

UHI | Water
Hub

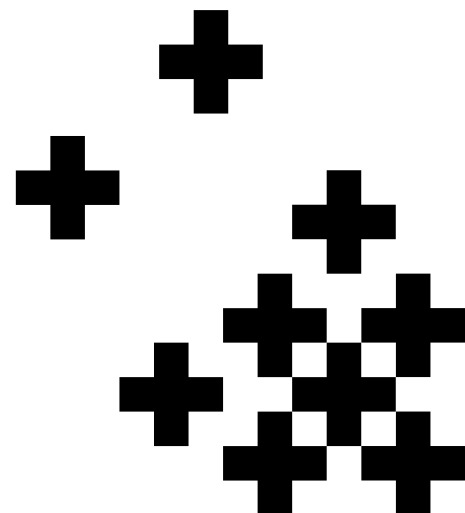
University of the Highlands and Islands - WaterHub
Strategy 2023-2025





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Water and the Scottish Economy

In Scotland, we have abundant natural water resources and widespread access to clean drinking water. The Scottish Government recognises that 'Scotland's water environment is one of our greatest natural assets, supporting our health, wellbeing, wildlife and the sustainable growth of our economy'.

Water is of central importance to the economy of Scotland. Scotland's water sector generates a turnover of £1.7bn and provides 16,600 jobs across the country. Water resources are critical to key sectors in the Scottish economy including, agriculture, aquaculture, food and drink, tourism and energy.

However, with growing pressure on resources, a changing climate, net-zero targets and increasing legislative requirements there are many emerging challenges associated with drinking water provision, wastewater treatment and resource management.

With our partners and collaborators in the public and private sectors we aim to contribute to the sustainable and responsible use and management of our natural water resources in Scotland and beyond.



Scottish Government
Riaghaltas na h-Alba
gov.scot

Scotland: The Hydro Nation

The Scottish Government is committed to making Scotland a Hydro Nation, one that views and manages its water resources responsibly, and sees our relationship and the ways we work with the water environment and industry as inextricably linked to our national identity.

Water has a disproportionate importance to the rural economy in Scotland and within the country urban communities and economies are 'indebted' to rural regions for provision of ecosystem services.

Around 150,000 people in Scotland, mainly in rural and remote regions, rely on a private drinking water supply i.e., not provided by Scottish Water.

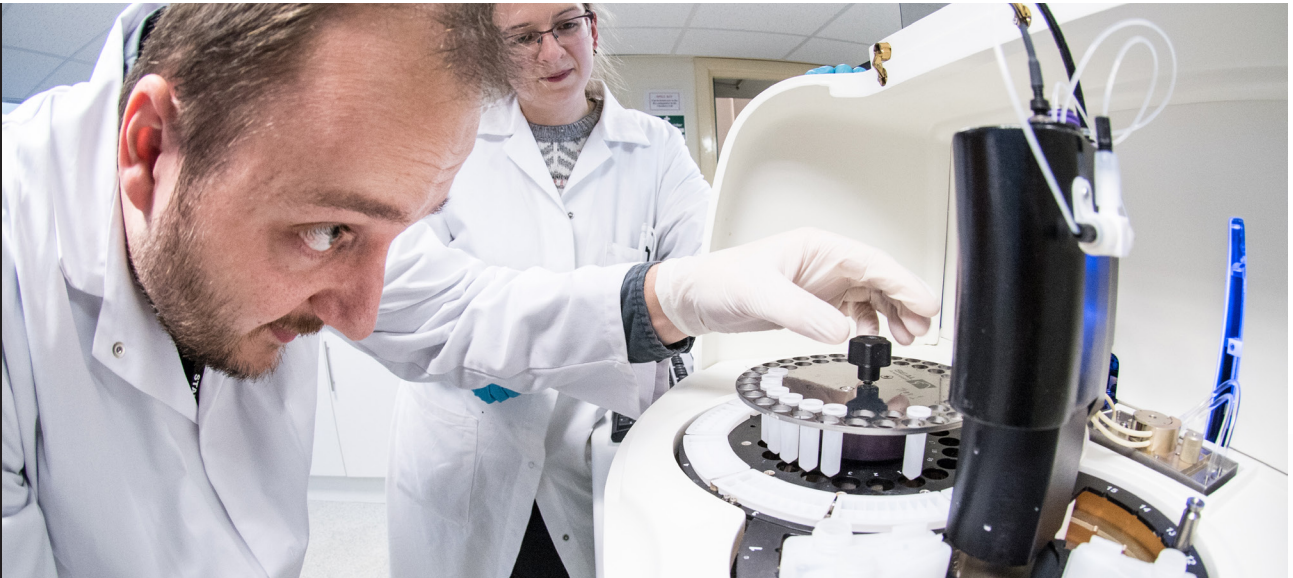
It is estimated that the water technologies industry could be worth around £900 million per annum for Scotland in water technologies alone.

www.gov.scot/policies/water/



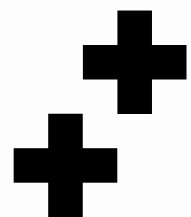
UHI WaterHub

The University of the Highlands and Island's WaterHub addresses contemporary challenges in drinking water provision, wastewater treatment and resource management in rural and sparsely populated regions of Scotland, and in similar regions elsewhere in Europe and around the world.



The UHI WaterHub draws on expertise from university locations around the Highlands and Islands in the areas of:

- + water and wastewater analysis, monitoring and assessment
- + innovative water treatment and remediation solutions
- + biodiversity assessment and enhancement
- + integrated catchment management
- + water, health and well-being



WaterHub Purpose

UHI WaterHub partners contribute to the enhancement of our natural and managed water resources bringing benefit to environmental quality, human health, and economic prosperity. We work with partners and collaborators to:

- + develop innovative new products and services
- + help them meet policy and regulatory challenges
- + advance responsible water stewardship
- + lower carbon footprints and to advance the low carbon economy
- + share knowledge, inform, educate and train

WaterHub aligns with the Scottish Government's National Performance Framework in aiming to

- + create a more successful country and give opportunities to all people living in Scotland
- + increase the wellbeing of people living in Scotland
- + create sustainable and inclusive growth
- + reduce inequalities and give equal importance to economic, environmental and social progress.

Our work is coherent with the Scottish Government's Hydro Nation strategy as outlined in the Water Resources (Scotland) Act 2013 for Scottish Ministers i.e., to "ensure the development of the value of Scotland's water resources"; and with the Programme for Government Protecting Scotland: Renewing Scotland (September 2020) which focuses on 'creating a successful country with opportunities for all to flourish through increased wellbeing, and sustainable and inclusive economic growth'.

WaterHub recognises that Issues around water are at the very core of sustainable development and critical to the survival of people and the planet. It seeks to be relevant to the goals adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development and contribute to the Water Action Decade launched by the United Nations General Assembly in 2018.





SUSTAINABLE DEVELOPMENT GOALS



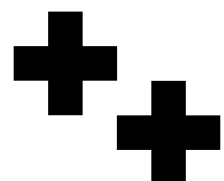
WATER ACTION DECADE 2018-2028

WaterHub Objectives

- + Position the UHI WaterHub as a recognised 'centre of excellence' in water innovation in Scotland
 - + Promote understanding of WaterHub activity and expertise with businesses, stakeholders and public sector agencies
 - + Support businesses, stakeholders and public sector agencies in addressing their challenges, and achieving their innovation and development potential
 - + Going 'beyond water' to aid transitions to the 'circular' and 'net-zero' economies
 - + Contribute to the UHI mission of having 'a transformational impact on the prospects of our region, its economy, its people. and its communities'
 - + Be outward looking and internationally relevant, with focus on regions with similar spatial and socio-economic challenges
-

WaterHub priority activities 2023-25

- + Promote engagement with key sectors through targeted communication via physical, virtual and hybrid events
- + Expand KE activity with businesses through Innovation Vouchers and Knowledge Transfer Partnerships
- + Intensify existing relationships with international partners and collaborators, and seek new working relationships in areas of challenge and opportunity
- + Work with adjacent KE groups (e.g. aquaculture energy, health) to address complex and interconnected challenges that span multiple sector
- + Increase income generation for the UHI, and for its KE partners
- + Promote student engagement in WaterHub KE activity



Knowledge Exchange

WaterHub is a component of the University of the Highlands and Islands Knowledge Exchange activity.

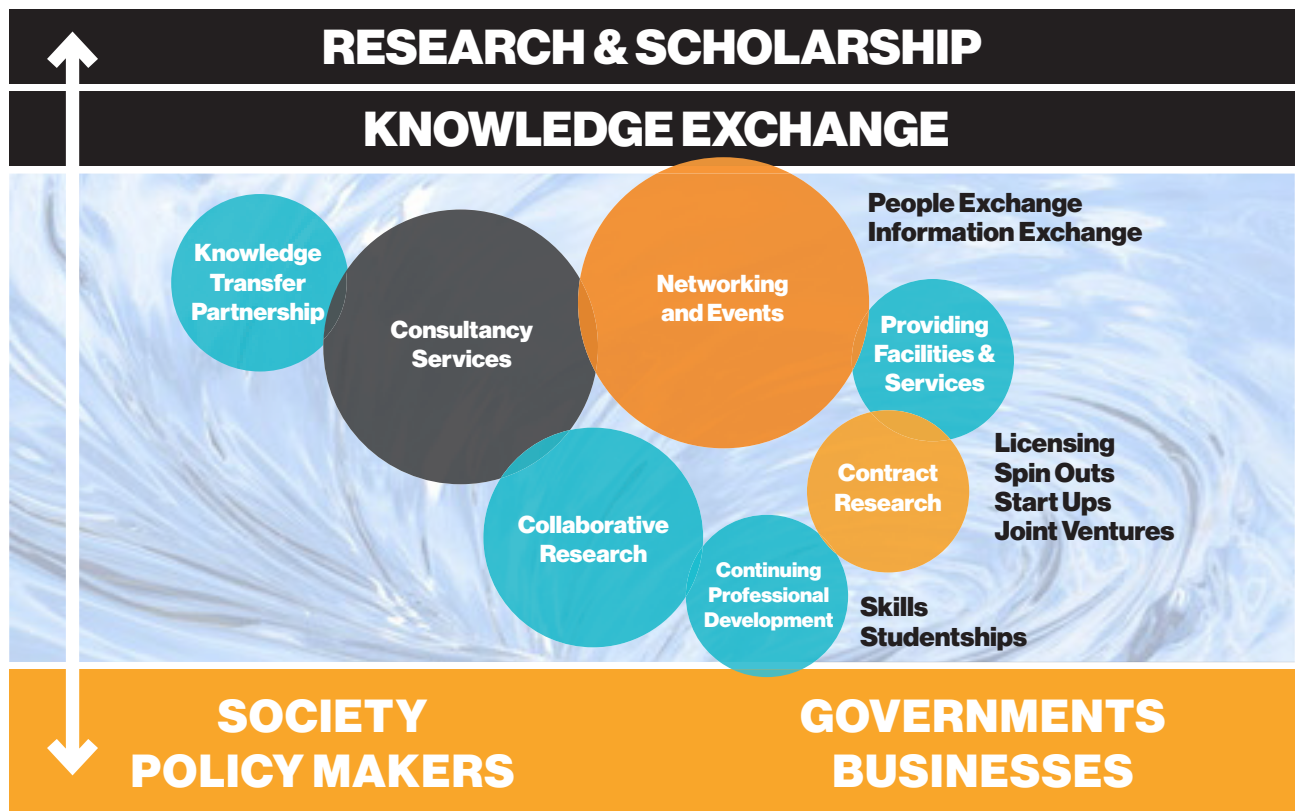
“Knowledge exchange (KE) encompasses the multiple interactions between Higher Education Institutions and businesses, public services, charities and communities to create societal and economic benefit”.

KE activity typically leads to mutual impacts such as creation of jobs, products, processes, services, society, culture, public policy, health, the environment, quality of life and associated increase in turnover and profit (Figure 1), but can also result in other activities such as secondments, placements and communicating research or IP exploitation.

WaterHub is a component of the University of the Highlands and Islands Knowledge Exchange (KE) activity. Our KE Team aims to help business and public agencies find innovative solutions and grow, whilst expanding our own research and KE activities.

We focus on the key sectors of:

- + Water
- + Energy
- + Tourism
- + Healthcare
- + Aquaculture
- + Food and drink
- + Creative Economy



Case Studies

Constructed Wetland Technology

In a series of projects we have been working to understand and enhance constructed wetlands designed to improve water quality. We have worked with Biomatrix Water to develop improved "Floating Ecosystem Technology" through a Scottish Funding Council Innovation Voucher, and in a Scottish Government Hydro Nation project we are now working with the Scotch Whisky sector to enhance the efficacy of constructed wetlands used to clean distillery effluents. In the whisky project, we are applying a novel combination of water quality assessment alongside eDNA metabarcoding of wetland biotic communities - exploring links between the complex wetland community and how this drives water quality improvement.

OneHealth Breakthrough Partnership' OHBP



The OHBP involves NHS Highland, UHI, Scottish Environment Protection Agency, Scottish Water, HIE and James Hutton Institute. It was established to tackle

the environmental impact of healthcare activities including the risk that water pollution with pharmaceuticals may arise from the excretion of medicines.

Through conducting research, linking with other HEIs, waste surveys, "greening" formularies, developing guidance for prescribers and the public and working with NHS Estates department the OHBP helped Caithness General become the first hospital in the world to be accredited by the Alliance for Water Stewardship.

The partnership was 'highly commended' for their work at the 2020 British Medical Journal Healthcare Awards and was winner in the 'Making an Environmental Difference' at the 7th Annual Scottish Knowledge Exchange Awards in 2022.



Pharmaceutical removal from wastewater

Developing effective and sustainable treatment solutions to address the issue of pharmaceutical presence in wastewater, especially those emitted from healthcare facilities like hospitals, is becoming increasingly important. A Water Quality Innovation Group Challenge Fund project which involved the Environmental Research Institute, the Institute of Health Research and Innovation – Division of Biomedical Sciences in Inverness and an Oxfordshire based company PolyCatUK Ltd., demonstrated in the laboratory that nanomaterials immobilised on the surface of a novel filter rig design have the capacity to remove common drugs like paracetamol from aqueous media. Results clearly showed that the filter removed drug concentrations substantially. Since 2020 the project has been taken forward as a HydroNation PhD project, with a focus on immobilised nanomaterials and their combination with energy efficient UV-light LED's. A light-activated chemical reaction (photocatalysis) on the surface of nanomaterials can break down ecotoxic pharmaceuticals and may become a sustainable treatment solution for a flow environment such as hospital wastewater.

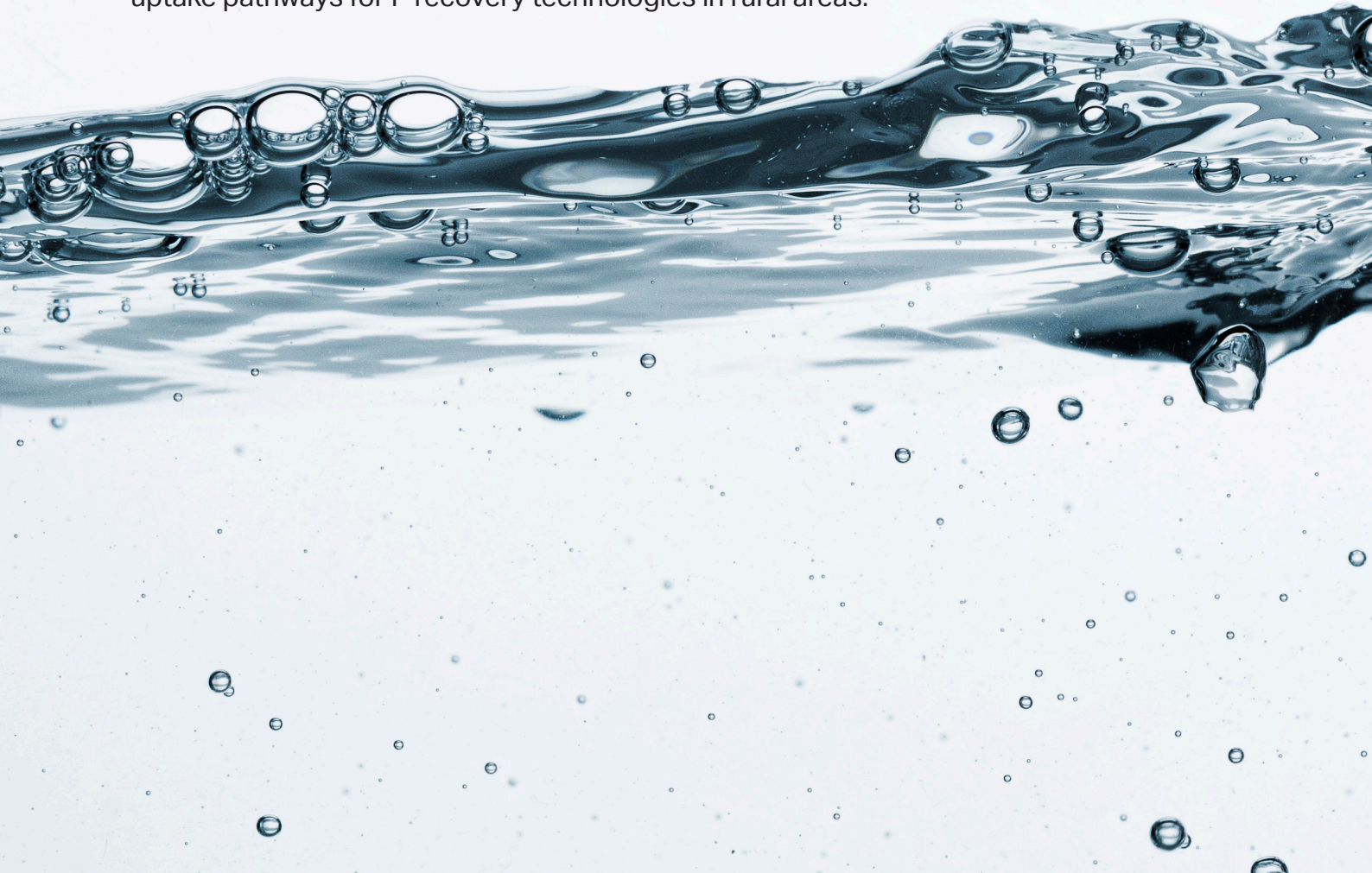


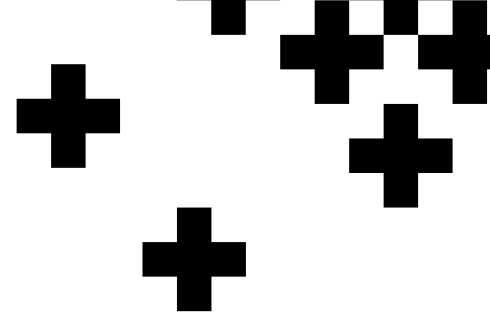
Health, Polluted Water and Soils Network (Global Challenges Research Fund) of excellence UHI is a partner in the GCRF Health, Polluted Water and Soils Network of excellence. This is focused on reducing health problems relating to water and soil pollution in climate stressed, rural and deprived urban communities in Kenya, Jamaica and Grenada. We aim to achieve this by focusing on affordable and innovative technological and sociological solutions to improve access to clean water, healthy and productive soils, and safe, nutritious foods. The network is based on a One Health interdisciplinary, approach, with a growing membership drawn from academic researchers, business leaders, entrepreneurs, health and environmental professionals, government officials, science policy diplomats, community leaders, and civil society and a commitment to grow.



Phos4You Water Quality Innovation to Build a More Circular P Economy. This was a NW Europe Interreg Project awarded €10.8 million to undertake a 5-year project to reduce the EU's dependence on imported phosphate rock. It demonstrated innovative P-recovery technologies under real-life conditions. UHI's Environmental Research Institute, a partner in the

project, focussed on small scale solutions for rural areas. Embracing the circular economy, this international partnership (involving 7 EU countries) brought together universities, industry, national authorities, fertiliser manufacturers and policy makers. ERI undertook quality assessment of new recovered P products, assessed the potential of small scale adsorption units to recover P, and, engaged with stakeholders to establish uptake pathways for P recovery technologies in rural areas.





UHI | Water Hub

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for more information

