

World Water Day

22nd March 2018

Report from workshop exploring Scotland's contribution to international water policy development and research needs







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This workshop brought together Scottish academics, practitioners and policy makers to share experiences in promoting the UN Sustainable Development Goal: "ensure availability and sustainable management of water and sanitation for all" (SDG 6).

Opportunities to promote collaboration to meet policy needs and barriers where research effort could help, were identified.

After a welcome from Tavish Scott (MSP) and an event overview by John Rathjen (Scottish Government), two keynote speakers set the scene during the morning session.

In the afternoon, nine of Scotland's Hydro Nation scholars gave "soundbite" presentations of their work.

A Research Carousel then explored opportunities for policy development and research under four themes:

- **1.** Waste Water Treatment Systems
- 2. Water Resources Water Quality and Quality
- 3. Drinking Water Supply and Technologies
- Future water challenges facing water resource managers

Scene setting by keynote speakers:

Andrew Allan

UNESCO Centre for Water Law, Policy and Science, School of Law, University of Dundee

The achievement of SDG 6 is a pre-requisite for the other SDGs, but one key pre-requisite for SDG 6 is improved governance. The Synthesis Report published in June 2018 informs the High Level Political Forum at the UN, which was scheduled to review SDG 6 in July 2018. Reporting the status of SDG 6 progress depends on voluntary national reports (NVR), which may vary in standard of the statistical data. A Scottish contribution to progress is possible because of the breadth of expertise in water-related research / regulation / stakeholder engagement in Scotland (e.g. across research institutions. Scottish Environment Protection Agency, Centre of Expertise for Waters, Scottish Water, Tweed Forum, Water Industry Commission for Scotland and others). Scale in Scotland allows levels of dialogue between government and researchers that is difficult to achieve in larger countries. Cataloguing all research ongoing in Scotland that is relevant to SDG 6 is challenging. Scottish Government-commissioned projects routed through Hydro Nation International include:

- Climate Justice Fund: Water Futures Programme (Strathclyde) - MALAWI
- Ganga River Health project (Dundee) INDIA
- Berambadi Modular Wastewater Treatment Project (Hutton) - INDIA
- Groundwater nitrate modelling (Hydro Nation Fellow, Dr Buvaneshwari Sriramulu) – INDIA

Research needs include: (a) How to establish connections between these projects and Voluntary National Reporting (b) Greater focus on governance of water and sanitation (c) on-line directory of academics working in this space to enhance collaboration between Scottish academics, policy activity and international partners.

Guy Howard

UK Government (Department for International Development)

The estimated scale of funding required to meet the SDGs (\$114 billion per year) means aid alone cannot solve the problems. Aid must be targeted to countries and populations most likely to be left behind such as poor countries, dispersed rural populations and marginalised urban groups. This will need sound public financial management, institutional development and mobilisation of local business. Aid money will need to leverage private investment e.g. from domestic pension funds. Instruments that spread risk and incentivise results are needed. Two broad areas for research investment were identified: (a) Operational research (e.g. effectiveness studies; economic measures to assess value for money) and (b) Opportunities/threats analysis (e.g. climate change, population and economic growth, new technologies). Aid is expected to become less about access and more about system building.

1 Waste Water Treatment Systems

While there appears to be the required technological solutions available now, the selection of the most appropriate solutions (simple technologies with low water and energy requirements, and waste reuse) is the key to meeting SDG 6. In many cases, Western European systems comprising large water collection facilities and treatment processes are deemed inappropriate. A shift to decentralised solutions that are quick to build and provide treatment as populations expand quickly is needed, especially in cities.

Knowledge and engagement with communities is the key to successfully attaining SDG 6 and achieving the behavioural change required. More research is needed in this area. It is important to explain 'why we treat wastewater' (health, environment) and the value of wastewater ('change the term waste as it is useful product'). Acceptable financial models to sustainably operate and maintain treatment is key to making the solutions acceptable. Engagement in defining the solution so it is appropriate and adopted by the community, is also important.

Governments should be aware of their role in promoting sustainable solutions, ensuring large projects have operating and maintenance built into financial models. They need to engage with Non-Government Organisations to ensure a more strategic and coordinated approach to achieving improved waste water treatment, to ensure the most effective use of resources are deployed for maximum benefit.



Hygienic management and re-use of waste resource

- Appropriate technology is available, but how to finance infrastructure, operation and maintenance?
- Improve risk awareness from latrine to catchment to national scales.



Low energy/water use systems

- Building resource recovery into systems
- Incentivising pollution prevention



Cultural barriers and economic benefits to re-use

- Demonstrate economic benefits of appropriate management
- Is it "Unclean" to re-use human waste e.g. for biogas for cooking?



Appropriate scale of facilities

- Improved awareness of local community needs
- "Bottom up" and "top down" planning of decentralised approach

2 Water Resources

Key elements of SDG 6 to be considered include Integrated Water Resource Management, catchment protection and restoration and participation of local communities.

For most catchments, there is a profound lack of knowledge of water resources, how they interlink and how they respond to change and management. There should be increased recognition of the need for improved data on storage and use of water and both diffuse and point sources of pollution.

Governance systems are generally constrained by sectoral interests, driven from the top down and poorly connected to local needs. There should be improved training of water managers in how to use data in decision making and policy development.

Solutions to these issues revolve around developing the paradigm of adaptive management among key stakeholders. Improved use of available data to make decisions, while at the same time reviewing the level of knowledge and how water resources respond to management decisions and natural processes are important. Experience can often be transposed, but solutions need to be tailored, in ways that recognise water responsibilities and rights.

2 Water Resources – Barriers, solutions and priorities for action



Data, knowledge and governance

- Appropriate level of data through e.g. remote sensing
- Improved training and analysis leading to robust knowledge
- Promote adaptive management paradigm



Stakeholder engagement

- Meaningful local dialogue with key water users
- Understanding each other's needs
- Incentives and charging



Strategy and planning

- Interdisciplinary communication
- Understanding outcomes at different scales
- Right information to right people
- Improved catchment scale governance



Outreach and support

- Resolve lack of expertise, incentives and corruption
- Transpose experience, tailor solutions
- Educate and advance the role of women

3 Drinking Water Supply and Technologies

The challenge of SDG 6.1 is achieving universal and equitable access to safe and affordable drinking water for all by 2030. Barriers to achieving this goal include reluctance of utilities to adopt new technologies because of cost constraints, lack of appreciation of the value of water, poor access to information and weak governance.

There are very large geographic discrepancies, with water quality affected by a diverse combination of pollutants that differ in different areas, resulting from both human activities and from natural geochemistry.

Research is needed to identify appropriate ways to price water while increasing awareness of its value. Sometimes the price of water is artificially cheap, leading to wastage. Water utilities can be reluctant to change treatment and supply methods because of uncertainty in financing such changes. Lower cost, access to information and technology is needed. Methods to strengthen governance needs to include dealing with corruption, e.g. water removal along the supply chain and unregulated pollution of sources.

Co-operative solutions have to be appropriately selected depending on the scale considered. Differentiation between rural, remote rural, urban and peri-urban is needed.

3 Drinking Water Supply and Technologies – Barriers, solutions and priorities for action



Balancing affordability and pricing

- Water quality standards appropriate to end use
- Awareness of water value linked to appropriate pricing
- Affordable technologies



Strategy and planning

- Stronger governance systems
- Anti-corruption measures and enforcement
- Improved access to information

Supply chain challenges

- Loss of quality and lack of resilience along supply chain
- Utility resistance to upgrading and new technologies
- Demand-driven solutions to influence upstream behaviours



Outreach and support

- Balancing of consumer and science
 perspectives
- Awareness raising and promotion of behaviour change
- Co-design of solutions appropriate to context

4 Future challenges for Water Resource Managers

The challenges of SDG 6.5 and 6.6 are to achieve integrated water resources management and to protect and restore water-related ecosystems. Barriers to achieving these goals include uncertainty of future projections linked to lack of current data; keeping track of emerging pollutants and their impacts; governance regimes and weak legal frameworks.

Increasing the capacity to monitor and analyse data is key to reducing uncertainty in water futures. Sustainable, self-dependent and remotely operationed technology is needed for this. Costbenefit analysis of both monitoring and mitigation is needed. Continuing adjustment in technological capacity should be accounted for, to keep up with emerging pollutants such as antibiotics and narcotics.

Achieving decentralised governance is important both for identifying and implementing appropriate measures. This will help policy makers and local decision makers deliver integrated and future-proof plans.

Proposed approaches, such as nature-based solutions, suffer from uncertainties, which can only be addressed by appropriate demonstration, adaptive management and evaluation. Such evaluation needs to consider ecosystem services in a holistic way.



Uncertainty in Water futures

- Understanding of climate change projections and uncertainties
- Impacts of climate change and water use pressures on vulnerability to extreme events
- Keeping track of emerging pollutants and their impacts



Information sharing

- Long term database availability
- Facilitation of sharing of information and knowledge
- Remote technology for monitoring and analysis



Decentralising governance

- Effective involvement of communities
- Developing equitable legal and governance frameworks
- Experience with adaptive management and planning



Nature-based solutions

- Comparisons between "high-tech" and "natural" approaches
- Resilience to extreme events
- Innovative business models that consider ecosystem services

Key messages

- The workshop focused on the contribution of Scottish academics, public bodies, SMEs and the Scottish Government to SDG 6 (Water and Sanitation).
- · Barriers to implementation and recommendations to enable and accelerate progress towards achieving SDG 6 were discussed in four thematic breakout sessions:
 - 1. Waste Water Treatment Systems
 - 2. Water Resources Water Quality and Quality
 - 3. Drinking Water Supply and Technologies
 - 4. Future water challenges facing water resource managers
- · Common high level outcomes and recommendations were identified across the four themes including:
 - a. Appropriate data acquisition and reporting of the SDG 6 status; capacity building, and effective mechanisms to get research into practice.
 - b. Governance systems are generally constrained by sectoral interests (i.e. top down and poorly connected to local needs). There should be improved training of water managers etc in how to use data in decision making and policy development. Need to review weak legal frameworks.
 - c. Knowledge and engagement with communities is the key to successfully attaining SDG 6 and achieving the behavioural change.
 - d. Effective drinking water and waste water technologies need to be simple, with low infrastructure and maintenance costs and low energy inputs

 It was recommended that the Scottish Government seek support from the science community to achieve and monitor SDGs. This will open new challenges for research, partnerships, and opportunities to find solutions to complex development challenges.

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Scottish Government Riaghaltas na h-Alba gov.scot

The report can be downloaded from the UNESCO website: www.dundee.ac.uk/water