EuropeanPlatform
UrbanGreening

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Urban Water Management

Addressing the Importance of Water in Urban Greening

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Contents

Water is a Priority

The Importance of Blue for Green

Water is one of our most valuable essential resources. Everyone and everything in the world needs water, but its scarcity is growing. In 2022, Europe suffered its worst drought in 500 years and increased flooding was officially declared amongst the greatest effects from climate change that the continent will face in its urban areas over the coming decades.

Recent reports from both the Global Drought Observatory and the European Environmental Agency provide the latest data, which highlight the significant effects of climate change on the water cycle. These reports, amongst many, illustrate just how seriously we must take water scarcity and, in turn, proper water management. As evidenced by unprecedented flooding and heatwaves, there is a renewed urgency for implementing immediate blue-green solutions and adopting more nature-based innovations.

The European Platform for Urban Greening has spent the last two years bringing together top industry leaders and vocational educators in the field, to make advances on the pressing issues, skills training, blue-green technologies and infrastructure solutions needed for climate adaptation, biodiversity and human well-being in the urban environment.

Specifically, Urban Water Management has recently been highlighted by the Platform's industry innovators as a priority, given water's essential function to enable Urban Greening and its fundamental benefits. These benefits include preventing flooding, enhancing biodiversity, cooling our cities and supporting our well-being; all crucial elements for combating the worst effects of climate change.

While Urban Greening is typically seen as providing 'green' solutions, it is important to recognise that without water, nature-based solutions and many of the most effective green innovations that help address climate change would be for naught.

Urban Greening is therefore best understood to provide integrated blue-green solutions for the challenges we face. There is no green without blue. Water alone cannot address the worsening effects of a changing climate, but its value as a resource is essential for greening and provides the foundation for transforming our urban centres.

If blue-green solutions are the way forward, and they are, then collectively we must ensure that water is a priority, protect its value as a resource and be more conscientious about how we manage it.

The Value of Water

Urban Water Management – Three Key Issues Across Europe

The European Platform for Urban Greening is comprised of industry pioneers and educational partners from across six European countries: Czech Republic, Denmark, Finland, The Netherlands, Romania and Spain. With a diverse range of climates, climate adaptation needs, government policies and legislation on local, national and European-wide levels, the partners of the Platform bring invaluable insights into Urban Greening from each of their countries.

In autumn 2022, our industry partners, who are leaders in their regional markets, came together to discuss Urban Water Management. Despite being competitors in the European marketplace, they shared their knowledge, experience and best practices with one another to benefit the industry at large. Their aim was to tackle common problems and elevate water management across the entire green supply chain. While every country has its own unique issues around Urban Water Management, three shared concerns emerged:

- Water Drainage
- Water Collection & Storage
- Water (Re)Use

At the heart of these three issues is a discussion about how we value our water resources. If water is essential for greening and greening is essential for adapting to climate change, then we need to start by assessing its value to our well-being, acknowledge its increasing scarcity and support new ways of managing it as a resource. Flushing our toilets and watering our lawns with drinking water, which is currently common practice across Europe, should cause pause for consideration.

Water Drainage

Our understanding of how urban development affects natural environments is core to how we manage water drainage. Due to the increasing effects of climate change, cloud bursts and flooding occur more frequently in our urban areas. With the current lack of capacity to drain or capture water in sewer systems, we must rethink the infrastructure of our urban spaces and mirror the processes of the natural environment.

Water Collection & Storage

Interlinked with water drainage, is water collection and storage. In order to create, maintain and reap the benefits of blue-green solutions in our urban environments, we must perfect our ability to collect and purify rainwater. Efficient rainwater collection and irrigation solutions are key to seamlessly supporting living green innovations.

Water Re(use)

Finally, how we use and reuse water as the precious resource that it is, matters. Upon a careful evaluation of current irrigation systems, it can be seen that water is often being used in excess or is simply wasted. Smart irrigation and sensoring systems can help with water use efficiency. Likewise, employing the reuse of grey water from domestic or office buildings can provide a new source of water, or rather, multiply its potential.

Industry Innovations

Sustainable Urban Drainage Systems

In order to address these three areas of Urban Water Management, the latest solutions being developed amongst our industry partners ought to be shared and championed. By exploring their initiatives and best practices, it is our hope that we can accelerate the adoption and implementation of these innovations across Europe.

Over the past few years, all of our industry leaders have been focussed on a variety of new blue-green technologies, processes and infrastructure developments around Sustainable Urban Drainage Systems (SUDS). As we will see, there are a range of approaches to water management, such as nature-based, technological or cultural solutions, which can be combined to great effect.

SUDS are drainage solutions that aim to align urban drainage systems with natural water processes as part of a blue-green infrastructure strategy. They are designed to mimic cyclical water systems found in nature and manage flood water and pollution risks that can result from urban runoff, while also contributing to environmental enhancement and placemaking.

By managing stormwater as close to the sources as possible, these systems retain water near urban centres during periods where there is excess water due to rainfall and store this excess resource to be used in periods of drought. Their multifunctionality provides an alternative to the direct channelling of surface water through networks of pipes and sewers to nearby watercourses, such as streams or water channels, by offering nature-inspired solutions for collecting surface water, redirecting it or allowing it to permeate the surface.

SUDS & Complementary Best Practices

Grey Water & Efficient Water Use in Denmark

Across Europe, legislation still largely does not allow companies to use grey water for secondary purposes, such as irrigating green roofs or living façades. To quell legislative concerns around health issues associated with grey water reuse in urban areas, Platform partner OKNygaard, Denmark's leading landscape design and maintenance company, is conducting pilot projects to test safe filtering techniques.

Grey water can be defined as wastewater generated in households or office buildings, from sources that do not contain faecal contamination, i.e., all sources with exception of wastewater from toilets. Primary sources of grey water include water from: sinks, showers, baths, washing machines or dishwashers.

To make the case for reusing grey water, OKNygaard aims to provide proof of concept by demonstrating the efficacy of pumping grey water into existing pipework, where it is then guided to a filtration system consisting of stone and soil. Through the incorporation of iron into the soil, any existing chemicals or contaminants in the grey water are drawn out, resulting in clean water that can be used for a secondary purpose.

Once the filtration system has proven effective, the intention is to use filtered grey water for green innovations such as living façades and green roofs. Future projects will then focus on improving energy efficiency by eliminating the need for a pump altogether.

Water Storage & Retention in The Netherlands

With growing concerns across Europe around shortages of drinking water, Platform partner Royal Ginkel Groep, the leading supplier of green roofs and plants in the Netherlands, have been spearheading water retention and storage projects to enhance how we collect and reuse water.

Amongst the innovations they are working on are 'retention roofs', that collect and retain as much rainwater as possible. Sophisticated models for calculating the weight of the water, the speed of flow of the water and how to reinforce roofs to carry the weight, are some of the technical aspects they have been honing.

Through their retention roofs, Royal Ginkel Groep are opening the blue-green conversation within the supply chain and demonstrating the sophistication of green roofs, the power of plant-based solutions and creating a larger paradigm shift around what it means to being a local water supplier.

Constructed & Aerated Wetlands in Spain

As one of the European regions to suffer most from drought and water shortages in the years to come, Spain is working quickly to find solutions for the treatment of urban and industrial wastewater. Recent innovations by Platform partner PAIMED, a leader in environmental restoration and bioengineering, include constructed artificial wetlands. These phytodepuration systems borrow their design from nature by recreating aquatic environments by means of rafts with floating plants where residual water is poured. There, the plants develop physical and chemical processes that progressively purify the water.

PAIMED have also been focussed on aerated wetlands, which are an advanced type of treatment wetlands that facilitate more efficient removal of contaminants from wastewater owing to the higher availability of oxygen. The subsurface flow system is aerated mechanically from below, providing the appropriate distribution of air that is ideal for treating wastewater with high levels of organic matter.

The latest systems minimise the land footprint of treatment wetlands and are currently being developed for urban areas. Like the retention roofs in Holland, these wetland systems are heavy and require technical advances to support them on urban rooftops in the near future. Such alternatives to traditional wastewater treatment plants are proving to have a lower maintenance cost, a lower energy cost and a smaller environmental impact.

Biochar & Plant Filtration in Finland

When we look to nature for blue-green solutions, often we find that the latest innovations aren't really new at all, such is the case with biochar, also known as charcoal. Biochar is the conversion of biomass produced in a low oxygen environment (pyrolysis, which results in a lightweight porous residue comprised of carbon and ash.

There are countless possibilities for using biochar in filtering. Phosphorous side streams are everywhere: in landfills, produced by manufacturing industries, and inevitably they are found throughout cities. In all of these scenarios it is possible to filter contaminants with biochar, so they do not end up in nature or burden the municipal waste water treatment.

In Finland, Platform partner VRJ Group, the country's leading construction enterprise, has been working with biochar in the urban environment for use in retainment and filtration of water, as well as the enhancement of plant filtration to capture carbon and purify water.

By adding biochar to soil, VRJ Group has been able to sequester carbon and improve the soil quality. The projects conducted at VRJ Group are proving that biochar has many applications and can be used, for example, in constructed wetlands and in the treatment of wastewater as a sorbent for contaminants removal.

Smart Irrigation & the Internet of Things in Czech Republic

As drought and heatwaves progressively increase in duration and impact across Europe, smarter solutions are needed to manage the water resources we have. In order to more efficiently and effectively use urban water to green our public parks, sports fields or gardens, Platform partner ITTEC based in Czech Republic has been developing some of the most advance irrigation and turf technologies.

Using sensors, big data, and the Internet of Things (IoT), ITTEC has created automated irrigation systems with a programmed central control unit. Able to connect and process data in real time, these systems process weather predictions and water accordingly using electromagnetic valves to open the water supply. Automated to function at night, when the vapour value is at its lowest, these smart irrigation systems use up to 30% less water.

Optimised for efficiency and conservation, precipitation sensors enable the system to react to weather changes, such as rainfall, to ensure that it does not water excessively or to shut off the entire system as needed.

Communicating the Value of Water in Romania

How do we value water? When it comes to Urban Water Management or water management in general, the preliminary questions being asked by Platform partner and landscape architects RPR, are around the value of water. As is the case in many countries, water is largely taken for granted and seen to be a given resource; a mindset that needs to be swiftly shifted.

Changing public perception, along with that of government and legislative bodies, is part of the latest communications strategy amongst the Green Sector in Romania. By harking back to traditional rituals and deities, such as Caloian, they believe that communities can be encouraged to develop a deeper respect for the value of water.

Caloian is a Romanian rain-making and fertility rite that predates Christianity, that is now embedded in traditional activities associated with Orthodox Easter. The ritual is based around the sculpting of a clay effigy, 'Caloian', followed by a burial procession for the figurine during this spring holiday and by its exhumation, in summer, during periods of drought. The rite aims to send Caloian to the skies to unlock rain and is then buried so that it can be reborn. Historically, the ceremony would involve the entire community and, in some cases, active participation from the Roman Orthodox clergy.

Reviving these traditional lores with contemporary communities offers an opportunity to open a dialogue about the value of water and how we can integrate old traditions into today´s water management practices. Without a basic understanding of how water benefits agriculture, green life, health and well-being, it is hard to get communities, legislators and government bodies onboard with advancing blue-green innovations in Urban Water Management and Urban Greening.

Supply Chain Innovation

The key to success for the partners of the European Platform for Urban Greening and their best practices, is their leadership in initiating supply chain innovation. Their ability to draw together stakeholders and wide-ranging expertise in order to collaborate on new approaches to nuanced projects is what we should continue aiming for.

Creating a paradigm shift across industries, professional skills training and specialisations is crucial for the advancement of Urban Water Management and Urban Greening. For example, how can we better transfer knowledge to gardeners about plumbing – or educate plumbers in plant sciences and plant-based filtration systems? How can we initiate projects or training through a blue-green lens from the outset, rather than as an afterthought to be incorporated?

After two years of collaboration through the European Platform for Urban Greening we have seen how engaging different stakeholders and partners, such as construction companies or municipal bodies, in Urban Greening initiatives at an early stage can bolster the entire regional skills ecosystem.

By utilising chain innovation, professionals involved in the supply chain will be better able to look across the field and see their role in tackling climate adaptation challenges and how they can best contribute to the development of blue-green solutions.

Looking Ahead

How Do We Bring About a Paradigm Shift?

While there are many new innovations and solutions in Urban Water Management being put forward, there remain barriers to adoption and implementation that need to be addressed if we are to successfully make an impact. Key areas that require action include:

- Creating greater awareness amongst regional, national and European-wide policy makers by presenting proof of concept.
- Educating the general public around the value of water to incentivise more sustainable water use and generate greater support for Urban Green planning.
- Developing the market in order to have a more sophisticated supply chain that can implement solutions at an earlier stage and on a larger scale.
- Up-skilling existing professionals through collaborative knowledge transfers, such as the Platform for Urban Greening (EPLUG) and Building an Applied Research Facility into Centres of Vocational Excellence (BARCOVE).
- Attracting new professionals to the field of Urban Greening by demonstrating the scope of opportunity.

"We are never going to change current legislation unless we can provide proof of concept."

– Kristoffer Sindby, Head of Climate Adaptation Development, OKNygaard

A Call To Action in 2023

What Are the Next Steps?

Having highlighted Urban Water Management as a major priority, the industry partners of the European Platform for Urban Greening will work to advance the following initiatives in 2023:

- A two day Deep Dive on product development innovations in Urban Water Management, with a specific focus on grey water.
- Scaling up Regional Centres for Vocational Excellence with new partners, including municipalities, with the aim of extending their skills ecosystems and scope of reach for their Urban Greening solutions.
- Developing a new Green Dictionary that can help professionals better understand terminology across industries and expertise.
- Creating a Plant Reference Guide for use in green solutions, by finding the most efficient plants in each region.
- Sharing information about regional legislation in order to advocate for new policies around Urban Water Management.
- Focussing on knowledge transfers and initiating dialogues with new partners. In January 2023 a new transnational project for applied knowledge on solutions commences. Referred to as BARCOVE, this project will work towards Building an Applied Research Facility into Centres for Vocational Excellence.
- Offering opportunities for students, teachers and coworkers to work on the latest projects across Europe.
- Brainstorming what kind of tools can be developed to help measure the value of water across the European Union.

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