Resilient Neighbourhoods in the Netherlands

An evidence-based blueprint for action

White paper

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Foreword

TU Delft established in 2023 the “Vision Team Wonen”– a multidisciplinary group of experts tasked with developing recommendations to address the pressing challenges of the current housing crisis. The team’s report, “Room for Housing” (2024), was presented to the Minister of Housing as well as to a broad range of societal stakeholders. It outlined four courses of action, accompanied by concrete steps and tasks. The report was very well received and inspired the Faculty of Architecture and the Built Environment at TU Delft to continue this important work.

This White Paper takes that effort further. Rather than covering all four directions, we chose to focus in depth on one: the creation of Resilient Neighbourhoods – places that provide the physical and social foundations for individuals and communities to thrive. This theme not only reflects the urgency of today’s housing and urban challenges but also embodies the diversity of disciplines and perspectives within our faculty.

Over the course of a year, researchers and students in our faculty collaborated in this initiative to identify the key challenges facing Dutch neighbourhoods, and to curate a set of innovative concepts, methods, and approaches. Together, they offer directions and inspiration for the planning and design of resilient neighbourhoods and give policymakers, professionals, and citizens practical tools to shape neighbourhoods that are better prepared for the future.

What follows is a concise overview of these recommendations, enriched with concrete examples of how resilience can be fostered in practice – grounded in evidence, and animated by the creativity that defines our faculty.

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Background

Neighbourhoods in the Netherlands are under growing pressure from a convergence of environmental, social, and economic challenges. Climate change is intensifying risks of flooding, heat stress, and biodiversity loss, directly threatening the liveability of cities and towns (IPCC, 2022). Rising sea levels, heavier rainfall, and prolonged droughts are no longer distant projections but present-day realities that require urgent local adaptation (Delta Programme, 2024).

At the same time, neighbourhoods face mounting social pressures. Demographic shifts, including population ageing and migration, are reshaping communities (CBS, 2023). Social inequalities manifest in uneven access to services, affordable housing, and public space, eroding cohesion and trust (SCP, 2020). Without active forms of participation and co-creation, neighbourhoods risk fragmenting in moments of stress.

Economic resilience is equally under strain. The Dutch housing shortage, compounded by affordability gaps and rising energy costs, places households under financial stress (Ministerie van BZK, 2023). Local economies are further pressured by structural shifts in employment and the need to transition to sustainable energy and mobility systems (OECD, 2021). Balancing short-term affordability with long-term investment in sustainability remains one of the core dilemmas for resilient neighbourhood development (PBL, 2021).

Taken together, these interlinked environmental, social, and economic pressures underscore the urgency of building resilient neighbourhoods. In our understanding, “resilience” is not only about withstanding environmental shocks but also about fostering strong social bonds and maintaining economic vitality. Achieving this requires innovative design strategies, integrated governance, and collaborative action that cut across sectors and scales (UN-Habitat, 2020; European Commission, 2022).

Key dimensions of Resilient Neighbourhoods

On all these areas, the Faculty of Architecture and the Built Environment at the TU Delft has produced advanced evidence-based solutions. In this white paper, we outline the key challenges, novel methods and tools, and propose action points emerging from this research. The paper is structured alongside four dimensions of neighbourhood resilience (figure 1):

Figure 1
The four dimensions of neighbourhood resilience

Climate adaptation
The Dutch built environment faces mounting threats from extreme events, requiring proactive strategies to enhance resilience. Effective climate adaptation minimizes risks, protects communities, and supports sustainable urban development. Achieving these demands coordinated public and private action to implement adaptive solutions capable of withstanding future climate-related disruptions.

Housing and place
Macrostructural phenomena like climate change, the economy and socio-demographic changes impact people's lives more directly on the spatial scale of their homes and neighbourhoods, where their daily lives unfold. The current housing crisis is a prime example of this. Beyond the need to build more, long-term resilience requires integrated solutions on what, how, and where these homes and accompanying facilities will be build. A key challenge is how to balance the urgency to meet short-term needs with the long-term sustainability of our living environments.

Communities and citizen engagement
Dutch policy has increasingly emphasised citizen responsibility and participation in public decision-making. While this shift has often been associated with a retrenchment of state support, it has also opened opportunities for citizens to organise independently and influence policy outcomes. New legal frameworks, such as the Omgevingswet (2024), require citizen engagement in spatial planning, potentially leading to greater societal support. However, the challenge remains how to move beyond symbolic consultation towards meaningful, equitable, and effective participation that contributes to resilient communities.

Governance
Challenges in the above dimensions of resilience come together in the Governance arena. It determines how risks are prioritised, whose voices are heard, and how resources are distributed. Without adaptive and inclusive governance, even the most technically sound solutions will struggle to take root or endure.

A blueprint for action

Tackling the complex challenges outlined above requires integrated approaches that connect solutions the four key dimensions of resilient neighbourhoods. In the final section of this white paper, we present 10 high-level recommendations that bring together these dimensions across different spatial scales. These recommendations are listed below.

10 recommendations for resilient neighbourhoods in The Netherlands

1. Embed Climate Adaptation into Everyday Urbanism
2. Institutionalize Neighbourhood Co-Governance
3. Diversify and Democratize Housing Models
4. Design Public Spaces for Climate and Community
5. Use Participatory Tools for Context-Specific Interventions
6. Link Housing, Health, and Care in Area Development
7. Mandate Distributional Impact and Equity Agreements
8. Retrofit with Empathy and Equity
9. Create Integrated Investment Vehicles
10. Establish Regional Knowledge Hubs for Democratic Learning

Climate Adaptation

Key Challenges

Urban environments in the Netherlands are increasingly confronted with acute climate adaptation demands. Neighbourhoods face heightened exposure to extreme heat, flooding, and other climate-related stressors, which are further intensified by underlying social and economic vulnerabilities. The densification of Dutch cities exacerbates these risks, reducing the spatial flexibility required for effective adaptation interventions.

Intersecting Vulnerabilities
Existing physical infrastructure, social systems, and governance mechanisms often lack the capacity to respond to compound climate threats occurring simultaneously or sequentially. Heat stress, drought, and flooding pose risks to public health, safety, and comfort. Public spaces—essential for social cohesion—require strategic redesign to remain functional and inclusive under evolving climatic conditions.

Disproportionate Impacts
Vulnerable and marginalized populations are disproportionately affected by climate hazards. Factors such as inadequate housing insulation, limited access to cooling and flood protection, and constrained public resources reduce adaptive capacity. Without inclusive and equity-oriented planning, climate adaptation may inadvertently reinforce existing socio-spatial inequalities.

Governance Fragmentation
Effective adaptation necessitates integrated, multi-level governance. However, institutional fragmentation and policy misalignment across local, regional, and national scales impede coordinated action. Technical retrofits often fail to reflect the lived realities of residents, underscoring the imperative for participatory, justice-sensitive, and context-specific approaches.

Knowledge and Solutions

Research conducted at the TU Delft advances a **multi-scalar framework for climate adaptation**, encompassing urban, neighbourhood, and building levels. The resilient neighbourhood serves as a critical nexus, linking macro-level strategies with localized design and planning interventions.

Urban Scale

At the metropolitan level, TU Delft researchers develop spatial and technological strategies in planning, to anticipate and mitigate climate-induced risks. **Risk-based modelling and simulation tools** are employed to forecast the impacts of heatwaves, flooding, and other hazards, enabling the identification of vulnerable populations and informing multi-criteria decision frameworks.
[EXAMPLES 1.1, 1.6]

High-quality public spaces are central to urban resilience. These spaces must be reconfigured to manage environmental risks—such as water retention and heat mitigation—while remaining inclusive, safe, and socially vibrant. **Shared green and blue infrastructures** not only enhance environmental performance but also foster community engagement and stewardship.
[EXAMPLES 1.2, 1.3]

Neighbourhood Scale

The neighbourhood scale constitutes the core of the adaptive framework approaches to design and planning, developed at TU Delft. Here, **digital innovation converges with participatory design** to enable context-sensitive interventions. Artificial intelligence facilitates comparative analysis across urban contexts, supporting the identification of optimal adaptation strategies. Computer vision technologies allow for the assessment of urban form and environmental vulnerability using aerial and street-level imagery, while unsupervised clustering techniques help prioritize areas most susceptible to heat stress.
[EXAMPLES 1.4, 1.5]

To translate data into actionable insights for designers and decision-makers, **participatory tools** and strategies have been developed to engage residents and stakeholders in co-creating locally relevant solutions. These digital platforms promote democratic engagement and empower communities to shape their adaptive futures.
[EXAMPLE 1.7]

Building Scale

At the building level, resilience is pursued through the integration of advanced technologies and design frameworks that enhance performance under diverse environmental conditions. TU Delft's research emphasizes **low-carbon, energy-efficient, and circular building systems** that are modular and scalable across varied urban contexts.
[EXAMPLE 1.9]

Digital simulation tools support risk-based assessments of climate impacts, quantifying potential losses in economic, social, and environmental terms. These evaluations inform the prioritization of interventions based on effectiveness and feasibility.
[EXAMPLE 1.8]

Design frameworks incorporating criteria such as health, safety, comfort, energy use, and environmental performance are essential for developing buildings capable of withstanding multi-hazard scenarios. Moreover, **equitable renovation strategies** must be grounded in residents' lived experiences, ensuring that interventions align with daily practices and community values. Participatory approaches that centre local knowledge contribute to justice-oriented and spatially sensitive retrofit solutions.
[EXAMPLE 1.9]

Action Points

The knowledge and solutions developed at TU Delft on climate adaptation translate into 3 key action points:

1. Integrated Planning & Governance
Focuses on embedding climate adaptation into broader urban systems and decision-making frameworks.

- Integrate climate adaptation within broader urban development and spatial planning initiatives.
- Employ multi-criteria, multi-hazard frameworks in design and planning, to guide assessment and implementation across scales.
- Utilize risk-based forecasting to inform robust and flexible urban planning.
- Use simulation tools to evaluate climate impacts and rank adaptation measures by effectiveness and feasibility.

2. Spatial & Technological Innovation
Emphasizes the use of spatial design, data, and emerging technologies to anticipate and respond to climate hazards.

- Develop spatial and technological strategies to anticipate and mitigate climate hazards, including heatwaves and flooding.
- Redesign public spaces to absorb water, provide shade, and support inclusive social use through green and blue infrastructure.
- Apply AI and computer vision to assess urban form and environmental vulnerability, enabling context-specific adaptation.
- Identify and prioritize heat-vulnerable morphological types for targeted intervention.

3. Community-Centered Adaptation
Centers on participatory approaches and equity-driven strategies to ensure inclusive and empowering climate responses.

- Bridge quantitative data with qualitative insights via participatory tools that empower residents to co-create solutions.
- Align retrofit strategies with residents' lived experiences to promote equity, empowerment, and spatial quality.

Housing & Place

Key Challenges

While homes are typically built to last—often exceeding 75 years—their design and distribution increasingly fall short of meeting society's evolving needs. The supply of affordable housing continues to lag behind rising demand, and escalating costs are pushing more households beyond their financial limits.

Crucially, the housing challenge is not simply a matter of building more units. It also concerns how living space is allocated across the population, how flexible our housing stock is in responding to changing life circumstances, and how resilient our neighbourhoods are in the face of social and economic pressures. First-time buyers and young adults, in particular, face mounting difficulties in securing suitable accommodation—especially in major urban centres where employment opportunities are concentrated. This barrier significantly delays their transition to independent living and postpones family formation.

At the same time, ageing populations present a different set of challenges. Municipalities are increasingly responsible for enabling older residents to live independently and remain socially engaged for as long as possible. In this context, the importance of resilient neighbourhoods—where homes are meaningfully connected to the community—has never been greater. Yet many older individuals live in environments where social contact is minimal; for some, a caregiver may be the only person they see in a day. Too many of our current living arrangements are ill-equipped to support this demographic shift, often resulting in isolation, loneliness, and neglect.

Housing is not merely a matter of shelter—it is deeply interwoven with health, well-being, and the vitality of our communities. Addressing today's housing crisis therefore demands a broader lens: one that moves beyond construction targets to embrace equity, adaptability, and community resilience as foundational principles of housing policy.

Key challenges for housing and places that build resilient neighbourhoods can be summarized in the following points:

Mismatch of Housing Supply and Demand
The Dutch population is changing, with an increasing proportion of single households, an ageing population, and more diverse family configurations. Despite growing demand for a wider variety of housing concepts that can better accommodate changing housing needs and preferences, the prevailing supply remains heavy on conventional single-family and large apartments (CBS, 2021). This mismatch leaves many households locked in unsuitable or unaffordable options and prevents a flow in the housing market.

Homogeneity of Housing Types
From an architectural point of view, even with contemporary urban policy aiming for diversity, many neighbourhoods still feature mono-typical housing forms (e.g. postwar row houses or homogeneous social housing blocks). Such uniformity limits socioeconomic diversity and flexibility in a time where multigenerational and adaptive living models are increasingly needed (Bloemen et al., 2019).

Dormitory Town Dynamics
Besides the homogeneity of housing types, large-scale suburban expansions continue to function as "bedroom communities," with limited walkable amenities or job opportunities (Nationale Omgevingsvisie, 2021). This model exacerbates car dependence and social isolation—especially for non-working or vulnerable residents and is counterproductive to any form of social life and community.

Disconnection Between Residents and Place
Research since 2018 highlights a growing "placelessness" in new dormitory developments—where residents commute to work but lack local attachment or community ties (Kourtit et al., 2022). This results in a lack of social infrastructure, reducing capacities for local resilience and informal care networks. Homes need to be imbedded in an environment that supports residents and are accessibility for those who are more vulnerable.

Lack of Spaces for Social Interaction in the Neighbourhood
Evaluation of the "Actieagenda Wonen" (2022) shows many neighbourhoods lack multifunctional community hubs or accessible indoor gathering spaces. Coupled with few well-maintained public squares or play areas, this restricts social interaction—particularly important for informal support and resilience after crises. With the shortage of professional caregivers, this informal support is crucial for many people.

Insufficient Support for Vulnerable Groups
Recent reviews (e.g. Sociaal Planbureau, 2019; Platform 31, 2024) show that low-income households, older singles, migrants, and disabled residents are still doubly disadvantaged: housing affordability remains tight, while social infrastructure is often lacking. Programmes like the "Wijkaanpak Inclusie" (2021) seek to bridge this gap, yet many neighbourhoods still lag behind.

Knowledge and Solutions

Education and research at the ABE Faculty on housing and neighbourhoods addresses the challenges mentioned before by starting from the perspective of residents and communities. Through a variety of methods, students and researchers gather knowledge and shape solutions. These can be clustered around the following themes:

Designing for Changing Housing Preferences
Designing housing that is truly future-proof requires a deep understanding of people's lived experiences. As individuals age and their life circumstances evolve, housing and the surrounding built environment must adapt to meet their changing needs. This calls for a human-centered approach that prioritizes flexibility, inclusivity, and long-term resilience. Researchers at the ABE Faculty employ diverse methodologies to explore and quantify housing preferences. These range from large-scale data analysis to case studies and design-led inquiry, offering nuanced insights into how people live—and want to live.

In response to today's ecological, socio-political, and economic challenges, alternative housing models grounded in principles of sharing and collectivity are gaining momentum in the Netherlands. These include housing cooperatives, cohousing arrangements, eco-villages, and other self-organized forms of living. By pooling resources and fostering closer social ties, such community-based models aim to decommodify housing, reduce environmental footprints, and strengthen social cohesion. The book *TOGETHER: Towards Collaborative Living [EXAMPLE 2.1]*, co-authored by researchers from the ABE Faculty, showcases a wide array of collaborative housing initiatives both within the Netherlands and internationally. It also outlines strategic pathways for expanding these models nationally.

Furthermore, evidence increasingly points to the appeal of community-based living for older adults. These environments support physical and social engagement, enabling seniors to remain active and connected within their homes and neighbourhoods. Students from the graduation studio *Designing for Health & Care [EXAMPLE 2.2]* contribute to this vision by designing neighbourhoods and housing typologies that promote everyday social interaction. Further advancing this work, the award-winning project *Professional Collaborative Housing Concepts for Seniors [EXAMPLE 2.3]* compared developer-led models of community living for older adults and offered recommendations to stimulate innovation in the housing sector.

Yet, a key challenge remains: how to scale these concepts and broaden their appeal across diverse social groups. Addressing this, the newly launched NWO-VIDI research project *InCommon [EXAMPLE 2.4]* employs an innovative methodology to examine evolving housing preferences in the Netherlands. Its goal is to assess the potential demand for housing typologies that incorporate varying degrees of collectivity and shared living.

Designing housing from the perspective of health and care
Today, we are more aware than ever of how the built environment shapes our health, supports disease prevention, and influences our overall quality of life. Where we live affects our physical, emotional, and social well-being. Elements such as access to daylight and fresh air, views of nature, privacy, social contact, control over one's environment, and proximity to services, playgrounds, and sports facilities all play a critical role in promoting health.

For older adults, the concept of "ageing in place"—remaining in one's home and neighbourhood rather than relocating to institutional care—has become a guiding principle. In this context, participatory design processes involving students and residents have proven valuable. Through collaborative research and design, students work directly with older inhabitants to identify and

address challenges in their living environments. A consistent theme emerges: older people wish to remain independent and autonomous for as long as possible—but not in isolation. Research highlights the importance of spaces for social encounters, especially in and around homes for those with limited mobility. Many older adults also express a desire to live among people of different ages and to continue feeling respected and included in society. Responding to these insights, students design community-based neighbourhoods and housing typologies that foster meaningful relationships among residents.

At the graduation studio *Designing for Health & Care [EXAMPLE 2.2]*, students develop innovative housing concepts tailored to the needs of older people. Their designs are grounded in immersive research, including week-long stays in sheltered housing facilities. This empathetic approach ensures that the voices of older residents are reflected in architectural solutions.

One frequently expressed wish is to live with family. This aspiration—combined with the growing pressure on individuals who care for both children and aging parents—inspired the project *Multigenerational Living for the Sandwich Generation [EXAMPLE 2.2.b]*. The concept brings together young families and their grandparents in a high-rise building where each household has a private apartment and entrance, yet remains connected via shared corridors or staircases. The building's density supports collective amenities on the lower floors, such as a library, café, and healthcare services, creating a vibrant multigenerational community.

Promoting movement and exercise, while raising awareness of the care needs of older adults, is central to the project *The Elderly Movement [EXAMPLE 2.2.c]*. This initiative proposes a neighbourhood centered around a sheltered housing facility, with indoor and outdoor walking loops designed to accommodate walkers, canes, and wheelchairs. The housing is integrated into a family-oriented area, featuring a children's daycare opposite a daycare for older adults. Shared activities and communal meals encourage intergenerational interaction. A dedicated building for people with dementia is also included, acknowledging the anticipated rise in dementia cases as the population ages.

The importance of accessible care infrastructure became evident during conversations with residents in Rotterdam South. The project *Networks of Care [EXAMPLE 2.2.d]* began by mapping formal and informal care networks—referred to as "care dots"—within the neighbourhood. This research informed the design of a central connection hub that directly responds to residents' expressed needs. The hub includes a multifunctional room, a shared kitchen and dining area, and healthcare facilities, creating a space where care and community converge.

Adaptability Through Diverse Typologies

To address the persistent homogeneity in housing design, the *Advanced Housing Graduation Studio [EXAMPLE 2.5]* explores densification strategies and innovative building concepts that combine the efficiency of repetitive structures with diversity in dwelling types and adaptability for individual customization. These approaches allow housing to evolve over time, responding to changing needs and lifestyles. Design-led research demonstrates how long-lasting structural frameworks can accommodate spatial and functional variety, offering flexibility without compromising durability. Two master's theses—*Standardisation & Versatility [EXAMPLE 2.6]* and *A House is Not a Home [EXAMPLE 2.7]*—each investigate how repetitive building systems can support diverse living arrangements and enable personal adaptation, highlighting the potential for scalable yet human-centered design.

Adaptive reuse also plays a critical role in sustainable housing development. By repurposing existing buildings, it reduces the demand for raw materials and limits demolition waste. The book *Adaptive Reuse for Housing [EXAMPLE 2.8]*, edited by researchers from the ABE Faculty,

outlines strategies to improve the environmental performance of existing structures through thoughtful renovation. It also addresses the challenges of transformation, offering solutions based on a comprehensive analysis of barriers and enablers from multiple stakeholder perspectives. Similarly, the publication *From Dwelling to Dwelling [EXAMPLE 2.9]* explores how existing buildings can be reimagined as new housing typologies.

Inclusive Densification and Redevelopment
Overly targeted housing developments—focused narrowly on specific income or demographic groups—can exacerbate social segregation. This often results in neighbourhoods that are either exclusive and unaffordable or economically and socially vulnerable. The *Advanced Housing Graduation Studio* investigates how to create mixed communities that support diverse lifestyles and income levels, anchored by shared social and spatial infrastructure. These strategies are applied both in new construction and in the densification and revitalization of existing neighbourhoods.

To ensure that housing solutions reflect the needs of current and future residents, participatory and co-creation methods are employed—especially for groups at risk of exclusion. The thesis *Incentivising Compromise [EXAMPLE 2.5.a]* explores how a Participatory Value Evaluation Tool can empower both long-term residents and newcomers in the redevelopment of post-war neighbourhoods in the Netherlands.

Other theses, such as *Independent Elderly Living [EXAMPLE 2.10]* and *Degrees of Encounter [EXAMPLE 2.5.b]*, examine strategies for fostering socially active and resilient networks—whether by supporting older adults or addressing urban loneliness more broadly. A further example of human-centered housing policy is the “reflexive policy agendas” approach used in the Horizon project *UPLIFT [EXAMPLE 2.11]*, which engaged young people facing housing exclusion in co-developing solutions to their challenges.

Designing Neighbourhoods for Human Capabilities
Applying the capabilities approach to housing and urban design shifts the focus from physical infrastructure to the real freedoms people need to live meaningful lives. Rooted in Amartya Sen’s theory, this perspective emphasizes how urban environments can either support or constrain individuals’ ability to transform spatial resources—such as housing and public spaces—into opportunities for wellbeing, participation, and personal growth.

People experience cities differently depending on their circumstances and access to resources. The capabilities approach encourages planners and policymakers to design inclusive environments that foster resilience and equity—not only through amenities, but also through governance, engagement, and social infrastructure.

Research at the ABE Faculty applying this framework underscores the importance of moving beyond technical solutions to prioritize human flourishing. Rather than asking what a space provides, it asks what people can do and become within it—and how those possibilities can be expanded for all *[EXAMPLE 2.12]*.

These insights informed the development of a method that applies the capabilities approach to assess how living environments enable residents to pursue what they value. This method was implemented in the project *Back to the Neighbourhood (Terug naar de Buurt)*, led by developer ERA Contour.

Action Points

Housing plays a fundamental role in shaping health, well-being, and the vitality of communities. As such, tackling the current housing shortage demands more than just meeting construction quotas—it calls for a holistic approach; it must also focus on strengthening the resilience of both existing and new neighbourhoods. Adaptability of buildings, design of common spaces and community involvement are central pillars of resilient neighbourhoods and the creation of long-term value. Action points emerging from the examples mentioned before can be clustered around the scale of the building and the neighbourhood, respectively:

Expand and optimize housing supply
Use both new construction and smarter use of existing stock—through sharing, splitting, transforming, and extending—to create resilient, adaptable neighbourhoods.

- Build for long-term value and adaptability: Adopt housing strategies focused on long-term societal value, flexibility, and futureproofing.
- Repurpose unused buildings: Facilitate the conversion of vacant or underused buildings into housing to quickly expand supply and revitalize urban areas.
- Diversify housing types through evidence: Improve knowledge on evolving housing preferences across social groups to guide the development of varied and responsive housing typologies.

Design inclusive, well-equipped neighbourhoods
Ensure new housing is embedded in neighbourhoods with essential facilities (max. 500m distance) and meeting spaces that support social interaction. Involve current and future residents and use research by designing adaptive neighbourhoods.

- Empower collective housing initiatives: Support self-organized groups by adapting planning and financial frameworks to enable diverse forms of cooperative and communal living.
- Integrate housing with care and health: Develop area strategies that link housing solutions with care and health services, especially for older residents.
- Apply research-by-design: Use design as a tool to explore and test new housing concepts that reflect changing preferences and lifestyles.

Communities & Citizen Engagement

Key Challenges

Since 2013, the Netherlands has promoted a *"participation society"* in which citizens are expected to take greater responsibility for social challenges and decision-making. Citizens have exercised both "voice" and "veto" powers, from legal challenges to development projects and climate protests, to grassroots alternatives such as collective housing for elderly and energy cooperatives.

Public authorities and market actors have responded by experimenting with participatory tools. The 2015 Housing Act recognised the right to form housing cooperatives. Developers and municipalities have adopted participatory methods in area development projects, while digital platforms such as *Participatieve Waarde Evaluatie* (PWE) by Populytics have been used to engage large groups on issues ranging from parking to renewable energy. Some municipalities have also introduced *Burgerberaden* (citizens' assemblies) or the *Right to Challenge*.

The *Omgevingswet* marks a significant policy milestone, requiring that residents be involved in spatial planning. Yet it leaves methods and depth of engagement open to interpretation, creating flexibility but also inconsistency and little obligation. A policy or recommendation without conviction or assurance runs the risk of being a 'checkbox'. Citizen engagement is often weakened by tokenistic processes, outsourcing to consultants, lack of knowledge, urgency and consistency, or limited uptake of citizen input in final decisions.

Cities are shaped by diverse groups with varying priorities, languages, and capacities. To build resilient neighbourhoods, engagement must reflect this diversity and balance different interests fairly. Developing methods for citizen engagement to target all groups in society, including those difficult to engage, is a significant challenge.

Debates about citizen engagement often oscillate between two perspectives. The **normative view** stresses that citizens have a democratic right to be involved in decisions affecting them. The **pragmatic view** emphasises that engagement draws on local knowledge to generate better, context-specific solutions. Additionally, public support is considered to accelerate and enhance the acceptance of urban transformations. In practice, both motives coexist, but a lack of clarity about institutional intentions risks eroding trust.

Clarifying the purpose of participation—whether legitimacy, innovation, or problem-solving—is crucial. Equally important are ethics: transparency, reciprocity, and the inclusion of marginalised voices.

Knowledge and Solutions

Our research highlights four promising approaches to citizen engagement to tackle the challenges from the previous page:

Co-creation involves collaborative design processes where citizens, civil servants, and professionals share responsibility and contribute different expertise and experiences. It requires creativity and empathy on all sides, with civil servants acting as key brokers between formal institutions and everyday community realities.
[EXAMPLE 3.1]

Evaluation methods enable communities to assess the qualities of their living environments, including intangible values and daily use perspectives often overlooked by professionals. Combining photo-elicitation, diaries, focus groups, and digital tools broadens inclusivity and captures evaluations of various stakeholders.
[EXAMPLE 3.2]

Empowerment approaches are essential to engage often underrepresented groups in neighbourhoods. Especially regarding issues of climate risks and socio-economic inequalities, engagement must acknowledge historical disadvantages and avoid displacement in redevelopment, ensuring that solutions are just and inclusive.
[EXAMPLE 3.3]

Translation methods reveal community-captured knowledge and lived experiences and integrate these into planning and design. Case studies illustrate how cultural practices shape space and highlight the need for sensitive interventions that respect community identities.
[EXAMPLES 3.4, 3.5]

Action Points

Citizen engagement in the Netherlands is evolving from a policy ideal into a legal requirement. The challenge now is to ensure that participation delivers more than consultation, by embedding it meaningfully in planning and design, strengthening institutional capacity, and ensuring that methods are context sensitive and the voices of all communities are valued. Doing so will not only enhance democratic legitimacy but also contribute directly to the resilience, equity, and sustainability of Dutch neighbourhoods.

The experience of the past decade points to several priorities:

1. **Participation should be embedded** across the full planning cycle, from agenda-setting to evaluation, rather than treated as an isolated exercise.
2. **The purpose of citizen engagement must be clear** and transparently communicated to participants, avoiding frustration and mistrust.
3. **Institutional capacity must be strengthened**: relying on external consultants risks tokenism and undermines trust, while building in-house expertise supports more consistent engagement.
4. **A diversity of methods—e.g. digital, face-to-face, and creative—is necessary** to capture a full range of voices, particularly from marginalised groups.
5. Above all, **engagement should move beyond formality toward processes that produce real influence/ impact**, fostering both equitable outcomes and stronger democratic legitimacy.

Governance

Key Challenges

Governance structures are too often treated as neutral backdrops for project development, when in fact they are the arenas where competing futures are negotiated. Building resilient neighbourhoods requires governance that takes accountability, risk, legitimacy, and distributional impacts seriously. Governance must be seen as designable; it is an assemblage of institutions, rules, and norms that can be purposefully reconfigured. Concepts like ‘participation’ or ‘integrative approach’ are not mere managerial tools; they are ethical and political choices about who decides, who benefits, and who bears the risk. Without addressing these questions, ‘resilience’ risks becoming an empty buzzword.

This is especially urgent in Dutch neighbourhoods, where climate adaptation and housing acceleration may deepen existing inequalities unless justice is treated as foundational rather than performative. Participation must go beyond legitimising predetermined outcomes, it must redistribute power in ways that have material consequences.

The credibility gap in many local projects stems from institutional realities, not communication failures. Communities familiar with cycles of renewal and displacement often interpret terms like ‘climate preparedness’ or ‘densification’ as precursors to rent hikes and displacement. Governance must therefore offer credible guarantees: the right to remain, enforceable affordability, and access to basic infrastructure like cooling and safety.

Moreover, coordination is often mistaken for shared decision-making. Ministries, water boards, housing associations, and municipalities operate under separate mandates and budgets, aligning plans only after the fact. Community initiatives—co-ops, energy groups, mutual-aid networks—are praised rhetorically but excluded in practice, relegated to short-term pilots without lasting support.

This fragmented governance addresses issues in isolation, while residents face them simultaneously. Climate projects may tack on minor social components, while energy schemes ignore care needs or local voices. Households continue to endure heat stress, high costs, and weak services, each managed by a different agency on a different timeline. Only through integrated, joint decision-making, with shared rules, pooled resources, and permanent community roles, can neighbourhoods experience meaningful change.

Finally, the pressure to accelerate housing and energy transitions often undermines deliberation. When speed overrides justice, we entrench inflexible systems instead of building adaptive, inclusive governance.

Knowledge and Solutions

To do things differently, governance must be redesigned. Encouragingly, practice across the faculty is already testing new rules. These projects, viewed as prototypes rather than showcases, point to a progressive governance architecture built on four key shifts:

- **From coordination to co-decision under uncertainty**, where actors share decision rights rather than merely align plans.
- **From siloed mandates to distributed, multi-actor arrangements**, with community organisations as permanent partners.
- **From isolated pilots to governance as a learning infrastructure**, linking experiments to rules, budgets, and procurement.
- **From performative justice to embedded justice**, using metrics and clear agreements.

Integration becomes meaningful only when it changes who holds decision-making power. The RED&BLUE project *[EXAMPLE 4.1]* exemplifies this by convening municipalities, market actors, and infrastructure experts to co-create a shared language around climate risk and navigate politically sensitive questions of benefit and burden. Its emphasis on trust-building and knowledge integration lays the groundwork for more joined-up decisions.

Similarly, the Greater Rotterdam Living Lab uses 'kennis-carrousels' to sustain collaboration between cities, researchers, and partners, translating insights into actionable questions. These efforts are not yet institutionalised integration, but they enable it. The forward-looking lesson is clear: if cities and water boards want shared problem definitions to translate into durable change, they must adopt instruments that match—pooled rules, shared resources, and credible forums. RED&BLUE continues to provide the evidence and vocabulary to make such shifts viable.

Distributed, multi-actor governance only works when civic capacity is made permanent. The Stichting Kennis Gebiedsontwikkeling (SKG), embedded in TU Delft, exemplifies this through its role as a governance node with budgetary continuity, convening power, and strong ties to research and education. Rather than offering a single method, SKG represents an institutional form that combines knowledge curation, agenda-setting, and public accountability.

Governance as a learning infrastructure means pilots should feed into formal decisions. Resilient Delta, part of the Convergence alliance, treats the Dutch delta as a living lab, developing actionable tools with municipalities, the port ecosystem, and civil-society partners. In Dordrecht's Maasterras project, a Gluon integration specialist helped translate interdisciplinary insights into programme requirements and design guidance, enabling a coherent planning trajectory. These integrated perspectives now inform the city's masterplan and flood-shelter implementation.

Beyond individual sites, Resilient Delta contributes to Regio Deal coalitions like Smart Delta Drechtsteden and Waterweg, which are formal arrangements aimed at multi-year implementation. While these efforts shape planning and programmes, they have yet to become system-wide mandates or procurement standards. Advancing governance means institutionalising these methodologies and commitments.

Capacity building must be treated as infrastructure. RE-DWELL *[EXAMPLE 4.2]* trains researchers and practitioners in transdisciplinary competencies for sustainable housing, framing governance capacity as a public good. REPAiR *[EXAMPLE 4.3]* operationalised co-governance through peri-urban living labs and a geo-design decision support environment, integrating stakeholder workshops and analytics into repeatable workflows. These are not just methods, they are institutional devices with potential to be embedded in regulation, such as open data requirements and decision tools that clarify trade-offs.

Justice must be embedded in the architecture of decision-making, not added as an afterthought. Two Horizon Europe projects, UP2030 and DUST, operationalise this principle. UP2030 *[EXAMPLE 4.4]* develops spatial-justice benchmarks and citizen-participation frameworks to guide cities in selecting and evaluating decarbonisation interventions. TU Delft leads efforts to up-skill pilot cities and build tools for diagnosing disparities and assessing justice-readiness in policy and design.

DUST *[EXAMPLE 4.5]*, which is led by TU Delft researchers, focuses on participation infrastructures for underrepresented communities, combining territorial design tools with large-scale digital deliberation. Crucially, it aims for institutional uptake, not just consultation. These projects demonstrate that fairness is measurable and enforceable: through no-displacement clauses, right-to-return guarantees, access to cooling and energy as entitlements, and distributional impact statements embedded in programme architecture.

Together, UP2030 and DUST show how justice can be systematically coded into decision-making, via benchmarks, indices, and participation infrastructure, ensuring that neighbourhood investments are selected and evaluated not only for carbon and cost, but for demonstrable fairness and inclusion.

Action Points

Urban resilience must be grounded not just in technical robustness but in political ethics and institutional justice. Participation must go beyond tokenism to shift power, and lasting change requires embedding commitments into the fabric of governance—across laws, budgets, standards, and everyday routines. The challenge is to move from promising pilots to enforceable settlements that lock in equity and accountability. This can be done by following these five action points:

1. Legislate Neighbourhood Co-Governance
- Recognise cooperatives, CLTs, and energy collectives as statutory partners.
- Grant decision rights, base funding, and data access.
- Make Community Benefit Agreements mandatory in public–private developments.
- Shift participation from consultation to constitutional status.

2. Create Integrated Investment Vehicles
- Pool climate, housing, and water funds under shared risk and justice rules.
- Replace siloed budget cycles with unified financial frameworks.

3. Adopt Binding Neighbourhood Equity Agreements
- For every development or retrofit, co-sign a short agreement that includes non-negotiables, tests, and remedies.
- Ensure signatures from municipality, delivery partners, and neighbourhood bodies.
- Publish results regularly as open data.

4. Mandate Distributional Impact Statements
- Require clear documentation of who benefits and who bears costs.
- Hard-wire two guarantees into every project: No net loss of housing affordability, and universal thermal safety (adequate heating and cooling).
- Use tools from UP2030 and DUST to monitor and report progress.

5. Endow Regional Knowledge Hubs
- Support hubs that maintain open tools, datasets, and guidance.
- Facilitate public deliberation and democratic learning.

10 Recommendations for Resilient Neighbourhoods

Based on the set of action points across all four dimensions, we propose **10 high-level recommendations** for creating resilient neighbourhoods:

1. Embed Climate Adaptation into Everyday Urbanism
Integrate climate resilience measures—like flood mitigation, heat reduction, and nature-based solutions—into all urban development and spatial planning scales. This ensures that adaptation is not a siloed effort but a foundational layer of neighbourhood design.

2. Institutionalize Neighbourhood Co-Governance
Legally recognize cooperatives, community land trusts (CLTs), and energy collectives as statutory partners. Grant them decision-making rights, base funding, and access to data to foster democratic legitimacy and long-term stewardship.

3. Diversify and Democratize Housing Models
Support a mix of housing types and tenure forms—including co-housing, adaptive reuse, and modular extensions—to meet evolving household needs. Enable self-organized groups to initiate projects by reforming planning and financial frameworks.

4. Design Public Spaces for Climate and Community
Redesign parks, squares, and streetscapes to absorb water, provide shade, and support inclusive social use. Green and blue infrastructure should serve both ecological and social functions, especially for vulnerable groups.

5. Use Participatory Tools for Context-Specific Interventions
Combine AI-driven urban vulnerability assessments with participatory mapping and storytelling to co-create solutions that reflect both data and lived experience. This bridges technical precision with community wisdom.

6. Link Housing, Health, and Care in Area Development
Plan neighbourhoods that integrate housing with care services, especially for elderly and vulnerable residents. Ensure proximity (≤500m) to daily facilities, nature, and meeting spaces to combat loneliness and promote wellbeing.

7. Mandate Distributional Impact and Equity Agreements
Require every development to include a binding equity agreement and a distributional impact statement. These should guarantee no net loss of affordability and universal thermal safety, with transparent reporting via open data platforms.

8. Retrofit with Empathy and Equity
Align retrofit strategies with residents' lived experiences. Prioritize interventions in heat-vulnerable morphological types and ensure upgrades enhance spatial quality, comfort, and dignity—especially for low-income households.

9. Create Integrated Investment Vehicles
Pool climate, housing, and water funds under unified financial frameworks that prioritize shared risk and social justice. This breaks down silos and enables coordinated, long-term investment in resilient neighbourhoods.

10. Establish Regional Knowledge Hubs for Democratic Learning
Support hubs that maintain open-source tools, datasets, and design guidance. These hubs should facilitate public deliberation, experimentation, and collective learning across municipalities, communities, market parties, and academia.

Example Projects

1.1 Urban Form, Climate and Health: A Study on Urban Health and Heat Stress Resilience for Outdoor Climate Retrofitting

Doctoral thesis, Doruntina Zendeli
Promotors Politecnico di Milano: Eugenio Morello and Nicola Colaninno, TU Delft: Arjan van Timmeren, Marjolein van Esch

Cities across the globe are facing rising temperatures and more frequent heatwaves, posing growing risks to public health and urban liveability. This PhD thesis investigates how urban form, climate, and social conditions interact to shape heat exposure and vulnerability, drawing on the city of Milan as a case study. Analysis of high-resolution climate and health data — including emergency calls for cardiovascular and respiratory distress during heatwaves — reveals strong spatial inequities: dense, poorly vegetated neighbourhoods experience the highest thermal stress and health incidents, while socially cohesive communities show greater resilience. These findings highlight that heat is not only an environmental challenge but also a social and spatial one. The paper proposes an integrated, equity-focused framework for urban planning and design, combining data-driven analysis with interventions such as green infrastructure, material retrofits, and improved access to cooling and care. Together, these strategies offer a path toward healthier, fairer, and more climate-resilient cities.

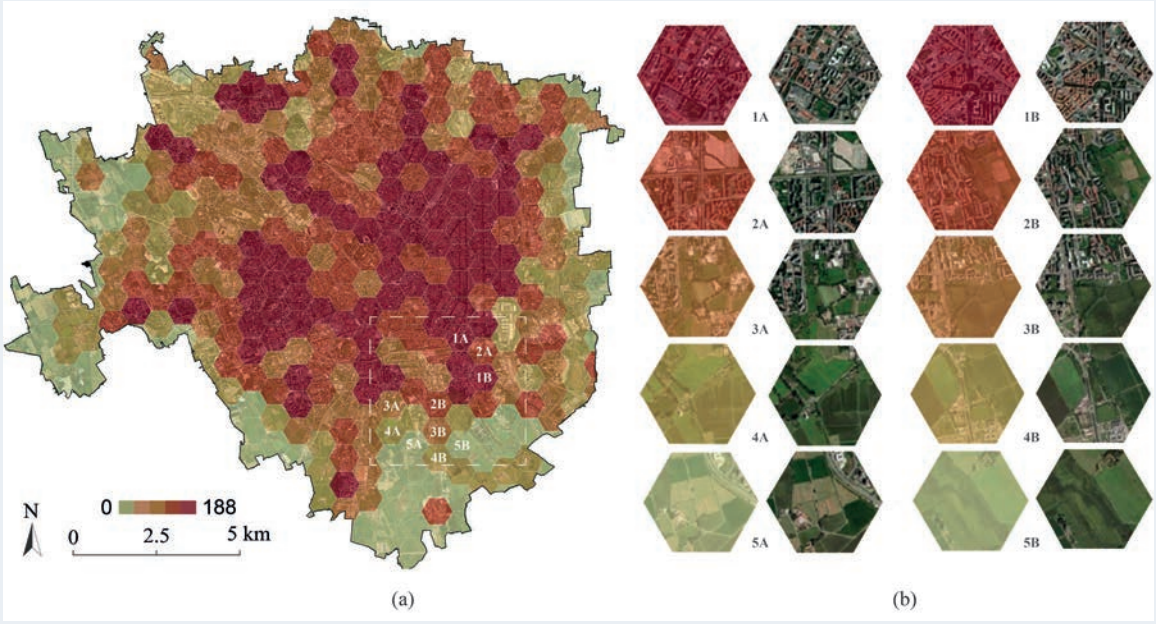


Figure 2
Spatial patterns of total calls (all ages and both females and males) from May to July 2022 (left). Zoom-in hexagons of different degrees of calls and morphological patterns (right)
Doruntina Zendeli

1.2 SYSTEMS IN THE CITY - Sustainable Urban Design BK7575

Design studio minor Sustainable Urbanism - third academic year
Minor coordinator: Mariette Overschie

An important task of urban planners and designers is to introduce and design sustainable urban interventions, creating future proof neighbourhoods within the framework of a green blue city. In the Sustainable Urban Design studio 'Systems in the City' of this minor a sustainable urban design is the main subject. In this studio the minor students will develop design proposals, in interdisciplinary teams. Focus in the studio is on concrete sustainable design exercises, considering the spatial implications of adapting to climate change in sustainable urban plans.

https://www.studiegids.tudelft.nl/courses/study-guide/educations/10725

Figure 3
The spatial implications of adapting to climate change in sustainable urban plans
Carlijn Babeliowsky, Corey Bricker, Greta Görg, Hatice Önel, Julie de Lange

1.3 i-Tree 2.0 NL: Next Generation Metrics and Methodologies for Urban Forestry and Climate Resilience in Dutch Cities

Leader Research group, René van der Velde
Funding body: CLICKNL

Green, blue, and brown infrastructures (GBBI) are essential for urban climate adaptation and mitigating the impacts of climate change in cities. As urban areas become more susceptible to higher temperatures, flooding, and other climate-related issues, incorporating and revitalizing green spaces—such as parks, street trees and green roofs (with the aid of healthy soils)—and blue spaces like water bodies and wetlands into urban environments helps to lower these risks. With this project, we aimed to quantify one of the most important benefits of urban trees: cooling. Applying the found metrics on cooling and growth curves, and the i-Tree tool together with planners, designers and greenspace professionals helps realise effective adoption and effectuate transitions in climate resilience and urban liveability

https://urbanforestry.nl/living-labs/i-tree-2-nl/

Figure 4
Map of the Marineterrein detailing the results of a traditional urban planning process and one utilizing the 8-step method
MVRDV and Justien Heideman

1.4 Urban Form Influence on Microclimate and Building Cooling Demand. An analytical framework and its application on the Rotterdam case

Doctoral thesis, Daniela Maiullari
Promotors: Arjan van Timmeren, Marjolein van Esch

The shape of cities and their urban spatial features greatly impact local climate patterns, as materials, land use, and geometric configurations all influence air temperature, radiation, wind flow, humidity, and air quality. Gaining a thorough understanding of microclimate processes and their interactions within complex morphological environments is crucial for developing effective climate-responsive planning and design strategies.

https://pure.tudelft.nl/ws/portalfiles/portal/148704493/9789463666695_WEB.pdf

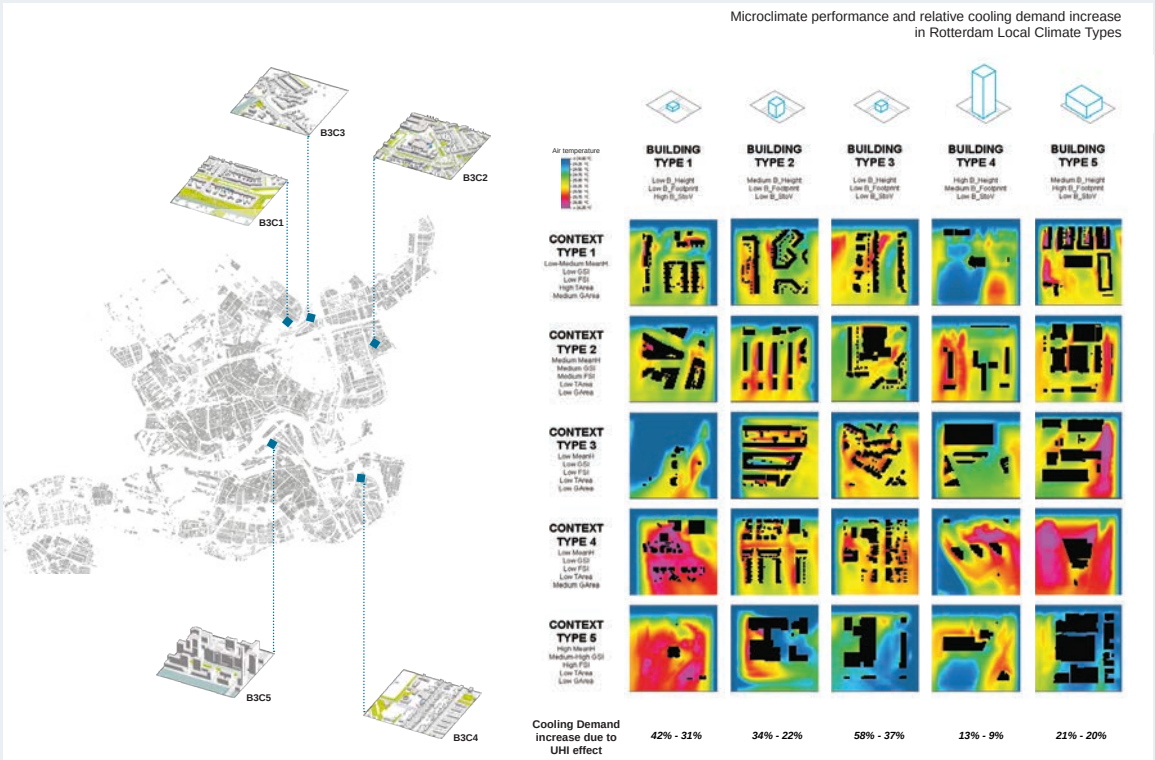


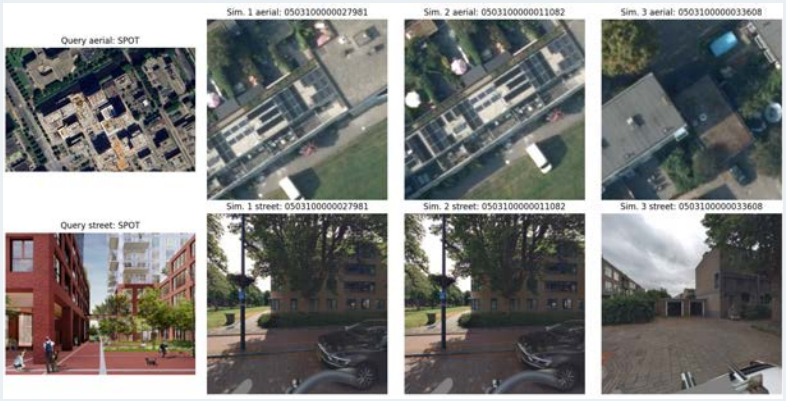
Figure 5
Visualisation of the building archetypes in the five context types - building type 3 (left). Spatial distribution of wind speed at 2m height (right)
Daniela Maiullari

1.5 AI in Architectural Design Course (AR2DS010)

Tutors: Seyran Khademi, Casper van Engelenburg, Fatemeh Mostafavi, Pablo Morato, Julien Vuillamy, Georg Vrachliotis

Identifying similar neighbourhoods using AI-based computer vision techniques helps transferring the resilience strategies, adopting proven solution, and benchmarking. One of the intelligent approaches to integrate AI in resilient neighbourhoods' investigation is via analyzing aerial photos and street view images. This can be realized by making appropriate representations of neighbourhoods and applying suitable computer vision models. In the Architectural Design elective on Computer vision model, the students compare the similarity of two buildings in Amsterdam and Eindhoven (SPOT, and Matchbox) to the buildings of the neighbourhoods of Hof van Delft and Krakeelpolder in Delft, with the foundation model DINOv2 used on a dataset of pictures.

https://www.studiegids.tudelft.nl/courses/study-guide/educations/12115



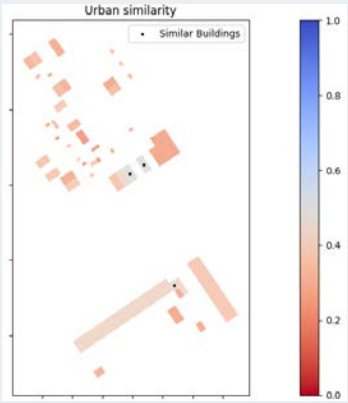


Figure 6
Neighbourhood similarity between SPOT, Amsterdam, and a subset of buildings from Krakeelpolder, Delft
Rosanna Bacon, Panthazin Aung, Ruveyda Han, Rabia Yasar, Fatemeh Mostafavi

1.6 Urban Heat Inequality

Doctoral research, Maha Moustafa Habib Abdelraouf
Promotors: Marjolein van Esch, Wim Timmermans, Maarten van Ham

Heat waves are becoming more frequent and intense, exacerbating urban heat exposure through the urban heat island effect and threatening public health and well-being. Despite growing awareness and initiatives to expand urban green space in the Netherlands, vulnerable populations remain disproportionately affected and insufficiently reached by current adaptation measures. Socio-environmental factors such as an aging population, dense urban form, and limited housing quality further complicate the development of equitable cooling strategies. This research aims advance our understanding of the socio-environmental interrelations that shape heat exposure and vulnerability in Dutch urban residential settlements. By unraveling these complex interrelations, we seek to uncover how heat exposure and vulnerability are spatially and socially distributed, and how such insights can inform more equitable and effective targeted strategies for mitigating heat stress across diverse urban populations.
Conducted within the Pandemic and Disaster Preparedness Center (PDPC) initiative, the study contributes to building long-term resilience and equity in the face of climate-related hazards.

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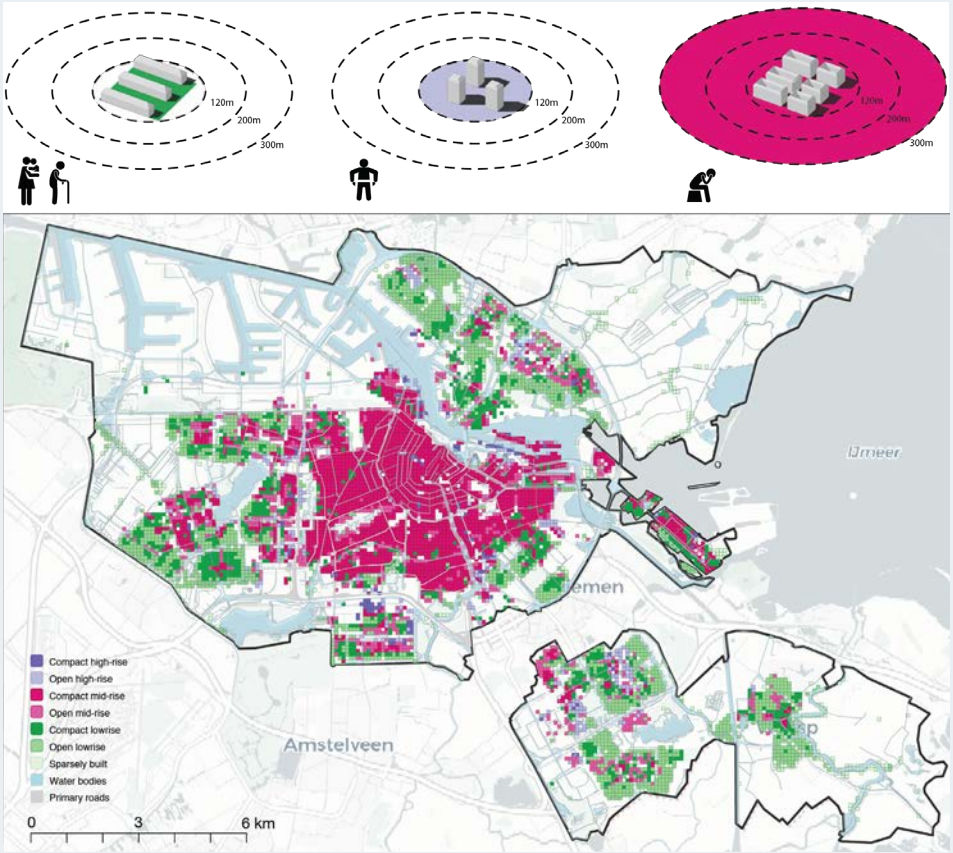

Figure 7
Differentiated Vulnerability to Urban Heat
Maha Moustafa Habib Abdelraouf

1.7 Practising Imaginaries: Rethinking Collective Action Through Everyday Urban Spaces

Doctoral research Aditi Natarajan
Promotors: Roberto Rocco, Caroline Newton, Juliana Goncalves

This research explores how climate imaginaries and collective action shape the social production of urban spaces. It responds to concerns that climate interventions increasingly favour technocratic, expert-led approaches, often neglecting local values, specific needs, and social inequalities. The constraints, choices, and resources available to communities are unevenly distributed, influencing the outcomes of interventions. Climate imaginaries, or shared visions of a climate-adapted future, provide a critical lens for understanding these dynamics. While extensively examined in policy and governance, their everyday relevance and impact on diverse urban realities remain underexplored. This study seeks to address that gap.

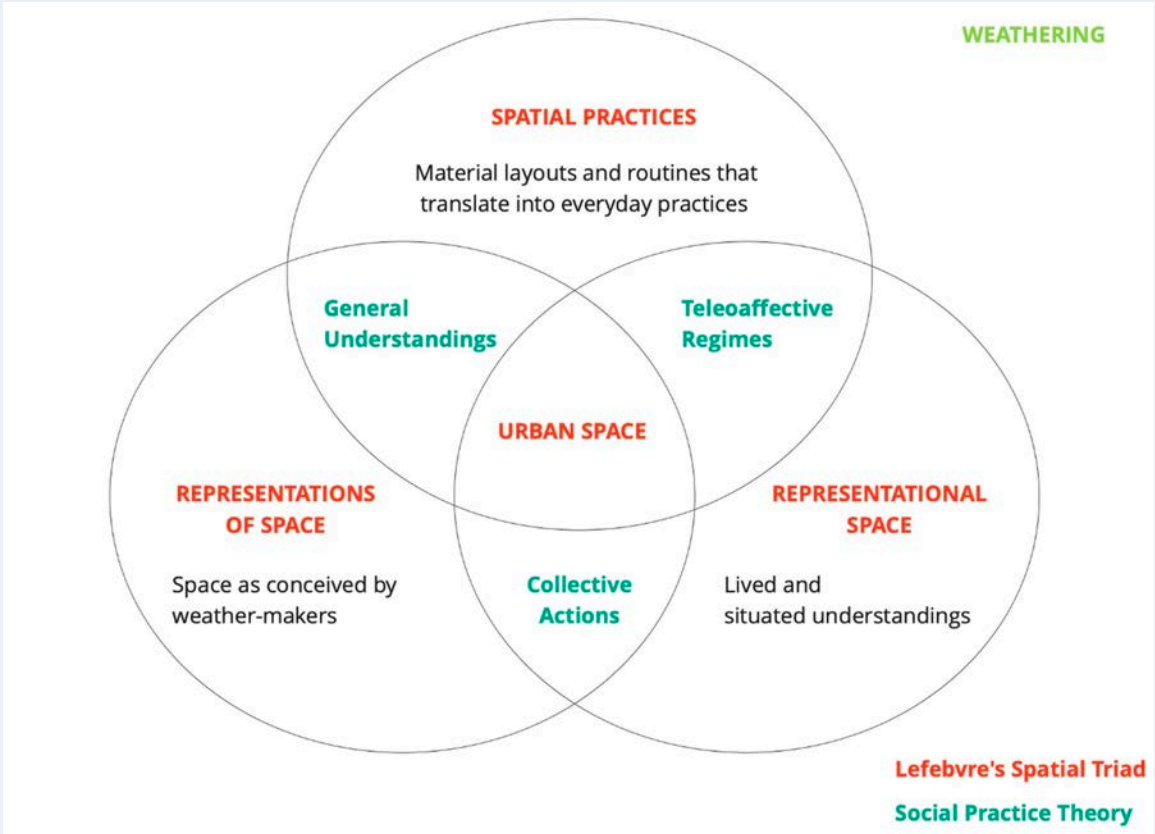

Figure 8
Conceptual framework for researching spatial embeddedness of climate imaginaries
Aditi Natarajan

1.8 MultiCare project
Multi-hazard low-carbon resilient technologies and multi-scale digital services for a future-proof, sustainable & user-centred built environment

TU Delft researchers: Simona Bianchi, Mauro Overend, Alessandra Luna-Navarro, Kyujin Kim, Thaleia Konstantinou, Justin Schembri, Azarakhsh Rafiee, Peter van Oosterom, Anna Maria Koniari, Eugene Mamulova
Funding body: Horizon Europe, European Union
2023-2027

Integrating holistic resilience indicators into building design and retrofit decisions enables structures to withstand diverse hazards, recover efficiently and support safer sustainable communities. This involves assessing a building's response and recovery capacities across physical, social, economic and environmental domains in the face of multiple hazards. Decisions at the material, component and building levels are interconnected, with small-scale choices shaping overall performance. Recognizing these links allows designers to optimize resilience, sustainability and comfort, ensuring every detail contributes to efficient structures. MULTICARE addresses those by developing innovative multi-criteria decision-support frameworks and providing plug & play low-carbon resilient technologies for improving the multi-hazard resilience of our built environment in a cost-effective, reliable and sustainable manner. A suite of multi-disciplinary digital services and tools will be developed for multi-hazard resilience assessment, design, operation and management across multiple scales (component, building, neighbourhood/district).

https://multicare-project.eu/

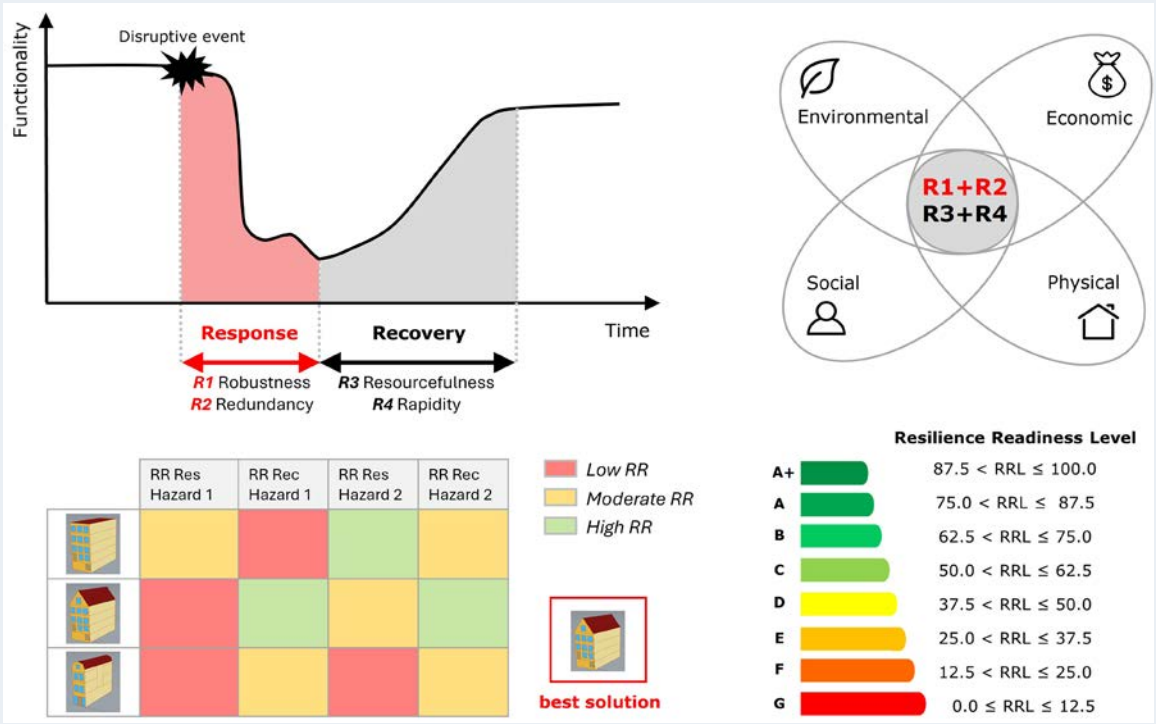

Figure 9
Resilience phases and domains for holistic decision making
MULTICARE project, Simona Bianchi

1.9 MultiCare project
Multi-hazard low-carbon resilient technologies and multi-scale digital services for a future-proof, sustainable & user-centred built environment

TU Delft researchers: Simona Bianchi, Mauro Overend, Alessandra Luna-Navarro, Kyujin Kim, Thaleia Konstantinou, Justin Schembri, Azarakhsh Rafiee, Peter van Oosterom, Anna Maria Koniari, Eugene Mamulova
Funding body: Horizon Europe, European Union
2023-2027

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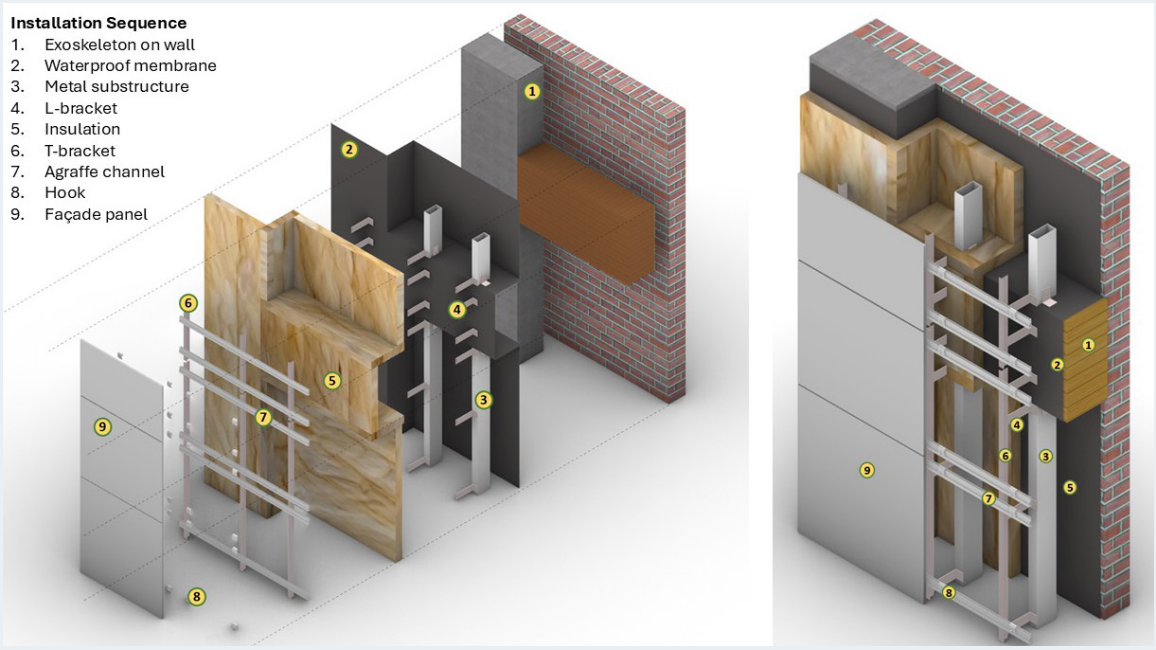

Figure 10
Resilience Integrated Facade Retrofit Design
MULTICARE project, Natchai Suwannapruk (Priedemann), Abhinay Kumar (Hoelscher)

1.10 Just Prepare project
Putting REsident Practices And REsidential areas at the center of a JUST and effective energy transition in underprivileged neighbourhoods

TU Delft researchers: Diletta Ricci, Thaleia Konstantinou, Henk Visscher, Aksel Ersoy
Funding body: KIC-call 'Energietransitie als maatschappelijk-technische uitdaging', NWO
2022-2026

JustPrepare Research Project (NWO funded), Putting Resident Practices and Residential Areas at the Centre of a Just Energy Transition, addresses two major mismatches that hinder equitable energy transitions: the disconnect between retrofit technologies and residents' actual energy practices, and between solution implementers and the lived realities of residents.

https://justprepare.nl/

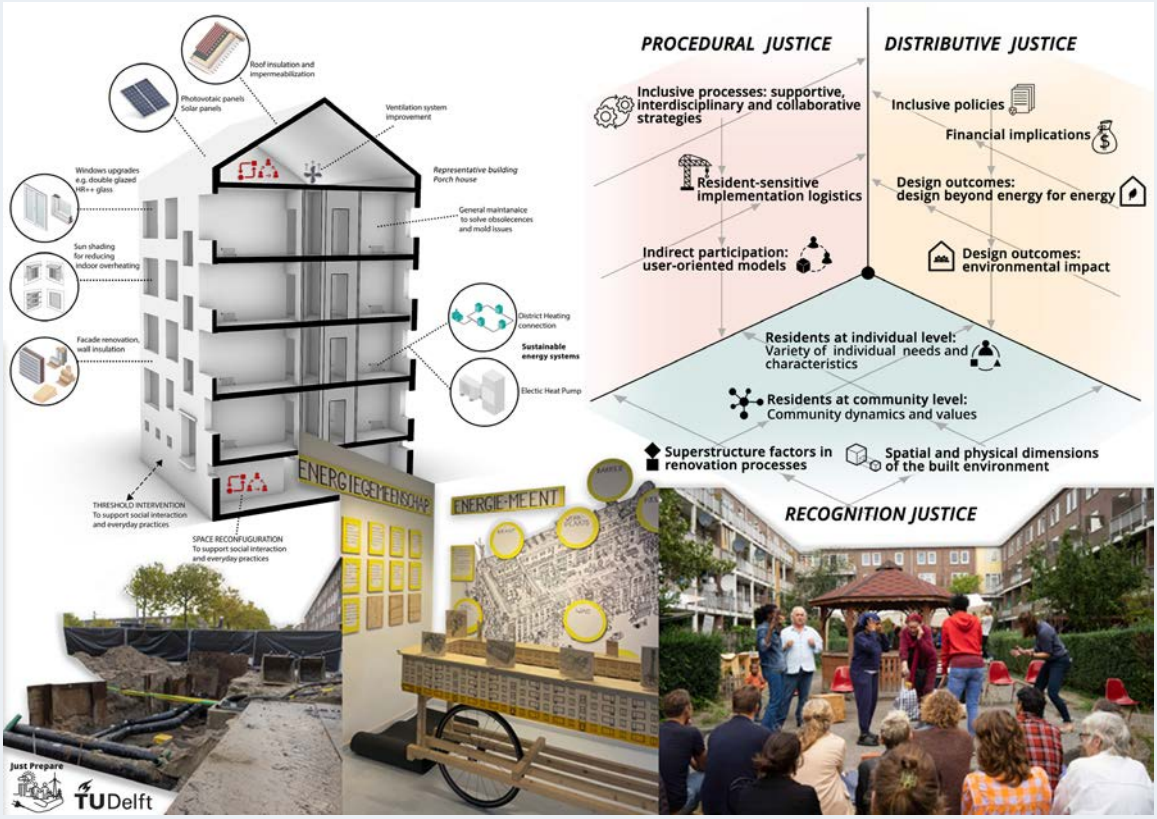

Figure 11
The interrelation between justice-oriented criteria and energy renovation decision-making, focusing on technical choices
Just Prepare project

2.1 TOGETHER: Towards Collaborative Living

Authors: Darinka Czischke, Marije Peute & Sara Brysch
Year: 2023
Publisher : Nai010 Rotterdam

Collaborative living is gaining momentum in the Netherlands as the country faces an unprecedented housing crisis. In response, many are turning to self-organized, community-driven solutions that prioritize sustainability and affordability. Yet these initiatives often struggle to take root. Building on insights from Project Together! carried out at the Faculty of Architecture and the Built Environment at TU Delft in 2021, the book examines the relevance of collaborative living today, the practical steps needed to realize such housing models, and the roles individuals and institutions can play in fostering them. By highlighting both challenges and possibilities, the book invites readers to consider a new paradigm for living together—one that supports more inclusive, resilient, and sustainable cities and regions in the 21st century.

English version: https://www.nai010.com/en/product/together-towards-collaborative-living/
Dutch version: https://www.nai010.com/en/product/together-ruimte-voor-collectief-wonen/
Open access via TU Delft Open: https://books.open.tudelft.nl/home/catalog/book/80

Figure 12
Together, Towards Collaborative Living
Nai010 uitgevers

2.2 Graduation studio “Designing for Health & Care”

This studio develops design suggestions for innovative housing ideas for older people, which connect health and care. Some example of outstanding projects include:

2.2.a “For and Together”

Master thesis, Nikola Wittmer
Year: 2020

After participation with the inhabitants of the neighbourhood where new housing was to be built, the graduation student Nicola Wittmer designed a flexible implementation on an available plot in an existing neighbourhood. The intention was to offer homes for older people and young people, families and singles. Due to the flexibility of the floorplan and the detailing, the house can grow from a small one-story apartment, suitable for an older person, to a two or even three-story house for a family. The vertical access can be adapted to the different situations, space for an elevator is reserved.

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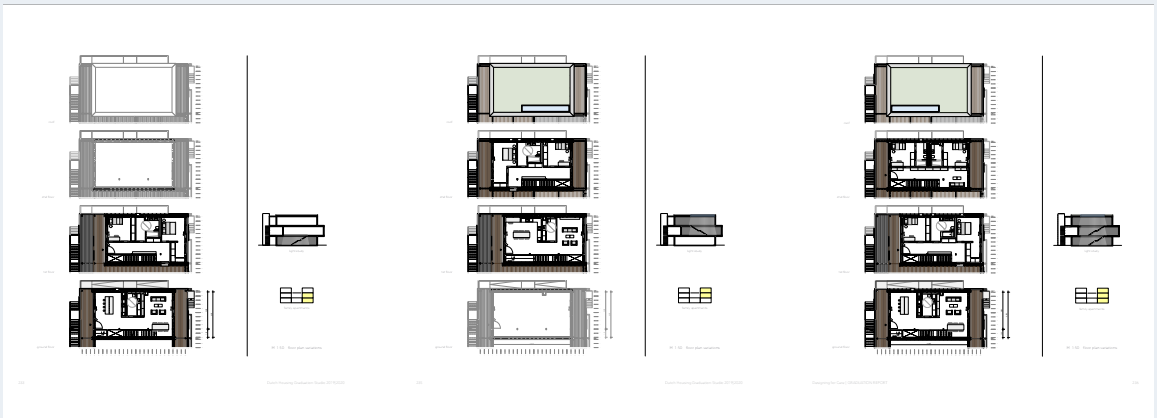

Figure 13
Modular Living – Flexible, Sustainable, Adaptable
Each 80m% unit, which can be connected horizontally or vertically, is part of a modular system supporting diverse lifestyles and changing needs over time
Nikola Wittmer

2.2.b “Multigenerational Living for the Sandwich Generation”

Master thesis, Chu-Yu Liang
Year: 2023

It lays the focus on the so-called “Sandwich family”, three generations living together: the young family with children and grandparents. Both have their own apartment with their own entrance, but they share an internal connection corridor or staircase. As the building is high-rise and there is a certain density of apartments, there is enough habitation to share collective rooms on the lower floors, even a library and a cafe and healthcare rooms.

https://resolver.tudelft.nl/uuid:c0a499d0-60bf-48d9-993a-b6f08e94b084

Figure 14
The Sandwich Generation - Concept Idea for Co-Living of Three Generations
Chu-Yu Liang

Figure 15
Final design of the Three Generation Building – living together in various choices
Chu-Yu Liang

2.2.c “The Elderly Movement”

Master thesis, Rosanne Alkema
Year: 2019

Focuses on daily walking circles of older people. The walking paths are often offering challenges for those with a walker, stick or even wheelchair. Rosanne designed a small neighbourhood with a sheltered house for vulnerable older people, offering internal- and external walking routes directly at the house, combining the sheltered home with a family neighbourhood and a daycare of children and one for people with dementia, arguing that they can organize togetherness with lunches or activities.

https://resolver.tudelft.nl/uuid:74561db2-3a25-4773-81a4-fbc86d2a284f

Figure 16
Designed for diversity: a living space where older adults can choose quiet retreat or lively connection
Rosanne Alkema

2.2.d “Networks of Care”

Master thesis, Emmy Vermeulen
Year: 2025

Shows how an investigation of care locations, “care dots” in a neighbourhood of Rotterdam South (Tarwewijk) resulting in a design of a central connection-dot in the centre of the neighbourhood, o!ering all the neighbours had asked for in the interviews (multifunctional room, kitchen and eating space, place for healthcare). Next to that a new residential complex shows how easy it could be to meet each other on the access gallery.

https://resolver.tudelft.nl/uuid:fde3e3e4-ea3f-468d-9719-37bb54a35971

Figure 17
A New ‘Care Node’ for Tarwewijk, Rotterdam: A Community Kitchen With Multifunctional Space
Emmy Vermeulen

2.3 “Professional Collaborative Housing Concepts for Seniors”

Master thesis, Joep Bastiaans
Year: 2021

The Netherlands is grappling with an ageing population, prompting the need for innovative senior housing solutions. Collaborative housing offers a promising approach by fostering social interaction, reducing loneliness, and lowering public health costs. This study explores how professionally led collaborative housing projects meet seniors’ needs, focusing on three cases using mixed-method research. Residents reported improved well-being, stronger neighbourly ties, and a sense of community. Two initiator types emerged: commercial-oriented, emphasizing efficient development, smart technology, and outsourced communal services; and ethos-oriented, prioritizing shared social values and resident-led communal organization. While professional collaborative housing models show potential, challenges arise when commercial goals undermine communal responsibility. Key risks include increased vacancies from selective communities, the need for intensive guidance during design, and difficulties in establishing shared spaces. Without structural support, collaborative housing concepts may falter in a market dominated by financial interests. Government and societal actors are urged to promote demand-driven models that prioritize social value over profit.

This thesis received the 2021 Jeroen van der Veer Award for the best masters thesis in the field of housing, awarded by the AVWC (Amsterdam association for housing corporations).

https://resolver.tudelft.nl/uuid:7e0df8a1-5e35-43c8-b09e-15556649bf13

Figure 18
New professional community-based housing concepts
Joep Bastiaans

2.4 “InCommon: Reconceptualizing Individual and Collective Housing Preferences”

Principal investigator: Dr. Darinka Czischke
Funder: NWO Vidi talent grant
Years: 2025-2030

This project investigates how collaborative living models—based on sharing and collectivity—can reshape housing in the 21st century. As Europe faces a housing crisis and shifting societal norms, traditional single-family homeownership remains dominant. Yet, alternative housing forms that promote shared spaces and resources are emerging, aiming to improve affordability, reduce environmental impact, and foster social connection. Despite their growth, it’s unclear how widely these models could be adopted beyond early adopters. The project addresses this gap by exploring the values and motivations that influence housing preferences across diverse households. It introduces a novel methodology that combines analysis of current collaborative living participants (effective demand) with those who haven’t yet opted in (latent demand). Using the Means-End-Chain method alongside action- and design-led research, the study examines how exposure to alternative housing options can shift perceptions. The goal is to build a comprehensive understanding of what people seek in a home, challenging conventional ideas centered on privacy and nuclear family structures. Ultimately, the findings aim to redefine how housing preferences are measured and interpreted by policymakers and industry, potentially transforming how homes and communities are designed to better reflect collective needs and aspirations.

https://www.tudelft.nl/en/2024/bk/vidi-grant-for-darinka-czischke-with-project-incommon

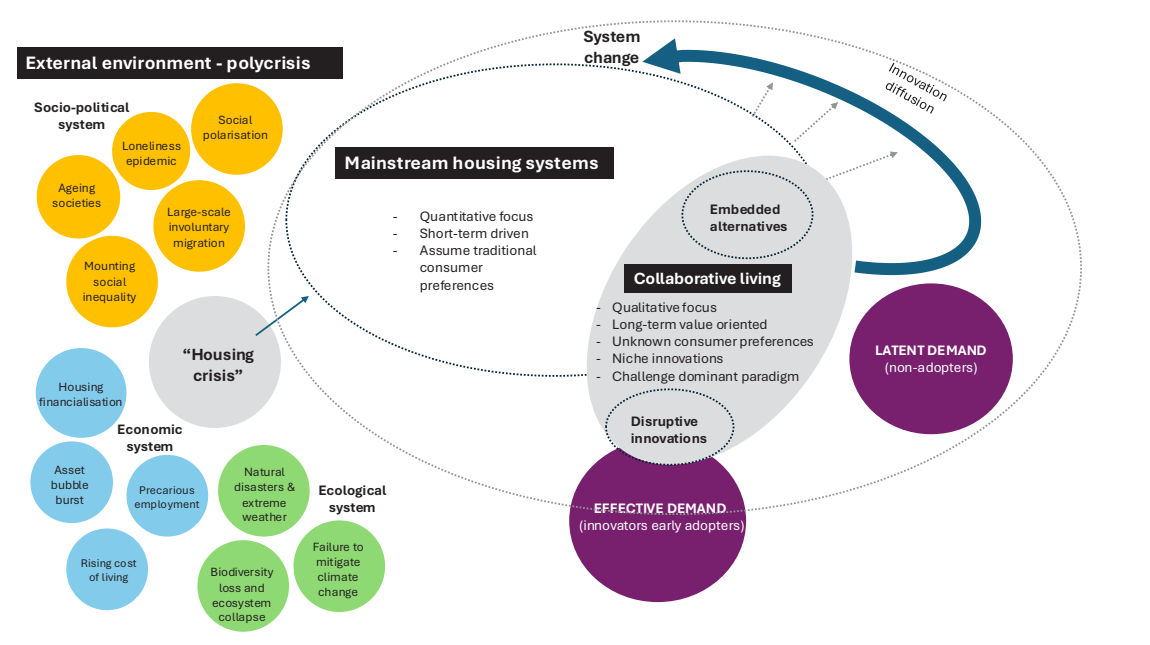

Figure 19
“InCommon” conceptual framework
Darinka Czischke

2.5 Graduation Studio “Advanced Housing: Densification Strategies”

While previous housing crises have been addressed by primarily building for the typical Dutch family households, the current demands combine a diverse range of target groups, environmental challenges and societal goals. Starters, students, families, seniors, migrants and locals cannot find adequate homes or conditions for the lives they aspire to, while existing close-to-centre neighbourhoods slowly deplete in their static monocultural structures.
Can a new approach to housing design invigorate existing urban neighbourhoods, assure social inclusion and enhance (bio-)diversity? Can such an approach increase densities and liveability, while reducing the ecological footprint of its residents? And can it maintain quality in the dynamic and disruptive conditions of a neoliberal housing market in a long-standing manner? The Advanced Housing Design Graduation Studio explores how housing and neighbourhood (re-)design can successfully address these challenges.

2.5.a “Incentivising Compromise”

Master thesis, Taija Love
Year: 2023

This project is an investigation into participatory design practices as a method for architects to revitalise communities through incentivising collaborative housing within existing urban structures in the suburb of IJsselmonde, Rotterdam. The project aims to show the potential of synthesis and collaboration for the development of new housing solutions. Based on a thorough analysis and understanding of participatory processes in design, a negotiating process is developed and tested through design development on the threshold between existing inhabitants and additional structures for newcomers, exploring the role of the architect in the process.

https://repository.tudelft.nl/record/uuid:149f501d-4539-4f91-9f45-9c7c1da15846

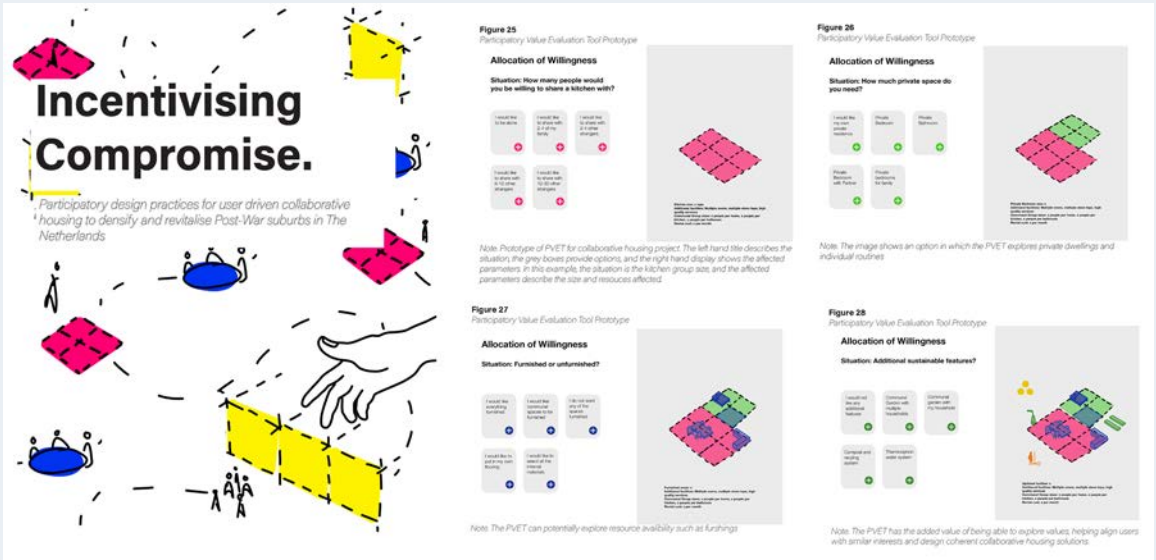

Figure 20
Incentivising Compromise - Participatory Value Evaluation Tool (prototype)
Taija Love

2.5.b “Degrees of Encounter - Densification Strategies to Alleviate Urban Loneliness in Post-War Neighbourhoods”

Master thesis, Alaa Hendi
Year: 2024

Tackling the issue of growing sense of loneliness in existing housing neighbourhoods, the theses explores opportunities for densification while increasing social and spatial connectivity.

https://repository.tudelft.nl/record/uuid:38c48022-20b5-468f-b026-5d892f569ba2

Figure 21
Degrees of Encounter
Alaa Hendi

2.6 “Standardisation & Versitility – Sociaal en Eigen in Mooi Mokum”

Master thesis, Maarten Verheij
Year: 2025

In a thorough exploration of how to combine the benefits of repetition and standardisation with ambitions of individual placemaking and identity, architectural solutions are discovered on the various scales of a high-dense urban neighbourhood, from the level of urban planning and routing to the spatial layout of various dwelling types and technical façade elaboration. Adapting historical examples of a continuous city to a new network of urban spaces that accommodate a variety of private, collective and public realms, a new way of thinking our cities more inclusively is propagated.

https://repository.tudelft.nl/record/uuid:533397a0-bebb-46e3-bde8-5edfd708f699

Figure 22
Social and Personal in Mooi Mokum
Maarten Verheij

2.7 “A house is not a home - Exploring the role of the architect in creating a sense of home in new living environments”

Master thesis, Maud van Wouw
Year: 2025

Based on the conviction that it is the inhabitant who turns a house into a personal home, a system for large scale mass-customisation is explored on a redevelopment location in Amsterdam. A standardised building structure allowing for a variation of dwelling types and sizes, is combined with spatial arrangements measured to incorporate existing prefabricated furniture solutions. Combined in open perimeter blocks with additional collective and communal spaces, the experience of coming home is explored on various scales and architectural definitions, while allowing the inhabitant to personalize and change the definitions of the private realm.

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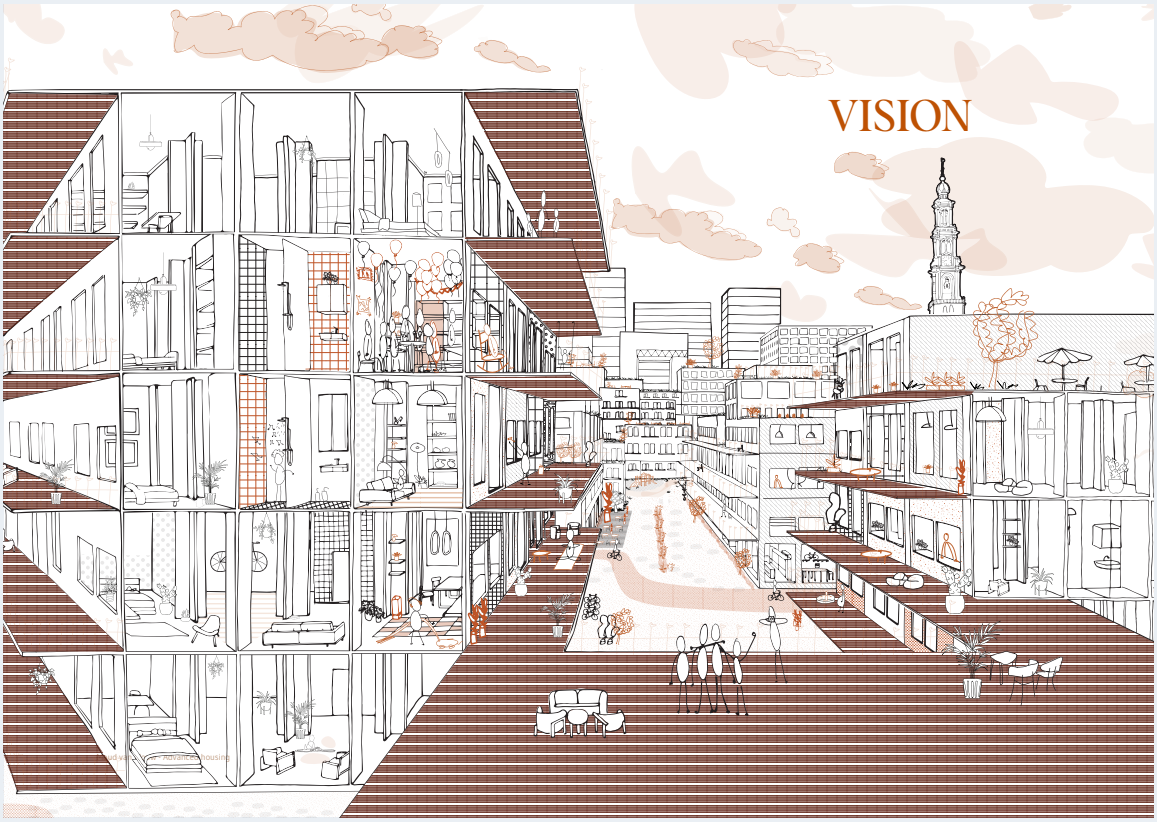

Figure 23
Homes in high densities
Maud van Wouw

2.8 “Adaptive Reuse for Housing”

Edited Book
Authors: Hilde Remøy, Erwin Heurkens, Gerard van Bortel and Roeli van Venrooij
Year: 2024

The Netherlands faces a deepening housing crisis, yet many buildings remain vacant. Adaptive Reuse for Housing, edited by four BK researchers, explores the potential of repurposing these structures into homes. With an annual need for 90,000 new residences, the authors argue that transforming unused properties—such as decommissioned churches, shuttered shops, outdated offices, and former schools or hospitals—could contribute 10–15% of the required housing supply. Beyond addressing shortages, adaptive reuse offers significant sustainability benefits. It reduces the demand for raw materials and minimizes demolition waste compared to conventional construction. The book also examines strategies to enhance the environmental performance of existing buildings through thoughtful design and renovation. However, transformation is not without challenges. Property owners and developers often lack mutual awareness, and projects face economic, legal, and policy hurdles, including financial uncertainty and bureaucratic delays. The book provides a comprehensive analysis of these barriers, presents stakeholder perspectives, and reviews sixteen case studies from across the country.

https://bookrxiv.com/index.php/b/catalog/book/42

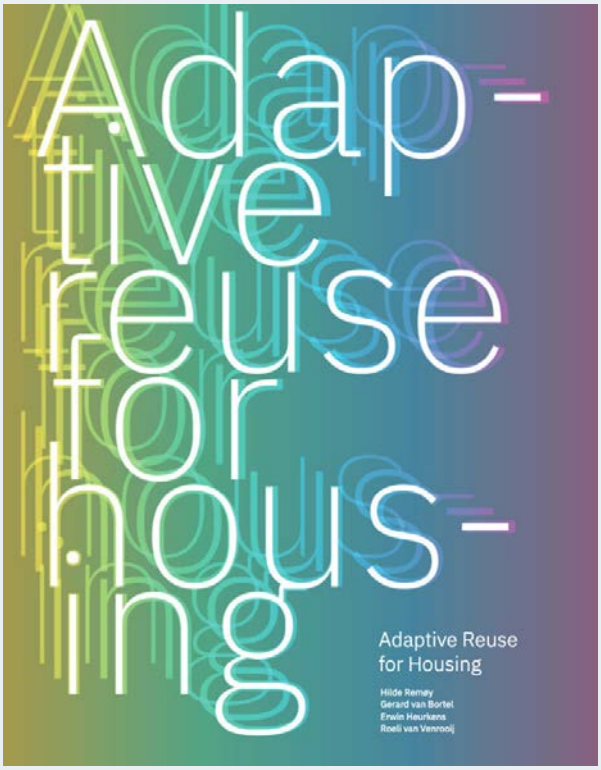

Figure 24
Adaptive Reuse for Housing
BookRxiv

2.9 From Dwelling to Dwelling – Radical Housing Transformations, DASH (Delft Architectural Studies on Housing)

No. 14, 2018 Rotterdam NAi010 Publishers

Housing designs from the past can be transformed to new housing that better fits current needs and lifestyles, often leading to surprisingly new solutions and unique qualities that add value to the lived-in experience. This publication examines in theoretical essays, interviews and case-study documentation the potential of transformation from housing to housing.

https://journals.open.tudelft.nl/dash/issue/view/DASH_14

Figure 25
From Dwelling to Dwelling
Delft Architectural Studies on Housing (DASH) (2018)

2.10 Independent Elderly Living, integrated into an informal care stimulating neighbourhood

Master thesis, Marin Salomons
Year: 2023

This thesis investigates the needs and wishes for people at older age to live as long as possible independently and integrated in their neighbourhoods, concluding that this means an integral approach of mixing ages and target groups that benefit from each others proximity in many ways. The project also explores how densification of existing post-war neighbourhoods can be successfully implemented with this strategy, allowing people to move within their neighbourhoods to dwellings more suitable to their needs, allowing newcomers to integrate into this blended history.

https://repository.tudelft.nl/record/uuid:1c4a480d-0831-4204-869c-180c6bf1f9ee

Figure 26
Needs and whishes elderly
Marin Salomons (2023)

2.11 UPLIFT project: Urban PoLicy Innovation to address inequality with and for Future generaTions

TU Delft researchers: Dr. Joris Hoekstra, Martina Gentili, Prof. Marja Elsinga
Funder: Horizon 2020
2020-2022

UPLIFT developed an innovative approach to policy design for reducing socio-economic inequalities. Traditional policies do not respond properly to the strategies and behaviours of vulnerable young households and are less effective in reducing inequalities. In the UPLIFT project, so-called “Reflexive Policy Agendas” in different domains (housing, education, social policy) were co-created and implemented in close collaboration between youth boards and policymakers. In the Dutch context, this resulted in a manifesto on youth housing policy, an in-depth insight into the effects of the housing crisis on young people (Gentili and Hoekstra, 2025) and a guidebook on how to successfully run a participatory co-creation process with young adults.

Figure 27
UPLIFT youth board presents their housing manifesto to the alderman of the city of Amsterdam
UPLIFT project

2.12 Developing places for human capabilities: Understanding how social sustainability goals are governed into urban development projects social sustainability and capabilities research

Doctoral thesis, Céline Janssen
Promotors: Prof. Co Verdaas, Dr. Tom Daamen
Year: 2024

This research explores how social sustainability goals can be effectively governed within area-based urban development projects. Using Amartya Sen's Capability Approach, it evaluates how institutional governance influences individuals' freedoms to pursue valued ways of living in urban environments. Through case studies in the Netherlands, Sweden, and Austria, the research highlights how people uniquely interpret social sustainability and transform spatial resources into personal capabilities. It identifies key governance factors and institutional conditions that either support or hinder these transformations. The study emphasizes that integrating social sustainability into urban development requires balancing flexible, responsive governance with clear institutional frameworks, defined roles, and adequate funding. Ultimately, it argues for a shift in urban development practices—moving beyond physical improvements to focus on expanding human capabilities equally. This capability-centered approach offers a more inclusive and effective pathway toward resilient and socially sustainable urban neighbourhoods.

https://journals.open.tudelft.nl/abe/article/view/7362

Janssen, C. (2024). Developing places for human capabilities: Understanding how social sustainability goals are governed into urban development projects.
A+BE | Architecture and the Built Environment, 14(01), 1–260. https://doi.org/10.7480/abe.2024.01.7362

Figure 28
'Waardenkaartjes' by Frank Hanswijk
ERA Contour

3.1 Urban safety for young women

Research project
Researchers: Geertje Slingerland, Krista Schram (PI), Linda Zuijderwijk, Wenda Doff, Joost Jansen, Tamar Fischer
Funding body: Kenniswerkplaats Leefbare Wijken

The research project aimed to redesign public spaces with young women, because they often feel unwelcome and unsafe there. Next to the fact that we encountered challenges to attract young women to participate in co-creative workshops, we identified some dilemmas related to the co-creation process.

"What are we designing? And what will happen with the outcomes?"
Before they decide to participate, young women want to know that their contribution is meaningful, i.e. that it will make a change. This requires commitment from the local government beforehand, that the input of young women on the public space design is going to be implemented. When in the urban development is the best moment to gather this input, so it can be implemented? And how open should the design assignment be?

"But their designs will be unrealistic!"
Most young women are not trained as urban designers, so how do we support them in coming up with meaningful designs for public spaces? There will always be a translation necessary from the ideas and input of participants towards the final urban design. In my view, this is the (new) role that designers should take in participation processes. However, this may require some skills (e.g. communication, feedback loops) that are not part of current education and practice.

Figure 29
Co-creation session with girls where they created a collage on their ideal neighbourhood
Geertje Slingerland

3.2 WijkWijzer: Co-assessing heritage attributes of Dutch New Towns through a digital walking survey

Research project
Researchers: Lidwine Spoormans and Rienje Veenhof
Funding body: Rijksdienst voor het Cultureel Erfgoed (Dutch Cultural Heritage Agency)

By using a digital tool for citizen participation, we aim to reach a larger, more varied stakeholder group, making it accessible for people with limited participation resources by avoiding expert language, combining visual and textual information and by making limited time demands. While walking through the neighbourhood, participants contribute their opinions through text or photographs in open, semi-open and closed questions. This mixed survey approach enables researchers to collect extensive data on (heritage) attributes while maintaining a relatively bottom-up approach, ensuring an open perspective on contributions from a diverse range of participants. The question formats allow for both quantitative and qualitative analysis; for the latter, we are employing a natural language processing model. Currently, we have results from five Dutch neighbourhoods, growing a database on neighbourhood attributes.

More information on: https://wijkwijzer.tudelft.nl/

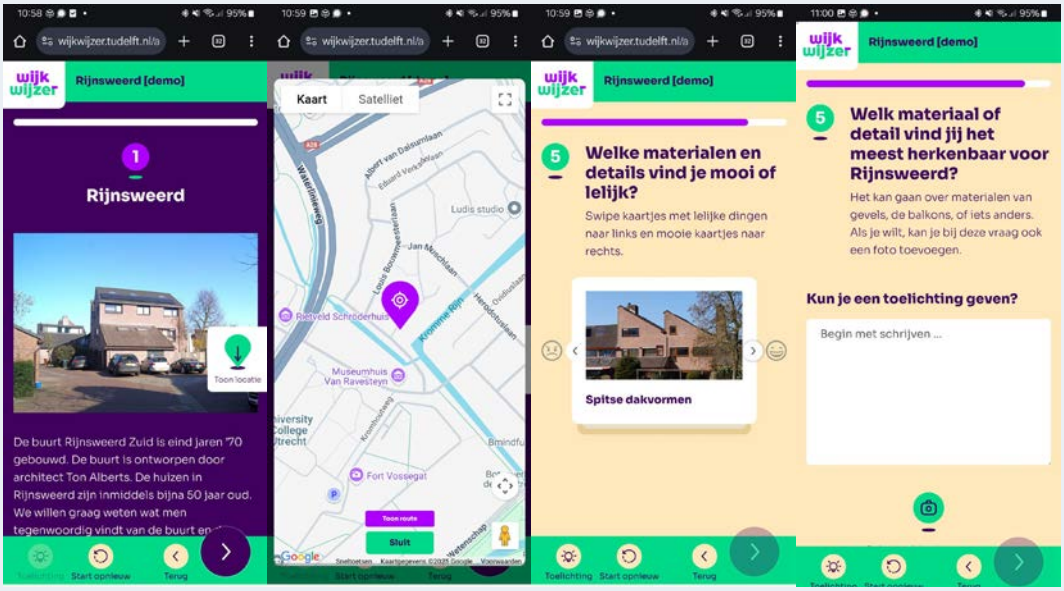

Figure 30
Screenshots from walking survey on mobile phone
WijkWijzer team

3.3 Integrating Soundscapes and Community Experiences: The Role of Sound in Public Spaces through Participatory Research in Katendrecht, Rotterdam

Research project
Researchers: Vincent Baptist, Sahar Asadollahi Asl Zarkhah, Rosa de Krui
Funding body: Resilient Delta Initiative, Kick-starter Grant for Early Career Academics

The NOISE® (New Outlooks in Sonic Environmental Resilience) research initiative, supported by Resilient Delta, reveals how sounds—from ship horns and distant traffic to local chatter—convey the rhythms of urban life and influence how people connect with their surroundings. Through fieldwork and dialogues with the local community, the research explores the intricate relationship between sound and place, showing how layers of auditory cues and urban rhythms define neighbourhood experiences, shaping both collective memory and individual perceptions. Reflecting the complexity of Katendrecht's soundscape, the outcomes of this work include several drawings that interweave three interconnected layers—space, sound, and perception—as well as a neighbourhood event, a policy paper, and other community-based outputs. Together, these elements capture how sound uniquely shapes place, identity, and memory in this vibrant, evolving neighbourhood.

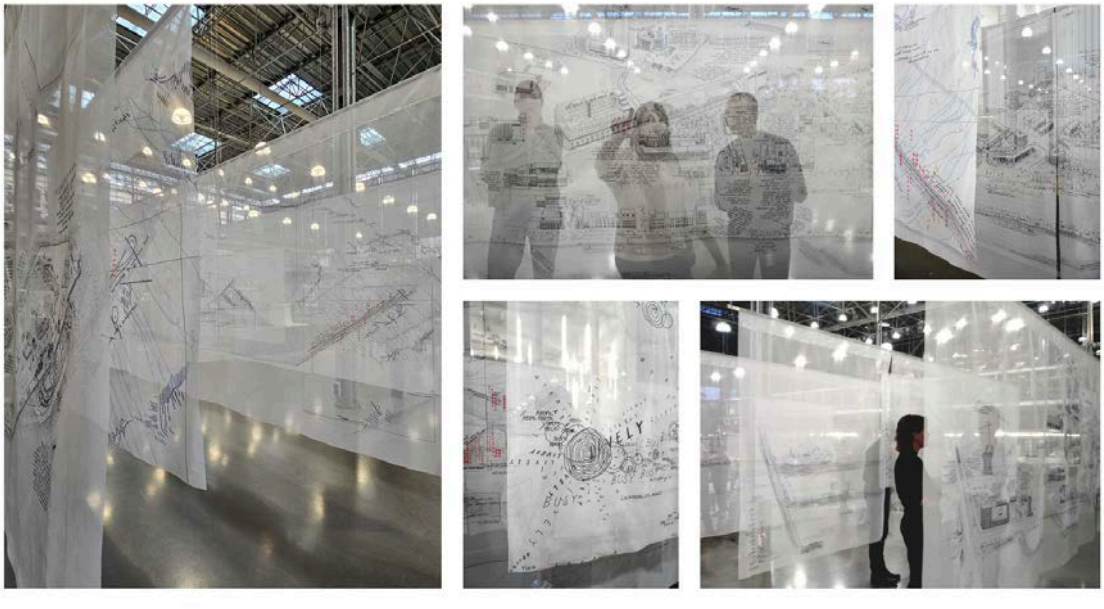

Figure 31
Exhibition, Integrating Soundscapes and Community Experiences: The Role of Sounds in Public Spaces through Participatory Research in Katendrecht, Rotterdam
Sahar Asadollahi Asl Zarkhah

3.4 ParticipAIte

Research project
Researchers: Juliana Gonçalves, Carissa Champlin, Tomasz Jaskiewicz, Betsie Loeffen, Charlotte De Jonghe, Joris Dietz, Juwe van Vliet, Kumsal Kurt, Maartje Roggeveen, Ryan Tsai, Robin Smits, Sander Aalbers, Valentina Guadagno, Virginia Facciotto, Yara Boom
Funding body: TU Delft Climate Action Program & Resilient Delta Initiative

ParticipAIte is a speculative design project that explores the role of artificial intelligence in the future of public participation. Rather than aiming to deliver definitive solutions, the project critically examines both the opportunities and challenges that emerging technologies present in this context. Its goal is to uncover the complexity of the topic and encourage viewers to reflect on it. It has been presented in public as an installation, bringing together three speculative concepts: Bruno the bench, Under the Loop, and kAIte, to explore the flow of citizen-generated data from neighbourhood buzz into a high-stakes municipal board room. It presents a critical and speculative vision of how AI might mediate and amplify public voices in urban planning.

The installation uses Rotterdam as an experimental site. By the year 2070, parts of Rotterdam will experience frequent flooding caused by rising sea levels and intense heavy rainfall events. The Municipality will have to choose between several courses of action to address the issue: from raising the level of the dikes to redesigning low-lying areas into floating neighbourhoods. ParticipAIte presents the dilemmas of people living in a Rotterdam neighbourhood who are grappling with an uncertain future for their community. By embedding AI into a fictional citizen engagement process, the installation explores how community values, local knowledge, and speculative technologies might converge to shape inclusive, participatory urban futures.

Figure 32
The three speculative concepts part of the participAIte exhibition: Bruno the bench, Under the Loop, and kAIte
ParticipAIte team

3.5 Lentefeest - Situated participation + Public commitment

Research project
Researchers: Juliana Gonçalves and Geertje Slingerland, Maria Gil Falcon, Isabella Jaramillo Diaz, Jing Spaaij
Funding body: Resilient Delta Initiative

As the culminating public moment of the BIO-CiVo project, the Lentefeest (Spring Festival) held on May 25th, 2024, in Serumpark (Oud-Mathenesse, Rotterdam) offered an ideal setting to engage directly with residents in a festive, informal atmosphere. Co-organised by student assistants from the Citizen Voice team and local residents from the citizen organisation Mathenesse aan de Maas (MaM), the event served both as a celebration of local culture and a testbed for the final version of the biodiversity prototype. Approximately 150 visitors attended the festival, which featured 23 booths, including ten showcasing green initiatives, a diverse food program prepared by residents, and live performances by local bands. This setting enabled easy access to participate in the testing and meaningful interaction with the prototype. During the preparation, feedback from a local resident helped contextualise the scenarios and inform important adjustments to the prototype. At the festival, visitors from all ages explored the tools and engaged in conversations about biodiversity. The presence of Mayor Aboutaleb, who engaged with various booths and initiatives, further validated the relevance of local voices in shaping biodiversity policy. Through this setting, the Lentefeest illustrated how biodiversity can be brought closer to people's everyday concerns and neighbourhood dynamics.

Figure 33
Testing the interfaces during the Lentefestival
Geertje Slingerland

4.1 RED& BLUE (Real Estate Development & Building in Low Urban Environments)

Research project
Researchers: Prof. Ellen van Bueren (lead), Dr. Zac Taylor, Dr. Tom Daamen, Dr. Audrey Esteban
Funder: NWA-ORC
2023-2028

RED&BLUE is a five-year research and impact program focused on improving climate risk management for real estate and infrastructure in the Dutch delta. It promotes integrated strategies for investment and urban development, fosters shared understanding of climate risks and governance challenges, and strengthens collaboration between public and private sectors. Through research, dialogue, and practical application, Red&Blue drives systemic change in how urban areas respond to climate threats. The program addresses fragmented governance, economic and social pressures, and knowledge gaps that hinder effective climate adaptation. It engages communities and institutions to co-develop equitable, climate-resilient strategies, and builds tools and shared language to enhance adaptive capacity. By connecting experts and authorities, Red&Blue facilitates data sharing, generates new insights, and aligns working methods for vulnerable urban environments—bridging disciplines and sectors to support long-term resilience in the built environment.

https://redblueclimate.nl/

Figure 34
Photo by Sander van Wettum
https://redblueclimate.nl/news/climate-proof-finance/

4.2 RE-DWELL

Research project
Researchers: Prof. Marja Elsinga, Dr. Marietta Heffner, Dr. Gerard van Bortel
Horizon 2020, Marie Skłodowska-Curie training network
2020–2024

RE-DWELL trained 15 early-stage researchers to work across design/planning, policy and financing, and community participation toward affordable, sustainable housing. Its purpose was not a one-off course but a transdisciplinary capacity platform: structured network schools, city workshops, and a shared research environment that deliberately bridges municipal policy, housing providers, civil society and industry partners. The consortium produced a formal Transdisciplinary Environment for Affordable & Sustainable Housing (TEASH), which sets out how mixed teams co-produce problem definitions, indicators and solution pathways that public bodies can reuse. RE-DWELL's value for governance is thus institutional capacity, not just knowledge: it generates 'multilingual' practitioners fluent in housing finance and design, participation and regulation; exactly the skill mix cities need to steer neighbourhood programmes without defaulting to single-issue delivery.

Figure 35
RE-DWELL workshop Delft, October 2023
Marja Elsinga

4.3 REPAiR: REsource Management in Peri-urban AReas

Research project
Researchers: Prof.dr. Arjan van Timmeren, Dr. Alexander Wandl, Dr. Marcin Dabrowski, Bob Geldermans, Dr. Hilde Remøy, Dr. Erwin Heurkens, Rusnė Šilerytė, Cecilia Furlan, Yan Song, Dr. Libera Amenta
Horizon 2020
2016–2020

REPAiR delivered an open-source Geodesign Decision Support Environment (GDSE) and a method for Peri-Urban Living Labs (PULLs) across six metropolitan regions. Together, these make co-creation and decision analysis work in tandem: stakeholders co-develop strategies in PULLs while the GDSE integrates material-flow, spatial and socio-economic data to compare options, surface trade-offs and document choices in a way that can be transferred between places. REPAiR shows how authorities can apply it to build place-based circular strategies, a governance workflow rather than a one-off tool.

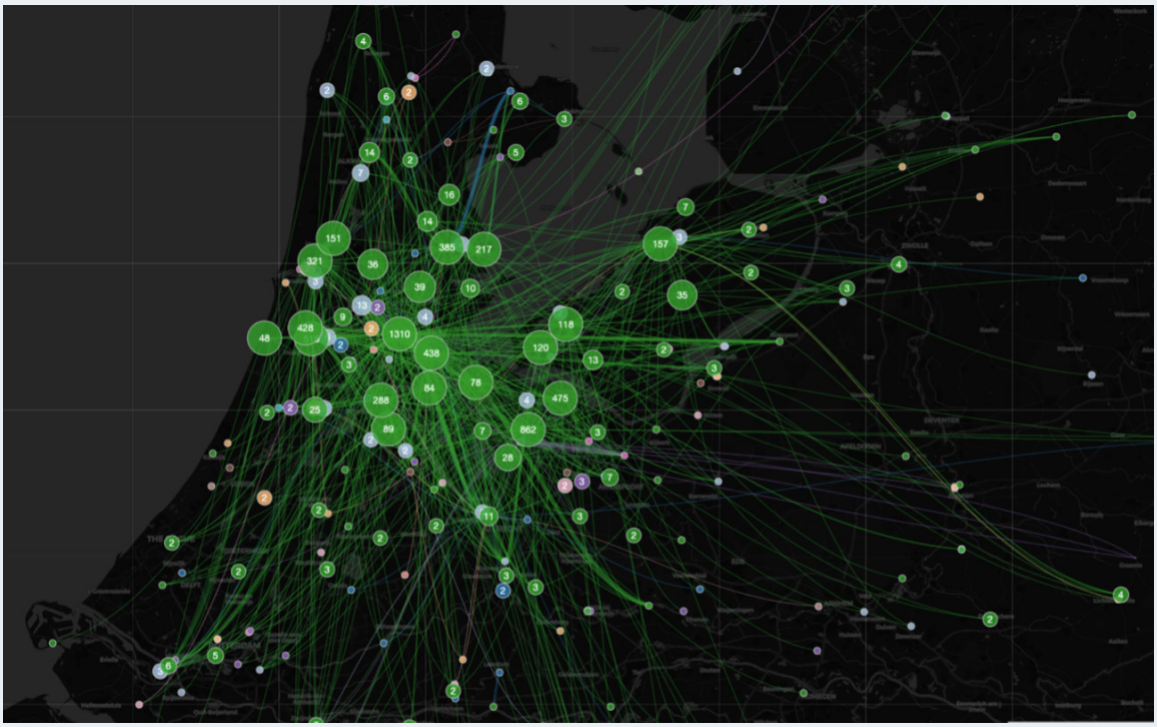

Figure 36
Geography of waste flows in Amsterdam Metropolitan Area, 2016: networks and clusters of the processing of construction and demolition waste (numbers in circles correspond to activities related to this flow) extend far beyond the administrative boundaries of the region
H2020 REPAiR project

4.4 UP2030

Research project
Researchers: Dr. Roberto Rocco (lead), Dr. Juliana Goncalves, Dr. Marcin Dąbrowski
Horizon Europe
2023–2025

The UP2030 project helps European cities reach climate-neutrality by using planning and design to shift from piecemeal decarbonisation to vision-led, strategy-based action at the neighbourhood scale. Within the consortium, TU Delft manages Work Package 3 (city up-skilling and solution selection) and leads the task on spatial justice and citizen participation, which includes developing a spatial-justice benchmarking framework that cities can use to compare options and evaluate interventions. The project has made this agenda public through TU Delft's 'Spatial Justice in Practice' symposium series (and related workshops), which convene municipalities, practitioners and researchers to translate justice principles into operational criteria for policymaking, planning and design. UP2030's early outputs include a benchmarking report that proposes a qualitative system to orient city goals and guide implementation strategies towards a 'just and resilient carbon-neutral city,' providing indicators and methods cities can adopt and adapt. In short, UP2030 is not treating 'justice' as an afterthought; it is building tools, metrics and training that embed justice into how cities choose, phase and assess decarbonisation measures.

Figure 37
UP2030 framework
UP2030

4.5 DUST: Democratising jUst Sustainability Transitions

Research project
Researchers: Dr. Verena Balz, Dr. Thomas Verbeek, Dr Marcin Dąbrowski, Odilia van der Valk
Horizon Europe
2023–2026

DUST is coordinated by TU Delft and brings together 13 partners to develop and operationalise participatory instruments that make sustainability transitions more democratic and place based. Methodologically, DUST combines design-led territorial tools with digital deliberation at scale, so that citizens' perspectives can be systematically gathered, compared and linked to formal decision points. The project works in eight regions undergoing transition, including Groningen, and explicitly seeks to identify the least-engaged communities and platform their voices in policy processes, while connecting them to policymaking networks. DUST's has been laying out how to study and structure democratic engagement in territorial transitions. The project also produced the STEP Index (Stakeholder Engagement and Participation Index), a comparative tool to measure the quality of participation in just-transition policies; published through EU channels and positioned for direct policy uptake.

Figure 38
Community's imagined plausible future of Stara Zagara (section)
Artwork by OOZE architects, with the support of Małgorzata Rybak (TU Delft)

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