

Gradients of Wetness:

Gardens as Experiments Towards Wetness

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and Giuseppe Faldi

Towards Wetness

In many European and North American cities, drainage and sanitation infrastructure is a complex network that runs underground and along roads, collecting both wastewater and rainwater from buildings and open spaces, before finally discharging it after treatment into surface water (Secchi 2011). Drainage infrastructure is based around a paradigm of dryness, which consists in keeping space dry by channelizing and discharging rainwater as quickly as possible. Such infrastructure often malfunctions: floods, leaks and overflows are only a few of the recurrent problems. These issues can highlight the obsolescence of drainage infrastructure that is no longer able to cope with increased runoff from growing urbanization or changing precipitation patterns (Karvonen 2011), and reveal the necessity of acting immediately to remedy the situation (Tjallingii 2012;

Gandy 2014). Furthermore, hydrological dysfunction affects the process of urbanization itself, requiring us to reframe cities as emergent ecosystems where multiple species and environmental dynamics overlap (Alberti et al. 2003; Gandy 2022). More particularly, as people's gardens cover large portions of the urban environment, they have a crucial role to play as spaces where novel combinations of drainage infrastructure can emerge.

An opportunity for the transformation of current drainage practices, referred to in this paper as 'wet transition', arises from the ongoing paradigm shift in urban planning and design from dryness to wetness. Shifting towards wetness suggests considering the hydrological cycle differently. If dryness centres on surface water and the flow of discharge, wetness grasps the fact that rain is where all flows of water start and that runoff should be the main focus (Da Cunha 2018): Precipitation, floods, evaporation, evapotranspiration and infiltration of rainwater are basic wet processes; thus, the atmosphere, vegetation and the ground are all components of wet infrastructure. At its core, this wet infrastructure is decentralized – small scale, spatially distributed, fit-for-purpose and embedded in the urban environment (Yu et al. 2011) – and combines both technological (often low-tech) and natural elements. The backbone of wet infrastructure is the rainwater, which falls on every roof and reaches every garden (Tjallingii 2012).

¹ Runoff is "the flow of water from the land as both surface and subsurface discharge," or in the more restricted use, "surface discharge in the form of overland flow and channel flow" (Marsh 2010: 493).

Residential Gardens as Wet Experiments

In many European and North American urban environments, large areas are occupied by open spaces, mostly residential gardens (Cameron et al. 2012; Jakobsson and Dewaelheyns 2018). In the frame of the experimental transdisciplinary project Brussel Water Sensitive City (Brusseau Bis), gardens become spaces for potential citizen wet stewardship (Nassauer 2011), based on different socio-ecological arrangements in which people's livelihoods can coexist with watery spaces, revealing their potential as key components of a decentralized drainage infrastructure. Our research tests and analyses innovative wet practices in individual and collective gardens to explore coalitions of private and public-private actors' ability to support the wet transition in the Brussels-Capital Region.

Residential parcels (left) and open-air spaces (right) within the Brussels-Capital Region.
Graphics: Andrea Aragone/Urbanis, 2022.

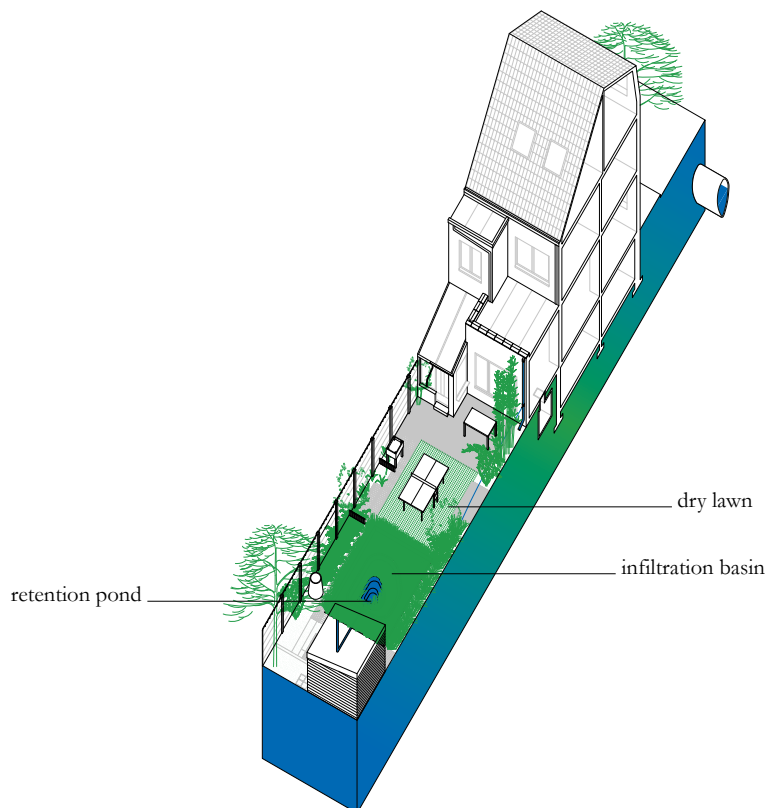


At present, 43 percent of the city is covered by residential parcels,² of which 62 percent is open-air surfaces such as asphalted driveways, decking and vegetated and concrete pathways, as well as lawns, flowerbeds and patches of trees. In addition to their typological diversity, residential gardens evince huge cultural and environmental potential (Egerer et al. 2018), being spaces in which human and other-than-human practices overlap. They are places of everyday life marked by the in-between experience (Foucault 1986), thus being at the membrane between human and wet practices. Gardens accommodate food production and horticultural practices, as well as hosting vegetation, insects and other wildlife and soaking up rainwater (Egerer et al. 2018). They comprise a major part of the urban ecosystem (Kowarik 2011; Cameron et al. 2012), even though they remain largely understudied and have unexpressed potential (Chalmin-Pui et al. 2019).

² Calculated by identifying parcels (source: Urbis) that are within residential zones defined by the Plan Régional d'Affectation du Sol. Residential parcels can be privately or publicly owned plots (e.g. social housing).

A Wet Domestic Garden and its Reverberations

In order to explore the wet potential of residential gardens, we tested wetness by carrying out experiments in individual domestic gardens and collective gardens in social housing blocks. The two residential garden types present different features in terms of ownership and management. Individual domestic gardens are private spaces managed by single households, while collective gardens in social housing blocks are public spaces managed by residents in agreement with a private management company. Here we focus on the example of an individual domestic garden in Jette, in the northern part of the Brussels-Capital Region.



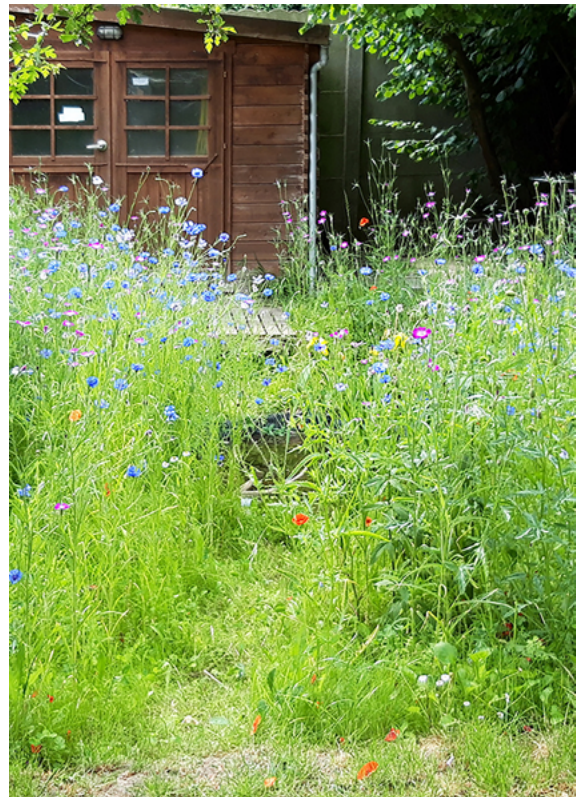
The design for new wet infrastructure in Sebastian's garden.
Image: Andrea Aragone, 2022.

This particular wet experiment was supported by a co-design process, based on two group workshops. Sebastian – the householder – together with some of his neighbours and one representative of the municipality attended the two workshops with us. Various possible design options were discussed, sharing the knowledge of each participant in order to define a collective wet project to transform Sebastian’s garden. The project places rainwater and its flows at the centre of the design as well as framing wet and human practices hosted in the garden. The result is an infiltration basin that expresses the potential of vegetation and the ground to absorb rain redirected from the roof; a small retention pond in the middle provides a waterbody for insects and birds, while the lawn gives Sebastian and his son a space to play ping-pong and relax.³ These design decisions were implemented during a collective construction process as a multiplicity of actors engaged physically to put in place the group choices. The wet experiment in Sebastian’s garden has already had reverberations in the neighbourhood and beyond. It is attracting the attention of other inhabitants, inspiring them to transform their own gardens and become part of the decentralized infrastructure.

³ The new wet infrastructure in the garden is entirely financed by the project Brusseau Bis.

A moment during the collective construction site (left) and the wet infrastructure enabled in the inhabitant’s domestic garden (right).

Photos: Andrea Aragone (left), Sébastien (right), 2022.



Wet Experiments Nurturing Creative Design and Encouraging Stewardship

Some preliminary findings can be drawn from our ongoing experimentation. Firstly, such experiments have twofold potential related to wet design and wet stewardship. The re-landscaping of the domestic garden illustrates the development of decentralized infrastructure in private spaces based on the paradigm of wetness, becoming itself an exemplary design for innovative and sustainable solutions. At the same time, the

collective nature of the experiment strengthens the network of participants, who consequentially become new stewards of wetness. This stewardship bridges the gap between individual action and common benefits by creating the conditions to further replicate and maintain wet experiments. This is in line with Ostrom's (2010) research on common-pool resources in relation to the need for climate action, which indicates that, different from large-scale units, households are potentially more apt to take positive action if they are well informed on the subject. Moreover, households form stronger reciprocal trust by working together locally to engage neighbours in climate action. Secondly, the experiment also reveals that for decentralized infrastructure to function it requires a polycentric system in the sense proposed by Ostrom (2010: 552) that is "characterized by multiple governing authorities at differing scales rather than a monocentric unit," where households acquire knowledge, and support the replicability and the future maintenance of the wet infrastructure. Finally, the wet experiment suggests moving from centralized water management to a shared decentralized system, which includes a large number of players and is based on the relationships between human and moisture dynamics. This reinforces current research on the role of voluntary citizen engagement that can lead to positive changes and is recognized as a necessity for the successful integration of urban rainwater at different scales (Dobre et al. 2018; Mees et al. 2018).

References:

- Alberti, Marina, John M. Marzluff, Eric Shulenberger, Gordon Bradley, Clare Ryan, Craig Zumbrunnen. 2003. "Integrating Humans into Ecology: Opportunities and Challenges for Studying Urban Ecosystems." *BioScience* 53 (12): 1169–79.
- Cameron, Ross W.F., Tijana Blanuša, Jane E. Taylor, Andrew Salisbury, Andrew J. Halstead, Béatrice Henricot and Ken Thompson. 2012. "The domestic garden – its contribution to urban green infrastructure." *Urban for Urban Green* 11(2): 129–37. <https://doi.org/10.1016/j.ufug.2012.01.002>
- Chalmin-Pui, Lauriane Suyin, Alistair Griffiths, Jenny J. Roe and Ross W.F. Cameron. 2019. "Bringing Fronts Back: A Research Agenda to Investigate the Health and Well-Being Impacts of Front Gardens." *Challenges* 10 (37): 1–11. <https://doi.org/10.3390/challe10020037>
- Da Cunha, Dilip. 2019. *The Invention of Rivers: Alexander's Eye and Ganga's Descent*. Philadelphia: University of Pennsylvania Press.
- Dobre, Catalina C., Joanne Vinke-de Kruijf, Luisa Moretto and Marco Ranzato. 2018. "Stormwater management in transition: The influence of technical and governance attributes in the case of Brussels, Belgium." *Environmental Science & Policy* 85: 1–10.
- Egerer, Monika H., Brenda B. Lin, Caragh G. Threlfall and Dave Kendal. 2018. "Temperature variability influences urban garden plant richness and gardener water use behavior, but not planting decisions." *Science of the Total Environment* 646: 111–20. <https://doi.org/10.1016/j.scitotenv.2018.07.270>

Foucault, Michel. 1986. "Of Other Spaces." *Architecture Mouvement Continuité* 16: 22–27.

Gandy, Matthew. 2022. *Natura Urbana: Ecological Constellations in Urban Space*. Cambridge, MA, and London: MIT Press.

Gandy, Matthew. 2014. *The Fabric of Space: Water, Modernity, and the Urban Imagination*. Cambridge, MA, and London: MIT Press.

Jakobsson, Anna and Valerie Dewaelheyns. 2018. "Contemporary interpretation of the meaning and heritage of early 20th century private gardens: From an historical reflection to a future outlook in planning." *Urban Forestry and Urban Greening* 30: 210–19.

Karvonen, Andrew. 2011. *Politics of Urban Runoff: Nature, Technology, and the Sustainable City, Environmental History*. London: MIT Press

Kowarik, Ingo. 2011. "Novel urban ecosystems, biodiversity, and conservation." *Environmental Pollution* 159 (8-9): 1974–83.

Marsh, William M. 2010. *Landscape Planning: Environmental Applications*. Danvers, MA: John Wiley & Sons.

Mees, Hannelore, Meghan Alexander, Mathilde Galepois, Piotr Matczak and Heleen Mees. 2018. "Typologies of citizen co-production in flood risk governance." *Environmental Science & Policy* 89: 330–39.

Nassauer, Joan I. 2011. "Care and stewardship: from home to planet." *Landscape and Urban Planning* 100: 321–23.

Ostrom, Elinor. 2010. "Polycentric systems for coping with collective action and global environmental change." *Global Environmental Change* 20: 550–57. <https://doi.org/10.1016/j.gloenvcha.2010.07.004>

Secchi, Bernardo. 2011. "La nuova questione urbana: ambiente, mobilità e disuguaglianze sociali." *Crios* 1: 89–99.

Tjallingii, Sybrand. 2012. "Water flows and urban planning." In *Sustainable Urban Environments: An Ecosystems Approach*, edited by Ellen Bueren, Hein van Bohemen, Laure Itard and Henk Visscher, 91–112. Dordrecht, London and New York: Springer.

Yu, Carlyne, Megan A. Farrelly and Rebekah Brown. 2011. "Co-production and the governance of decentralised stormwater systems." *Report for the Centre for Water Sensitive Cities*. Monash University.

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