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The magazine of the International Water Association

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The wisdom of taxi drivers

Many years ago, I was in Perth, Western Australia, on business. Perth has often been described as the 'canary in the coalmine' when it comes to climate change – the early warning of impending danger. It has seen declining rainfall and plummeting water yields for more than two decades now. Upon learning that I was in the water industry, my taxi driver offered his solutions to the problem of stressed water supplies: "There's plenty of water in the 'top end'; just pipe it south."

The 'top end' is the far north of Australia, where there is indeed a lot of water: rainfall is, on average, 1700mm each year. There were, however, a few problems with the idea. Well, several problems: a pipeline from the Kimberley region (the northern source) would be 3700km long, at a huge commensurate capital cost – and while one may think, from looking on a map, that the water would flow 'down' from the north, a look at the topography shows that it would need to be pumped. Compared with a desalination option, the capital cost of a channel or pipeline was substantially greater: it needed three times more energy, and would emit 4.5 times the greenhouse gases.

There were other important considerations, too. Australia's north is known as the 'dry tropics' because 75% of rainfall occurs in only four months and, typically, more than 50% of the annual river flow is in three months, with long periods of little or no flow. Capturing this water for the dry months would require huge dams and extensive interference with natural flows, with resultant impacts on important ecosystems, not to mention compromising Indigenous peoples' interests.

I conveyed this detail to my driver on my way from the airport to the city, pleased with my command of the issues and impeccable logic. I was not ready for his response. "That's rubbish," he said (actually, he used a rather less polite, colloquial expression), adding: "It makes more sense to just pipe the water down."

Experiences such as these have shaped my view that good science, good engineering, even good economics, are not enough when it comes to making decisions and progressing options for solutions to our water needs. Sound water management is needed – more so than ever. But if we are to advance the cause of sound water management, water professionals must engage in dialogue with affected communities and elected officials.

Over recent years, water utilities have been able to achieve better outcomes and community support through education, consultation and engagement. Education centres and public tours of facilities demystify processes around decisions on options; citizen juries empower representatives with detailed briefings before seeking their input; and reducing dense research reports to online presentations expands access. Such initiatives all help.

> **"Water experts do not, and will not, have a monopoly on decisions about what course to follow**

In Perth, they avoided the pipeline from the north. Instead, they adopted a suite of measures to improve yield in catchments, drive up water efficiency in homes, business and agriculture, and supplement supplies through extensive desalination and recycling.

The water decisions we will need to take over the years and decades ahead will become more challenging with time. Solutions will not be simple or straightforward. At the same time, water experts do not, and will not, have a monopoly on decisions about what course to follow. Decision-making processes must allow for scrutiny and robust debate – including the 'taxi driver' view. The task for our sector is to engage with those debates so that sound water management wins the day.

Tom Mollenkopf, President, IWA

Climate

COP27 sees launch of International Drought Alliance

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At COP27 in November, following the initiative of the Presidents of Senegal and Spain, the leaders of more than 25 countries and 20 organisations launched the International Drought Alliance, aiming to accelerate action for better preparation for future droughts.

The leaders pledged to drive change in how drought risks are managed, moving from an emergency response position to efforts to build long-term resilience.

"We are only as resilient to climate change as our land is," said Presidents Sánchez and Sall in a joint communication. "Building resilience to drought disasters is the way to secure the gains we make on each Sustainable Development Goal, particularly for the most vulnerable people. The mission of the alliance is to give political impetus to make the land's resilience to drought and climate change a reality by 2030."

Droughts have increased by a third since 2000 and climate change is predicted to cause more droughts in the future. Currently, the cost imposed by droughts runs into billions of dollars per year, even before the impact on people is considered.

The Alliance is intended as a solution to climate change, supported by new political commitments, including a new €5 million seed fund intended to mobilise more resources, and a commitment by Kenyan President William Ruto to plant 10 billion trees within the next 10 years.

Calling on world leaders to prioritise drought resilience in national development and cooperation, the Alliance aims to increase the engagement of stakeholders, consolidate regional initiatives, and fast-track the sharing of innovation and technology, and the mobilisation of resources.

The Alliance will also collaborate with other initiatives, such as that launched by the UN Secretary General and the World Meteorological Organization aiming to achieve universal coverage of early warning systems.

More effective drought resilience will help to reduce the extensive human, social and economic costs of drought, ranging from loss of life, livelihoods and biodiversity, water and food insecurity, disruption of energy, transportation, and tourism sectors, forced migration, displacement, and conflicts arising from resource scarcity.

Climate

Action for Water Adaptation and Resilience

A new Action for Water Adaptation and Resilience (AWARe) initiative launched at COP27 focuses on water as both a problem, with regards to climate change, and a potential solution, reflecting the commitment of Egypt to make action on water issues a top priority.

The AWARe initiative was launched on the meeting's Water Day (14 November) as a collective effort by many stakeholders and UN Agencies to address the importance of water issues, which currently affect billions of people worldwide and look set to be aggravated by increasing demand, fluctuating levels of availability, and the increasing impact of droughts and floods.

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The initiative has three major aims: to reduce global water losses and improve supply; promote mutually agreed actions for cooperative water adaptation; and promote cooperation with the aim of achieving the 2030 agenda, particularly on water and sanitation.

The initiative is supported by the World Meteorological Organization, complementing its Early Warning for All, and the Water and Climate Coalition, aimed at improving water data and information.

Currently 3.6 billion people have inadequate access to water for at least a month per year. This figure is expected to increase to more than five billion by 2050. UN-Water reported that between 2001 and 2018, 74% of all natural disasters were related to water issues, particularly floods and droughts. Focusing on water-related hazards is therefore an important part of the new initiative, which is intended to provide a positive contribution to the success of the forthcoming 2023 UN Conference on Water.

Water supply

Agencies call for urgent action on drinking water

The World Health Organization (WHO), UNICEF and the World Bank have called for governments to invest strategically in building safe drinking water systems by not only increasing funding, but also strengthening capacities to plan, coordinate, and regulate service provision. This call was made with the release of the 'State of the World's Drinking Water' report, highlighting the need for urgent action if the world is to achieve universal access to safe drinking water and mitigate the effects of climate change.

The report calls for the strengthening of existing institutions, a dramatic increase in funding from all sources, and for the capacity of the workforce in the sector to be developed. It also highlights the need for relevant data and information to be available to better understand inequalities in drinking water services and support evidence-based decisions, and for innovation and experimentation to be encouraged through supportive government policy and regulation, accompanied by rigorous monitoring and evaluation.

"Providing greater access to safe drinking water has saved many lives, most of them children. But climate change is eating into those achievements," said Dr Maria Neira, WHO Director, Department of Environment, Climate Change and Health, at the launch. "We have to accelerate our efforts to ensure every person has reliable access to safe drinking water – something that is a human right, not a luxury."

The report provides a comprehensive review of the links between water, health and development, with actionable recommendations for governments and partners, illustrated by examples of how countries are contributing to the attainment of the Sustainable Development Goal (SDG) target of reaching safely managed drinking water for all by 2030.

Existing institutions should be strengthened by filling gaps, facilitating coordination, establishing a regulatory environment supported by legislation and standards for service quality, and ensuring enforcement, the report states. Alongside increases in funding, there is a need for water service providers to improve efficiency and performance, with governments providing a stable and transparent administrative, regulatory and policy environment.

Climate

UN Environment Programme releases emissions update

The UN Environment Programme (UNEP) released its Emissions Gap Report 2022 in October, the 13th edition in an annual series aimed at providing an overview of where the position on global emissions should be if the world is to avoid the most dangerous impacts of climate change.

The report calls for a rapid transformation of societies across the world and warns that the international community is falling far short of the goals set during the Paris climate conference. This means that the only means of avoiding climate disaster is to achieve widespread system-wide transformation.

National pledges since COP26, held in Glasgow, will make little more than a negligible difference to predicted 2030 emissions. The goal of limiting global temperature to well below 2°C, preferably 1.5°C, is still far from being achieved, with current policies implying a rise in global average temperature of 2.8°C by the end of the century. This means that enormous cuts in emissions need to be enacted. The UNEP report explores how to deliver this transformation, including required actions in the electricity supply, industry, transport and building sectors, and the food and financial systems.

In brief

Policy
Accelerator to target gender

The European Bank for Reconstruction and Development, the African Development Bank Group and the French Development Agency, in partnership with the Egyptian government, have launched the Gender Equality in Climate Action Accelerator, aiming to help private sector companies and governments improve gender responsiveness with regard to corporate climate governance and governmental climate policies.

Policy
South African Master Plan

South Africa's independent, non-profit, economic research institution Trade and Industrial Policy Strategies (TIPS) has released two reports providing the first draft of a proposed Water and Sanitation Industry Master Plan for South Africa.

'The Water and Sanitation Industry Master Plan Policy Report', released in June, follows the 'Water and Sanitation Industry Master Plan Research Report', released in April. The two reports combined present a vision, with associated proposed interventions, calling for the emergence and growth of locally designed products and services. South Africa is well positioned to grow a domestic manufacturing base addressing domestic priorities, growing existing businesses and jobs, developing export potential, and transforming local industries.

Business
Suez unveils strategic plan

The Suez Group has unveiled its strategic plan to 2027 in which it says it will focus on its core businesses of water and waste and develop its international footprint, while also creating value for shareholders.

Since early 2022, Suez Group has also made various strategic acquisitions to strengthen its position in its key markets, the UK, Italy, China, India, Australia, the Middle East, and Africa.

The strategic plan is aimed at helping clients tackle growing environmental challenges and differentiate the group through its expertise in infrastructure, innovation, digital technology, and customer experience. It is also publishing its sustainable development roadmap in which it will outline its ambitions and targets in climate, conservation, and social transformation.

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Drinking water

Scientists call for overhaul of WHO PFAS guidelines

Scientists have urged a complete overhaul of the World Health Organization's (WHO's) draft drinking water guidelines for two per- and polyfluoroalkyl substances (PFAS), specifically PFOS and PFOA, released in September.

More than 100 scientists signed a letter to WHO, pointing out that the draft guidelines avoid a calculation of health-based standards and disregards robust evidence relating to the harm caused by PFOS and PFOA. The letter also finds that the guidelines are a significant departure from science-based guidelines developed by other major health agencies, and expresses concern that WHO did not disclose the names, affiliations, and potential conflicts of interest of those who developed the guidelines.

The scientists noted how the draft's survey of scientific studies omits or obscures evidence of the links between PFOS and PFOA exposure and cancer, liver damage, increased cholesterol, and immune system harms, among others. This is despite the abundance of strong human studies establishing links at very low levels of exposure, between these harms and PFOS and PFOA and other PFAS. Numerous other animal and mechanistic studies further support these links.

Europe

Revision for urban wastewater directive

The EU is revising the rules on treating urban wastewater. The Urban Wastewater Treatment Directive is more than 30 years old. Since its adoption, the quality of European rivers, lakes and seas has improved greatly.

EU countries have set up collecting systems and wastewater treatment plants with the help of EU funding. There is a high level of compliance with the Directive across the EU, with 98% of wastewater collected and 92% satisfactorily treated, according to the current coverage of the directive.

Yet, pollution remains that is not covered by the current rules and needs to be addressed to achieve a pollution-free environment by 2050. This includes pollution from smaller cities outside the scope of the Directive and pollution caused by storm water overflows.

At present, micropollutants such as residues from pharmaceuticals and cosmetics are also not covered. These residues are frequently found in all our water bodies and have a detrimental effect on nature.

Wastewater treatment is one of the biggest consumers of energy in the public sector. The revised Directive therefore also sets an energy neutrality target for the sector.

Recent experience has shown that viruses can be tracked with high reliability in wastewaters, providing precious information for public health decisions. The need to collect the necessary data has also required an update of the Directive.

The current revision of the Directive is in line with the results of the 2019 Evaluation, adapting it to the newest scientific knowledge.

The proposal for revising the rules on treating urban wastewater aims to: make the wastewater sector energy-neutral; make industry responsible for treating toxic micropollutants; improve access to sanitation in public spaces and for the two million most vulnerable and marginalised people in the EU; and require the monitoring of health parameters in wastewater to enhance the EU's preparedness against pandemics or other major public health threats.

Sanitation

WHO launches sanitation planning manual

The World Health Organization (WHO) has launched the 2022 edition of its Sanitation Safety Planning (SSP) Manual.

The manual is intended to assist in the implementation of the 2018 WHO guidelines on sanitation and health and the 2006 WHO guidelines for safe use of wastewater, excreta and greywater in agriculture and aquaculture.

The manual outlines the SSP process in a series of six modules, supported by guidance notes and tools.

It targets numerous users at different levels, including health authorities, regulators, local authorities, sanitation utility managers, sanitation enterprises and farmers, community-based organisations, farmers' associations, and non-governmental organisations. The modules cover a range of issues and topics, and the manual explains why climate-related risks should be included in SSP, providing a framework for identifying, prioritising, and managing risks and integrating them into local management policies. It also sets out how SSP can help to identity and clarify institutional roles and coordination, identifying priority actions for regulation. It seeks to inform policy dialogues, local planning, operation of sanitation systems and monitoring, and provide guidance on risk assessment at local level.

WHO suggests that the approach and tools outlined in the manual should be applied to all sanitary systems to ensure they meet health objectives.

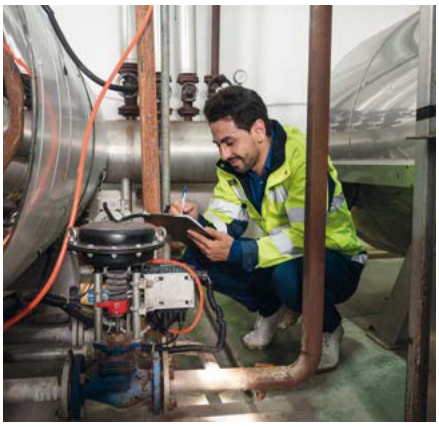
Sanitation

Agenda for improving the safety of sanitation workers

A report entitled 'Global research agenda for improving the health safety and dignity of sanitation workers' has been released by the World Health Organization, aimed at focusing research activities on relevant topics to understand and address challenges faced by sanitation workers all over the world.

The research agenda is intended to focus research where it is most needed. The transition to safely managed systems will require a great many more sanitation workers, given that these systems require significant amounts of labour at every stage of the process. However, sanitation workers are often ignored, neglected or stigmatised, leading to increasing risk of physical harm, including illness and death. Many are not protected by basic labour rights.

Research on sanitation workers globally is currently lacking. However, this report lays a foundation for building an evidence-based research agenda focusing on low- and middle-income countries. It is aimed at researchers, practitioners and funders who wish to understand and address the challenges faced by sanitation workers globally.



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Utilities

Digital action for Saudi Arabia

Saudi Arabia's Water Transmissions and Technologies Company (WTTCO) is working with IBM Consulting on a major digital transformation programme that cuts across a range of its key business processes.

With a network that spans 9200 kilometres across Saudi Arabia, WTTCO is one of the world's larger water utility companies. The government-owned entity is responsible for designing, building, developing, and operating water transmission and storage.

Working with IBM Consulting, WTTCO is taking several steps geared to upgrading its business process and technology. The digital transformation incorporates a new blueprint of working across finance, human resources, supply chain, sales, and maintenance.

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In brief

Agriculture

EEA calls for agriculture rethink

The European Environment Agency (EEA) has set out the case for a profound rethink of agriculture, noting in a briefing that efforts in food production to reduce greenhouse gas emissions and pressures on water resources and biodiversity are 'currently almost stagnant'. 'Rethinking Agriculture' highlights that agriculture is one of the biggest contributors to environmental and sustainability challenges, and that the pressure it creates undermine food systems. Options include pursuing agroecology, which the EEA describes as a holistic approach to enhancing biodiversity and stimulating interactions between species to build long-term soil fertility and healthy agroecosystems, and secure livelihoods.

Energy

Water-energy links in the Gulf region

Opportunities to respond to connected challenges around water and energy in the countries of the Gulf Cooperation Council (GCC) region include addressing subsidies and pricing to discourage waste, increasing reuse of treated wastewater, and scaling up renewable energy use, according to a report by the World Bank. 'Advancing Knowledge of the Water-Energy Nexus in the GCC Countries' notes that the region is facing many challenges because of the impact of climate change on already scarce water supplies, and that energy resources and the energy sector are heavily tied to the water sector given that desalination and other capacities are fuelled by oil. According to the Bank, the report showcases a real opportunity to make more efficient use of water and energy, and that this promises to have positive effects on climate, jobs, and fiscal sustainability.

Europe

EBRD Climate Adaptation Action Plan

The European Bank for Reconstruction and Development (EBRD) launched its Climate Adaptation Action Plan at COP27, aimed at boosting finance for climate adaptation.

The EBRD occupies a leading position on climate finance, but its business model focuses on the private sector, so has mostly concentrated on mitigation, rather than adaptation, which is often publicly financed. Its Plan aims to strengthen the bank's involvement on adaptation, something that is especially important to addressing climate vulnerability in EBRD regions, particularly the Southern and Eastern Mediterranean and Central Asia.

Water's role in the loss and damage climate debate

The climate change political agenda has been focused mainly on mitigation and adaptation, without addressing the extent to which impacts are felt by developing countries that have contributed little to the root cause. **Kala Vairavamoorthy** reflects on the complex area of loss and damage and the implications for water.

There is an inherent injustice around climate change – an injustice at the heart of the slow rate at which politicians and their negotiating teams have been able to secure progress in the Conference of the Parties (COP) process of the UN Framework Convention on Climate Change (UNFCCC). This injustice is illustrated vividly by the prospects for Small Island Developing States. They have made minimal contributions to greenhouse gas emissions and, in turn, to a rising sea level or to extremes of weather. Yet, in some cases, their very existence is threatened.

This need to bring the extent to which countries are impacted into climate discussions is captured by the term 'loss and damage'. Negotiations at the many COP meetings have mainly focused on mitigation efforts to reduce greenhouse gas emissions. It was only at COP 26 in Glasgow that adaptation – and, with it, water – really featured. Loss and damage was first mentioned in the COP process in Bali in 2007 (COP 13). The big change here is that the main success of the COP 27 meeting in Egypt in November was an agreement to establish an international fund to provide a response to loss and damage.

The water sector has long been used to talking about adaptation, preparing measures to better respond to the many climate change impacts that are felt through water. We have been talking increasingly too about mitigation, given the need for carbon emission reductions wherever possible, alongside the growing realisation of the opportunities for mitigation in our sector. The latest progress on loss and damage firmly positions it as the third pillar in the climate change policy agenda, alongside mitigation and adaptation. This brings with it the need for the water sector to understand the complexities and sensitivities around loss and damage if we are to find the correct fit for action on water within these three pillars.

Kala Vairavamoorthy is CEO of the International Water Association

Understanding loss and damage

Multiple complexities and sensitivities come into play in discussions on loss and damage. One is around who is responsible.

Climate change impacts result from cumulative contributions to global emissions, but how does that convert to responsibility? There are a number of principles that can serve as a starting point here, such as the 'no-harm principle' seen in the 1992 Rio Declaration, under which states should not harm the environment of other states. Others include the 'polluter pays principle', where those who polluted must pay, and the 'beneficiary pays principle', where those who have benefited most from carbon intensive industries must pay.

This aspect of the debate might shape, for example, the balance of contributions made to a global compensation fund. But even if that were resolved – which it needs to be for the new fund – how to progress from there?

In particular, what is the link between climate change and any harm suffered during, say, a severe flood? Is there a causal link, meaning there has been loss or damage that can be attributed to climate change? This makes it necessary to distinguish between, for example, flood damage that might have occurred had there not been climate change linked to fossil fuel use and flood damage made worse by such anthropogenic climate change.

This attribution needs to be made at the local level, tied to the →

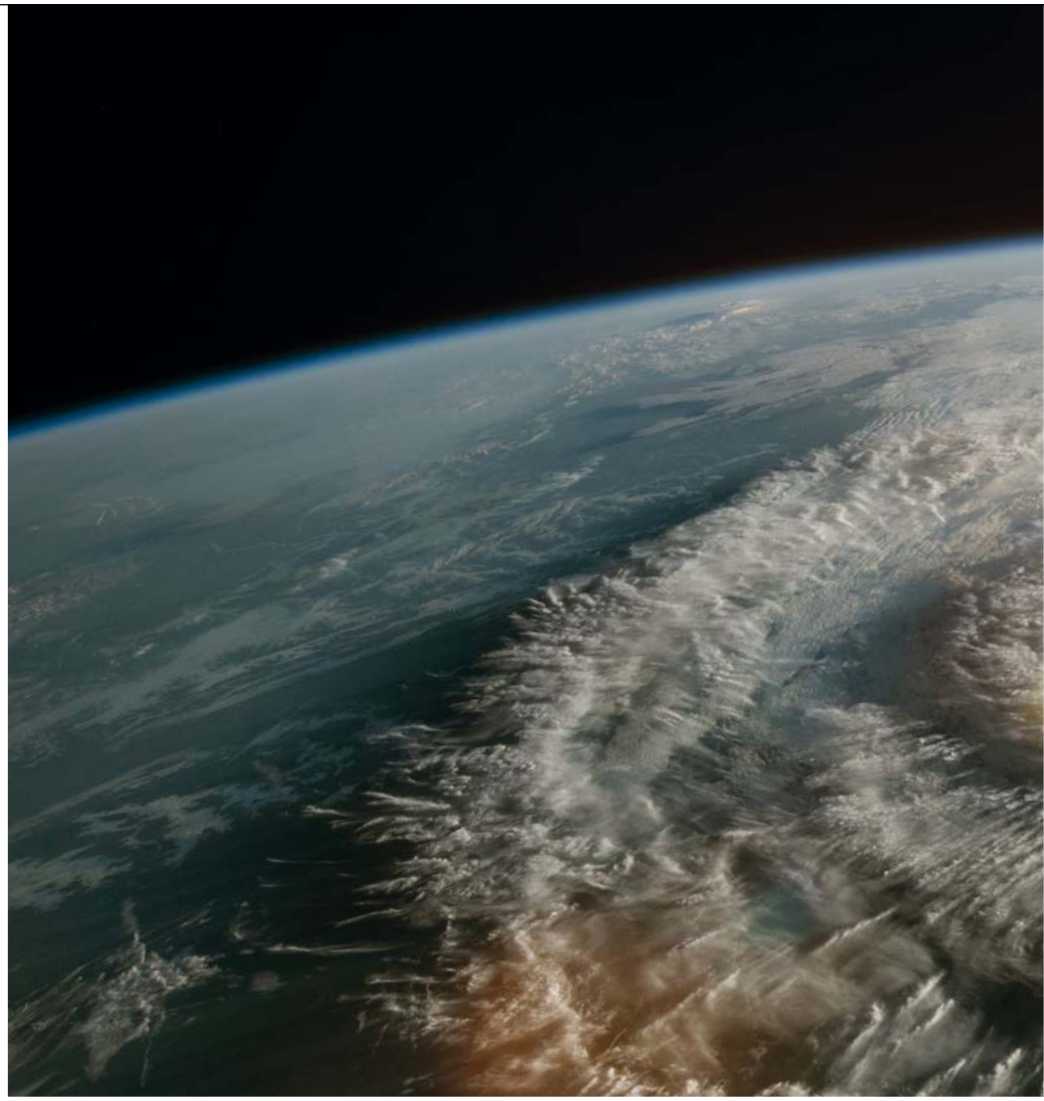
specific loss or damage. We are accumulating more evidence to allow this local attribution, but in general our primary tools here – models – have lacked the certainty or coverage to satisfy this need. This is the case for extreme events such as floods and droughts where loss and damage is very visible, but it is also the case for less direct impacts, such as changes in the burden of water-related disease. Attribution also needs to account for local factors that shape the scale of loss and damage incurred. For example, to what extent have local land use changes or creation of large areas of impervious surfaces intensified flooding?

Despite the complexities around attribution, compelling figures have been issued in calls for action on loss and damage in an attempt to secure progress.

For example, the Vulnerable Twenty (V20) group was formed in 2015 as a voice for countries systemically vulnerable to climate change. This group has said that around US$525 billion has been lost by its 58 member countries over the past 20 years – equivalent to about a fifth of their wealth – as a result of climate change.

Such figures expand the geography of loss and damage way beyond the original injustice raised around Small Island Developing States. They also highlight the extent to which loss and damage is an issue with matters of justice and equity at its heart.

The complexities around compensation don't end there. Should any compensation be adjusted depending on the extent to which a country can fund its own recovery? For example, following extensive flooding in 2021, the German government was quickly able to mobilise €30 billion to pay for reconstruction. Meanwhile, floods in 2022 in Pakistan affected more than 33 million people, with infrastructure damaged including more than two million houses. The country faced flood rehabilitation and



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> **“ It is typically the poorest who suffer most**

reconstruction requirements of more than US$16 billion, with a funding gap of around half of this. These examples are not all climate-related, but they highlight the differences in prospects for a home-grown recovery from climate impacts.

Needless to say, it is typically the poorest who suffer most – at the country level, but especially within countries, all compounded by other inequalities. But even this relative clarity is blurred when mitigation is brought into the discussion. Should countries receive compensation for loss and damage if, for example, they continue to invest in fossil fuels, especially large emerging economies? Or can developing countries counter this, given that developed countries have gained so much from exploiting fossil fuels, sometimes over centuries.

Fault lines in the financing debate

On top of all this, any funding mechanism on loss and damage needs to integrate with the already complex world of climate finance, especially in connection with adaptation. At a basic level, adaptation is focused on steps to ensure better preparedness for future, more extreme conditions. Loss and damage is more about what happens after an incident in which climate change causes harm. But the distinction may not be clear. Adaptation measures may have been accelerated in response to worsening extremes occurring because of climate change. Distinguishing between the two is not just a technical matter: developed countries in particular have been happy to focus on adaptation, as this steers clear of the issue of responsibility.

One challenge is that the joint term loss and damage combines loss, which can be thought of as harm to society that is irreparable, such as loss of life or culture, and damage, which can be thought of as harm that is reparable, such as financial losses or damage to infrastructure that is not insured. Indeed, there has been a shifting, expanding view of loss and damage. This has gone beyond the initial ‘slow onset’ issue of sea level rise, to bring in other slow onset issues and faster-moving extreme events. Loss and damage has also expanded to take in non-economic losses relating to issues such as loss of biodiversity and cultural heritage, and the movement of people as a result of climate change.

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At the same time, countries have been, and are increasingly, planning to implement adaptation measures, whether in anticipation of climate change impacts or by including climate-resilient approaches in efforts to 'build back better'. Numerous financing mechanisms have sprung up to support this drive towards adaptation. But there are limits to what protection adaptation measures can deliver. Indeed, we know they will fail at some point; there will be a flood or a drought that goes beyond this adaptive protection. So there is a whole debate around whether loss and damage can be separated conceptually as something that happens beyond the limits of adaptation, or whether the two are inherently linked.

The promise of progress

COP 27 nonetheless managed to secure commitment to establish a fund for loss and damage.

This was a major milestone, but much still needs to be done to operationalise the idea. The expectation is to finalise arrangements during COP 28 in UAE in late 2023. The intention is to direct assistance at developing countries that are "particularly vulnerable to the adverse effects of climate change".

While there is much to debate about loss and damage during this operationalisation, there is relative clarity on, for example, the way that financing around loss and damage needs to differ from adaptation when it comes to post-disaster recovery.

Adaptation finance does not cover the immediate impacts of climate-related disasters or of social impacts, such as migration because of sea-level rise. Estimates of the cost to developing countries of impacts that they will not be able to avoid through adaptation have been put at US$290 billion to US$580 billion in 2030 and in excess of US$1 trillion by 2050 – figures that humanitarian aid will not be able to cover. This all means that the fund will need to target recovery and reconstruction, for example, and be on hand to deliver immediate assistance.

The way ahead for water

This all raises questions for our world of water. The operationalised new fund will need to be applied to specific incidents in specific countries. More broadly, the arrival of the fund will more clearly bring loss and damage to the fore as the third pillar of climate change policy.

A water utility in the grip of a severe drought will always have to do its best to maintain supplies to its customers, but the shift on loss and damage may bring with it a change in terms of where financial support for the response may come from. To what extent can that drought be attributed to climate change and, depending on the answer, can a case be made for international support or compensation for the response? But at the same time, has the utility been responsible in maintaining its

"Disaster responses could serve as inflection points, sparking a change of course

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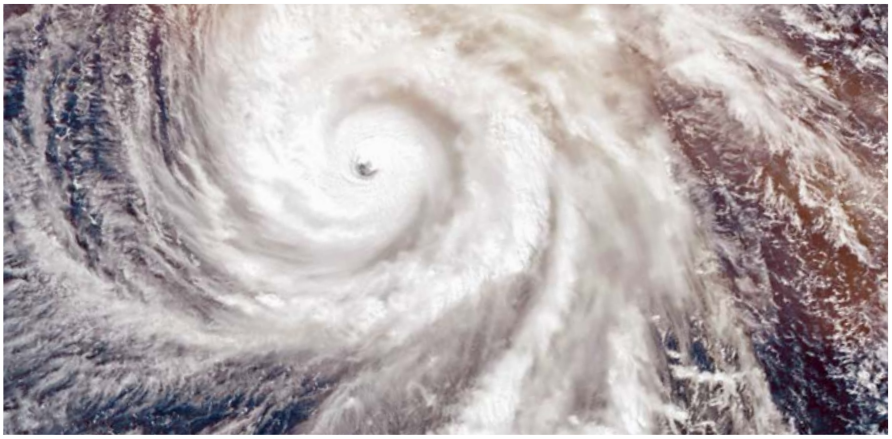
assets, and dealt with water losses adequately? Our sector has a history of poor infrastructure maintenance – something we must continue to work to remedy. We know that a well-run utility will be better placed to deal with greater extremes of drought.

This marks out a need for progress on the attribution science around climate change, including tools that can be used and the local application of tools to offer location-specific perspectives on the actual impacts of climate change.

Similar questions can be posed when it comes to flooding. If a city's sewer and stormwater infrastructure is overrun or destroyed during flooding, the utility will always have to do its best to protect the lives and properties of its customers, and to restore services as rapidly as possible. But to what extent can the flooding be attributed to climate change versus badly planned, impervious urban development – and has the infrastructure been sufficiently well maintained to ensure good functioning during extreme events?

It may also be that we, in the water world, can provide leadership in a different direction. Rather than be drawn into a politically led distinction between loss and damage financing on the one hand and adaptation financing on the other, we should emphasise the opportunity for a systems-led recovery, where we build back better in a way that makes us more resilient. Rather than replacing like for like, we push for a transition to a new normal.



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The stronger disaster-response focus of loss and damage drives attention here towards rapid action. This potentially connects well with decentralised technology solutions, both for sanitation and supply, including rainwater harvesting. It also connects with the need for greater policy focus on inclusive sanitation, given that poor and marginalised communities are the ones likely to be impacted most by disasters. In all cases, the key is to build the case for these options in anticipation of the need for rapid deployment, and to do so in a way that ensures what gets installed can contribute to a longer-term solution.

This points to the practical need around loss and damage as far as water is concerned. The use of funding will probably be subject to conditions or shaped by technical assistance. In both cases, this presents a window of influence through which to shape solutions – and, in the case of technical assistance, that can mean ensuring that the expertise and competence drawn on has a local base.

There is an opportunity across all of this for IWA's network to shape the future. Indeed, while the regular workings of the life of a utility are typically shaped by scheduled investment cycles, disaster responses could serve as inflection points, sparking a change of course.

There is further cause for optimism from a water perspective, given that COP 27 built on the relative prominence of water in Glasgow and explicitly called for action on water in its final declaration. No doubt reflecting the scale of the water crisis that is highlighted in the latest IPCC reports, the declaration emphasises the importance of water and water-related ecosystems, and urges countries to further integrate water into their adaptation efforts.

This supports the case for wider use of nature-based solutions, for example. Use of approaches such as sustainable urban drainage systems align with action across the three pillars, with their multiple functions providing options to contribute as adaptation measures, provide low emissions treatment, and soften the harmful blows of loss and damage. While nature-based solutions, like hard infrastructure approaches, can be overwhelmed, their use fits well with the need for antifragility – building systems that come back stronger after being subjected to the stresses of extremes.

We know how closely water and climate are linked. The strengthening of the third policy pillar of loss and damage offers promise that action on water and climate can reflect this closeness and be better aligned. ●

Wastewater

Suez sludge incinerator for Chengdu

Suez has announced that it has been awarded a contract to supply a Thermylis sludge incinerator for Phase III of Chengdu No 1 Municipal Wastewater and Sludge Treatment Plant in southwest China. The company says its technology will help to provide reliable and safe sludge disposal for Chengdu, so that the city can achieve its environmental goals under China's 14th Five-Year Plan.

Chengdu has a population of more than 20 million people and plays a key role in the protection of the Yangtze River basin's ecological environment. The city treats millions of tonnes of municipal wastewater every day, generating around 2200 tonnes of sludge. The Chengdu Plant already treats 600 tonnes of sludge per day. According to Suez, the latest contract will add capacity of another 800 tonnes and make the plant the largest single sludge operator in southwest China.

Monitoring

Analysis for difficult environments

Palintest has developed a multi-parameter benchtop photometer designed as an accurate, all-round solution for water analysis in challenging environments.

Lumiso Expert allows staff to conduct testing multiple times per day, across key routine troubleshooting parameters. The technology allows analysis to be carried out with a single piece of equipment covering a range of parameters including ammonia, bromine, chloride, free chlorine, total chlorine, copper, fluoride, and iron.

Wastewater

Montpellier contract to bring energy boost

Veolia has announced that the Metropolis of Montpellier in southern France has awarded it, through its subsidiaries OTV and Veolia Eau France, a contract to extend, upgrade and operate the Maera wastewater treatment plant, located in the town of Lattes. According to Veolia, the project, to be completed by a consortium led by OTV, will enable the plant to produce biomethane, heat and electricity, providing 205% of its energy consumption by 2031, and reusing wastewater following treatment. The upgrade will enable the plant to cover the needs of 19 municipalities.

Desalination

Floating wave energy desalination

Norwegian company Ocean Oasis has announced that it is to test its new Gaia prototype offshore floating desalination plant at the Oceanic Platform in the Canary Islands (PLOCAN) test site, following the launch of the prototype at Las Palmas in Gran Canaria.

According to the company, the plant will enable the production of freshwater from seawater by harnessing wave energy to drive a reverse osmosis desalination process and then pump the potable water ashore for coastal users. Use of wave energy ensures that the device can carry out desalination operations without the need to produce electricity, thereby increasing its efficiency.

Desalinated water is vital to Gran Canaria, with drought increasing its importance. However, desalination is generally an energy-intensive process. Ocean Oasis says that, once the prototype has been tested at PLOCAN, a second installation will be built where the prototype can be scaled up with the intention of producing water for consumption, and for this to be connected to the water distribution system to help address water stress sustainably.

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Irrigation

Smart option for irrigation

Idrica has developed a new digital solution for agricultural irrigation infrastructures and networks. The GoAigua Agro Twin module centralises the main elements of agricultural irrigation management and has been successfully deployed in Spain and Qatar, according to the company.

Based on Big Data and data analytics techniques, the company says the key to this project is an artificial intelligence algorithm for irrigation that facilitates real-time control and monitoring of assets, improves decision-making, optimises irrigation schedules, and provides early detection of leaks, fraud, and consumption that exceeds the established allocations. Along with comprehensive work order management, GoAigua Agro Twin boosts operational results and records interactions with irrigation associations through an online office and mobile application.

Idrica says this technology can also programme irrigation, pumping and fertiliser systems from the control centre, analyse soil water status and optimise crop water consumption.

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Hydropower

German project promotes hydropower in water systems

A research initiative under way at the Hof University of Applied Sciences, Germany, is working to strengthen the transfer of knowledge from the university to regional companies, to expand the use of hydropower for the generation of renewable energy in the state of Bavaria.

The project focuses on facilities that could implement hydropower with no ecological impact. To date, 10 network meetings and knowledge transfer events have been held as part of the NEEWa initiative – the Network for the Generation of Energy with Hydropower in Existing Water Systems.

Anthropogenic water structures such as canal networks, sewage treatment plants and aquaculture have a high – and, in terms of ecology, relatively harmless – energy potential. In Bavaria, there are more than 500 cold water sites (ponds, etc.) that could potentially be equipped with hydropower plants, and there are around 10,000 sewage treatment plants throughout Germany. Theoretically, there is enormous potential for environment-friendly electricity generation, which is currently underused.

The project has brought together all stakeholders from the value chain. Through guideline-based interviews, legal framework conditions were clearly identified as the greatest challenge stakeholders faced. The events have been held to support members in overcoming the obstacles and to cover their knowledge needs.

An online decision-support tool is also being developed that will serve as a guideline to navigate the legal aspects and to support project planning associated with a hydropower plant, encompassing Bavaria and the rest of Germany.

Funded by the European Social Fund, the project was launched in July 2021.

● Information provided by Nirupama Nair and Dr Harvey Harbach, Institute for Water and Energy Management, Hof University

Circular economy

Opportunities for Saudi Arabian wastewater transformation

A review paper presents the opportunities for conversion of wastewater treatment plants (WWTPs) into resource recovery factories (RRFs) as a means of achieving a circular economy in Saudi Arabia's water sector.

● 'Adopting the circular model: opportunities and challenges of transforming wastewater treatment plants into resource recovery factories in Saudi Arabia', Muhammad Ali *et al* *Journal of Water Reuse and Desalination* (2022) 12 (3): 346–365. **doi.org/10.2166/wrd.2022.038**

Supply

Focus on the important role of pH

Researchers have published a paper noting that, while there is general agreement that pH is an important parameter in many drinking water treatment and control processes, such as taste and odour (T&O) control, it is not usually targeted as a primary control parameter and its effects on T&O are often overlooked in favour of other treatment issues. The paper aims to serve as a cornerstone for future research.

● 'The effect of pH on taste and odour production and control of drinking water', Hunter Adams *et al*, *Journal of Water Supply: Research and Technology-Aqua* (2022) 71 (11): 1278–1290 **doi.org/10.2166/aqua.2022.133**

Health

Benefits of adding magnesium to desalinated water assessed

Results have been published of a study evaluating the effect of adding different concentrations of magnesium chloride to desalinated drinking water on glycaemic, metabolic, and insulin resistance parameters among patients with type-2 diabetes mellitus (T2DM).

A randomised cross-sectional controlled clinical trial was conducted. The results suggest that oral magnesium supplementation at the given dose of 50 mg/l daily added to drinking water could improve long-term glycaemic control indicators and reduce insulin resistance in patients with T2DM.

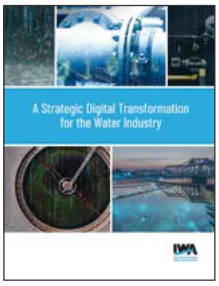
● 'Beneficial effects of adding magnesium to desalinated drinking water on metabolic and insulin resistance parameters among patients with type-2 diabetes mellitus: a randomised controlled clinical trial', Waleed I Albaker *et al*, *npj (Nature Partner Journals) Clean Water* (2022) 5:6 **doi.org/10.1038/s41545-022-00207-9**

Reading

Digital

A Strategic Digital Transformation for the Water Industry

Oliver Grievson, Timothy Holloway and Bruce Johnson



This book is a compilation of the knowledge shared and generated so far in the IWA Digital Water Programme. It is an insightful collection of white papers covering best practices, linking academic and industrial studies with applications to give real-world examples of digital transformation. These white papers are designed to help utilities, water professionals and all those interested in water management and stewardship issues to better understand the opportunities of digital technologies.

With these topics, the aim is to present an all-encompassing reference for practitioners to use in their day-to-day activities.

Through the Digital Water Programme, IWA leverages its worldwide member expertise to guide a new generation of water and wastewater utilities on their digital journey towards the uptake of digital technologies and their integration into water services.

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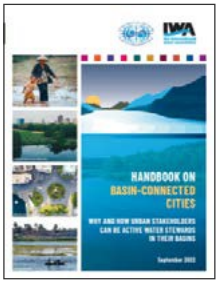
See: www.iwapublishing.com

Basins

Handbook on Basin-Connected Cities: Why and How Urban Stakeholders can be Active Water Stewards in their Basins

Co-published by IWA and INBO. The lead author is Katharine Cross, formerly with IWA. François-Xavier Imbert provided inputs from INBO.



The IWA-INBO *Handbook on Basin-Connected Cities* aims to support decision-making in strengthening the city's connection and integration with its river basin. It expands on the IWA Action Agenda for Basin-Connected Cities, which provides a framework to influence and activate utilities, cities and their industries to become water stewards working with basin stakeholders.

The action agenda and handbook have three main parts:

1. Drivers for action outlining how basin-wide risks are impacting urban areas from economic, environmental, and social perspectives
2. Pathways for action demonstrating how cities and their basins can actively cooperate
3. Foundations for action which are the elements needed to create an enabling environment to implement the pathways.

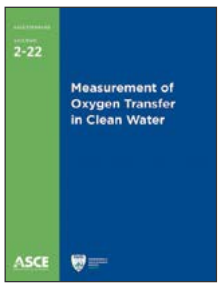
The action agenda for basin-connected cities builds on IWA's Principles for Water-Wise Cities, which aim to integrate water in planning across scales. The principles support city leaders planning future-proof access to safe water and sanitation for everyone in their cities, while delivering enhanced liveability for people and nature.

The handbook is a comprehensive and detailed resource for practitioners, structured for quick reference. The purpose is to inform, influence and encourage urban stakeholders to take an active role in protecting and investing in water resources, together with basin and catchment organisations.

Access the publication at:
https://iwa-network.org/publications/basin-connected-cities-why-and-how-urban-stakeholders-can-be-active-water-stewards-in-their-basins/

Monitoring

Measurement of Oxygen Transfer in Clean Water



Published by the American Society of Civil Engineers, *Measurement of Oxygen Transfer in Clean Water*, ASCE/EWRI 2-22, provides the latest methods for measuring the rate of oxygen transfer from diffused gas and mechanical oxygenation devices to water. This standard aims to be general enough to be applied to all clean water unsteady state tests and specific enough to incorporate all essential procedures. This standard is an update of the 2006 version. Revisions to the mandatory requirements include use of the nonlinear least squares estimates for parameter fitting, the need to correct and report results to a common TSS level, and acceptance of a nitrogen gas method for deoxygenation.

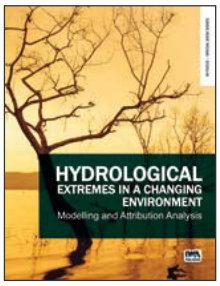
A new commentary provides a detailed description of a supersaturated oxygen desorption method. This method may be incorporated into a future revision of the standard as an acceptable method, pending a comparison of results with existing deoxygenation methods.

ISBN 978-0-7844-1564-1
Measurement of Oxygen Transfer in Clean Water (2-22)
American Society of Civil Engineers
www.asce.org

Climate

Hydrological Extremes in a Changing Environment: Modelling and Attribution Analysis

Yanlai Zhou, Cosmo Ngongondo and Nils Roar Sælthun (Eds)



This book focuses on climate change and hydrological extremes that are globally important natural hazards with associated costly impacts on society and the environment. Floods and droughts result from physical processes in the atmosphere, catchments, river systems, and anthropogenic activities. However, the characteristics of hydrological extremes have altered as a result of climate change, such that approaches for their detection, attribution, and the frequency of occurrence need to be revisited as they are no longer stationary processes.

For more accurate estimation of hydrological extremes under nonstationary and uncertain conditions, there is a need for holistic assessments. Time frequency analysis, hydrological modelling, physical cause analysis, multivariate statistical analysis, and uncertainty analysis are powerful tools for detecting, attributing, and making frequency analysis of nonstationary hydrological extremes in a changing climate. This book provides guidance on how to respond to this shaping context.

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See: www.iwapublishing.com

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