its limits. It positions itself as a prefigurative intervention: small-scale, adaptable, and situated in local context, but capable of informing policy, enabling collaborations, and inspiring adaptation in other neighbourhoods. Its significance lies not only in what it directly delivers but also in how it can seed longer-term transformations when embedded in wider coalitions for change.

CHALLENGES AND LIMITATIONS

While De KlimaatKalender and GroenBINGO created enthusiasm and curiosity in Oude Noorden, the project also faced a number of challenges that shaped its reach and potential. These limitations sit at the project level: how it was scoped and who was represented, the design and scaling choices, the evaluation process, and the implementation challenges that will determine its future.

9.2.1 SCOPE AND REPRESENTATION

One of the main challenges was the limited connection to formal governance. The project was deliberately positioned as community-driven, but this also meant that links to municipal departments, housing associations, and public services were limited. As a result, the intervention's influence on policy and decision-making was indirect, in part due to structural barriers such as fragmented governance and power imbalances. Residents often voiced that policies felt distant and imposed, without stronger ties to institutions, the calendar risked leaving residents with the impression of being on the sidelines rather than fully at the centre of change.

Representation did extend across a range of groups, showing that the calendar was able to reach beyond the most active voices alone. At the same time, participation could have been broadened further, particularly among residents with limited Dutch, low literacy, or little digital access. The analog format reduced some barriers, yet additional strategies will be needed to increase inclusivity and sustain engagement over time. This reflects not a limitation of intent, but the ongoing challenge of creating participation that is as representative as the neighbourhood itself.

It is also important to acknowledge the influence of timing. Many of the conversations and interviews with residents took place in the winter months, when neighbourhood greenery was less visible. This seasonal context may have

shaped how people described their relationship to local green spaces and how they imagined climate adaptation. What might feel abstract in the winter can become more tangible in spring or summer, when trees, plants, and shaded areas are part of daily life. In this sense, the season itself acted as a filter, highlighting the importance of seeing green not only as a physical asset but also as a lens through which residents interpret change and as a potential lever for climate action.

9.2.2 PRACTICAL DESIGN AND SCALING

The first prototype also revealed practical limitations. The heavy paper made the calendar feel more like a crafted design artefact than an everyday object, which may have shaped how residents interacted with it. Exploring other materials such as Wasgras010 grass paper offers possibilities to connect with the environmental story and local identity of the project. Also, balancing ecological considerations with durability, foldability, and legibility remains a design task for future editions. The analog format is a strength in terms of accessibility, but it also comes with logistics. Printing, storing, and distributing hundreds of copies requires ongoing resources.

Scaling was another tension. The project deliberately stayed at the soft end of intervention by raising awareness, sparking conversations, and celebrating everyday acts of green care. This made it feasible and acceptable, but also meant that harder measures such as infrastructural investments or binding institutional commitments remained outside its scope. Delivering the calendar currently as a finished product left little space for residents to continue shaping it. The tool could risk becoming static unless future iterations include ways for residents to adapt and co-create content. A more modular format where residents can co-create pages, share new tips, or even host calendar-linked activities could strengthen ownership and keep it alive across years.

9.2.3 EVALUATION AND EVIDENCE

Evaluation was another area of limitation. The calendar is designed to accompany people over a full year, but the testing took place within a much shorter window. This meant that feedback reflected first impressions rather than long-term use. While residents responded positively, it remains to be seen whether the calendar would sustain attention over months or adapt to the different rhythms of the seasons.

Evidence also remained anecdotal. Conversations, observations, and small feedback moments gave valuable insights. However, more systematic methods such as seasonal check-ins, diary notes, or simple community surveys could give a richer picture of whether the tool actually becomes part of everyday routines. Without this, the calendar's long-term impact on awareness, behaviour, or trust in institutions is not yet fully understood.

9.2.4 IMPLEMENTATION CHALLENGES

Finally, the project relies on intermediaries. Trusted places like Huis van de Wijk, schools, or neighbourhood hubs are key for distributing the calendar and keeping it visible. These hubs are essential because they hold the relationships that make people pick up and use the tool. At the same time, this reliance creates vulnerability. If staff capacity shrinks, priorities shift, or funding runs out, the calendar's momentum may depend on the continued capacity and commitment of these intermediaries.

Sustaining production is another risk. Even modest printing and translation costs require stable resources year after year. Without these intermediaries, continuity depends on securing other resources. There is also the tension of institutional uptake. Support from the municipality could give the calendar stability and reach, but if they take control, there is a risk it could shift from a community-first initiative toward a more top-down communication

product. Preserving shared ownership while maintaining institutional support will be an ongoing balancing act.

In summary, these challenges do not diminish the project's contribution but show the boundaries of what a modest, community-rooted intervention can do. They also point to clear directions for improvement, from widening representation and refining design to building evaluation loops and partnerships that secure continuity while preserving local ownership. Acknowledging these limits is a step towards the calendar growing into a tool that supports lasting climate justice.

PATHWAYS FORWARD FOR COMMUNITY, RESEARCH, POLICY

FUTURE

The challenges and limitations described in Section 9.2 also point toward opportunities for future work. De KlimaatKalender was never intended as a complete intervention but as an opening, a modest step that reveals possibilities for how climate justice can be advanced in neighbourhoods like Oude Noorden. Pathways forward exist on different levels: within the community, through research and design practice, and in policy and governance.

9.3.1 COMMUNITY

At the community level, the task is to build on the recognition and trust already created. As described in Section 6.3, residents responded to the calendar because it translated abstract ideas of climate adaptation into small, everyday actions connected to familiar places. This reflects recognition justice from Section 2.2, where lived experience is treated as a form of knowledge.

Future iterations should not only distribute

a finished product but also leave space for residents to co-create. This could mean adding seasonal activities, local stories, or drawings and photographs that make the calendar feel alive. Anchors such as Huis van de Wijk or schools can keep ownership local, but the calendar can also be linked to neighbourhood walks, gardening days, or GroenBINGO challenges. In this way, it becomes more than an object, but a platform for collective action and shared memory. The case studies in Section 2.4, reminds us that these everyday practices and networks are what enable neighbourhoods to reorganise and adapt.

9.3.2 RESEARCH AND DESIGN PRACTICE

There are also opportunities for research and for design. Section 7.2 showed that evaluation was limited by the short timeframe. Longer-term studies are needed to understand whether interventions like the calendar become part of daily routines, whether they shift perceptions of climate risk, and whether they help build

trust in institutions. Seasonal surveys, diaries, or participatory evaluation could give a clearer picture of these dynamics.

For design practice, the lesson is an awareness of limits. As Section 9.1 reflected, design cannot solve systemic problems on its own, but it can open footholds for change. Future design research could therefore explore how analog tools like the calendar can be complemented with light digital features, or how modular formats can give residents the freedom to adapt content over time. Such approaches would contribute to the ambitions of Klimaatrechtvaardig Rotterdam by exploring how inclusive design can reduce inequities in participation.

9.3.3 POLICY

On the policy level, the pathways forward involve experimenting with co-governance. Section 4.3 showed how residents often sit at the margins of influence, while institutions

dominate. To address this, decision-making needs to move from consultation to shared responsibility.

Community-led tools can help bridge this gap. By aligning with Rotterdams WeerWoord 2030 and the Resilient Rotterdam Strategy 2022–2027, neighbourhood initiatives can connect to city-wide adaptation goals while keeping their local identity. Policy support should focus on resourcing and recognising these efforts without taking ownership away. Scaling should also be seen as networked adaptation. Each neighbourhood has its own languages, cultures, and green spaces, as described in Section 3.2. Allowing each to develop its own edition, while sharing learning across neighbourhoods, creates a constellation of locally grounded interventions that together advance climate justice across the city.

9.3.4 CONTINUING THE JOURNEY

The systemic design framework (See Figure 67) reminds us that in dynamic systems, work is never finished. Change is constant, and each intervention creates new openings as well as new challenges. For De KlimaatKalender and similar community-led tools, this means recognising that the close of the project is not an ending but a transition. The outcomes should remain open-ended, focused on creating and sharing knowledge that others can adapt and build upon.

Looking back at Section 8.3, success was described as layered: from usability, to resonance, to embedding, to lasting change. Continuing the journey means asking how far along these layers the project has travelled, and what steps are still needed. Reflection also includes recognising mistakes and blind spots, and using these as sources of learning rather than as failures.

The impact of the intervention should be considered in systemic terms. Even a modest tool like the calendar can ripple out into other

parts of the neighbourhood system, influencing how residents talk about green space, how organisations collaborate, or how institutions view community knowledge. Capturing these ripples and making them visible can help others see the value of small-scale, justice-oriented interventions.

Another aspect of continuing the journey is sharing knowledge. The stories, methods, and design choices behind the calendar are as valuable as the object itself. Opening these up allows other neighbourhoods, designers, or policymakers to learn from both the strengths and the struggles of the project.

Finally, continuing the journey means strengthening the connections already made. The relationships with neighbourhood hubs, green experts, residents and schools can become the basis for new projects that grow out of the same values. Building on these alliances ensures that the calendar is not an isolated intervention but part of a longer trajectory of climate justice in Rotterdam.

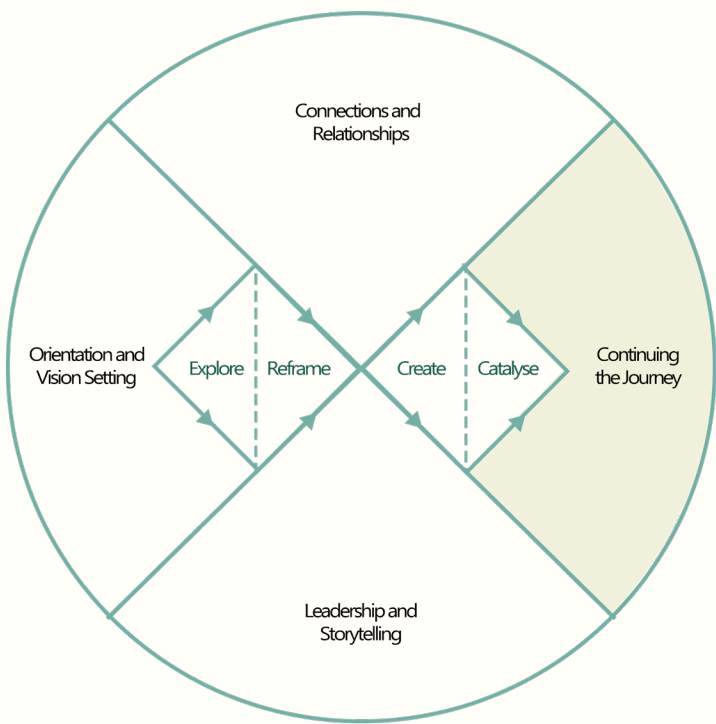


Figure 67. The Systemic Design Framework (Continuing the Journey)

SECTION 9.4

JUSTICE, SYSTEMS, AND DESIGN: WHAT I LEARNED

Working on this project was more than an academic exercise. It was also a personal journey of learning about myself as a designer, about the neighbourhood of Oude Noorden, and about the role design can play in systemic transitions. My reflections fall into two strands: what I experienced personally during the process, and what I came to understand about justice, systems, and design.

9.4.1 PERSONAL EXPERIENCES AND PROCESS

Being In The Neighbourhood

Spending time in Oude Noorden was one of the most rewarding aspects of the project. I was there regularly, visiting hubs, schools, and public spaces, and each visit deepened my connection to the area. Conversations with residents and informal exchanges with stakeholders gave me a sense of the neighbourhood's life and vibrancy that could never be captured in data alone. Being present helped me build trust, and people became more open when they realised I was not just passing through but committed to listening. This sense of connection gave me energy and motivation, even when the process became difficult.

Getting Lost In Research

The early stages of the project were dominated by research. I immersed myself in literature on climate justice, systemic design, and climate resilience, as well as data on the neighbourhood itself. While this helped me grasp the complexity of the issues, I often struggled to translate insights into concrete design. The more I researched, the harder it felt to move into the creative phase, partly out of fear of oversimplifying. I learned that in systemic contexts there will never be full clarity, and that progress often means acting on an informed intuition rather than waiting for certainty.

Designing With Purpose

From the start, I wanted to create something useful. It mattered to me that the outcome

would not only benefit residents but also provide the municipality with a clearer sense of what was happening in the neighbourhood. This dual ambition shaped the project: it pushed me to choose an accessible analog format, to include local stories, and to ensure the tool was visible in spaces where both residents and institutions could engage with it. Balancing these different audiences was not always easy, but it gave the project direction and accountability.

Learning From Challenges

The process brought inevitable challenges. Some residents were difficult to reach, especially under the constraints of time and season. Talking about green space in the winter months sometimes felt abstract, when there was little greenery visible. Balancing academic requirements with the slow process of trust-building in the community was another tension. At times I doubted whether the calendar would resonate or whether it would disappear after the pilot. These struggles taught me to see uncertainty not as failure but as part of systemic work, where outcomes are always open-ended and iterative.

9.4.2 JUSTICE, SYSTEMS, AND DESIGN

Working With Power

The project revealed how power shapes adaptation. Institutions hold authority over resources and decisions, while residents often feel excluded from processes that affect them. As a designer, I moved between these worlds, always welcomed, but sometimes met with scepticism. This taught me that design is never neutral: it can reinforce existing hierarchies, or it can create small cracks where alternative voices are heard.

Recognising Limits

I also learned to accept the limits of design. The calendar could make adaptation visible and accessible, but it could not fix structural

inequities such as poverty or housing conditions. Rather than discouraging me, this clarified the role of design: not to deliver solutions to systemic problems, but to create footholds for conversation and recognition. A modest tool can still matter when it builds community pride, sparks dialogue, or makes abstract issues tangible.

Embracing Participation

Participation emerged as a central theme. Residents preferred informal, face-to-face interaction, and their contributions often reshaped the direction of the work. Letting go of control and making space for others to leave their mark was challenging but also deeply rewarding. I came to understand participation not as inclusion for its own sake, but as a practice of sharing authorship and responsibility.

Systemic learning

Finally, I learned to view the project as part of a larger system. Its value lies not only in what it delivered directly but in the relationships, knowledge, and momentum it created. These ripples may influence how residents perceive green space, how organisations collaborate, or how institutions view community knowledge. In this sense, the calendar is not an endpoint but one step in an unfolding process of climate justice.

In summary, what I learned from this project is that design for climate justice is both personal and systemic. It requires presence in the community, persistence in the face of uncertainty, and purpose in balancing the needs of residents and institutions. It also demands an honest recognition of power and limits, a commitment to participation, and an openness to systemic learning. These lessons will continue to shape how I work: not as a designer seeking to control outcomes, but as one who creates spaces where

SECTION 10.0

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SECTION 11.0

APPENDIX

- 1. Project Brief
- 2. Stakeholder Influence scores
- 3. Work Canvas

DESIGN
FOR our
future

TU Delft

IDE Master Graduation Project

Project team, procedural checks and Personal Project Brief

In this document the agreements made between student and supervisory team about the student's IDE Master Graduation Project are set out. This document may also include involvement of an external client, however does not cover any legal matters student and client (might) agree upon. Next to that, this document facilitates the required procedural checks:

- Student defines the team, what the student is going to do/deliver and how that will come about
- Chair of the supervisory team signs, to formally approve the project's setup / Project brief
- SSC E&SA (Shared Service Centre, Education & Student Affairs) report on the student's registration and study progress
- IDE's Board of Examiners confirms the proposed supervisory team on their eligibility, and whether the student is allowed to start the Graduation Project

STUDENT DATA & MASTER PROGRAMME

Complete all fields and indicate which master(s) you are in

Family name

Initials

Given name

Student number

IDE master(s) IPD ☐ Dfi ☐ SPD ☒

2nd non-IDE master

MSc Management of Innovation

Individual programme
(date of approval)

Medesign ☐

HPM ☐

SUPERVISORY TEAM

Fill in the required information of supervisory team members. If applicable, company mentor is added as 2nd mentor

Chair

Dr. J.I.J.C. de Koning

dept./section

SDE/DFS

mentor

Dr. G.S. Celik

dept./section

DOS/MOD

2nd mentor

client:

Seline Westerhof

city:

Rotterdam

country:

The Netherlands

optional
comments

! Ensure a heterogeneous team. In case you wish to include team members from the same section, explain why.

! Chair should request the IDE Board of Examiners for approval when a non-IDE mentor is proposed. Include CV and motivation letter.

! 2nd mentor only applies when a client is involved.

APPROVAL OF CHAIR on PROJECT PROPOSAL / PROJECT BRIEF -> to be filled in by the Chair of the supervisory team

Sign for approval (Chair)

Digitally signed by
Jotte de Koning
Date: 2024.11.29
14:01:33 +01'00'

Name

Jotte de Koning

Date

29 Nov 2024

Signature

167

CHECK ON STUDY PROGRESS

To be filled in by SSC E&SA (Shared Service Centre, Education & Student Affairs), after approval of the project brief by the chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total

EC

Of which, taking conditional requirements into account, can be part of the exam programme

EC

	YES	all 1 st year master courses passed
	NO	missing 1 st year courses

Comments:

Sign for approval (SSC E&SA)

Name Date Signature

APPROVAL OF BOARD OF EXAMINERS IDE on SUPERVISORY TEAM -> to be checked and filled in by IDE’s Board of Examiners

Does the composition of the Supervisory Team comply with regulations?

YES		Supervisory Team approved
NO		Supervisory Team not approved

Comments:

Based on study progress, students is ...

	ALLOWED to start the graduation project
	NOT allowed to start the graduation project

Comments:

Sign for approval (BoEx)

Name Date Signature



Personal Project Brief – IDE Master Graduation Project

Name student

Fred Nyarko

 Student number

4,213,610

PROJECT TITLE, INTRODUCTION, PROBLEM DEFINITION and ASSIGNMENT

Complete all fields, keep information clear, specific and concise

Project title

Local Voices, Lasting Change: Addressing Climate Injustice in Oude Noorden

Please state the title of your graduation project (above). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

Introduction

Describe the context of your project here; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)

Climate change is one of the most pressing global challenges of our time, causing rising temperatures, unpredictable weather patterns, and increasing sea levels that profoundly impact our living environment. Cities like Rotterdam encounter problems due to climate change, with neighborhoods experiencing a range of environmental stresses, from intensified flooding and extreme heat to strains on infrastructure. For Rotterdam, addressing climate adaptation is not just an environmental imperative; it is also a crucial step toward ensuring the city's long-term sustainability and resilience. As climate impacts worsen, certain communities within the city face heightened vulnerabilities, with low-income and marginalized neighborhoods bearing a disproportionate share of the burden. This phenomenon, often referred to as "climate injustice," manifests as an unequal distribution of climate impacts across different social and geographic landscapes, creating stark disparities in the experience of environmental challenges. [1] This Master Graduation Project focuses specifically on addressing climate injustice in Oude Noorden, a neighborhood in Rotterdam Noord, by employing a systemic design approach. Recognizing that the impacts of climate change are not evenly spread, this research seeks to unpack the underlying causes of vulnerability unique to Oude Noorden, taking into account its social, economic, and physical landscape. Urban adaptation strategies are essential but often overlook the unique challenges faced by communities like Oude Noorden, where socioeconomic factors can worsen environmental vulnerabilities. In these contexts, systemic design offers a framework for understanding the interconnected layers of risk and resilience, allowing for a holistic approach to climate adaptation that is rooted in both environmental and social dimensions. [2] By exploring the neighborhood's specific needs, this project aims to uncover not only the direct environmental threats but also the broader systemic factors --such as economic inequality, limited access to resources, and community engagement --that influence how climate impacts are experienced. A primary goal of the research is to develop actionable interventions that are community-driven and tailored to the local context of Oude Noorden, thereby creating a sense of empowerment among residents. Such an approach is intended to enhance both the quality of life in the neighborhood and its long-term resilience, ensuring that interventions address immediate needs while promoting sustainable practices for the future. Ultimately, this design project seeks to create an intervention toward more just climate adaptation, one that gives back to the community in meaningful ways, not only by improving environmental resilience but also by promoting social equity. Through an inclusive design process that prioritizes local voices, the project aims to deliver solutions that are as practical as they are equitable, contributing to a more resilient and just Rotterdam.

1. Chancel, L., Bothe, P., Volturiez, T. (2023) Climate Inequality Report 2023, World Inequality Lab Study 2023
2. Design Council - Design for Planet. Available at: <https://www.designcouncil.org.uk/our-resources/systemic-design-framework/> (Accessed: 12 November 2024)

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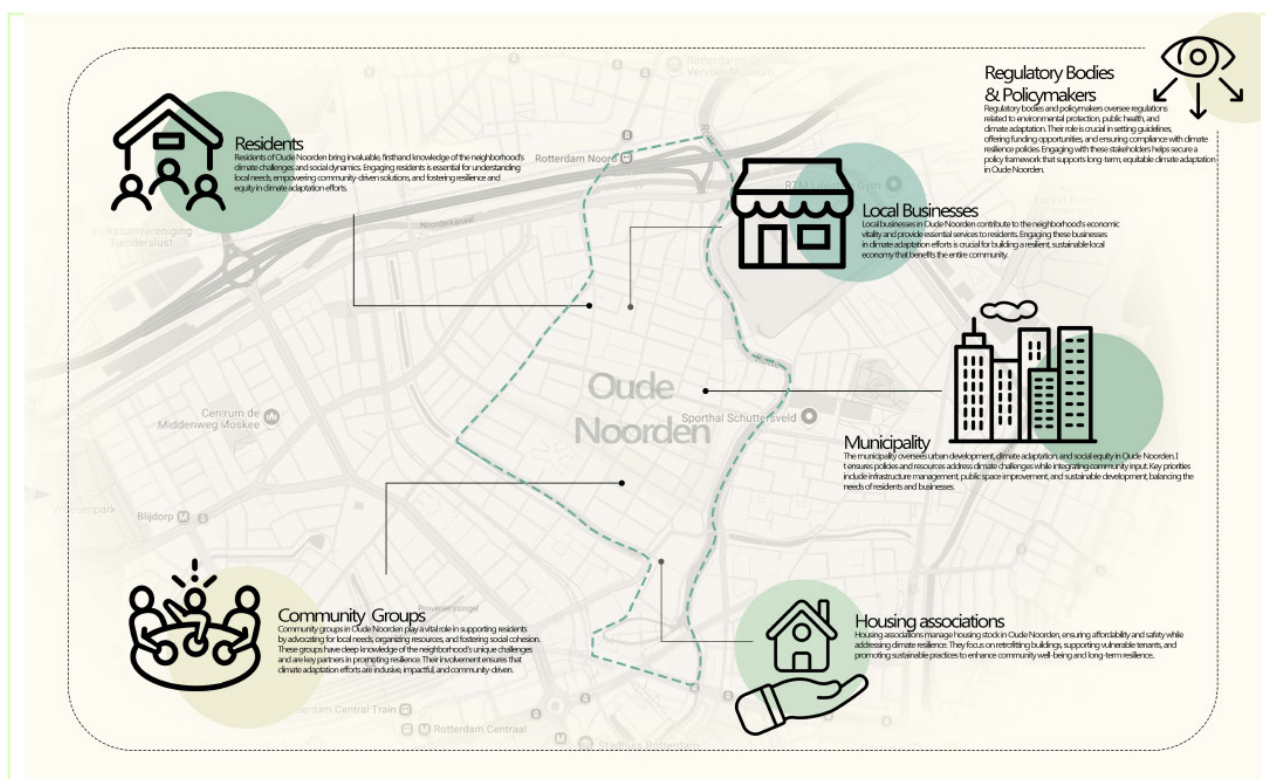


image / figure 1 First impression of involved stakeholders

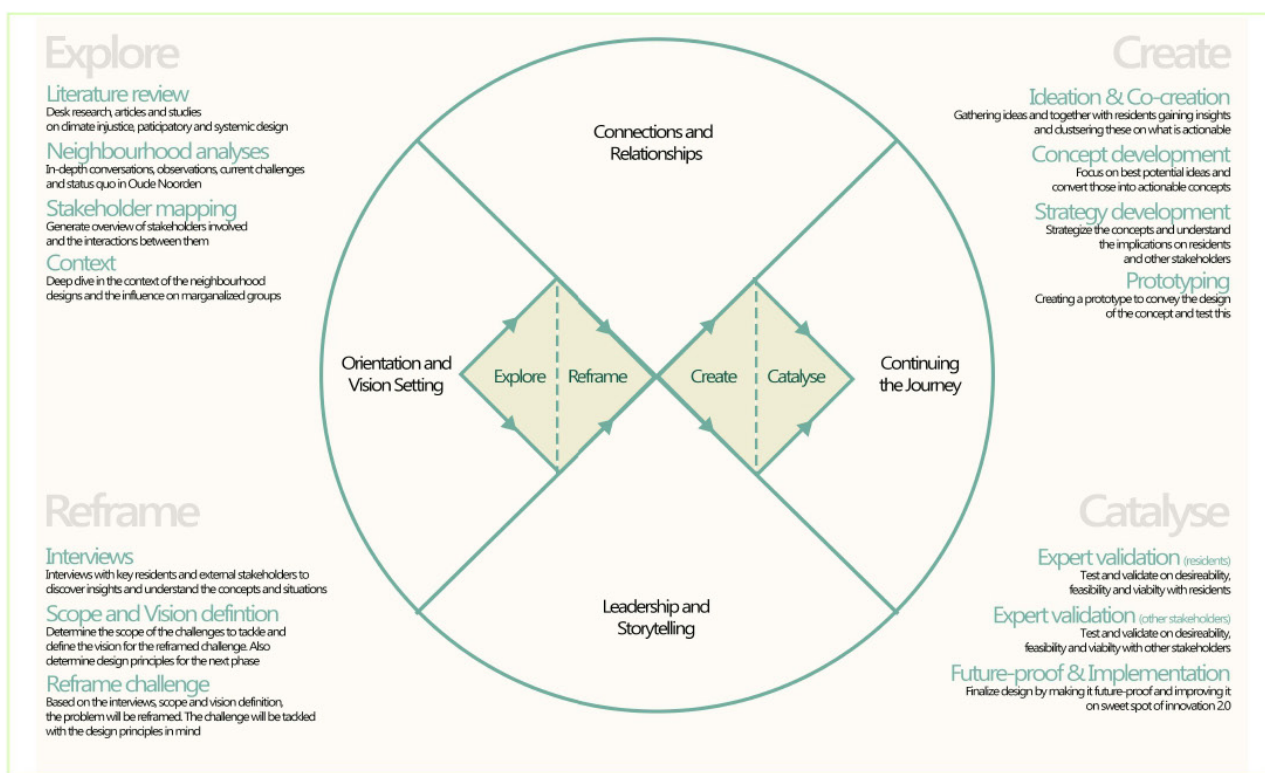


image / figure 2 Systemic Design Process and Approach



Personal Project Brief – IDE Master Graduation Project

Problem Definition

What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice. (max 200 words)

This project tackles the challenge of **fostering climate justice / mitigating climate injustice** in Oude Noorden, a neighborhood in Rotterdam Noord, amid intensifying climate impacts. While climate adaptation is recognized as essential across Rotterdam, there exists a critical gap in how these efforts consider the unique needs of communities disproportionately affected by climate change. Currently, adaptation strategies in urban areas often prioritize physical infrastructure improvements but lack a focus on localized, community-driven solutions that account for the specific social, economic, and environmental dynamics of neighborhoods like Oude Noorden. This disconnect results in interventions that may overlook the everyday experiences and needs of residents, leading to solutions that are less effective in building true resilience or empowering the community. This research project seeks to address this gap by exploring how a systemic design approach can identify and respond to the underlying causes of climate injustice. Specifically, this project aims to answer the following research questions:

1. How are local communities in Oude Noorden currently engaged in climate adaptation efforts, and what barriers do they face?
2. How can community-driven, systemic design interventions foster climate justice/ resilience and social equity in Oude Noorden, ensuring that adaptation efforts are inclusive, actionable, and locally relevant?

Through a comprehensive analysis of the neighborhood's unique challenges and a participatory design process with local residents, this project will develop practical, community-focused interventions that address climate injustice. The goal is to create a toolkit of interventions tailored to Oude Noorden's needs, equipping the neighborhood with sustainable, long-term resilience solutions that empower residents and promote equity in the face of climate change.

Assignment

This is the most important part of the project brief because it will give a clear direction of what you are heading for. Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project. (1 sentence) As you graduate as an industrial design engineer, your assignment will start with a verb (Design/Investigate/Validate/Create), and you may use the green text format:

Design a systemic intervention to identify and address climate vulnerabilities in Oude Noorden within the context of urban climate injustice/ adaptation in Rotterdam Noord. This toolkit will empower local residents by fostering community-driven solutions that promote resilience and social equity, ensuring that adaptation efforts are inclusive and tailored to the unique needs of the neighbourhood.

Then explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words)

I will use a mixed-method approach combining literature review, design thinking (double diamond), and participatory design methods to develop a tailored intervention for the neighbourhood. Firstly, I will conduct a literature and desk research to establish a foundational understanding of climate injustice and recent developments in urban adaptation strategies. This research will analyze academic papers, policy documents, and case studies to identify key themes, challenges, and actionable insights for addressing climate inequities in urban neighborhoods. Following the literature review, I will apply design thinking methodologies, beginning with qualitative and quantitative data collection. This includes semi-structured interviews, observations, and discussions with key stakeholders --such as residents, community groups, and local experts --to uncover latent insights and nuanced perspectives specific to Oude Noorden. Next, I will facilitate co-creation workshops to collaboratively generate ideas with residents and stakeholders, ensuring their input directly shapes the solution. These workshops will incorporate GIGA-mapping to visualize complex social and environmental interconnections, helping identify leverage points for impactful interventions.

Concepts generated during these workshops will be translated into minimum viable prototypes (MVPs). These prototypes will be iteratively refined through feedback from community members and experts, ensuring the final intervention is both effective and aligned with local needs and priorities. Through continuous feedback and iteration, the toolkit will evolve into a practical, community-centered solution.

Project planning and key moments

To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include a **kick-off meeting, mid-term evaluation meeting, green light meeting and graduation ceremony**. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities).

Make sure to attach the full plan to this project brief. The four key moment dates must be filled in below

Kick off meeting19 Nov 2024

Mid-term evaluation13 Feb 2025

Green light meeting3 Apr 2025

Graduation ceremony1 May 2025

In exceptional cases (part of) the Graduation Project may need to be scheduled part-time. Indicate here if such applies to your project

Part of project scheduled part-time	
For how many project weeks	
Number of project days per week	

Comments:

Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other).

Optionally, describe whether you have some personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology. Personal learning ambitions are limited to a maximum number of five. (200 words max)

During this graduation project, I would like to focus on my personal/professional growth and learning ambitions. It is important to be open to constructive feedback and be initiative-taking in discovering my strengths and weaknesses. However, there are some competences I am aware of that I would like to improve and some that I would like to use. These are listed below.

Competences yet developed, that I want to integrate and display during this graduation project, are:

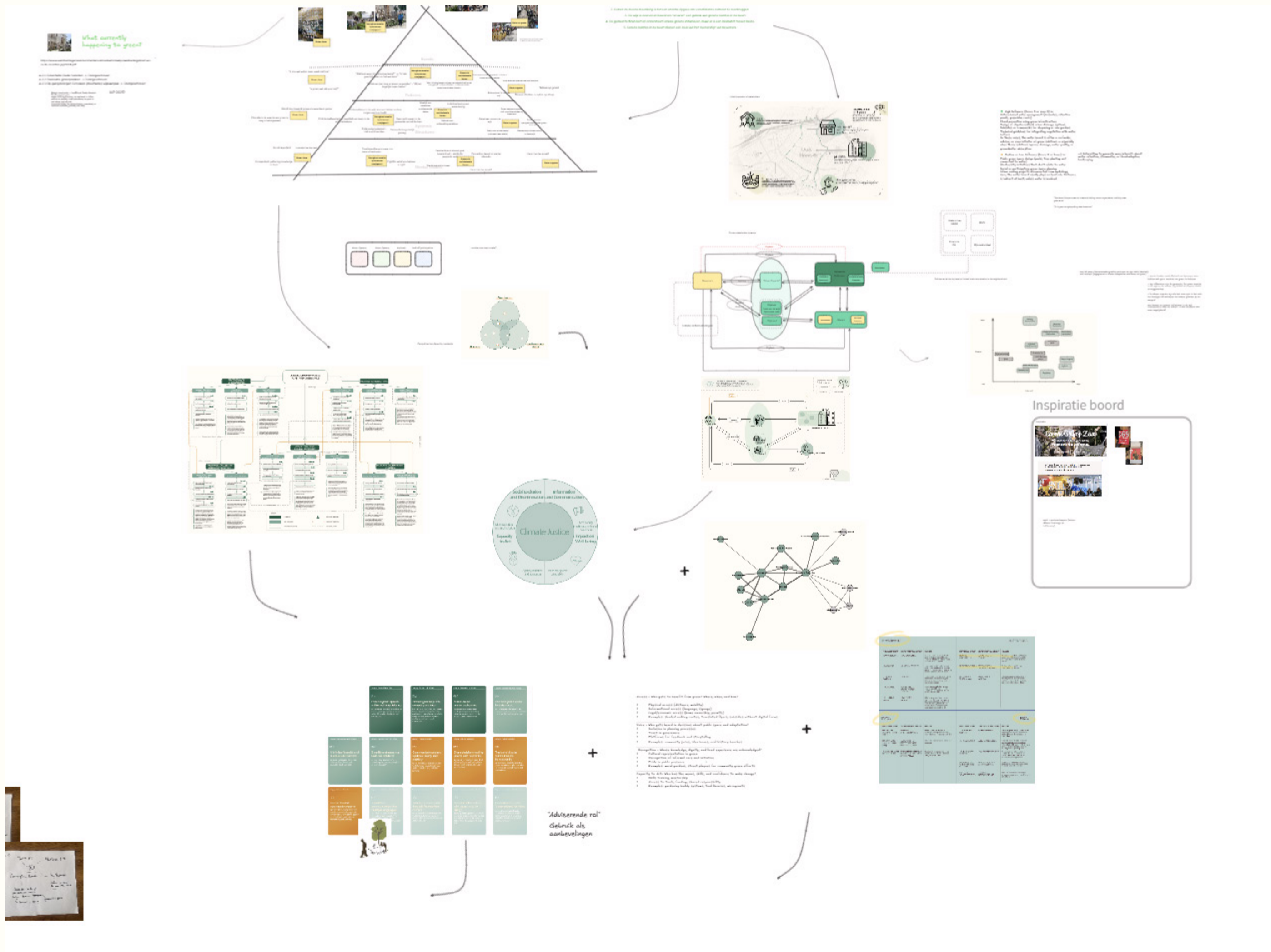
- Strategic thinking: showing that I can make and decisions that will influence the long-term success with strong argumentation.
- Empathizing: Critically analyse & thoroughly understand different stakeholders by being integrally involved in the crucial situations.
- Visually communicating being able to quickly and clearly sketch ideas & findings and make complex ideas and process visually appealing and understandable.

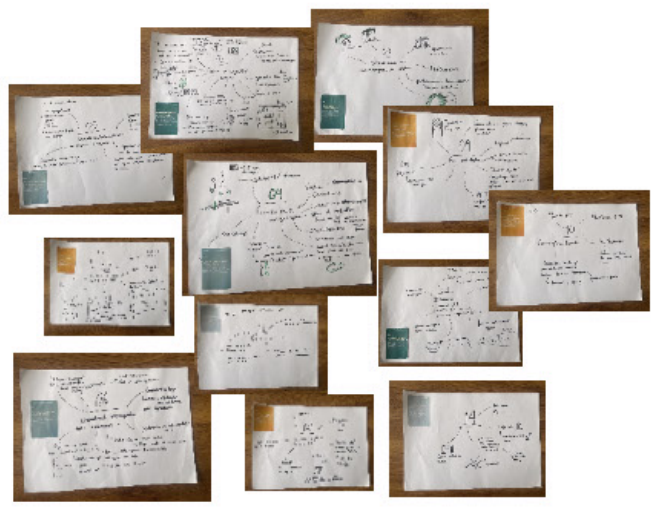
Some competences that I want to further improve during this graduation project, are:

- Managing complexity: Dealing with complex problems while keeping the overview and taking the interests and goals of all stakeholders into account.
- Communicating: Effectively and thoroughly communicate with stakeholders and all involved parties in a concise yet constructive manner.

Stakeholder	Status Quo Score	Ideal Score	Status Quo (Justification)	Ideal (Justification)
Gemeente Rotterdam	4	3	Currently the dominant decision-maker, holding the most institutional power in climate adaptation.	Should shift into more of a partner role, enabling and supporting residents instead of dominating decisions.
Woningcorporaties	3	2	Influential due to control over housing and maintenance, often acting in a top-down manner.	Ideally more collaborative with residents, focusing on co-developing solutions rather than steering them alone.
Residents	1	4	Currently have the least say, despite being most affected by flooding, heat, and poor air quality.	Should be central actors with strong influence, co-leading adaptation strategies in their neighborhoods.
Wijkraad	2	3	Plays an advisory role but with limited power and representation gaps.	Strengthened as a connector that amplifies resident voices in official decision-making processes.
Community Initiatives	2	3	Driven by enthusiasm but under-resourced and limited in influence.	Should become key co-creators, shaping local projects and driving bottom-up climate action.
Green Experts	2	3	Provide expertise but are often peripheral in actual decision-making.	Should be integrated into community-led processes to share knowledge and co-design solutions.
Huis van de Wijk	2	3	Acts as a local hub, important socially but with limited influence on adaptation planning.	Should play a stronger role as a trusted community anchor supporting resident-led adaptation.
Opzoomer Mee	2	3	Mobilizes neighbors but has little structural power in formal planning.	Should be recognized as a vital intermediary, helping residents collectively take ownership.
Wijkhub	2	3	Community platform with limited influence beyond small initiatives.	Needs to be elevated as a central bridge between residents and institutions.
Waterschap HHSK	2	2	Regional water board with technical expertise, but distant from residentsâ€œdaily lives.	Continues as a supportive advisor, offering expertise without dominating local processes.
RIVM	2	2	Provides national-level expertise, but little direct involvement locally.	Maintains an advisory role, contributing scientific knowledge while staying in the background.
Rijkswaterstaat	2	2	Provides national-level expertise, but little direct involvement locally.	Should stay a background actor, aligning national policy with local adaptation without controlling it.
Provincie Zuid-Holland	2	2	Provides regional policy direction, but has little day-to-day presence in Oude Noorden.	Remains a supportive, peripheral stakeholder to enable scaling and coordination.
Local Businesses	2	2	Contribute somewhat to greening but driven mainly by commercial priorities.	Can continue to support adaptation, but not as strategic decision-makers.
Stadsbeheer	3	3	Responsible for infrastructure and public space, influential in practical implementation.	Remains important but should coordinate more closely with residents and communities.
Rotterdams WeerWoord	3	3	Key municipal program with influence on climate adaptation planning.	Maintains influence, but needs to embed more strongly in resident-led approaches.
Klimaatrechtvaardig Rotterdam	3	3	Raises awareness on climate justice and influences local debates.	Should keep advocating but also support residents in shaping interventions fairly.







"Adviserende rol"
deelnik als
aankomelingen

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1

GreenSpots
Greenbackpack Daily Aankomen

Justice Lever

Idea

Target Group

2

Green Plantje
Klimaat - Climbing Together

Justice Lever

Idea

Target Group

3

Alleenmakers -
(Green) Ideebank

Justice Lever

Idea

Target Group

4

TreeFriends

Justice Lever

Idea

Target Group

5

TafelTafel

Justice Lever

Idea

Target Group

6

Buurtgroen

Justice Lever

Idea

Target Group

7

Klimaatje
Klimaatje - GreenSpots

Justice Lever

Idea

Target Group

8

Klimaatje
Klimaatje - Klimaatje

Justice Lever

Idea

Target Group

9

De Schakelaar
(Neighborhood Intervention)

Justice Lever

Idea

Target Group

10

De Buurtbus/Klimaatbus
(Neighborhood Outreach)

Justice Lever

Idea

Target Group

11

De Klimaatbinder/
Plant per Dag

Justice Lever

Idea

Target Group

12

Wijkteam - Klimaatgroep (green)

Justice Lever

Idea

Target Group

13

De Klimaatje

Justice Lever

Idea

Target Group

14

PlantPost

Justice Lever

Idea

Target Group

15

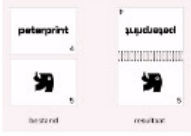
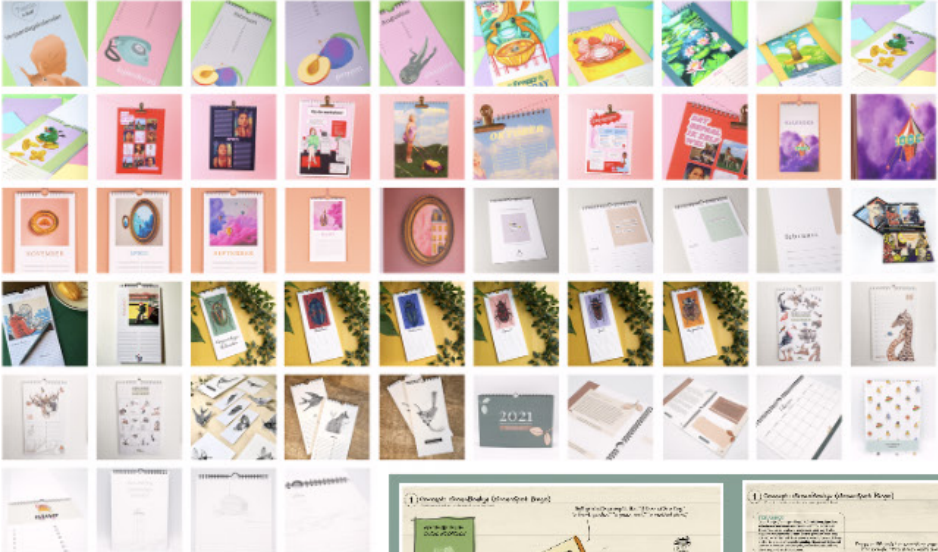
TafelTafel

Justice Lever

Idea

Target Group

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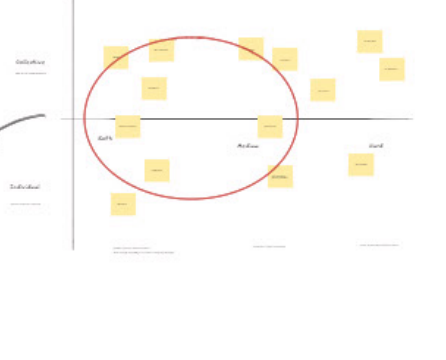
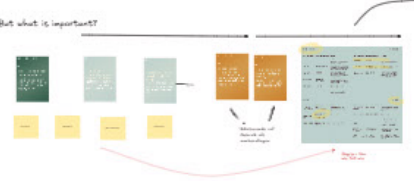
FORMAT



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But what is important?



Concept 1 + Concept 4

CONCEPT	JUSTICE LAYER IMPACT	FIT WITH INDICATORS: KNOWLEDGE/INNOVATION	FEASIBILITY	VIABILITY & SUSTAINABILITY	ADAPTABILITY OVER TIME	Score
Concept 1: Design	●	●	●	●	●	4.5
Concept 2: Design	●	●	●	●	●	4
Concept 3: Design	●	●	●	●	●	4
Concept 4: Design	●	●	●	●	●	4.5