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Designing for Extremes: Heritage Strategies for Rising Sea Levels Adaptation in The Hague

27 Dec 2024

General Coordination of NXR-2024
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Introduction

How do we protect our cities from rising sea levels? This question is no longer hypothetical for coastal cities like The Hague, the political capital of the Netherlands. Set to celebrate its 800th anniversary in 2042, The Hague faces significant risks from climate change, particularly from the rising North Sea. With the city's rich history and cultural heritage connected to the maritime dynamics at stake, innovative strategies for climate adaptation are urgently needed. This was the central challenge tackled during the recent **International Workshop Netherlands eXchanges Recife (NXR-2024)**, where experts, students, and professionals from across the globe collaborated to co-create solutions for sea level rise adaptation.

The over 12 years of International Exchanges between the Netherlands and Brazil mirrored two climate hotspots, ancient fisherman communities and political coastal capitals that are threatened by sea level rise: Recife and The Hague. The research-by-design workshop focused on using design to test multiscale interventions to protect and adapt The Hague's coastal regions, from a national-deltaic (KPZZ) scale, to the Zuid Holland scale, The Hague City scale, and finally, the microscale of the historic Port of Scheveningen. The initial phase was the analysis, in collaboration with the TU Delft Master's elective (Building Green), national and international partners such as the RCE, the Municipality of The Hague, and Federal University of Pernambuco (UFPE), which aimed to start research-by-design projects focusing on the coastal region of Scheveningen. A five-day strategic workshop on designing for extremes followed, where participants generated innovative ideas to address these urgent water challenges aggravated by sea level rise. The workshop culminated in a public debate where relevant authorities and stakeholders discussed the proposed alternatives on Protection and Adaptation.



What if? In the unlikely event of a 2–5 meter sea-level rise in the long term, this image visualizes an extreme scenario of flooding for Scheveningen. Source: NXR-2024.

Restoring Nature: Designing with the Water_Culture_Heritage Landscape

A key concept explored during the workshop was the idea of **"Design with Nature"**—working with the natural environment to create blue-green networks as protection systems, restore biodiversity, and reconnect existing Nature2000 reserves. One of the workshop's most strategic proposals involved using existing coastal dynamics inland and offshore. To expand the dunes, there is a combination of sand suppletion that Rijkswaterstaat does combine with the coastal dynamics of the sedimentation of an existing "sand river" that flows into the North Sea. By harnessing the natural movement of sand and sediment, the participants envisioned a plan to enlarge and enhance the existing dune system along The Hague's coastline. These dunes would not only act as a biomimicry barrier against sea level rise but also restore biodiversity, creating a more resilient coastal ecosystem.

In addition to dunes, the workshop proposed a network of urban buffers, sponge territories, and floating or amphibious structures that could adapt to varying water levels. This approach, rooted in biomimicry and ecological restoration, would help reduce the impact of tidal surges and provide flexible solutions

for water management in vulnerable areas of the city. These nature-based solutions also include the restoration of seagrass meadows, biomimicry reefs, and the creation of artificial islands to absorb the energy of waves and protect the coastline from erosion.

Key design principles include:

- Design for Extreme Floods and Droughts.
- Design for/with/by Nature: Restoring coastal ecosystems by utilizing a hybrid between anthropogenic and natural dynamics (e.g. "sand river") to strategically place fine sediment and expand dune systems, optimize tidal dynamics, and enhance biodiversity. This includes sedimentation basins, massive blue-green networks, urban buffers, sponge territories, floating/amphibious structures, and natural/artificial islands.
- Landscape the Submerged: Revitalizing seagrass meadows, designing biomimicry reefs, creating rich revetments, producing renewable energy, and developing wetlands with zones for permanently wet, semi-wet, and dry areas, while enhancing wetland forests.
- Adaptive Maritime-City-Territory Solutions: Integrating vegetated foreshores and expanding green networks in Scheveningen to serve as resilient inland buffer zones, opening more space for water, and renaturalizing secondary channels, all while fostering biodiversity and preserving cultural heritage.
- Be Radically Inclusive: Establishing spaces for knowledge exchange, innovation, and collaboration to foster ongoing climate resilience for +7,000 species, including us humans. Also, accept and prepare for new species that will arrive and/or disappear due to Climate Change.



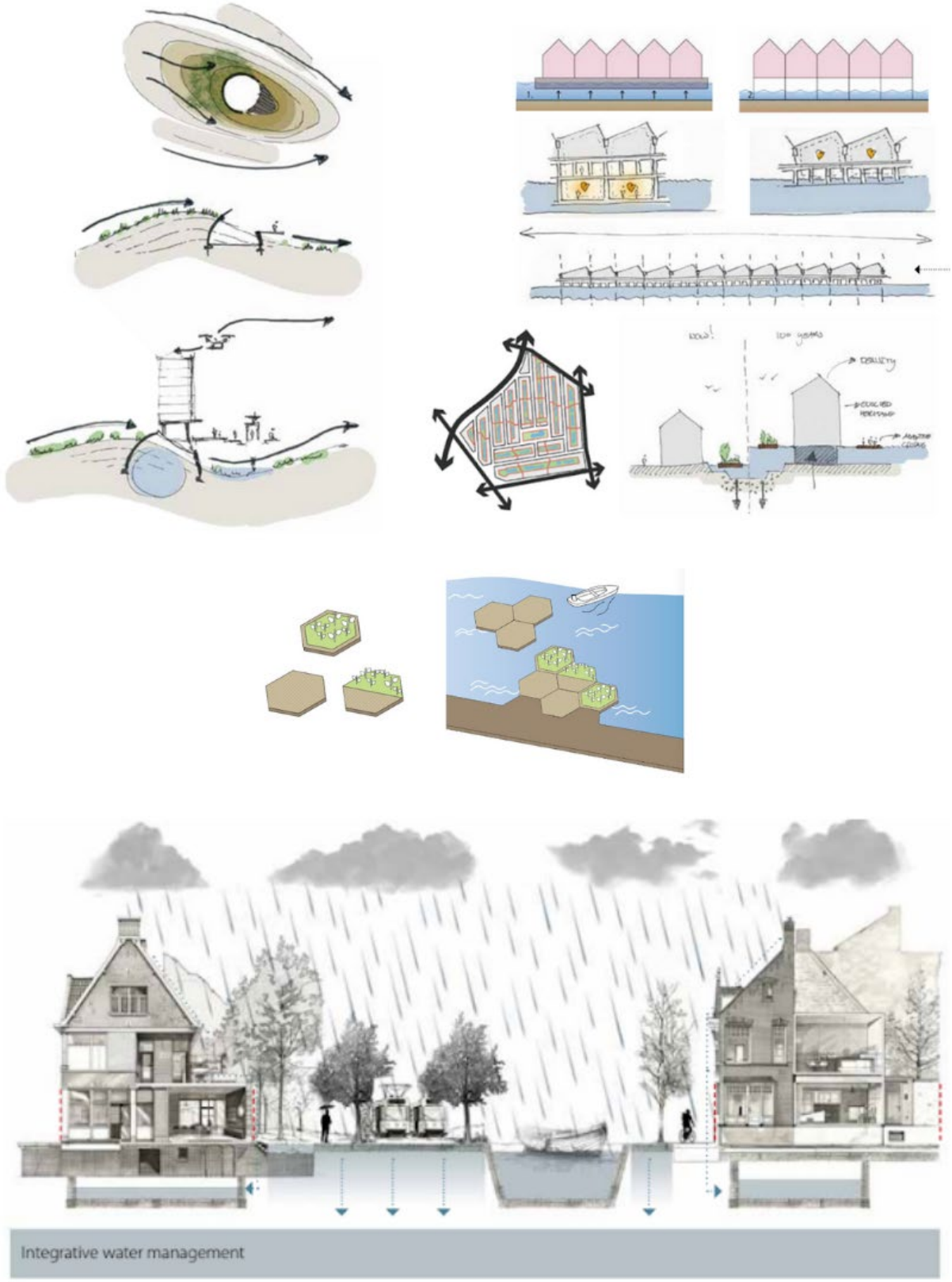


Spatialization of the design principles applied to the city and port scales. Source: NXR-2024.

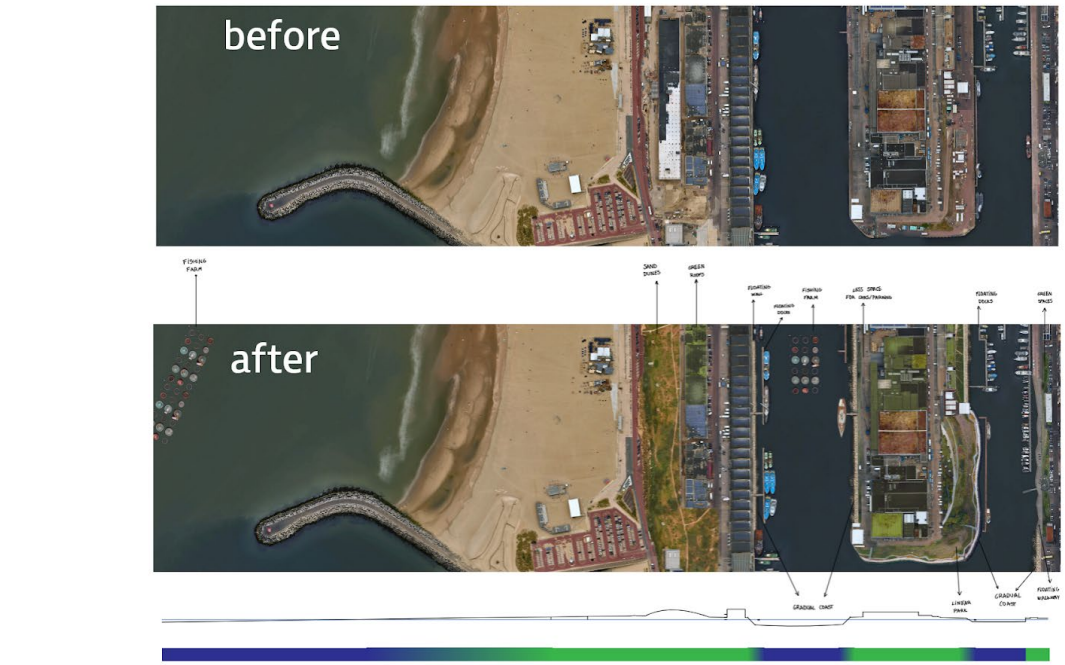
Adaptive Infrastructure: A Flexible Harbor for a Changing Climate

The Port of Scheveningen, a historical and economic hub for The Hague, was another focal point of the workshop. The harbor is not only a vital part of the city's identity but also highly vulnerable to rising sea levels. To address this, participants designed **adaptive maritime infrastructure** capable of withstanding fluctuating water levels. The proposed solutions included flexible, floating platforms, movable bridges, and modular building systems that could adapt to changing sea conditions. The future form and function of the port as a hub for the fishing industry remains a challenge, as ships need access, raising the question of a fourth basin.

Rather than viewing the harbor as a fixed structure, the participants imagined it as a **dynamic space** where different uses and structures could evolve alongside the changing environment. This vision of an "amphibious harbor" integrates floating, mobile, stilted, and even hanging buildings into the landscape to create a dynamic harbor where uses and typologies co-evolve. The aim is to create a multifunctional waterfront that can accommodate human activities while still allowing nature to thrive. Such adaptive solutions not only protect the harbor's economic functions but also transform it into a resilient, future-proof urban space.



Sketches on diverse flood-adaptation measures for the Port-Scale. Source: NXR-2024.



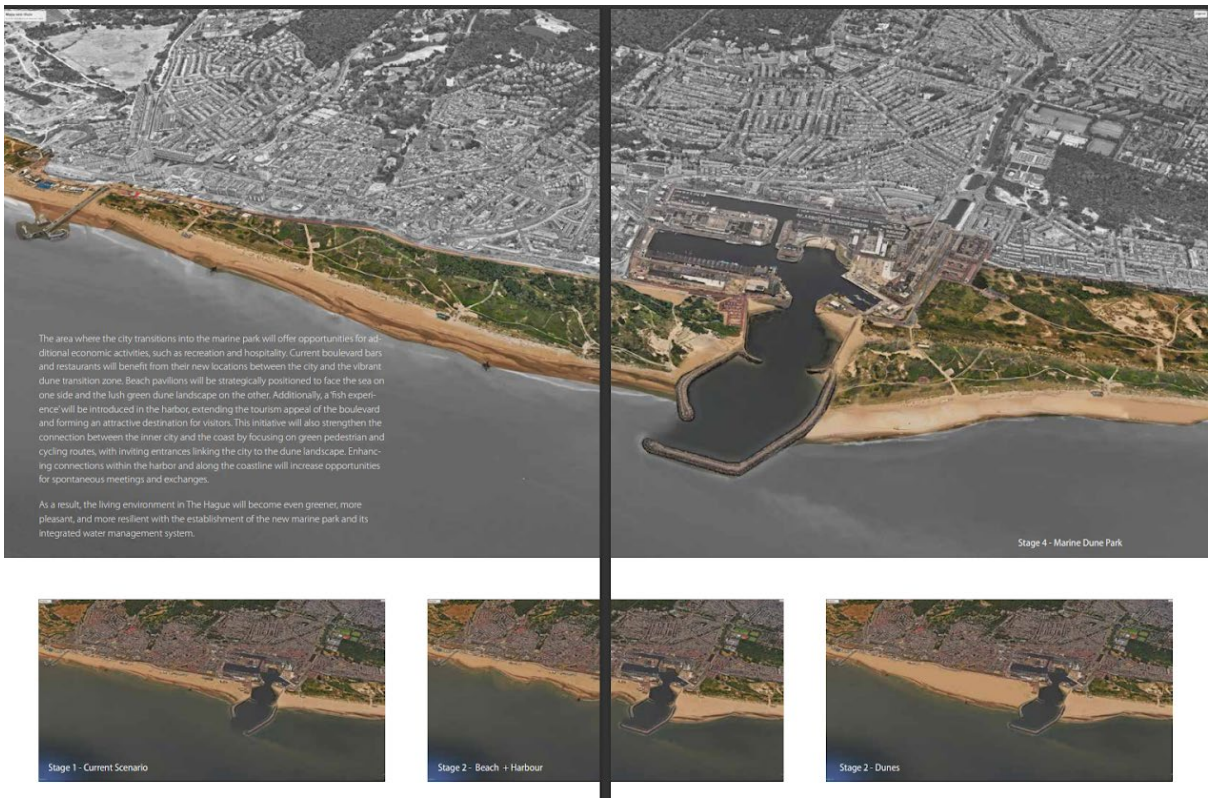




Coastline of the Hague and Scheveningen before and after intervention, focusing on using the coastal dynamics to extend the Nature-Based Solutions in urban-maritime territories. Source: NXR-2024.

A Global Effort: Community and Innovation at the Core

The international nature of NXR-2024 was crucial in fostering a broad exchange of ideas. Participants came from 40 countries across six continents, contributing diverse perspectives, expertises, and backgrounds (from urbanists, engineers, architects, biologists, geologists, sociologists, marine scientists, etc.). This diversity of thought led to proposals that merged technical innovation with social engagement. One of the standout ideas from the workshop was the creation of **living labs**—community spaces where citizens, researchers, and policymakers can collaborate on climate adaptation strategies and bridge the gaps towards their implementation.



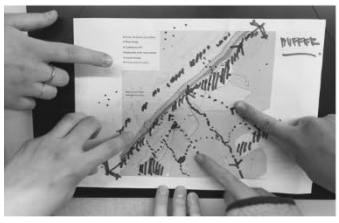
These labs would serve as hubs for ongoing innovation, enabling the co-creation of knowledge and providing real-time testing grounds for adaptive solutions. For The Hague, these living labs could be key in ensuring that climate adaptation measures remain flexible and responsive to evolving challenges. More importantly, they emphasize that climate adaptation is not just about protecting infrastructure—it's about creating sustainable environments where humans and nature coexist.








Scheveningen



DUFFEL


Participative methodology of Research by Design: Technical Visits, Co-Design sessions, testing with multiple stakeholders, and Public Debates. Source: NXR-2024.

Conclusion

The International Workshop NXR-2024 highlighted the urgency of designing both protective and adaptive strategies for cities like The Hague, which faces the growing challenge of sea level rise. The workshop's multiscale interventions—from **nature-based solutions** restoring coastal ecosystems to **adaptive infrastructure** reimagining urban spaces—provide a comprehensive roadmap for coastal resilience. By integrating innovative engineering, ecological restoration, and community-driven engagement, The Hague has the potential not only to protect its cultural heritage but also to lead global efforts in climate adaptation. These strategies, further refined, will contribute to policy frameworks in both the Netherlands and Brazil, culminating at COP30 in 2025, Belém-Brazil.

Further Developments

The ideas from NXR-2024 do not remain in theory—they are being actively promoted in both Brazil and the Netherlands, with the aim of shaping ongoing public policies, promoting international collaboration, and inspiring future climate resilience initiatives.

NETHERLANDS

- **Expert Session (02/10):** Focusing on adaptation for small port cities
- **Scientific and Mainstream Media Publications**
- **Symposium on (Re-) Connecting Maritime-Urban Ecosystems**
- **Courses at TU Delft, IHS-Erasmus, workshop in Delta Metropool**
- **Exhibitions communication strategy, including collaboration with local museums, art, events and outreach programs for schools:** Disseminating innovative proposals and raising awareness.
- **Public Policies from the Municipality:** continue working on a “research by design” approach.
- **Catalogue of Best Practices for Small Port Cities**
- **UN Climate Change Conference (COP30) 2025**

BRAZIL

- **Strategic Publications:** Linking The Hague and Recife's climate adaptation strategies
- **Ongoing Public Policies:**
    - **Recife City Park Agreement** (city level)
    - **Economic/Environmental Action Plan of Pernambuco** (state level)
    - **Green-Resilient Cities Program** (national level) by MCTI, MC, MMA.
- **Roundtable:** Unify Adaptation and Protection Proposals (31/08)
- **OIA International Observatory of the Atlantic** (under development)
- **RCP Podcast**
- **Recife Exchanges Netherlands (RxN) 2025**
- **Preparatory events for the COP30**
- **UN Climate Change Conference (COP30) 2025**

As the ideas continue to take shape, **urban activations** between The Hague and Recife will foster ongoing engagement, ensuring that both cities remain at the forefront of climate adaptation strategies. NXR-2024 is not only a platform for new ideas but also a stepping stone toward tangible, impactful solutions for coastal cities worldwide.

Acknowledgments



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