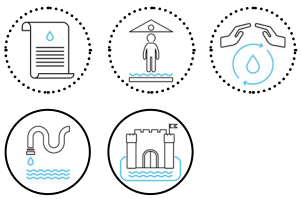
Blue Papers
2022 (Vol. 1 No. 1), 58-67
10.58981/bluepapers.2022.1.06

Valuing Heritage for Water Management

Arjan Conijn
Witteveen & Bos, Chair of the Water and Heritage Platform, the Netherlands
Maarten Ouboter and Jeroen Oomkens
Regional Public Water Authority Amstel, Gooi and Vecht

Adding Place to Balance People, Planet, Prosperity, Peace and Partnership (toward 6Ps of SDGs): *The Dutch landscape contains unique elements resulting from both natural processes and human interventions. To truly understand the Dutch water system, we need to consider how human interventions have impacted it throughout history. This is especially important when it comes to addressing current water challenges as part of the United Nations' Sustainable Development Goals (SDGs). However, the SDGs are not just isolated goals. They should be perceived as interdependent spheres of action, with "place" being a particularly important new pillar to consider. The concept of "place" forces an integrated approach between the five pillars of SDGs (5Ps of SDGs) – people, planet, prosperity, peace and the unique historic characteristics of specific spaces. By acknowledging and understanding the unique historic characteristics of different places and fostering mutual understanding through the sharing of narratives and building partnerships, we can effectively work together to find solutions that address future challenges.*

KEY THEMES



< Fig. 1 Entrance to the fifteenth-century section of the underground canal under Nieuwmarkt, Amsterdam, coming from the seventeenth-century section (Source: City of Amsterdam, Office for Monuments and Archaeology).

The Netherlands as a Living Canvas for People, Water and Nature

The Dutch delta is a natural drainage system composed of the rivers Rhine, Meuse and Scheldt, which flow into the North Sea. It sparked the traditional Dutch focus on the drainage of wetlands, which, combined with extensive peat reclamations, caused significant land subsidence in almost two-thirds of the Netherlands. Ultimately, this approach led to a demand for protection from the same rivers and sea through an elaborate network of dikes, pumping stations and waterworks (Ven 2004). Water management involved people setting up organizations and making decisions together. For centuries, local disputes have centered on water levels, such as the choice between lower water levels draining the land and making it fertile, or higher water levels protecting buildings from collapsing and preventing land from subsiding any further. Significant regional issues in the past were, and will continue to be in the future, the downstream transport of water surplus, the availability of upstream water during droughts and the water quality in our living environment.

In addition to addressing the national, provincial, and municipal levels, the various water authorities are tasked with flood protection, water quantity management and water quality management. In the Netherlands, the regional public water authorities represent the fourth tier of democracy, with a lineage dating back to its founding in the 13th century. The elected boards are responsible for allocating taxpayer funds and determining solutions to water-related issues (van Tielhof 2021). Nowadays, water authorities face increased societal challenges on different spatial and temporal scales, e.g., reducing water quality and quantity risks, and negotiating between the different regional interests. These societal challenges also offer operational and business opportunities within the water cycle, such as the exploitation of thermal energy, the exploitation of raw materials from sewage, along with ecological alternatives for the traditionally less "sexy" maintenance of existing water structures. Maintenance of existing and future water structures requires knowledge of the long history of Dutch water management, and the approaches and achievements that have become the most prominent Dutch legacy and an inseparable part of Dutch identity and culture.

Engineering Nature and the Need for Knowledge of Water Heritage

In the nineteenth century, as industrialization and a sovereign state developed in the Netherlands, water management emerged as a flagship export product. In the twentieth century, the construction projects known as the Zuiderzee Works and the Delta Works represented the pinnacle of Dutch engineering's ability to control and mitigate natural risks. The country's success in this regard can be attributed to the priority placed on water infrastructure and functionality. A prime example is a hidden gem in Amsterdam's city center located at the Nieuwmarkt, at the former city gate known as the Waag (fig. 2). Construction of this "hidden" water defense and canal started in 1488 and the structure has undergone numerous modifications and adaptations to meet changing needs. The city's expansion resulted in the abandonment of the Waag's defensive function in 1599, which resulted in an underground canal (fig. 3, 4). More recently, in 1980, a section of the canal was modernized using concrete construction (fig. 5). At this point, the underground canal serves as a vital part of the city's water infrastructure, because it transports polder water from Amstelland's hinterland through the his-

^ *Fig. 2 Waag in 1880 (Source: Andreas Theodorus Rooswinkel, Stadsarchief Amsterdam, 010005001413).*

^ *Fig. 3 Waag, seen from the Kloveniersburgwal in 1982. Development of the Nieuwmarkt square began in the early seventeenth century, extending the underground canal entrance (Source: B.P. Opschoor, Stadsarchief Amsterdam, OSIM00008002319*).

torical city center and therefore is considered a precious time capsule, with equal importance as cultural heritage and as a water safety feature.

Water management in the Netherlands has been dominated by technological advances designed to control nature. However, engineers have more recently come to the belief that natural systems should inform design. The challenge in the Netherlands lies in the extensive alterations that have been made to the natural system – in this context the concept of "creating natural conditions" appears to be a distant reality as the natural state of an artificial landscape is often hard to distinguish and maintain. For example, the ecological system of the Dutch lake Markermeer is the result of separating the lake and its surrounding areas, as well as a shortage of shallow waters and floodplain areas (fig. 6, van der Geest 2018). The shallow waters and floodplains have been converted into polders (such as the Flevopolder), largely disconnected from the Markermeer.

Spatial planning – now and in the future – must balance technological perspectives with an appreciation for the power of building with nature. Attention to water heritage is critical, as it encompasses the "human factor" in our landscape. Water heritage embodies our impact on water systems and the interplay between society, water and nature. Therefore, we strongly advocate reflecting upon past decision making for present-day practice and robust future design considerations.

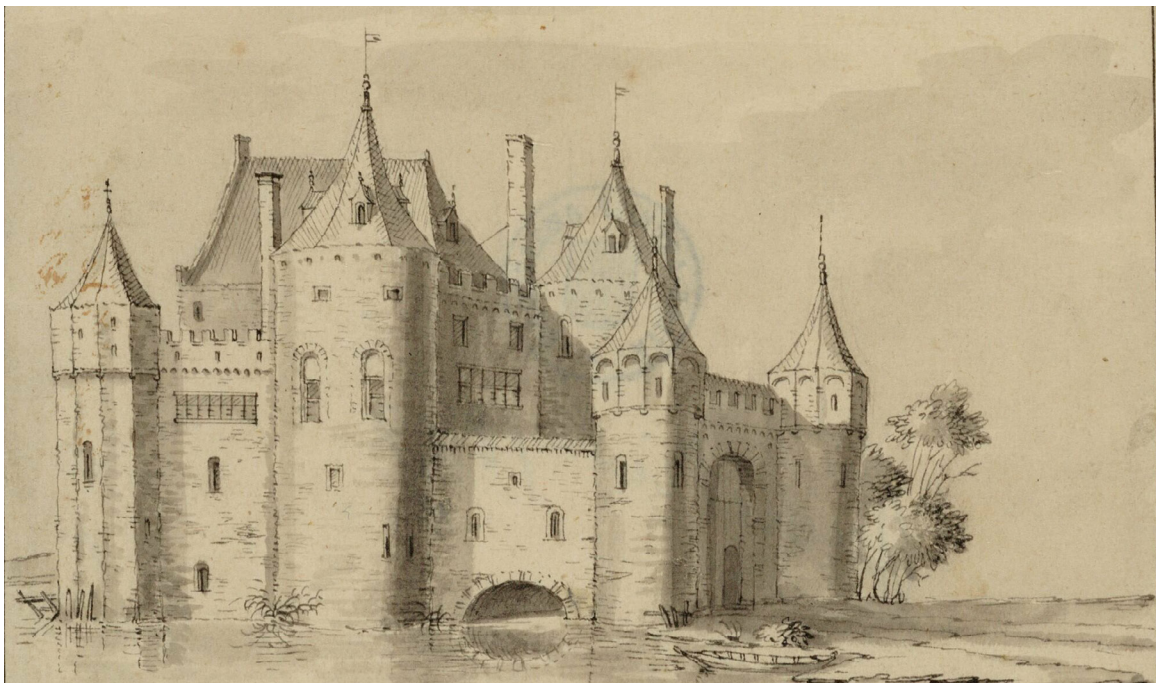
Inventing the Future Needs an Integral Approach to Society, the Natural Environment and Historical Technological Changes

Dutch water professionals are urged to find alternative solutions for future water management as climate change brings new challenges, such as sea level rise, land subsidence, intensified rainfall, increased peak discharges and more frequent droughts and heatwaves. And our location in a low-lying delta makes challenges especially acute. Society's ideas and creativity are crucial in this effort. Engineers need to work together with other members of society, considering both the natural system and the changes that have been made to it. Understanding heritage is a key skill to add to our toolkit. Heritage is not just about preserving isolated objects – it encompasses the entire functional landscape that tells the story of our ancestors' struggles and triumphs in a world that both supports and threatens us. Only by learning from the past can we secure human capital, the environment and our future.

New Solutions are Defined by a Place and its History

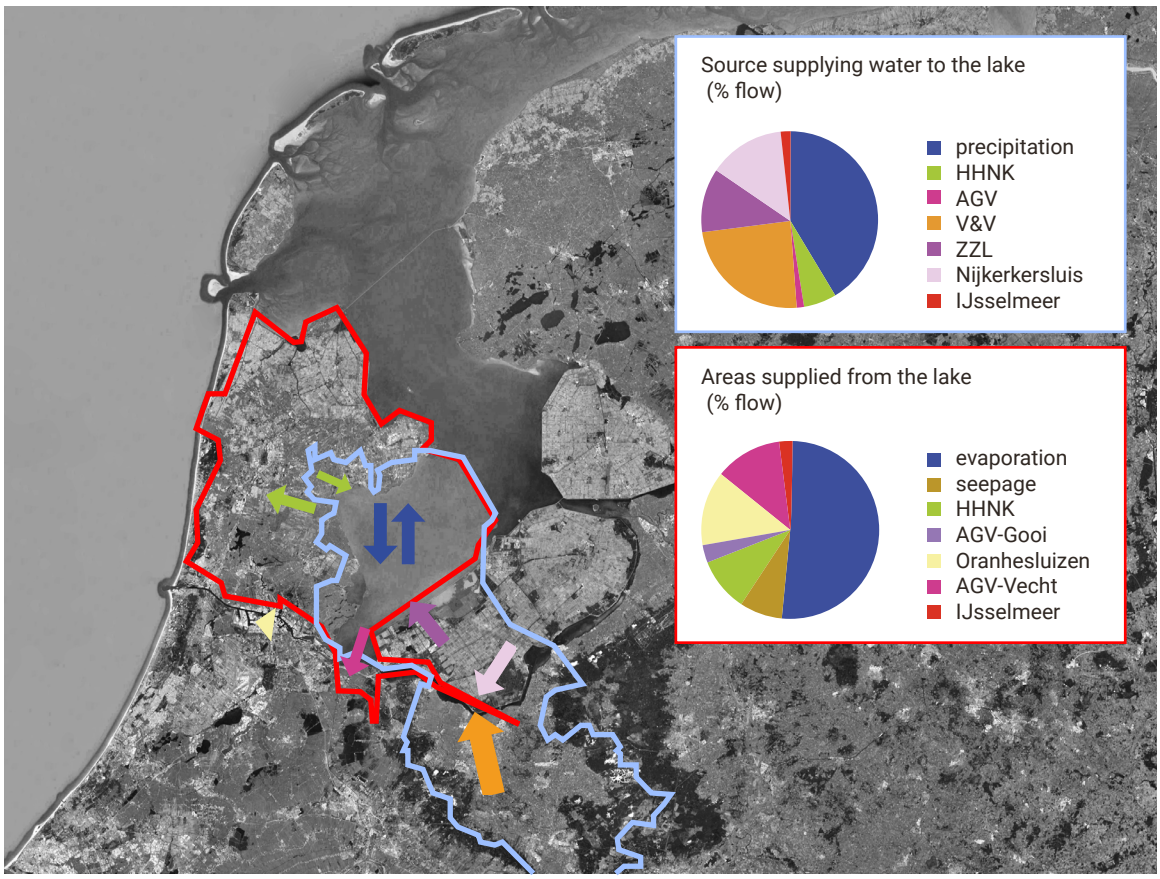
In the Netherlands, regional water boards elected by the public give voice to water and play a vital role in maintaining the delta landscape. The process of balancing the interests of various stakeholders in water management is commonly known as consensus decision making and referred to as the "polder model." Effective water management requires a deep understanding of geomorphology, the water system and the application of a broad range of engineering skills to address the interplay between natural processes, technological changes and historical choices. Water boards are obligated to raise awareness about the identity and value of water to strengthen resilience against increased land use pressures and challenges posed by climate change.

A landscape's narrative holds shared stories of places and people critical to shaping its future.



^ *Fig. 4 Drawing of "the old St. Antoniesgate" in 1604, showing the arch in fig. 1 before the extension of the underground canal (Source: Stadsarchief Amsterdam, 010097001537).*

^ *Fig. 5 1980 reconstruction of the closing doors in the underground canal under Nieuwmarkt, Amsterdam. The canal functions as a connection, eventually transporting water discharge from the Amstelland catchment in the direction of the North Sea. The closing doors protect the city from flooding when outside water levels are high (Source: Maarten Ouboter).*



^ *Fig. 6 Markermeer, in the center of the Netherlands, its catchment (blue line) and the area that is supplied with water from the lake (red line). Arrows indicate inflow and outflow; the graphs show the relation between the two based on the water balance of the lake from 2000–2015 (Source: van der Geest et al., 2018).*

Cultural heritage is integrated into Dutch water management practices, creating opportunities and added value between nature and culture. Distinctive landscape features inherently determine ecosystem functions, providing significant insights into how to balance natural context and cultural influences. Finding local solutions starts with advocating for "place" to be added to the existing five pillars that constitute the SDGs. Only then can we secure our legacy for future generations.

Acknowledgment

This contribution was peer-reviewed. It was edited by members of the editorial team of the UNESCO Chair Water, Ports and Historic Cities: Carola Hein, Matteo D'Agostino, Queenie Lin and Hilde Sennema. The authors thank Molly Mullin for her help in clarifying the text.

References

Brown, Kaysie, and Krista Rasmussen. 2019. "The Sustainable Development Goals In 2019: People, Planet, Prosperity in Focus." *Climate, Energy and Environment* (blog). United Nations Foundation. July 9, 2019. https://unfoundation.org/blog/post/the-sustainable-development-goals-in-2019-people-planet-prosperity-in-focus/.

Van der Geest, Harm G., Arie J. Vonk, and Maarten Ouboter. 2018. *Reconstruction water and material balance Markermeer; report University of Amsterdam and Waternet 1976–2015*. University of Amsterdam and Waternet report. (In Dutch)

Ven, Gerard. 2004. *Man-Made Lowlands: History of Water Management and Land Reclamation in the Netherlands*. Utrecht: Uitgeverij Matrijs.

Van Tielhof, Milja. 2021. *Consensus and Conflict. Water Management in the Netherlands 1200–1800*. Hilversum: Uitgeverij Verloren.

Arjan Conijn studies the interaction between people and water from a landscape perspective. After finishing his dissertation on changing mentalities on flooding in the Upper Rhine valley at the University of Heidelberg in Germany, he aimed to understand the practice of flood management at the engineering consultancy Witteveen+Bos. He combines his work in the field of flood management with elaborative research in the Living Dikes project at University of Groningen.

Contact: arjan.conijn@witteveenbos.com

Maarten Reinier Lemme Ouboter has a background in earth sciences, specializing in hydrogeology and geochemistry. He started his professional career at Delft Hydraulics, where he developed a strong foundation for integrated system analysis. Since 2001, Maarten has evolved into the public voice – ambassador – of water at the Regional Public Water Authority of Amstel, Gooi and Vecht. His comprehensive knowledge of greater Amsterdam is essential in regional water, environmental and cultural developments. Securing this voice and its intrinsic values in investment plans makes Maarten instrumental for future challenges of the region. He advocates for more integrated approaches that include historical perspectives of systems, in particular, the landscape, natural processes, culture, governance and its people. The outcome of all equations is ecology: can plants and animals sustainably co-exist in a water system with people and their ambitions?

Contact: maarten.ouboter@waternet.nl

Jeroen Oomkens is a senior legal policy advisor responsible for future-proofing regional legislation in the Netherlands. For ten years, he has coordinated and led the development of tailored water, climate and environmental solutions to support the transition of (inter) national organizations and institutions. For the NL MFA, he participated in a study on the political economy of water infrastructure investments in South Africa, Kenya, Indonesia and the Philippines. And for Cabo Verde he co-authored the National Adaptation Plan. Jeroen also contributed to policy developments for the European Green Deal, where among other projects, he led the impact assessment for the new EU Adaptation Strategy, inspiring a clear call for action. He is chairman of the Dutch committee of ISO standards on climate change adaptation and the Dutch Head of Delegation for the CEN/TC on Climate change. Jeroen also volunteers within the SDSN Youth Network as a coach and expert. He holds a master's degree in earth sciences – Environmental Management from the University of Amsterdam and a mechanical engineering degree from the University of Applied Sciences in Utrecht.

Contact: jeroen.oomkens@waternet.nl