









## Supplementary Information Report World Water Day 2024 Scotland: 'Leveraging Water for a Just Transition'

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### Leveraging Water for a Just Transition

The World Water Day (WWD 2024) event was organised by the Hydro Nation International Centre (HNIC) to coincide with UN's World Water Day leveraging on the theme of 'Water for a Just Transition'. This theme aligns with the UN's 'Water for prosperity and peace' goal given that achieving a Just Transition for water by 2040 also ensures equity, sustainability, and well-being, fostering peace and prosperity. The event convened representatives from the Scottish Government, industry, regulatory bodies, policymakers, and academia. Dr Rachel Helliwell, Director of HNIC and Centre of Expertise for Waters, opened the event and emphasised the urgency for a Just Transition, given the growing impacts of climate change and biodiversity losses, highlighting the need for collaboration across policy sectors. The key messages of the WWD 2024 event are summarised in the **Policy Brief**. This Supplementary Information report provides further account of the presentations and discussions throughout the day.



### Inaugural address:

Nicole Paterson, Chief Executive for the Scottish Environment Protection Agency (SEPA)

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- Drew attention to Scotland's 87% good or better environmental status in its water environment, a vital resource, but cautioned against complacency.
- Mounting pressures as a result of the climate emergency include frequent flooding, droughts, pollution, and loss of habitats. The UK has experienced six of the wettest years on record since 1998 and reported over 700 flood alerts since September 2023, alongside persistent drought occurrences every year since 2018.
- 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.
- Tackling the climate emergency requires new approaches, concerted efforts, and collaboration across multiple disciplines to bring about a Just Transition, positioning water as a strategic asset.
- Maintaining soil quality is crucial for retaining water and nutrients to improve water quality, enhancing drought resilience, mitigating flood risks, storing carbon, and combating biodiversity loss.
- Moving forward, the emphasis should be on catchment-based approaches and holistic 'Source-to-Sea' approaches.

## **Keynotes**

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

Jon Rathjen, Deputy Director, Water Policy & Directorate of Energy and Climate Change Operations, Scottish Government

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Despite 87% of Scotland's waters being in good or better environmental status, and the significant progress in the use of the water network for renewable energy, adaptation to future scenarios in a fair and just manner is important. Challenges from climate change and population shifts highlight the importance of the theme "Water for a Just Transition."

Scotland's existing Water legislation is outdated and lacks coherence for present day challenges. The country is facing unpredictable rainfall patterns characterised by intense rainfall leading to flooding and extended dry spells resulting in water shortages. To tackle these issues, there is a need to develop and update water policy.

A recent <u>Water, Wastewater and Drainage Policy</u> <u>Consultation</u>, involving ~ 800 individuals highlighted two key aspects of policy development:

#### 1) Addressing droughts:

- A national water planning strategy for Scotland is essential to improve the efficiency of water usage across diverse sectors.
- This strategy requires a comprehensive understanding at a national level of Scotland's detailed water resources, including quantity, quality, and sector-specific usage.
- The new policy development should prioritise incentives to encourage behavioural changes towards reduced water consumption, as Scotland currently utilises significantly more water compared to other countries.

#### 2) Addressing surface water flooding

• Preventing flooding in homes and businesses involves slowing down the flow of water and

enhancing the water storage capacity at a catchment and local scale.

- Much of the surface water currently flows through an ageing sewage network that is near capacity, resulting in overflow problems during storm events.
- Increasing the size of sewers is not an effective or viable solution.
- A potential alternative is to construct features that capture water, allowing it to gradually seep into the ground. This has the dual benefit of reducing flood peaks whilst restoring groundwater, building resilience in the system for times when water is scarce.
- Implementing these features requires societal acceptance, which requires community engagement and incentivisation.

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

Patrick Campbell, Director for Water US, Ramboll Consultancy

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- The study was driven by the Scottish Government's long-term target to reach net zero by 2045 and the need to consider the viability of alternative energy sources in a decarbonised economy.
- Water availability is key for hydrogen production (green and blue) as a renewable energy source.
- The primary objective was to understand the logistics of water usage and availability for meeting the demands of producing hydrogen.
- The project took into consideration the principles of Circular Economy. Effluent has additional circularity benefits by using electrolysis byproducts in treatment (oxygen) or community (district heating).
- Co-location of energy production at a wastewater treatment plant could reduce the project's water infrastructure needs and act as a water resource recovery facility.
- 15 discrete regions and 6 archetype regions (Shetland, Grangemouth, Fife, Glasgow, Western

Isles, Energy Island) were identified.

- Evaluation of the different types of water resources: surface water, ground water, potable water, seawater, and effluents, showed that recycled wastewater treatment effluent, and where applicable seawater, should be considered due to reliable availability, non-competitive use, and ability to scale.
- However, the actual viability of using seawater/ wastewater treatment plant effluents depends on the scale of the project, location, and considerations around brine disposal.

#### Leveraging Water Cooperation: Engaging with the UNESCO water family-International opportunities for Scotland

John Rowan, Director of the UNESCO Centre of Water Law, Policy and Science

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- The University of Dundee hosts UNESCO family's Centre for Water Law, Policy, and Science, a unique Category 2 Centre in the UK known for its integrative approach to science, policy, law, and governance.
- Importance of trans-disciplinary research incorporating social science aspects to address global challenges such as climate change, biodiversity loss, social inequalities, generative AI, conflicts, pandemics, and mass migration ('polycrisis').
- The University actively supports UNESCO's mission through the Intergovernmental Hydrological Programme (IHP; 9th phase 2022-2029) to promote a water-secure world with access to clean water and sanitation (SDG6). Through engagement with the IHP programme Scotland has highlighted innovative research and technologies with global relevance and application.
- The <u>UN's World Water Development Report</u>, launched on March 22nd 2024, unveiled the world's first Alliance for Water Stewardship group certification, proudly developed in Scotland using the Water Resources Energy Tool.
- Specific examples of 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 (nature-based solutions for flood management), and the new regenerate project in partnership with Eden Project Scotland.

- The Centre has been active in the revitalisation of <u>UNESCO's HELP (Hydrology for the Environment,</u> <u>Life and Policy) flagship programme</u> to help tackle sustainability challenges and equity issues worldwide. The University is keen to raise the profile of three basins in Scotland (Tweed, Dee (Grampian), Don) by focusing on wider participation and fostering international networking.
- Government policies emphasised as vital drivers for these initiatives.
- Scotland's Hydro Nation agenda is a valuable asset in the global context, highlighting the importance of water stewardship on a larger scale.

#### Leveraging for Climate Resilience: Adaptive responses to climate-driven water quality issues

Linda May, Director, Freshwater Ecologist, UK Centre for Ecology and Hydrology

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The annual CREW lecture highlighted key outcomes from a recent CREW-funded project "<u>Assessing Climate Change</u> <u>Impacts on the Water Quality of Scottish Standing</u> <u>Waters</u>."

- Scottish lochs (lakes) are vital to our national heritage, providing habitats for plants and wildlife, drinking water, and recreational opportunities. Climate change is causing a significant threat to the quality of Scottish lochs, making it crucial to understand its effects.
- Global temperatures of lakes, including those in Scotland, are rising, and in some cases surpassing threshold levels (17°C) with potential impacts on the frequency and intensity of algal blooms.
- Algal bloom growth is influenced by:
  - o Higher nutrient concentrations, especially

phosphorus levels.

- o Warmer temperatures.
- o Low flushing rates of water.
- The primary source of phosphorus in Scottish lochs is runoff from agricultural land to water, which is expected to increase due to climate change impacts.
- Projections to 2080 indicate that phosphorus concentrations are likely to exceed the World Health Organisation's recommended threshold levels.
- Climate change impacts on water quality can be reduced by adopting more sustainable land use practices such as reduced application of excess fertilisers in agricultural systems and other land uses such as golf courses. Model projections show that such measures could reduce phosphorous runoff by 20% resulting in improve water quality of our lochs and reservoirs ~85% by 2080.
- Research indicates that through the adoption of sustainable management practices it is possible to lower phosphorus concentrations to help mitigate algal bloom growth.
- Collaboration with farmers, landowners, environmental regulators, and policymakers is essential to co-develop sustainable evidence-based solutions.
- The importance of soil testing to determine required phosphorus (fertiliser) amounts and optimal application timings was highlighted.

## **Breakout Sessions**

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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 two overarching questions:

- What do we know and where are the gaps (e.g. examples of best practise/successes, identified gaps)?
- 2. What do we need to be doing and how do we need to be doing it (e.g. actionable, policy relevant recommendations)?

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The participants then reconvened in the plenary room to hear a <u>report of key messages by the Hydro Nation</u> <u>Scholars</u>. Following are summaries of the discussions from the Breakout Sessions:

# Session 1: What does a just transition to climate resilience and Net zero need to look like?

Session Leads: Catriona Laing and Ian Freeman (Scottish Government)

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#### Q1- What do we know and where are the gaps.

The premise of the discussion focused on how effective partnerships and collaborations can accelerate progress to achieving climate resilience, and a just transition to net zero, an important part of <u>Scotland's National</u> <u>Adaptation Plan (SNAP3) consultation process</u>. Four gaps were identified:

1. Communication: Getting the right information to the right people at the right time is critical. It is importance to review how data, information and knowledge is shared. Using summaries, easy-read versions, blogs, podcasts and images to make information accessible to a range of stakeholders, from farmers to policymakers, was underlined as a way to close the communication gap. Bringing relevant research to farming communities and guaranteeing inclusivity, especially for groups with disabilities by allowing them to take part in online consultations are two examples of this.

- 2. Funding: Addressing gaps in funding, for nature-based solutions, creating incentives for implementation, and addressing who pays.
- **3.** Evidence: In understanding Scotland's water assets and their resilience, access and ownership of data and information (e.g., water infrastructure, water use/abstraction) is an issue making the delivery of evidence to policy and practice challenging.
- Collaboration: Importance of outreach activities to involve school children and marginalised communities (e.g. people with disabilities need to be included in consultations, to consider their needs and lived experiences).

## Q2- What do we need to be doing and how do we need to move towards a Just transition?

The second question addressed what actions need to be taken and where they need to be implemented.

#### Policy

Investing in education, encouraging entrepreneurship among young people to foster innovative solutions and develop inclusive government policies and incentives that consider small-scale industries alongside large companies. Developing models to transition away from stock market-driven economic models.

#### **Industry Perspective**

Identifying key actors/users who will be impacted by policy decisions, raising awareness through different media, and motivating industry to prioritise resilient solutions.

#### Academia

Conducting trans-disciplinary research particularly in social sciences and other STEM disciplines, focussing on cost-benefit analysis of Just Transition, understanding complex land use (including valuation and quantification), whilst making data accessible and more democratised, and finally, measuring behaviour changes for net zero and Just Transition.

#### **Roles and Responsibilities**

Discussions focused on the roles of farmers versus the government and other groups. Emphasis was placed on building trust, respecting differing viewpoints, and recognising the scale of the challenge.

#### Session 2: Water Resources Management and Nature-based Solutions (NbS) in Rural and Urban Settings

#### Lead: Christopher white (University of Strathclyde)

Water Resource Management (WRM) and the use of NbS and Sustainable Urban Drainage Systems (SuDS) approaches across rural and urban environments were

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discussed. 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 coordinated efforts across various stakeholders.

Further, groups in this session were posed two different sub-questions per table to explore different aspects of the two overarching questions given to all of the breakouts. The key points are summarised as follows:

#### Q1. What do we know and where are the gaps?

- Insufficient schemes to evaluate the effectiveness of NbS/SuDS due to their location specificity.
- Knowledge gaps in measuring their effectiveness

   uncertainty about the metrics needed to assess
   their impact on quality, quantity, and biodiversity.
- Uncertainty about the long-term maintenance of NbS/SuDS.
- Current funding is primarily focused on floods, neglecting water scarcity.

#### **Subquestions**

#### Q1. What do we know and where are the gaps?

#### How effective are NbS/SuDS in urban and rural settings? Are they practical/cost effective?

Discussions reflected uncertainty regarding the effectiveness of NbS and SuDS in urban and rural areas, citing the need for more data on their impact on water quantity, quality, and biodiversity. Key considerations included defining NbS, addressing community and landowner behaviour change alongside engineering interventions, determining relevant metrics to assess their impact, and recognising the importance of not just NbS but also stewardship and maintenance for their overall effectiveness.

# **1.2** Do existing NbS/SuDS solutions deal with both flooding and water shortages/scarcity? What examples can we draw on for either/both across Scotland?

The group felt that there was not sufficient knowledge or examples available about the effectiveness of existing NbS/SuDS in addressing both flooding and water shortages in Scotland. Trust issues among funders to be convinced of their efficacy, challenges in determining appropriate scales for implementation, and the need to bridge the gap between extremes of floods and droughts. Lack of sufficient knowledge on the location of placement of NbS within a given landscape for getting maximum benefits, the siloed nature of work between disciplines hindering predictability. There was a consensus on the necessity for more empirical evidence versus modelling (e.g. more examples are required like Eddleston) to support funding mechanisms, particularly those projects that demonstrate their effectiveness on both floods and droughts.

#### 1.3 What lessons can urban environments learn from rural environments, and vice versa? What are the barriers/challenges to adoption/uptake, maintenance and management?

From group discussions, it emerged that there is a massive gap in examples of NbS in the water policy sector, with significant gaps noted. The priorities of SEPA and the Scottish Government were highlighted:

- Lack of examples of NbS in rural areas; questions about scalability of NbS with most examples being smaller catchment scale.
- Requirement for cost/benefit analysis, particularly in rural/agricultural settings involving assessing incentives for investing in projects considering the long-term benefits.
- Funding gaps with more focus on flood management rather than water scarcity in rural areas indicating a need for improved coordination to break down silos.

#### 1.4 What enables effective collaboration, partnerships and stewardship? How is effectiveness measured across multiple (disjointed) policy areas?

Since NbS is place based and site specific, it is important to consider socio-economic factors to make effective collaboration. It is important to provide tailored messages to the right kind of people. However, there is a gap in how to measure and what data and evidence to use on effectiveness and success criteria of collaborations/partnerships within communities and different policy areas.

#### **1.5 How does NbS/SUDS fit into wider water resource** management practices? How does/can NbS solutions get funded?

To integrate NbS and SuDS into wider water resource management practices presents challenges: how to incentivise integration, easier for new builds but not for retrofitting to existing infrastructure, determining responsibility, and identifying funding sources. Policy gaps were identified, particularly with regards to disparity between envisioned and end results of schemes and approval processes that are easier with smaller scale housing schemes compared to large scale developments. Importance of long-term maintenance was highlighted, as the multiple benefits of NbS and SuDS are contingent upon proper upkeep. Reluctance to adopt NbS in the absence of thorough cost/benefit analyses was seen as a hurdle particularly in the current financial climate. Discussions regarding funding focused on clarifying who bears the costs and simplifying payment structures, while ensuring that the benefits are easily understandable to all stakeholders.

# Q2. What do we need to be doing and how do we need to be doing it?

- Develop '**demonstration catchments**' across varied spatial scales as an evidence base for NbS.
- Funding: who pays, fair funding mechanisms, providing incentives for landowners such as agricultural subsidies for adapting NbS, ensuring long-term maintenance (who owns the NbS?), funding research outside traditional NbS sectors.
- **Community & Stakeholder engagement**: co-create solutions with communities, fostering stewardship values, importance of changing mindsets, and fighting 'business as usual', realising co-benefits for long-term success. Finding effective messaging and communication routes with stakeholders. Push for cross policy engagement.

# Through discussions, eight actions/cross-cutting themes were identified:

- 1. Need to define NbS more clearly,
- 2. Scale/location specific nature of NbS

- 3. Unclear routes to funding
- 4. Issues with long-term maintenance of NbS
- 5. How to monitor consistently and collect data
- 6. Interconnections between various schemes and approaches
- 7. Need for community engagement
- 8. Education about NbS

#### **Subquestions**

# 2.1 How effective are NbS/SuDS in urban and rural settings? Are they practical/cost effective?

The effectiveness and practicality of NbS and SuDS in both urban and rural settings depend on various factors. These include the need for retrofitting SuDS and NbS, supported by appropriate policy frameworks and funding. Research, education, monitoring, and upscaling efforts are essential for enhancing effectiveness and cost-effectiveness. Collaboration among not only organisations and departments, but also communities, and local authorities is crucial, along with Appreciating and rewarding good practices, including taking measurable risks to do the right thing, even if it doesn't always align with current guidelines. It's important to monitor and measure these efforts to provide evidence for upskilling and upscaling. Education plays a key role, focusing on both content and methodologies. Adopting a holistic, whole systems approach and recognising the interconnectedness between different themes was also emphasised.

# 2.2 Do existing NbS/SuDS solutions deal with both flooding and water shortages/scarcity? What examples can we draw on for either/both across Scotland?

Discussions highlighted the need for developing an evidence base for NbS and SuDS by establishing demonstration catchments across wide locations and spatial scales, supported by long-term funding and utilising data from these catchments to improve existing models. Additionally, incentives for landowners, such as agricultural subsidies and funding from the private sector, were highlighted as essential for promoting adoption. It was noted that these incentives should not only focus on funding but also on changing mindsets and combatting 'business as usual' attitude.

# 2.3 What lessons can urban environments learn from rural environments, and vice versa? What are the barriers/challenges to adoption/uptake, maintenance and management?

Incorporating NbS into corporate responsibility and social policy, exploring incentives beyond financial benefits. Identifying socio-economic benefits, along with the importance of building case studies and engaging stakeholders in NbS projects. Monitoring and evaluation through SEPA were highlighted.

#### 2.4 What enables effective collaboration, partnerships and stewardship? How is effectiveness measured across multiple (disjointed) policy areas?

Finding effective messaging and communication routes for stakeholders was identified as crucial point for effective collaboration, partnerships, and stewardship, as well as by funding research beyond traditional NbS sectors. Public awareness campaigns from other issues, such as smoking and recycling, can be drawn upon. Translate complex policy and government objectives into language that is easily understandable by the general public., and building trust were recognised as key factors.

# 2.5 How does NbS/SuDS fit into wider water resource management practices? How does/can NbS solutions get funded?

It was highlighted that NbS and SuDS must be resilient to climate change to fit into wider water resource management practices.

Integration into land use planning processes, and education and engagement with Scotland's people were recognised as solutions to get funded.

### Session 3: Blue-green skills in water sector

Lead: Douglas Bertram, University of Strathclyde

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The third breakout session focussed on blue-green skills in the water sector, addressing gaps in skills and necessary actions.

#### Q1. What do we know and where are the gaps?

#### **Policymaker perspective**

Importance of government support for progressive policies, develop appropriate training programmes that are cross-disciplinary and focus on STEM fields. There was recognition of the challenges posed by "Known Unknowns" in policy, where different definitions may lead to confusion. Need to involve the younger generation in policymaking processes.

#### **Industry perspective**

Lack of funding, importance of confidence in results of blue-green infrastructure/NbS, lack of tools for quantifying results, costs and multiple benefits, issues with long-term maintenance of SuDS (costs, responsibility), need for new equipment and engineering, and limited manpower with right skills to do so. Industry is usually tied into frameworks so have limited scope to use consultants outside the frameworks e.g. landscape architects or hydraulic modellers as opposed to traditional engineers.,. Problems due to out of sync planning cycles. Need for more collaborative efforts between organisations responsible for roads, private property owners, and those managing sewer systems because surface water runoff can impact all. However, there can be challenges in securing joint funding for coordinated management. Other aspects that were discussed were: Scotland lacks information on water demand, availability, and the effectiveness of NbS in urban areas, gaps in knowledge about sewers flooding and blue green infrastructure, reluctance from clients to use sustainable solutions over grey infrastructure, lack of knowledge on surface water disconnection strategies to adapt to climate change, limited opportunities and skills for students to gain experience with hydraulic modelling before joining workforce, importance of mentality shift from human centred and cost focussed towards inclusion of environment and nature considerations.

#### **Academic perspective**

Knowledge gaps in Scotland on measuring the effectiveness of NbS in urban areas, what distinguishes blue skills from regular skills, importance of public engagement and awareness raising (conducting workshops to include public participation) that can help to move away from solely human-centred and costfocused approaches towards embracing environmental and nature considerations (as above), creation of a unified platform providing access to comprehensive NbS information including open-source maps and databases (similar to the English Magic Map), case studies on land use while remembering that NbS is not a panacea to address all risks in water sector. Scotland currently lacks information on water demand and availabilitythis was also raised in the latest Scotland Government Consultation.

# Q2. What do we need to be doing about the situation and how/where do we need to be doing it?

#### **Policymaker perspective**

- **Training:** Government apprenticeships in the water sector receive support.
- **Experience:** importance of gaining experience and understanding new technologies emerging in the sector.
- **Skills:** providing incentives to retain skilled individuals in Scotland.
- Communication: Enhancing communication between science and policy was highlighted as crucial, with a strong emphasis on improving both policymakers communications to science and

science communications to policymakers (received the highest number of votes).

• Education: Incorporating awareness of current environmental challenges into the curriculum and providing clear messaging on opportunities and careers in catchment restoration for schoolchildren.

#### **Industry perspective**

- Identify and Fill Skills Gaps: Identify skills gaps and take measures to address them. This includes upskilling maintenance teams for SuDs. This requires a larger workforce and encouragement/incentives for more individuals to join the water industry.
- Communication and Upskilling: Better communication and knowledge transfer with contractors; supplemented with additional training and knowledge exchange opportunities between universities, organisations and students.
- **Public Education on Blue-Green Infrastructure:** Educate the general public about the functions and benefits of blue-green infrastructure.
- High School Education and Career Awareness: Educate high school students about the water sector and showcase potential career paths, (through initiatives like the "H<sub>2</sub>O Generation").
- Graduate Training Programs: Implement graduate training programs to fill knowledge gaps (e.g. Scottish Government-funded flood risk training programme at SEPA/University of Stirling in response to the Flood Risk Management Act).

#### Academic perspective

- Importance of enhancing outreach efforts, how to achieve interdisciplinary collaboration before project initiation.
- The role that Hydro Nation could play as a driver and lever for interdisciplinary collaboration. Shareable data platforms to facilitate interdisciplinary work.
- Importance of mentality shift and engaging with communities to understand their priorities and codesigning solutions with communities (received the highest votes).

## **Scotland The Hydro Nation**

### Updates on the Hydro Nation chair research and innovation programme: Progress to date

Andrew Taylor, Scotland Hydro Nation Chair, University of Stirling

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- The <u>Hydro Nation Chair Research and Innovation</u> <u>Programme</u> funded by Scottish Water aims to unite Scotland's research and innovation community to support Scottish Water's goal of transitioning beyond Net Zero by 2040.
- The program focuses on six key areas:
  - Advancing systems understanding with AI development, sensor technology, and satellite data utilization.
  - 2. Climate adaptation through Blue-Green infrastructure and Nature-Based Solutions.
  - 3. Resource recovery through Circular Economy principles.
  - 4. Reducing emissions in the water sector and WWTPs through innovative approaches
  - 5. Exploring alternative materials for infrastructure carbon reduction
  - 6. Developing skills for the Water sector
- Current projects include greenhouse gas emission characterisation using passive FTIR, behaviour-changing tools and techniques, and carbon capture initiatives.
- Crucible projects: 19 funded at £239k to date with the aim of fostering new ideas.
- Forth-ERA (Environmental Resilience Array): A £9 million state-of-the-art digital observatory showcases water as a strategic asset for a Just transition; Generates data to enhance decision-making processes.

#### Blue -Green Prescribing Blueprint: A prescription for Scotland's Healthy population and healthy planet

<u>Julius Caesar Alejandre, Hydro Nation Scholar, Glasgow</u> <u>Caledonian University</u>

![](_page_8_Picture_17.jpeg)

Scotland's first blue-green prescribing programme was discussed, highlighting the importance of collaboration of healthcare, water, and environment sectors for a sustainable transition in healthcare. Mental health is a pressing concern in Scotland, especially in deprived communities, with a notable increase in the use of antidepressants over the past decade. Use of these medications have been linked to Antimicrobial Resistance in Scotland's water systems. A key action in the Scottish Government's NHS Scotland's Climate Emergency and Sustainability Strategy (2022) is to reduce environmental harm from medication use through improved prescribing practices. A blueprint prescribing model developed in this project was discussed that included integrating environmental considerations into healthcare, establishing a standardised referral system, increasing socio-ecological investment and encouraging collaboration for evidence-based Blue-Green prescribing system.

## Closing Remarks Summary and close of WWD 2024 Event

Alex Plant, Chief Executive, Scottish Water

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Scotland's WWD 2024 served as a platform for the exchange of scientific knowledge and policy ideas to raise awareness of the progress made to date and the need for greater inclusivity, cooperation, sustainability, and participatory and representative decision-making to advance a Just Transition for climate resilience, and net zero. Alex wrapped up the event by drawing on the importance of blue-green spaces for mental health and the need, going forward to make Scottish Water's assets more welcoming to the public.

Three high level messages were captured from the day:

- Water is an essential element of Scotland's identity, with its high-quality drinking water and associated high level of public trust in the water system. This trust creates a chance for constructive transformation via joint efforts. Progress toward achieving Net Zero by 2040 is on track.
- The challenge of climate change adaptation is substantial, with an unprecedented number and frequency of severe storms, flooding, and droughts. Ageing water assets are not equipped to handle these increased stresses, highlighting the inadequacy of current approaches.
- 3. Our response must be collective, engaging in conversation with various communities across Scotland. This can be achieved through:
  - a. Increasing investment that is fair, replacing ageing assets, increasing 'blue-green-grey' infrastructures to boost resilience and biodiversity, reducing carbon emissions and improving social amenities.
  - b. Behaviour change Water consumption among households in Scotland is already high relative to other countries with a similar climate. On average, each individual in Scotland uses around 180 litres of water per day, compared to an average of 144 litres per day for England and Wales. Behaviour change is therefore essential, with customers becoming active participants in the adaptation journey. Furthermore, the developing home devices for measuring water usage could be beneficial. The environmental perspective should be catchment-based and outcome-focused.
  - c. Changes in legislation Priority areas are:
    - i. **Surface water management** focussing more on upstream rather than only downstream approaches.
    - ii. Water resource planning is currently lacking in Scotland. It is crucial to consider strategies for reducing demand, understanding the needs of the environment, and identifying specific areas with potential supply-demand imbalances.
    - iii. Use of digital techniques to lower costs and alleviate system pressures and aids proactive problem solving rather than reactive responses.

These steps are fundamental for Scotland to become a global leader in water and wastewater management in the face of climate change.