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Never Ask for a Lighter Rain but a Stronger Umbrella

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In a recent editorial in the journal *Nature Sustainability*, the editors raised the concern that journal submissions on water studies appear too similar. The gist of the editorial: “too many publications and not enough ideas.” In this response, we contest this notion, and point to the numerous new ideas that result from taking a broader view of the water science field. Drawing inspiration from a recently hosted conference geared at transcending traditional disciplinary silos and forging new paradigms for water research, we are, in fact, enthusiastic and optimistic about the ways scientists are investigating political, economic, historical, and cultural intersections toward more just and sustainable human-water relations and ways of knowing.

Keywords: first sociohydrology conference, conceptual and methodological pluralism, water crises, societal feedbacks within engineering designs, inclusive dialogues

The first sociohydrology conference (6–8 Sep 2021, <https://delft2021sh.org/>) brought together a vibrant community of ~300 natural, social and interdisciplinary scientists such as environmental scientists and historians, political ecologists, human and physical geographers, as well as practitioners, such as environmental engineers, who met on an equal footing. While hydrologists, historians, political scientists, ecologists, engineers, geographers, and economists have all studied water for decades, if not centuries (Wittfogel, 1953), we argue that consolidating scholarship under one *umbrella* (Figure 1) is relatively new and gathering momentum. During the conference, the causes of the recent water crises and new paradigms for addressing them were discussed. These included human and knowledge dimensions, environmental justice and sustainability concepts that are needed in every stage of solution-building.



Humanity is indeed facing multifaceted and intractable water crises, which are no longer effectively tackled by traditional water-centered technocratic solutions alone. India's groundwater crisis, for example, stems from decisions made in the 1970's to feed a growing population by boosting agricultural production and subsidizing energy inputs, which facilitated excessive groundwater pumping (Mukherji, 2020). Increased pumping and drilling costs, however, were disproportionately borne by resource-poor farmers who thus became hostage to indebtedness and poverty (Sarkar, 2011), highlighting the critical role of social power not addressed by the policies. This role is also discernible in the differences in water security and the experiences of drought across different social groups in Cape Town during the 2015–2017 Day Zero water crisis (Savelli et al., 2021). The need for new ideas that go beyond technical dimensions is thus blatantly apparent.

The editorial emphasized that: “Engineering solutions are portrayed in elegant terms that may appear simple and make us feel better, precisely because they ignore the messy institutions, norms and processes that underlie our relationship with water (Editorial: Too much and not enough, 2021).” We echo the need to incorporate complex institutional and societal feedbacks within engineering designs and are encouraged by many collaborative research efforts being made toward this goal. The broad field of systems thinking has embraced placing stakeholders at the center of water resources decision-making (Hipel et al., 2008). Formal policy analyses have been supplanted with participatory modeling that amalgamates systems research (e.g., causal loop modeling, non-linear dynamics, collective

behavior) with stakeholder engagement. Such approaches acknowledge the complexities between institutional norms and water solutions, thereby providing a means for elucidating their interactions for actionable management.

The editors also shared “the concern that water studies as a field may have largely given up on historical context and institutional change, suggesting that as water studies has become more quantified and technically driven, it has also become less grounded.” We do not share this view and believe that historical context and institutional change are now being integrated more firmly than ever with other branches of the water sciences, as illustrated by the myriad studies presented during the Delft Conference.

For example, Bhattacharya and Mukherjee¹ developed multiple emergent “storylines,” based on the historical unfolding of the socio-political and geomorphological emergence in the Adi Ganga river basin in India, including the human-non human interactions along the river. The study highlighted failures of technocratic interventions aimed at ecological restoration of wetlands, and propounded an ecology “of” cities instead of an ecology “in” cities approach that integrates the perceptions of local stakeholders in its design.

Dedaa² and Dame et al.³ presented new concepts for studying perceptions of mining impacts on the quality and quantity of water resources. The former explored discourses surrounding modern assumptions of pre-colonial norms in Ghana while the latter examined avenues for more equitable processes in Chile's glacial governance. Accounting for the implications of pre-colonial norms on water governance goes beyond current-day politics, and the new concepts facilitate reaching distributive justice goals.

The editors continue: “While publishing more about how humans use water, scholars may have become less interested in or capable of researching how humans see water as a resource or threat.” Our experience is different. There is a strong interest in the human perspectives on water as a resource or threat with an emphasis on site-specific contexts and particularities. For example the research of Shahid et al.⁴ showed how a socio-political process involving various stakeholders enabled making the necessary decisions to implement the Diyatha Uyana multi-purpose park in Colombo, Sri Lanka, which now simultaneously serves as an effective water retention, wetland, and recreational area, for the benefit of both the local environment and society.

To shed light on historical context, institutional change and social perspectives, a field currently emerging is the use of novel data sources. For example, Priya⁵ identified a

¹Shreyashi Bhattacharya and Jenia Mukherjee. (Un)Choked: reconnoitering ‘storylines’ across the pillaged hydroscales of the Adi Ganga. <https://surfdive.surf.nl/files/index.php/s/MIIThcCnwLovJL>.

²Alesia Ofori Dedaa. Can Pre-colonial Water Practices Save Ghana's Polluted Rivers? A waterscape analysis of the water-mining nexus. <https://surfdive.surf.nl/files/index.php/s/Tb8kUSM56pLTyrb>.

³Juliane Dame, Susanne Schmidt, Carina Zang and Marcus Nüsser. Hydrosocial dynamics and water conflicts in the Upper Huasco Valley, Chile – an integrative assessment. <https://surfdive.surf.nl/files/index.php/s/Tb8kUSM56pLTyrb>.

⁴Ramsha Shahid, Klaas Schwartz and Janez Susnik. A socio-political approach to integrated flood risk management in Colombo. <https://surfdive.surf.nl/files/index.php/s/5WIDayJfOpKGZU>.

close link between media narratives and long-term change in decision-making and governance priorities in flood-prone regions of Northern India. She showed how case-by-case engineering solutions have complicated rather than resolved impending water problems. Willemin and Backhaus⁶ explored the histories of chemical pollution and the possible future of rivers in Switzerland, and found that farmers were motivated to protect water resources through new forms of solidarity between people and water. Making such human-water interactions transparent paves the way to new, more sustainable solutions.

We believe that the intellectual space where natural scientists, social scientists, engineers, artists and communities can come together on a level playing field and develop sustainable solutions to pressing water crises is materializing. The conference

on sociohydrology has clearly demonstrated that new paradigms are emerging and that conceptual and methodological pluralism can exist under one *umbrella*. Further development and deepening of new, interdisciplinary paradigms need fostering by scientific journals, funding agencies, educational institutions, and professional associations. We encourage all those who are interested in pursuing new directions in water science, including the editors of all *water-related journals*, to lead by example in promoting new research initiatives and more inclusive dialogues.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

SP, MH, GB, MFA, and MS contributed to conception and final version of the manuscript. All authors contributed to various sections of the manuscript, read, and approved the submitted version.

⁵Ritu Priya. Media narratives on the flood problem in Bihar, India-Communicating or complicating the problem? <https://surfdrive.surf.nl/files/index.php/s/k6hLs77rD2u7yLr>.

⁶Rémi Willemin. Pasts and futures of hydrochemosocial waterscapes: oral history, chemoethnography and speculative photo-response fabulation with Swiss Jura farmers. <https://surfdrive.surf.nl/files/index.php/s/PRw0F0YwYInAYvB>.

REFERENCES

- Editorial: Too much and not enough. (2021). *Nat. Sustain.* 4:659 doi: 10.1038/s41893-021-00766-8
- Hipel, K. W., Obeidi, A., Fang, L., and Kilgour, D. M. (2008). Adaptive systems thinking in integrated water resources management with insights into conflicts over water exports. *INFOR* 46, 51–69. doi: 10.3138/infor.46.1.51
- Mukherji, A. (2020). Sustainable groundwater management in India needs a water-energy-food nexus approach. *Appl. Econ. Perspect. Policy* 2020:1–17. doi: 10.1002/aepp.13123
- Sarkar, A. (2011). Socio-economic implications of depleting groundwater resource in Punjab: A comparative analysis of different irrigation systems. *Econ. Politi. Week.* 46, 59–66. Available online at: <http://www.jstor.org/stable/27918148>
- Savelli, E., Rusca, M., Cloke, H., and Di Baldassarre, G. (2021). Don't blame the rain: Social power and the 2015–2017 drought in Cape Town. *J. Hydrol.* 2021:594. doi: 10.1016/j.jhydrol.2020.125953
- Wittfogel, K. A. (1953). Oriental despotism. *Sociologist* 3, 96–108.

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