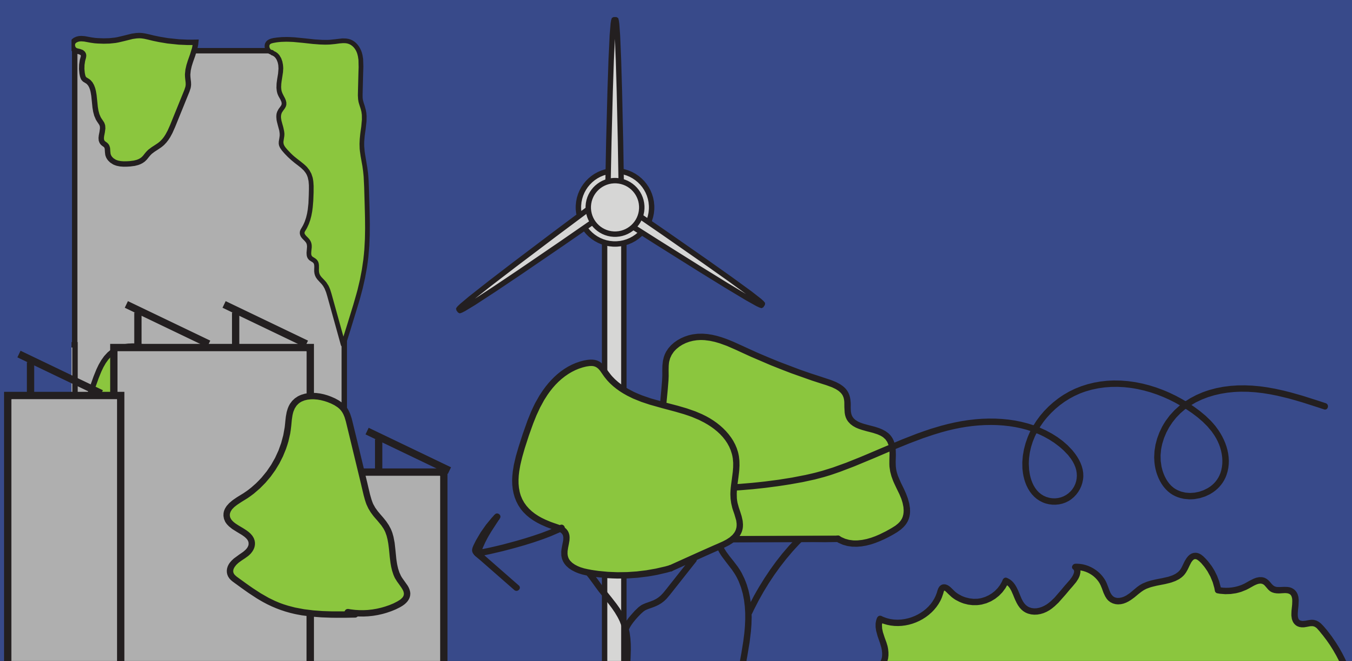
Call to Action: Promoting Synergies in Climate Mitigation and Adaptation

White Paper by the 4TU.Built Environment Climate Adaptation & Mitigation DAT

December 2025



Synergy

is what happens when one plus one equals ten or a hundred or even a thousand. It's the profound result of valuing differences and combining strengths.

Stephen R. Covey

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Keywords: climate change, climate adaptation, climate mitigation, climate resilience, climate-driven design.

Key definitions:

Climate adaptation: Adjusting and adapting our environment to minimize the negative effects of climate change.

Climate mitigation: Reducing greenhouse gas emissions to minimize the cause of climate change.

Climate-driven design: Planning and design with climate at the centre, with local climate as a driver of form and function instead of a constraint.

Dutch Delta: The Dutch landscape, much of it below sea level, characterized by rivers and the sea.

Contents

Abstract

The Netherlands today faces many severe climate-related risks, including rising sea levels, droughts, heat stress and flooding. Solutions are put in place to tackle these issues, but are often focused on either adaptation or mitigation, but not both. In a country where the pressure on land use is critical, a synergistic approach is urgent and essential.

This paper introduces a framework to address this lack of synergy. First, we call for designing streets, buildings and more proactively with climate mitigation AND adaptation at the center; both strengthening the other. Second, stakeholders need to intersect and collaborate during the entire design process. Third, these goals can be achieved using spatial data supported by decision support systems to find synergies, trade-offs and investments.

Finding overlap in stakeholder goals and aligning them is essential for creating shared momentum. Tackling the issues requires funding and innovating, with a long-term integrated approach. Any solution requires spatial designs with respect for the environment and human wellbeing, taking citizen needs and desires into account.

Future steps include sharing the narrative with stakeholders for feedback and validation, building a community of practice and research, securing funding opportunities and scaling to an international arena.

Figure 1: *Green Wall at Herzog & de Meuron, Madrid. By Alfredo Sánchez Romero from Madrid, España - Vertical Garden, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=35398332*

Introduction

1.1 Climate, climate adaptation & climate mitigation in the Netherlands

As climate change intensifies, the Netherlands faces the urgent dual challenge of reducing greenhouse gas emissions (climate mitigation) and adapting its densely built environment to rising sea levels, fluctuating river discharges, heavier rainfall, prolonged droughts, and increasing heat stress (climate adaptation). Recent years have demonstrated the severity of these risks: the country experienced significant droughts in 2018, 2019, 2020, and 2022 (Bartholomeus et al. 2023), while in 2021, heavy rainfall caused severe flooding in Limburg, affecting many families and resulting in €383 million in damages (Figure 2) (Pot, de Ridder, and Dewulf 2024). Heat stress is also an increasingly critical problem and is considered the most urgent climate-related health risk in Europe (European Environmental Agency 2024). During the summer of 2022, excess mortality due to extreme heat reached 61,000 people in Europe (Ballester et al. 2023) and 1,350 people in the Netherlands. Predictions indicate that this number may increase by 20% to 40%, respectively 60% to 100%, dependent on mitigation measures, in the Netherlands by 2050 (Hall et al. 2021).

A collection of policy frameworks currently guides the transformation of the Dutch built environment to address these dual challenges. The Dutch National Climate Agreement (Climate Agreement 2019) stipulates that by 2050, 7 million residential dwellings and 1 million utility buildings must have replaced natural gas with sustainable heat sources, implying substantial construction and infrastructural work. Furthermore, 70% of electricity production should come from sustainable sources by 2050, necessitating the continued rollout of wind and solar energy. However, the Netherlands is largely "grid locked", as the current electricity grid cannot keep pace with the rapid expansion of sustainable energy solutions such as wind farms, geothermal systems, residential heat pumps, photovoltaic panels, and electric vehicle charging points.

The Delta Programme for Spatial Adaptation outlines strategies to enhance climate resilience by implementing mitigation and adaptation measures that support sustainable development through spatial planning. Its goal is a climate-resilient Netherlands by 2050. Achieving this requires significant implementation of blue-green infrastructure in both public and private spaces—to provide cooling, increase water retention, and reduce flood risks—supported by governmental instruments such as the Maatlat Groene Klimaatadaptieve Omgeving. Additionally, the National High Water Protection Programme aims to reinforce 1,500 km of dikes, which has substantial spatial consequences beyond flood safety alone. All these efforts unfold against the backdrop of a severe housing shortage (Hochstenbach 2025), resulting in competition for political attention, funding, and space.

This multi-scalar policy landscape is pushing the construction sector toward developing solutions that are specifically aimed at either climate adaptation or climate mitigation. Earmarked budgets, sectoral policy targets, administrative responsibilities, and strict implementation timelines often constrain the exploration of synergistic solutions that address both mitigation and adaptation simultaneously, and in a manner that they reinforce each other.

Figure 2: *Flooding of the Geul in Valkenburg, 2021. By Romaine - Own work, CC0, https://commons.wikimedia.org/w/index.php?curid=107588096*

As a result, various ministerial and advisory reports (Dijk et al. 2025; Graeff et al. 2023; Hamers et al. 2021; Ministerie van Infrastructuur en Waterstaat 2024) highlight the need to improve coordination between the various challenges facing the Dutch built environment. Limited physical space, shortages in skilled labor, and insufficient organizational capacity continue to hamper the rapid implementation of solutions. The pressure on land is extreme: space is needed simultaneously for housing, agriculture, water management, energy transition, and nature restoration (Dam, Pols, and Elzenga 2019; Hamers et al. 2021, 2023). As several commentators note:

"If the Netherlands were to accommodate all its spatial claims, it would need to be three times its actual size"
(van Klaveren et.al., 2020).

This scarcity makes synergistic approaches both urgent and essential.

The urgency is amplified by the fact that the Netherlands is effectively a fully urbanized country (Centraal Bureau voor de Statistiek n.d.). The built environment is therefore the primary arena where climate action must occur. Integrated approaches—such as combining renewable energy generation with climate-adaptive design in buildings, neighborhoods, and public spaces—are crucial to avoid maladaptation and to ensure long-term resilience (National Delta Programme 2022). Research increasingly emphasizes the benefits of combining mitigation and adaptation measures (Figure 3) (Sharifi 2021).

1.2 The role of 4TU and DAT Climate Mitigation and Adaptation

For this reason, the 4TU Domain Acceleration Team (DAT) Climate Mitigation and Adaptation aims to address these challenges by organizing an interdisciplinary coalition that defines and implements an action-oriented research agenda together with industrial and societal partners.

Education plays a crucial role in advancing this mission by fostering the ability to synthesize research, technology, and design. Future professionals must be equipped to navigate the complexities of interconnected societal challenges and contribute to co-designed solutions. This aligns with the development of the T-shaped profile: individuals with deep expertise in a specific domain, complemented by strong collaborative abilities and a broad understanding of adjacent fields.

Research initiatives share a similar logic. Transdisciplinary research forms the foundation for developing synergistic climate mitigation–adaptation solutions in close collaboration with practitioners. Each of the four universities partnering in this DAT brings its own strengths and expertise to the table:

University of Twente (UT): multi-actor collaboration and transitions in infrastructure and the built environment

Wageningen University & Research (WUR): landscape architecture design

Delft University of Technology (TUD): architectural engineering and technology

Eindhoven University of Technology (TUE): urban planning and transportation

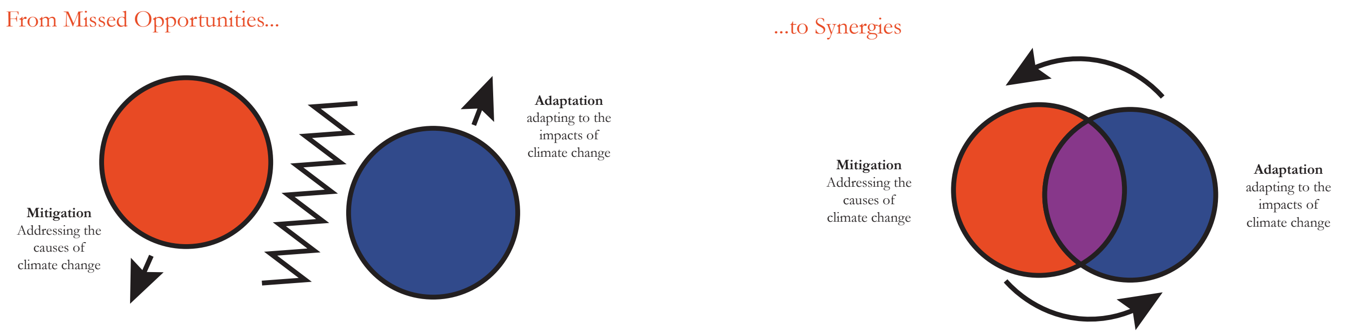

Figure 3: *Diagram showing the current lack of collaboration between adaptation and mitigation and the proposed synergy*

By bringing together these complementary competences, the DAT seeks to foster an interdisciplinary environment. In addition, it aims to advance a transdisciplinary approach through close collaboration with practitioners. This enables researchers, practitioners, and students to jointly explore, test, and implement integrative climate mitigation and adaptation strategies.

1.3 Mission & Aim

To address existing misalignments and seize opportunities for synergy between climate mitigation and adaptation, the 4TU-DAT Climate Mitigation and Adaptation initiative aims to demonstrate that integrated approaches are both possible and beneficial. Its mission is to provide evidence and a robust framework that supports researchers and practitioners in developing innovative, combined climate strategies, enabling more effective responses to the dual challenges of mitigation and adaptation.

We aim to nurture/support/educate practitioners and researchers to actively explore, test, and apply governance, planning, co-design, and implementation approaches that integrate mitigation and adaptation measures. Through this, we create new knowledge and progress a meaningful norm and culture of climate-driven design.

For example:

> Practitioners and researchers actively explore how to govern, plan, co-design, and implement integrative climate mitigation and adaptation strategies and measures.
>
> Practitioners, societal organisations, and decision-makers understand the implications of maldevelopment in relation to an integrative mitigation–adaptation approach.
>
> Practitioners open up to explore and explicitly assess the potential of integrative climate mitigation and adaptation measures at the outset of each project.
>
> Societal organizations, decision makers, practitioners are equipped with the means and tools to govern, plan, co-design, and implement integrative mitigation–adaptation strategies.

Dutch society is well-positioned to take a leading role in this transition. The urgency of climate action is particularly high in the Netherlands due to the combination of high flood risks (from both sea and river), dense urbanization, extensive infrastructure, strong design culture, and a high population density. At the same time, the Netherlands is a wealthy, innovation-driven country, home to strong research institutions and a societal culture supportive of experimentation and innovation. This provides fertile ground for becoming a global frontrunner in synergistic climate mitigation and adaptation.

UNIVERSITY OF TWENTE.

TU Delft

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

WAGENINGEN UNIVERSITY & RESEARCH

A Way Forward

2.1 Scale Levels

Climate mitigation and adaptation cannot be advanced through isolated interventions. They require coordinated action across scales and integrative approaches across domains. We identify three critical spatial levels, 1.) building, 2.)street & neighbourhood, and 3.)city & region, that together form the nested hierarchy in which climate strategies are deployed and experienced.

At each of these levels, three domains of action must intersect:

- **Climate-driven design** — the **aim**
- **Cross-sector interactions and multi-actor integrative planning** — the **means**
- **Spatial data and decision-support systems** (**DSS**) — the **tools**

These scales are interdependent and require aligned strategies to avoid fragmented action or maladaptive outcomes. Measures taken at one level influence and can either reinforce or undermine those taken at another. Differences in synergies between scale levels could be taken as an opportunity to develop a new perspective on synergies. For example, for the transformation and design of new buildings the focus is on mitigation measures, methods to include adaptation measures lack scientifically substantiated criteria. For the design of urban areas, there is more evidence for adaptation than for mitigation design measures. Coordinated planning across scales ensures that synergies between mitigation and adaptation can be fully utilized.

2.2 Action Domains

Climate-Driven Design (the Aim)

While traditional climate-responsive design often reacts to the consequences of climate change, typically as an afterthought or to deal with negative impacts, Climate-Driven Design places the climate itself at the centre of planning and design (Figure 4). It shifts from a reactive to a proactive posture, using local climate characteristics as a driver of urban form and function rather than a constraint.

At the neighborhood scale, this means orienting streets and open spaces to capture prevailing winds for natural cooling and ventilation. Such measures reduce heat stress, enhance comfort, and simultaneously lower reliance on mechanical cooling systems, thereby reducing energy demand and associated emissions. At the building scale, similar principles apply: designing for solar orientation, shading, and hybrid ventilation not only supports resilience to overheating in our climate zone (Figure 5) (Eijkelenboom et al. 2024) but also improves energy efficiency, linking adaptation and mitigation in a single strategy.

For example, siting new housing developments in areas where wind flows are strongest can simultaneously enhance thermal comfort and support on-site renewable generation, such as small-scale wind harvesting.

These principles also extend to the regional scale. In contexts like the Dutch delta, decisions about where urban development can or cannot take place must consider wind patterns, hydrology, heat dynamics, flood safety, and ecological functions. This is especially relevant in

Figure 4: *Water-source heat exchanger being installed By Mark Johnson (Marktj at English Wikipedia) - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=7952259*

current debates on building in flood-prone areas such as the IJsselmeer region, Waterfront Lelystad, and Arnhem's Stadsblokken–Meinerswijk, or the extensive urban developments in areas below sea level. An integrated mitigation–adaptation approach prevents maladaptation, avoids carbon-intensive lock-ins, and ensures that regional growth strategies align with long-term resilience and climate-neutrality targets.

Cross-Sector Interactions and Multi-Actor Integrative Planning (the Means)

Current mitigation and adaptation efforts often take place in institutional silos. Actors tend to collaborate with familiar partners and follow established sectoral rules, resulting in one-dimensional outcomes (Bakhanova et al., 2025). Previous research on Dutch transitions highlights that the fragmented governance landscape, where regional water authorities, municipalities, housing associations, energy providers, and grid operators work independently, seriously hampers systemic change (Warbroek et al., 2023).

Integrative planning frameworks can break through these barriers by aligning stakeholders' objectives, timelines, and investments. To enable climate-driven design, cross-sector interactions and multi-actor integrative planning are essential (Figure 6). Coordination among public and private actors, knowledge institutes, NGOs, and local communities enables the negotiation of trade-offs and the maximization of co-benefits. For example, aligning energy infrastructure upgrades with water-retention projects ensures that mitigation and adaptation measures can be implemented simultaneously rather than sequentially.

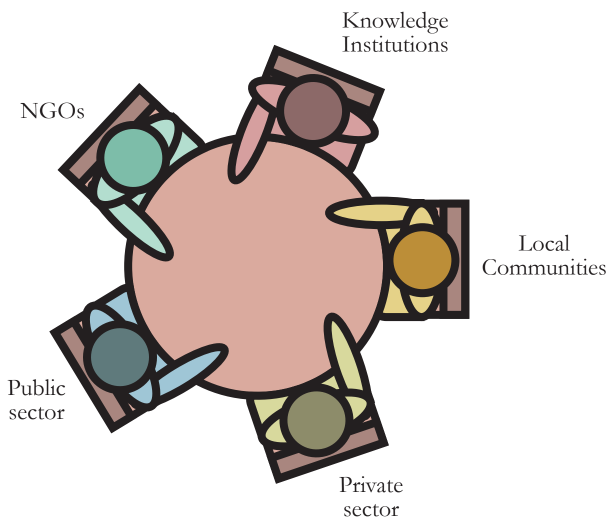

Figure 6: *Intersections between stakeholders (NGOs, public sector, private sector, local communities & knowledge institutions) are vital for making synergy happen*

Figure 5: *Dakakker rooftop garden in Rotterdam. By tjabeljan - https://www.flickr.com/photos/jankruithof/43272063671/, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=153128484*

However, the Dutch debate often returns to the idea of fataal integraal, the concern that pursuing holistic solutions may lead to paralysis or failure. Underlying this fear are factors such as longer project timelines, increased coordination demands, higher transaction costs, and more complex decision-making processes, issues that add to projects and programs already characterized by complexity, time pressure, and conflicting regulations and stakeholder interests.

The type of collaboration required for integrative mitigation–adaptation solutions, therefore, calls for new institutional arrangements. Key conditions include, amongst others:

- a willingness and opportunity to experiment
- embedding innovative approaches in existing structures
- shared responsibility across administrative boundaries
- capacity building at both strategic and operational levels

Without these conditions, even the most innovative designs risk remaining isolated pilot projects rather than becoming systemic solutions. Institutional rules that shape actor interactions play a particularly important role in determining whether such pilots become embedded in mainstream practice.

Spatial Data and Decision-Support Systems (the Tools)

To make climate-driven design operational, stakeholders need accurate and accessible data supported by effective decision-support systems (DSS) (Figure 7). Indicators related to impact, cost–benefit analyses, effectiveness, acceptance, and uptake, as well as spatial requirements, must be clearly defined, measurable, and comparable. Tools such as GIS, scenario modelling (e.g., KNMI'23 climate projections), and digital twins enable the analysis and visualization of synergies, reveal potential trade-offs, and guide investments across scales. Digital tools and large datasets create an opportunity to make the benefits of integrated measures more concrete and visible to policymakers, funders, and the broader public.

Figure 7: *Digital Twins, Geographic Information Systems and Scenario Modelling are among the tools decision makers can use to move towards synergy.*

The development of new DSS' that integrate climate, energy, hydrology, and social data can provide a strong foundation for evaluating synergies. Importantly, such tools are dynamic, not neutral: they actively shape and demonstrate how problems are defined and which solutions are deemed feasible. Ensuring that data systems are interoperable, transparent, and geared toward integrated planning is crucial for supporting objective and evidence-based decision-making. Embedding these tools into planning and design routines ensures climate-driven design as a systematic component of the built environment's transition, rather than a collection of isolated projects.

Outlook

By embedding climate-driven design as the guiding aim, cross-sector interactions as the organizing means, and spatial data and decision-support systems as enabling tools, we can establish a robust action framework. This approach transforms climate from a limiting factor into a generative force for shaping resilient, low-carbon futures.

In the Dutch context, competing land claims necessitate synergies between mitigation and adaptation. Coordinated strategies across scales and domains are essential to ensure that every square meter contributes simultaneously to mitigation and adaptation, supports, by extension, to broader societal goals, such as inequity and the economic workforce.

2.3 Mitigation–Adaptation Examples from Practice

Demonstrating good practices across different scale levels and domains—buildings, neighborhoods, public space, mobility, and governance— illustrates what is possible and, importantly, what is to be gained.

Buildings: Evolving new solutions, learning from Vernacular Architecture

Buildings are central to climate action because they are both major energy consumers and vulnerable to climate extremes. Vernacular architecture provides valuable lessons on synergy: centuries-old practices integrate passive cooling, natural ventilation, and shading to reduce energy demand (mitigation) while enhancing comfort and resilience during heatwaves (adaptation). Examples include:

- wind towers in Persian architecture (Figure 8),
- thick walls and shaded courtyards in Mediterranean dwellings (Figure 9),
- climate-responsive materials and passive cooling systems in various traditional cultures.

Figure 8: *Wind tower in the Dolat Abad Garden, Iran. By Bernard Gagnon - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=67136700*

Figure 9: *Courtyard of the Casa de Sefarad, Córdoba. By Ymblanter - Own work, CC BY-SA 4.0. https://commons.wikimedia.org/wiki/File:C%C3%B3rdoba_Casa_de_Sefarad_Courtyard_2.jpg*

These practices were tailored to local climate conditions, solar exposure, settlement density, and human acclimatization. Translating these principles into modern construction, through adaptable design, integrated renewable energy systems, and health-supporting indoor environments, can reduce reliance on energy-intensive cooling and heating while enhancing resilience to rising temperatures.

Since adaptation of existing buildings is a major mitigation measure, significantly reducing embodied emissions compared to new construction, a renewed design approach inspired by historical practices can lead to novel, context-appropriate solutions that cultivate synergies between mitigation and adaptation.

Neighbourhood Design: Balancing Energy Fluxes

At the neighborhood scale, opportunities arise to balance energy fluxes by coupling mitigation and adaptation. Excess solar radiation is simultaneously a hazard and a resource. Designing neighborhoods with reflective and vegetated surfaces reduces urban heat island effects (adaptation), while incorporating photovoltaic systems allows solar radiation to be harvested as renewable energy, often with higher efficiency due to lower surface temperatures (mitigation).

Innovative concepts such as local energy communities or district heating and cooling systems show how synergy can create self-sustaining, climate-responsive neighborhoods. Here, adaptation measures (e.g., cooling through green–blue infrastructure) and mitigation measures (e.g., local renewable energy generation) reinforce one another instead of competing.

Public Space: From Grey to Green–Blue Infrastructure

Public space is a visible and impactful arena where synergies between mitigation and adaptation can transform cities. Converting paved, impermeable surfaces into green–blue infrastructure delivers multiple benefits: shading and evapotranspiration reduce heat stress (adaptation), while carbon sequestration by vegetation and reduced cooling demand in adjacent buildings lower emissions (mitigation) (Figure 11).

It is also important to distinguish between governmental and societal interventions in public space and those carried out in private space. Interventions in private spaces can significantly influence climate adaptation and mitigation outcomes in surrounding public areas. For example, the cooling effect of a green private garden extends into nearby streets and open spaces, improving local microclimates.

On a regional scale level, examples such as the Room for the River programme demonstrate how multifunctional landscapes can simultaneously improve water safety, restore ecosystems, and enhance urban livability. By reimagining streets, squares, and waterfronts as climate infrastructures, cities can unlock co-benefits that are both tangible to residents and politically visible.

On a national scale, Dutch responses to climate change have traditionally followed a technocratic model, relying heavily on engineered flood defenses. While effective in the short to medium term, these infrastructures are inherently fragile: they require constant reinforcement, generate high maintenance costs, and contribute to CO_2 emissions during construction. Importantly, they are not safe-to-fail, resulting in new policies for risk contingency.

The concept of adaptive living (Castro and Sen, 2022) suggests an alternative pathway, one that does not seek to dominate natural systems but instead emphasises coexistence with ecological processes. The Room for the River programme exemplifies this paradigm shift, moving from resistance to accommodation by deliberately creating

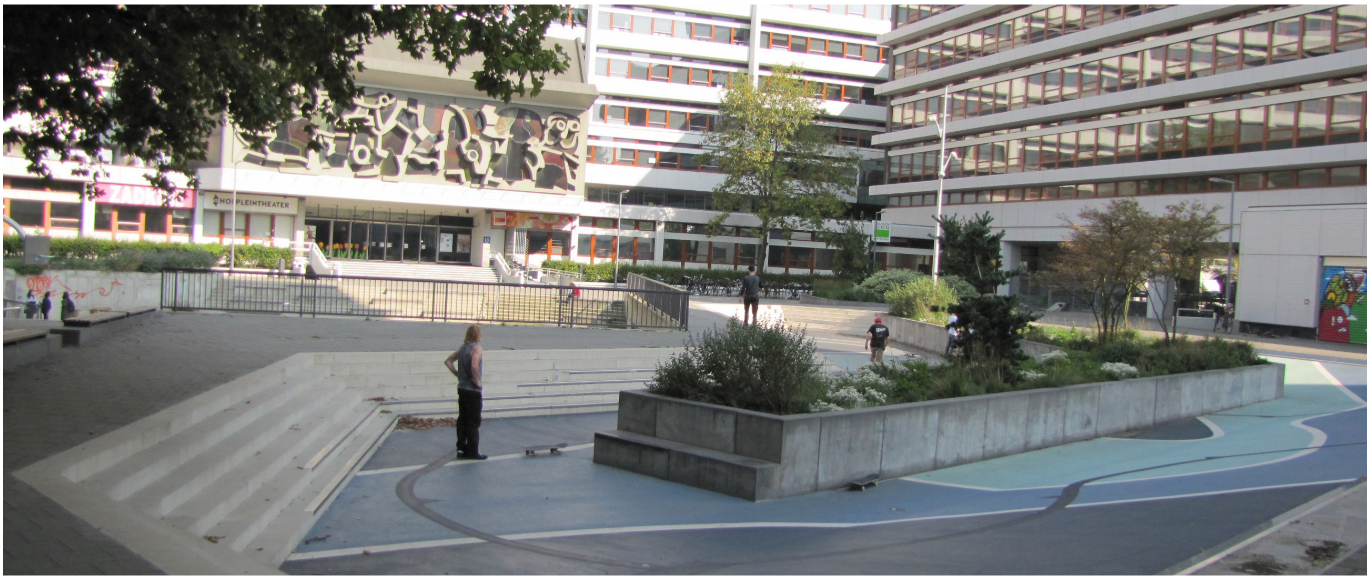

Figure 11: *Benthemplein in Rotterdam. The square acts as a water reservoir, collecting and storing rainwater for the surrounding buildings. Photo by Cathrotterdam - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=62810090*

space for water rather than fighting against it. In other words, the approach evolves from fail-safe to safe-to-fail flood risk management (Warner and van Buuren, 2011). Extending this principle to urban planning raises important questions:

- What would future cities look like if they were designed not as fortresses against nature, but as environments attuned to ecological rhythms?
- How might dwellings be reimagined through transformation of existing dwellings, site selection and design strategies aligned with hydrological, ecological, and weather cycles?

Such a model highlights the synergy between mitigation and adaptation: reducing emissions by prioritizing lighter, nature-based infrastructures while enhancing resilience through ecological integration. This approach requires not only technical innovation but also a cultural and spatial reorientation, positioning Dutch cities as adaptive landscapes embedded in broader ecological systems.

Mobility: Shared Systems and Electric Vehicles

Mobility offers another concrete illustration of the potential gains when mitigation and adaptation are integrated. Shared car systems (e.g., Greenwheels, MyWheels) reduce overall car ownership and kilometres travelled (mitigation), while freeing substantial space previously used for parking (Figure 12). This reclaimed space can then be redesigned for adaptation purposes, such as wadis, rain gardens, and urban trees that increase water retention and reduce urban heat stress (adaptation).

Simultaneously, the rise of electric vehicles creates distributed battery capacity across the city. When coupled with renewable energy generation (solar and wind), and automated driving, electrical vehicle storage can help stabilize local grids, reduce dependence on fossil fuels (mitigation), and improve energy reliability during climate-induced disruptions (adaptation). In the near future, autonomous vehicles could even relocate themselves to centralised charging or parking facilities during off-peak hours, balancing energy demand and freeing urban space.

What Is to Gain

These examples demonstrate that synergy is not only technically feasible but also a catalyst for innovation and socially desirable outcomes. Synergetic approaches reduce costs, create co-benefits, and deliver visible improvements in liveability, health, and safety. In practice, mitigation–adaptation synergies reveal that climate action is not primarily about trade-offs but about unlocking new models of urban living where both goals reinforce one another.

By showing what is possible, we also illuminate what is to be gained: cities that are cooler, cleaner, safer, and more equitable.

Figure 12: *Shared mobility hub in Stuttgart, Germany. By 5R-MFT - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=126481470*

Process for Change: Setting the Agenda

This content-driven framework approach, addressing variant scale levels and domains developed in the previous chapter, forms the foundation for moving forward. This chapter addresses what is needed to break down barriers and build momentum, stimulate innovation and funding, and acknowledge that any spatial science inherently includes design thinking.

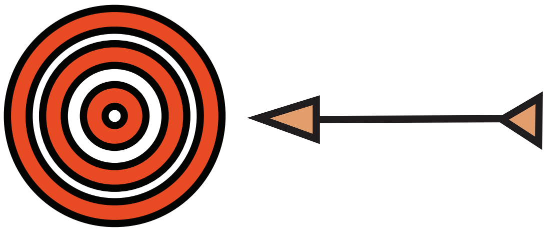

Figure 13: *Aligning urgencies is essential for creating shared momentum.*

3.1 From Urgency to Action: Breaking Barriers, Building Momentum

Different actors experience different urgencies. Municipalities may feel pressure due to heat stress and flooding; housing associations face urgent renovation tasks; water authorities prioritize water safety and quality; and energy companies confront increasing demands on the grid. Recognizing differing urgencies and aligning them is essential for creating shared momentum (Figure 13). Integrative climate mitigation–adaptation strategies require timing windows where multiple actors are ready, or can be made ready, to collaborate.

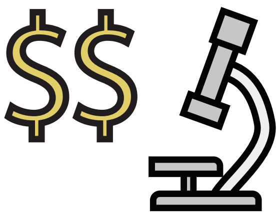

Figure 14: *Innovation and funding are important in making synergy happen.*

3.2 Stimulate Innovation & Funding

Fostering synergies between mitigation and adaptation is not merely a technical challenge; it is also an innovation and investment challenge. Current funding structures, research agendas, and building regulations often separate the two domains. What is needed instead are ambitious, integrated projects that break down separation of mitigation and adaptation (Figure 14).

Floor Milikowski (2025) notes that the Netherlands often lacks a strong long-term vision, reacting piecemeal to crises in climate, housing, agriculture, and water management. Rather than relying on fragmented interventions, we propose transformative projects that integrate safety, ecology, and liveability—projects that not only reduce risks but also cultivate public support, shared ownership, and a sense of collective pride.

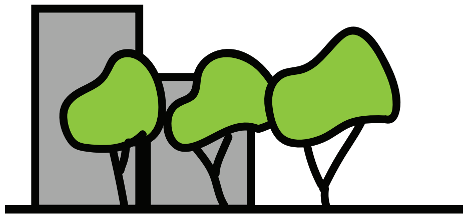

Figure 15: *Design thinking needs to be at the centre*

3.3 Spatial Science Means Design Thinking

Any intervention in climate adaptation or mitigation ultimately materializes in physical space. Implementing changes in existing urban environments or developing new areas that incorporate novel climate-synergetic measures, also creates an opportunity to integrate these measures thoughtfully within the overall design of the area (Figure 15).

This white paper stresses the importance of doing so with respect for the environment and human wellbeing, taking citizen needs and desires into account. This relationship flows both ways: when designing a building or an urban development, the design should be climate-driven, meaning that mitigation and adaptation should be proactively embedded from the outset. Conversely, climate mitigation and adaptation measures should reinforce the overall design quality of the area, contributing to wellbeing now and in the future.

For example, the New European Bauhaus principles, which emphasize sustainability, aesthetics, and inclusion, align strongly with climate-driven design. Integrating these principles strengthens the cultural and spatial foundations of synergistic climate strategies, ensuring that interventions are not only functional but also meaningful, attractive, and socially embedded.

In short, design thinking is fundamental to implementing synergistic climate mitigation–adaptation measures in the built environment.

Conclusion: Call to Action

This position paper is a starting point. To move from vision to impact, our DAT proposes the following steps:

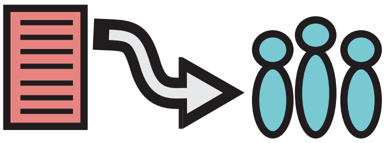

Figure 16: *Sharing the white paper with stakeholders for input*

4.1. Share and Validate the Narrative

We will begin by sharing this narrative with partners across academia, practice, government, and civil society (Figure 16). This clear and urgent message is meant to spark dialogue and gauge the relevance of our thinking. By gathering feedback, we aim to assess how stakeholders perceive the urgency of mitigation–adaptation synergies and which aspects resonate strongly or remain underdeveloped.

Figure 17: *Building a community of professionals to continue the momentum*

4.2. Build a Community of Practice and Research

A stakeholder meeting will be organized to verify and elaborate on our position and to explore the capacity and willingness of professionals and policymakers to contribute. From there, we aim to initiate a community of practice that connects research, education, and implementation (Figure 17).

Creative innovation and design workshops, bringing together scholars, practitioners, societal organisations, and students, will further stimulate novel ideas on when and how to integrate mitigation and adaptation. Expected outputs include:

- a scientific publication (e.g., a perspective paper) to initiate academic debate
- practice-oriented executive summaries tailored for policymakers and practitioners
- teaching material, connecting students with societal organizations and practitioners
- keypoints for research agenda

Figure 19: *Looking for and securing funding opportunities can support activities*

4.3. Explore and Secure Funding Opportunities

With a co-created research agenda in place, the next step is to pursue funding opportunities actively (Figure 19). This includes existing funding programmes as well as advocating for new cross-sectoral schemes that cut across TKIs (e.g., Bouw & Techniek, Delta, Watertechnologie).

Funding will be sought for both research activities and pilot projects or prototypes that demonstrate the feasibility of synergistic interventions. Dissemination of research outputs, via scientific and professional channels, will help further expand the mission and impact of this DAT.

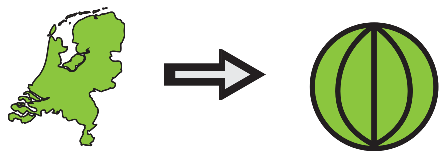

Figure 18: *Scaling the work to the European and international context*

4.4. Scale to the European and International Arena

While our starting point is the Dutch context, where land scarcity and competing spatial claims make synergies particularly essential, climate change transcends national borders.

Therefore, we will explore how Dutch examples can contribute to European and global solutions (Figure 18). By linking our agenda to EU frameworks (e.g., the European Green Deal, Horizon Missions), we aim to strengthen international relevance and ensure that mitigation–adaptation synergies are pursued not only nationally but also across Europe and far beyond.

Final Statement

Our work shows that climate action becomes truly effective when it is connected across scales and grounded in integrated thinking. By advancing climate-driven design, strengthening cross-sector and multi-actor planning, and enhancing the use of spatial data and decision-support systems, we work toward climate strategies that reinforce both mitigation and adaptation. In doing so, we support the transition to resilient, future-ready cities.

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