









POLICY BRIEF

April 2024

World Water Day 2024 Scotland: 'Leveraging Water for a Just Transition'

Dynamic Earth, Edinburgh 22nd March

Overview

- Water is at the heart of Scotland's national identity and one of its most precious assets.
- Water resources in Scotland and abroad are at the centre of some of our greatest global challenges, including climate change and biodiversity loss, and we need to work systemically from source to sea in urban and rural catchments, building resilience and adapting to climate change in a way that is positive and just across society.
- Scotland's water sector plays a vital role in achieving its climate ambitions.
- Working in partnership across academia, policy and practice to secure a sustainable future, the Hydro Nation community recognises the need to deliver the necessary research excellence and innovation to allow Scotland to adapt at pace to contribute to net zero ambitions and wider policy goals.
- The Scottish water sector has a reputation for efficient and successful water governance, policy design and delivery, and 87% of its waters are in good or better condition, but there is no room for complacency.
- Moving forward, water can serve as a strategic asset to maximise co-benefits of water-related initiatives and activities, optimise resources, and help advance a just transition for climate resilience, and net zero incorporating principles of justice, inclusivity, cooperation, and sustainability, participatory and representative decision-making, and stronger institutions.

Background

UN-Water is the convenor for World Water Day (WWD) which is a global observance celebrated each year on the 22nd March to promote the responsible use of water and access to safe water for everyone. In Scotland, the Hydro Nation International Centre is responsible for coordinating and delivering the WWD Conference on behalf of Scottish Government. The purpose of this event is to provide a platform for water professionals, researchers, policymakers, regulators, and the wider community to come together, share knowledge and learn from recent projects and activities aligned to this year's theme to support policy and practice in the water sector.

Key themes

The theme for Scotland's WWD 2024 was **Leveraging Water for a Just Transition**. Some of the main questions that were addressed were: How can water act as a strategic asset to transition to a more sustainable economy in a way that is fair and inclusive to everyone? How can we maximise the co-benefits from water-related activities? How can water contribute to climate resilience? How can we leverage partnerships and cooperation (theme of Scotland's WWD2023) drawing on local, regional, and transboundary examples.

The event programme consisted of keynote talks, breakout sessions, and spotlights on Hydro Nation related activities. The keynote talks centred around four key themes: 1) Leveraging Water Policy for a Sustainable Future; 2) Leveraging the Water-Energy Nexus; 3) Leveraging Water Cooperation; and 4) Leveraging Water for Climate Resilience. In the afternoon, delegates participated in breakout sessions around three themes: 1) Just Transition to Climate Resilience and Net Zero; 2) Water Resources Management and Nature-based Solutions in Rural and Urban Settings; and 3) Blue-green Skills for the Water Sector. Spotlights on Hydro Nation related activities included an update by the Hydro Nation Chair, a spotlight on Blue Green prescribing by a Hydro Nation Scholar, and a poster exhibition by the Hydro Nation Scholars Programme which was broadcast with verbal narratives via the <u>Virtual Pavilion</u>.

The key messages from WWD 2024 Scotland are summarised below.

Opening Address

Scotland's water environment is a unique and precious resource, and one of Scotland's most important assets. Nicole Paterson, Chief Executive for the Scottish Environment Protection Agency (SEPA) marked the start of the event noting that 87% of Scotland's waterbodies are in good or better condition for water quality; however, it is under pressure due to the twin global crises of climate change and biodiversity loss, which also presents a significant risk to lives and livelihoods, and has the potential to damage the economy, disrupt infrastructure and devastate communities. Scotland is vulnerable to more frequent and damaging floods, as well as increasing water scarcity and drought. Scotland has responded well to these challenges through innovation, technology, policy development, and collaboration but more needs to be done to address the scale and urgency of the climate emergency and protect Scotland's water environment through collaborative actions that help realise the benefits of more joined-up, catchmentbased approaches to water management. A good example of this is the Levern Valley project in Barrhead where multiple benefits have been obtained across a community from one scheme. Policy alignment, funding, and collaboration across public and private sectors are essential for success, and continued partnerships, knowledge sharing, innovation, and new approaches are necessary for meaningful change. To this regard, WWD provides a platform for Scotland to showcase its work, discuss challenges, and continue our collaborative journey towards climate justice and a just transition.



Leveraging Water Policy for a Sustainable Future: The Future of Scotland's Water Policy

Jon Rathjen, Deputy Director for Water Policy & **Directorate of Energy and Climate Change Operations** in Scottish Government provided the opening thematic keynote on the importance of water management and policy development in Scotland. The global WWD theme of "Leveraging Water for Peace" is an important global concept and there is a necessity for good water governance and management to prevent conflicts to water scarcity. International collaboration and knowledge sharing across the water sector is needed to address these challenges effectively. Domestically, the focus is to achieve stability of water supply and wastewater management in the face of changing climate, populations, and water use patterns, and provide reliable water services and well-managed drainage and wastewater systems. This was the focus of the recent Water, Wastewater and Drainage Policy Consultation, which engaged around 800 people through various focus groups and forums. The Consultation received positive feedback indicating a willingness to adapt and improve existing frameworks. Scotland is using water resources better than before and the current state of Scotland's water resources and quality is improving, but water legislation needs modernising to add coherence and align with current climate change realities and population dynamics. Some key areas under review include:

- Understanding water resources: Scotland needs to better understand its water resources, including their quantity, quality, and usage. This information will help in allocating water efficiently and sustainably among different sectors, including the environment, agriculture, industry, and drinking water supply.
- Managing too little and too much water: Scotland faces challenges of both intense rainfall and longer periods of dry weather. To address these issues, national water planning is necessary to ensure efficient water use through positive behavioural change, drive business and domestic efficiency, and protect the environment. Additionally, measures to handle surface water flooding and improve sewerage networks are needed.
- Changing water usage culture: Scotland needs to shift its water usage culture to become more efficient and sustainable. Learning from other countries with less water resources can help in adapting and implementing best practices.

In conclusion Jon noted that there will be further consultation and discussion to come as we move forward and invited everyone to engage to bring positive change in this space.

Leveraging the Water-Energy Nexus: Water Requirements for Hydrogen Energy Production in Scotland

There are various potential applications for hydrogen in a decarbonised economy, including being used as a storage medium for green energy or as a replacement for natural gas. Linking to earlier points by Nicole and Jon on water as a strategic asset and understanding where the water is and how to use it, Patrick Campbell, Director for Water US at Ramboll presented a case study on how to assess water supplies requirements to fulfil one potential aspect of Scotland's future economy relating to hydrogen production. The study was driven by the Scottish Government's long-term target to reach net zero by 2045. It is estimated that around 30 gigawatts of hydrogen capacity will be needed to achieve this goal, potentially requiring a water volume of 6% of current raw water abstraction rates. The study aimed to understand how the potential future investment would impact the water infrastructure, considering aspects of water volume needed, potential hydrogen production regions, and how existing infrastructure can be utilized. Circular economy considerations were also important, including the potential co-benefits of heat production and oxygen generation The exercise consisted of allocating 15 potential hydrogen production regions to distribute the total 30 gigawatt capacity and assess how much water will be needed per region. Further, different sources of water were assessed, including surface water, groundwater, potable water, seawater, and effluent from treatment plants based on local scenarios. Findings suggest that all hydrogen regions can be supplied with adequate water by effluent, surface water, and seawater, but there are challenges with groundwater. Where applicable, effluent and seawater have higher resilience due in part to reliable availability, non-competitive use, and ability to scale. Effluent has additional circularity benefits and co-location of energy production at a wastewater treatment plant could reduce water infrastructure needs and expand the role as a water resource recovery facility.



Leveraging Water Cooperation: Engaging with the UNESCO Water Family – International Opportunities for Scotland

John Rowan, Director for the UNESCO Centre for Water Law, Policy and Science provided insights from the Centre's work and showcased the achievements and opportunities for engagement through UNESCO's global water family. The Centre based at the University of Dundee is the UK's only category two UNESCO water centre, focusing on good governance for development. The Centre's activities include research, convening, integrating, and providing expertise in line with UNESCO's mission. During his talk, John emphasized the importance of considering both local and global perspectives on WWD and highlighted the challenges posed by the current global turbulence, including climate change, social inequity, and the 'polycrisis', with water being a central issue. The discussion touched on the interdisciplinary and transdisciplinary nature of research needed to address these challenges, emphasizing the importance of collaboration and cooperation. Further, the role of UNESCO in driving a water-secure world through initiatives like the Intergovernmental Hydrological Programme and the World Water Development Report (launched on World Water Day 2024) was outlined, including a deeper look into UNESCO's 16 flagship programmes, such as the Hydrology for Environment, Life, and Policy (HELP) programme, which aims to tackle sustainability challenges globally. The HELP initiative was one the earliest attempts to consider ways in which science and society, through the medium of the water basin concept, can help address sustainability and equity issues worldwide, with three basins in Scotland (Tweed, Dee (Grampian), Don). It is important to revitalise initiatives like HELP and the Centre has been invited to take more direct leadership responsibility to do this. A few specific research and collaborative activities were highlighted including the award winning disaster resilient homes project in Bangladesh that has been active for nearly a decade, the Eddleston Water project in the Tweed Basin, and the new regenerate project in partnership with Eden Project Scotland. The Centre's activities showcase collective work and facilitate conversations across the international network.

<u>Leveraging Water for Climate Resilience:</u> <u>Adaptive Responses to Climate-Driven</u> <u>Water Quality Issues</u>

Scottish lochs and reservoirs are warming at an alarming rate. This is increasing the risk of algal blooms, which reduce their value for water supply, recreational use, and wildlife habitat. The annual CREW lecture talk was delivered by Linda May, Freshwater Ecologist at the UK Centre for Ecology & Hydrology. The talk highlighted key outcomes from a recent CREW-funded project (Assessing Climate Change Impacts on the Water Quality of Scottish Standing Waters) on the impact of climate change on Scottish lochs

(lakes), highlighting the increasing temperatures and the risk of harmful algal blooms due to high phosphorus levels. The study revealed that runoff from farmland is the main source of phosphorus in Scottish lochs, rather than sewage effluent. Recommendations to mitigate phosphorus runoff included reducing excess fertilizer application through targeted soil testing. Adopting sustainable practices and reducing greenhouse gas emissions were emphasized as key strategies to improve water guality in Scottish lochs. The study projected that sustainable land use and emission reduction could lead to a 20% decrease in phosphorus runoff and improve water quality in 85% of the lochs, while failure to do so could result in a doubling of phosphorus levels in the future. In summary, the project showed that while Scottish lochs and reservoirs are under threat from climate change, impacts can be mitigated through collaboration with farmers, landowners, environmental regulators, and policymakers to co-develop sustainable, evidence-based solutions, however, Linda stressed the need for urgent action. The talk concluded with the official launch of the project video.



Breakout Sessions

This year's WWD event included three breakout session, which allowed participants to meet in subgroups to hear from an expert speaker and then address specific questions. During a lively and wide-ranging discussion, two overarching questions were considered: 1) What do we know and where are the gaps (e.g. examples of best practise/successes, identified gaps)?; and, 2) What do we need to be doing and how do we need to be doing it (e.g. actionable, policy relevant recommendations)? After an hour of discussion, the groups reconvened in the plenary room and the ideas were summarised and reported by the Hydro Nation Scholars. Following are summaries of key messages from each of the Breakout Sessions (see WWD2024 Supplementary Report for further information).

What does a Just Transition to Climate Resilience and Net Zero need to look like?

Led by Catriona Laing and Ian Freeman from Scottish Government, this breakout session focused on the topic of a just transition to climate resilience and net zero, an important part of Scotland's National Adaptation Plan consultation process. The main question addressed was how effective partnerships and collaboration can accelerate Scotland's transition to a net zero and a climate resilient nation. The session identified gaps in communication, funding, evidence, and collaboration/ outreach. These gaps included issues with making research accessible to key stakeholders, funding naturebased solutions, understanding water assets in Scotland, and involving marginalized communities in discussions. The second question addressed what actions need to be taken and where they need to be implemented. Solutions were identified in the areas of policy, academia, and industry. Under policy, suggestions included investing in education, creating joint government policies, and transitioning away from stock market-driven economic models. Within the academic sector, solutions involved transdisciplinary research, understanding root causes of problems, and measuring behaviour change in initiatives. Industry solutions focused on identifying key actors, increasing awareness through media, and incentivising resilient infrastructure.

Water Resources Management and Nature-based Solutions in Rural and Urban Settings

In this breakout session led by Christopher White from University of Strathclyde the group discussed water resource management (WRM) and the use of nature-based solutions (NbS) and sustainable urban drainage systems (SuDS) approaches across rural and urban environments. In addition to the overarching questions, this session explored questions on effectiveness, collaboration, funding, and maintenance. Key themes included defining NbS, scale implementation, funding sources, and maintenance strategies. Monitoring and scalability were highlighted as areas needing more attention, with a call for more case studies and data collection. The importance of stakeholder collaboration, including the private sector, and the need for interdisciplinary research were emphasized. Education and community engagement were identified as crucial aspects for moving forward with NbS implementation. Overall, the session highlighted the complexity of NbS implementation and the need for coordinate, interconnected efforts across various stakeholders.





Blue-green Skills for the Water Sector

The third breakout session was led by Douglas Bertram from the University of Strathclyde with the focus on blue-green skills in the water sector, addressing gaps in skills and necessary actions. Key points included Scottish Government exploring potential avenues for funded academic and Knowledge Exchange activity to support developing blue-green skills across the water sector, and beyond; Government and stakeholders developing stronger sector wide communication and data sharing, including a common language and terminology framework (where appropriate) to allow academic, industrial and other stakeholders access to key environmental information to develop and train from; and Scottish Government, SEPA and leading sector Professional bodies such as ICE, CIWEM encouraging universities to adapt curricula to include raising awareness of complex environmental systems and issues, the benefits of interdisciplinarity and the role of social sciences in complete STEM problems. Overall, the session emphasized the need for a shared vision, enhanced communication, and collaboration within the water sector.



Scotland The Hydro Nation Updates on the Hydro Nation Chair Research & Innovation Programme

The <u>Hydro Nation Chair Research and Innovation</u> <u>Programme</u> was launched at WWD2022 and <u>Andrew</u> <u>Tyler from the University of Stirling</u> provided this year's update. The programme is funded by Scottish Water through the Scottish Funding Council and aims to bring the research innovation community in Scotland together to help Scottish Water achieve its net zero goals by 2040. The programme focuses on advancing systems understanding, climate adaptation, resource recovery, reducing emissions, managing infrastructure carbon, and upskilling the workforce. Innovation plays a crucial role in translating research into operable solutions, with a focus on deep tech and place-based innovation. The programme has already brought in state-of-the-art technology from various sectors to address challenges in water management and emissions reduction. Additionally, the programme stimulates new ideas through funding projects and collaborations with Scottish Water to identify key challenges and launch calls for innovative solutions. Andrew highlighted notable projects including the Forth-ERA programme, work on circular economy, and efforts to enhance climate resilience involving sensor technology to monitor water flow, pollution, and ecology in specific catchments, leading to interventions to improve water quality and quantity. The programme emphasizes collaboration and invites researchers to contribute their expertise to implement solutions effectively.

Blue-Green Prescribing Blueprint: A Prescription for Scotland's Healthy Population and Healthy Planet

This presentation by Hydro Nation scholar Julius Caesar Alejandre from Glasgow Caledonian University highlighted Scotland's first blue-green prescribing programme as a sustainable transition in healthcare, focusing on mental health issues and pharmaceutical pollution. Mental health problems are prevalent in Scotland, with high dependence on antidepressants leading to increased costs. The presence of pharmaceutical substances in water environments, including antidepressants, poses environmental risks. The Scottish Government's Climate Change and Sustainability Strategy aims to reduce environmental harm caused by medicines through improved prescribing practices. The Blue-green prescribing model involves four core strategic approaches: providing accessible blue space activities, integrating environmental considerations in mental health care, increasing socioecological investment, and fostering collaboration for evidence-based prescribing. To successfully implement blue-green prescribing, collaboration among various sectors is essential, including health, social care, patient groups, third sector organizations, water, and environment sectors. This holistic approach can transform Scotland's healthcare system into a more environmentally sustainable one.

Summary and Close

The event wrapped up with closing remarks provided by Alex Plant, Chief Executive for Scottish Water, who started by acknowledging the value of blue and green spaces for mental health and highlighting the need to make Scottish Water's assets more welcoming to the public. Scotland is in a good starting point with a shared Water Sector Vision and high levels of trust in the water system. Nevertheless, the pace of climate change and severe weather events is increasing, posing challenges for aging water assets. The response to these challenges requires a collective national effort, including increased investment, and the need to 'do things differently', and promoting behaviour change. Water is fundamental and crucial for Scotland's future, with the potential to become a global leader in water management and climate change adaptation. To conclude, Alex highlighted the need for collaboration and proactive measures to address climate change, improve water infrastructure, and engage the public in water conservation efforts.



Conclusion

Scotland is considered successful in water governance and policy design and delivery, with 87% of its waterbodies in good or better condition but there is still a need to improve and adapt by working jointly and innovatively to create a resilient and sustainable water environment in anticipation of future challenges, with climate change at the core of the conversations. In 2023, this WWD event explored emerging trends and opportunities for water to act as a catalyst for accelerating change through partnerships and cooperation and the ways in which policy, research and innovation can come together to safeguard water sustainability and resilience. A key take home message of the conference was that further than recognising the importance to collaborate, we need to think more about how to collaborate effectively. Continuing that conversation, Scotland's WWD 2024 served as a forum for science, industry, and policy interchange to explore ways to balance water demands and optimise resources by leveraging water-related sectors opportunities and initiatives to help advance to a just transition and a sustainable and climate resilient future.