

Editorial

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Introducing *Cambridge Prisms Water: Solutions for managing an essential resource and critical hazard*

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Abstract

Water is a vital resource essential for both sustaining life and a healthy environment as well as being a critical hazard in the form of floods or droughts which can destroy people's livelihoods and property. This gives rise to a multi-faceted set of concerns and issues that affect everybody. For example, when contaminated with pathogens, wastewater can carry and rapidly transmit disease. The global distribution of freshwater is uneven and the problems this creates are likely to get worse due to climate change and the uncertainties associated with changing rainfall patterns and the emergence of more extreme weather events. Water has been described as the "new oil," with potential conflicts arising out of disputed access to scarce water resources in the rest of this century. Billions of people around the world still do not have access to adequate safe water supplies or basic sanitation facilities, so in bringing basic water services to all there is much still to be done.

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In some parts of the world, water, especially groundwater, is being extracted ("mined") faster than the natural hydrological cycle can replenish it. A further concern is the deteriorating condition of existing infrastructure which in many countries needs rehabilitating and upgrading, and treatment capacities need expanding. At the same time the use of Nature-Based Solutions is becoming the preferred solution to many water-related problems, which can also deliver a wide range of multiple benefits.

The basis for good water management is accountable and transparent institutions which make policies based on adequate information. Like many resources, water has often been managed independently of other resources such as energy and land, but these are all inextricably coupled, where decisions in one sector can have profound impacts on the other sectors. A more integrated approach is needed. There are many trade-offs that have to be considered here, including the hydropolitics involved in transboundary cooperation. A key overarching issue is ensuring that proposed solutions are resilient, meet the needs of local stakeholders and communities, and especially traditionally marginalised communities (e.g., Indigenous communities), embrace flexibility and can evolve and adapt as new concerns and unforeseen constraints arise.

The management of water is therefore complex and multi-dimensional and requires skills and knowledge from many intersecting fields. These include hydrology, hydraulics, water resources, water physics and chemistry, water engineering, water treatment technologies, water distribution and collection systems, safe disposal of used water (wastewater), flood risk management, agriculture and irrigation, hydroinformatics, water policy, socio-hydrology, stakeholder engagement, water demand management, water economics and pricing, land use planning, aquatic ecology, water quality and pollution control, coupled resource management (across the water-energy-land nexus), water sensitive urban design, nature-based solutions, hydropolitics, water

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rights and regulations, water footprinting and virtual water, decision support systems (based on AI) and so on. At the same time, there is a need to share experiences and insights from operational practice.

Looking beyond the research box

A report from the United Nations University Institute for Water, Environment and Health (UNU-INWEH) from 2019 stresses that “the water research community needs to look beyond the research “box” and identify ways to measure development impact of water research programmes” and goes on to call for research findings to be “conveyed in a practical way to the real users of this knowledge – stakeholders who are beyond research circles.”

This ambition ties in exactly with the aim of *Cambridge Prisms: Water* – to be accessible to a diverse audience of scientists and other stakeholders such as practitioners, policymakers NGOs (non-governmental organisations), and local and indigenous communities. Thus the aim of the journal is to link the latest research in water-related topics with the practical development and implementation of solutions for the provision of essential water services and reduction in water risks and hazards. This will range, for example, from the public health needs of providing sufficient potable water supplies to protection from flood risk and other associated hazards including pollution of aquatic ecosystems. Authors will be invited to highlight how their work can significantly impact the mitigation of such current and future water problems by identifying pathways to practical implementation of their work. Thus *Cambridge Prisms: Water* will capture the best new international research and ideas across all dimensions of water science, technology and policy in ways that are directly accessible to water managers and practitioners, highlighting where research outcomes can have direct impacts in solving water-related threats and risks.

Topic map rationale

The topic map has been developed as a sequential progression starting with understanding water movements in a natural state (*Natural Systems and Resources*), and how variability in the quality and quantity of water can lead to anthropogenic and environmental risks (*Extremes and Hazards*). The uses of water across domestic, industrial and agricultural sectors are considered together with how these may be in competition with themselves – as well as with the maintenance of environmental flows in the natural environment (*Needs and Services*). Meeting these diverse and sometimes conflicting demands for water through technological solutions and engineered systems in ways that are sustainable and resilient is the basis for *Responses and Interventions* in the physical management and distribution of water, whilst the governance, organisational and socio-economic aspects of water management are addressed in *People and Policies*. Finally, the supporting tools and models that are needed in decision-making processes to address all of the above are covered in *Hydroinformatics*. Although these diverse topics appear separately on the map, we expect to report on research results from different disciplines and topical areas to be used to target specific water challenges.

Article range and scope

Cambridge Prisms: Water will provide a platform for disseminating the latest water-related research both across the academic

community and to water managers and practitioners through conventional research articles, technical notes and state-of-knowledge reviews. In addition, it will present shorter articles intended to provide informed discussion on how the results of current water research can influence the practical delivery of water services, such as exploring how they can provide required transformational changes or significant efficiency gains. These will be published in a standing section on *Implications for Water Management Policy and Practice*.

Contributions are welcome from the academic community and particularly from practitioners such as watershed managers, regulators, utility organisations, NGOs, government agencies, consultancies, system operators, planners, policymakers and local community organisations. A key focus is to identify the barriers and opportunities for the implementation of new and novel solutions to water-related problems and share top-down and bottom-up impact-focused experiences of where such solutions have already been adopted across existing water systems.

First content

Prior to launching the journal, the Editorial Team of *Cambridge Prisms: Water* invited key researchers, specialists and practitioners to review the current state of knowledge in areas relating to each aspect of the topic map. Contributions currently available include several reviews: from the operational resilience of the water sector to three major hazards – sea-level rise, earthquake and cyber-attack (Sinha et al., 2023) – to water as a key enabler of water–land–energy nexus interactions in which Sušnik et al. (2023) show the consequences of “water going wrong” and call for more systems thinking, especially in policy and decision-making. In addition, Grafton et al. (2023) provide an economic review of the price and value of water, whereas Bartholomeus et al. (2023) report from the Netherlands on how water is being managed across the flood-drought spectrum. Rajapakse et al. (2023) present progress towards attaining targets of SDG 6 globally, and Shah (2023) discusses the need to move away from siloed thinking with respect to policymaking in the water, energy, food and agriculture fields by embracing “pragmatic but principled” solutions. Holman and Knox (2023) highlight the impact of drought on UK agriculture, including economic damages this could lead to, barriers to implementing drought resilience all through to forecasting agricultural water demand. A practical view from industry is provided by Osborne (2023), who raises concerns over how sewerage models are calibrated/validated using short-term flow surveys, proposing an alternative set of steps for preparing a hydraulic model.

Comments from the senior editors

Finally below are some comments from the Senior Editors of *Cambridge Prisms: Water* expressing their hopes and vision for the journal.

“The Journal is intended to provide a bridge between academia, industry and policymakers and we hope it will be read by all these groups, and our challenge is to make it relevant to each of their needs. Essentially our mission is to connect the ‘push’ of exciting new ideas from the research community with the ‘pull’ for effective and novel solutions from those responsible for managing water problems in practice. In this respect, the topic of water can be split by the prism which the journal provides into multiple perspectives

from a range of vital viewpoints. In short, my focus is to ensure that the research the Journal reports is useful, usable and USED.”

Professor Richard Fenner, Co-Editor-in-Chief, Cambridge Prisms: Water

“The public may be unaware of the huge challenges water is facing and will face globally due to climate change, population growth and pollution. Therefore, there is a great urgency to tackle global water and climate adaptation issues. With the journal we want to connect research, policymaking and practitioner communities behind a common water vision for climate change adaptation. This will help us co-create future solutions to water problems, increase the resilience of water systems, stimulate debate between various groups and provide opportunities for engagement. I firmly believe in bridging science with practice, which for me was the main reason to support the creation of this Journal.”

Professor Dragan Savic, Co-Editor-in-Chief, Cambridge Prisms: Water

“Just as an optical prism refracts light into a spectrum of colours, *Cambridge Prisms: Water* synthesises diverse perspectives and new knowledge to enrich the community of water practitioners and researchers. The journal encourages us to look beyond surface-level understanding of water in the natural and built environment, to explore its multi-faceted role in supporting life on the planet as we work towards sustainable development.”

Dr Leon Kapetas, Senior Editor, Cambridge Prisms Water

“There is a need to explore how to more effectively transition from ‘traditional’ water resources management (i.e., typically engineering based, top-down, focused on individual sectors and supply oriented approaches, etc.) to more collaborative, integrated and adaptive management of water resources where we more meaningfully engage local stakeholders and traditionally marginalised communities (e.g., Indigenous communities) in water resources planning, modelling and management. Among other things, this requires greater collaboration between local communities, academia, industry, policy-makers, etc., to co-create feasible and effective solutions, and we hope that our journal will facilitate this process.”

Professor Jan Adamowski, Senior Editor, Cambridge Prisms: Water

“The compartmentalisation of water research into basic hydrological science and technological development restricts the translational work to develop tools and products for society. The journal aims to bridge the gap through participation from academia, industry and policymakers. The journal encourages submissions in interdisciplinary areas with a very clear statement/ section on the applicability of the research for society/ industry. This makes the journal different from the conventional research journals on water.”

Associate Professor Subimal Ghosh, Senior Editor, Cambridge Prisms: Water

“Sustainable Development Goal (SDG) 6 is to ensure the availability and sustainable management of water and sanitation for all by 2030. Achieving SDG 6 is integral to the success of the 2030 Agenda for Sustainable Development, which is humanity’s blueprint, agreed between 163 countries in 2015, towards implementing sustainable development; towards a future where economic growth, social

cohesion and environmental resilience are simultaneously achieved. Water Resources Management is an inherently interdisciplinary, science and data-herctic problem/challenge. This journal aspires to provide a robust scientific outlet for research results and solutions that derive from the interface between natural sciences, engineering, information technology, economics and social sciences that handle water resources management problems, in the short, medium and long run. The journal will publish innovative interdisciplinary research and solutions that are relevant not only for scientists in academia but also for professionals and practitioners, businesses, financial institutions and policymakers, in the water sector and beyond. All interested in the sustainability transformation will benefit from actively engaging with the “*Water*” journal!”

Professor Phoebe Koundouri, Senior Editor, Cambridge Prisms: Water

“Water forms a common link through several of the UN sustainable development goals (SDGs). Goal 6 (SDG 6) was established to ensure the availability and sustainable management of water and sanitation for all by 2030 (Agenda 2030). SDG6 on water and sanitation has a very close link with human health and well-being. (SDG3). Improved water quality and sanitation combat water-related diseases, and improve health and well-being. The 17 SDGs and their associated 169 targets interact to make up a complex network of indivisible interlinkages. Target 6.1 linked to SDG6 is directly influenced by 35 other targets and is a key influencer of 7 other targets. The 2030 Agenda recognises the centrality of water resources to sustainable development, and achieving the goal of water and sanitation is vital for the success of the entire 2030 Agenda. *Cambridge Prisms: Water* will provide a platform for engagement to boost the SDG6 progress.”

Dr. Jay Rajapakse, Senior Editor, Cambridge Prisms: Water

“Building an equitable and resilient water future requires fresh thinking and reimagination of our current top-down centralised, linear and fragmented water systems and the governance structure that overlays it. While part of the world will be retrofitting its existing system to adapt to the new climate and social realities, others will have the opportunity to leapfrog and avoid the antiquated policies and infrastructure models altogether, thereby embracing the new water landscape. The digital and data-driven economy will enable real-time management of every drop of water and its quality, and enhance accountability, transparency and a shift to more effective partnership, governance and financing strategies. *Cambridge Prisms: Water* intends to encompass the multi-faceted complexities of the water sector, providing a platform that enables a diverse set of stakeholders to share their insights, experience and expertise.”

Dr. Newsha Ajami, Senior Editor, Cambridge Prisms: Water

Open peer review. To view the open peer review materials for this article, please visit <http://doi.org/10.1017/wat.2023.9>.

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