

Critical inter-disciplinary and inter-species approaches to water sustainability and climate change issues

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This special issue represents critical intersections within and between different disciplinary fields, cultures and methodologies towards water sustainability praxis and understanding and climate change mitigation strategies. In recent years both an increasing volume of scientific research and successive international conferences on climate have made it very clear that the *linkage* between critical issues of sustainability (and indeed all the elements that comprise planet earth), continues to be under-considered. No element or cultural context is any less significant than another. At the same time, recent discussions on issues like equity in access to fresh water and many other aspects related to climate change are often overshadowed by the incessant emphasis placed on the global goal to reduce earth's atmospheric temperature by 1.5 degrees Celsius by actions such as reducing emissions or carbon capture. This is, of course, a critical issue, yet the quest for solutions requires understanding that all facets of life, weather and climate are inextricably interlinked, as strategies for resolving or mitigating must also be. Our search for “constructive alignment” (Biggs and Tang, 2015) between the ecological, socio-cultural, and economic concerns of sustainability involves making radical departures, some of which appear in each of the papers published in this Special Issue of *Visions for Sustainability*.

As editors of this issue, for us this follows on from our work in co-creating the AquaMOOC: Participatory Engagement with Water that emerged from our first research project¹ together on the Anthropocene. The AquaMOOC is a series of

¹ <https://imoox.at/course/AquaMOOC?lang=en>, “Surviving the Anthropocene” (2019-2022) funded by ARRS (J7-1824) and FWF (I-4342-G). MOOC means massive open online course.



online learning modules on climate change, water and the Anthropocene. It includes instructional films with footage of the Isar River on the border of Austria and Germany, and the Murrumbidgee River Corridor on First Nations Ngunnawal Country in Canberra, Australia. The online learning platform advances an inter-cultural, inter-disciplinary, and inter-species approach to water literacy that actively involves citizens - a concern that has led us to many fruitful collaborations including the edited volume *Pedagogy in the Anthropocene* (2022), and the contributions to this Special Issue.

The guiding questions for this issue involve a search for how science, governance, technology, and citizens can come together effectively and respectfully to drive genuine and inclusive stewardship and sustainability pathways. Our emphasis is on water and the need to understand that it continues to co-evolve with other elemental properties, human culture, and inter-species relationships. An ongoing challenge of these early decades of the twenty-first century is discovering ways in which different fields of science can listen actively and deeply to each other and move towards innovative, rigorous, transboundary, and achievable outcomes as partners for the planet and its sustainability patterns for the future, through mechanisms such as Ecosystem Based Approaches (EBAs), and Nature-Based Solutions (NBSs) that include nature as a (research) partner. Part of our intention has been to advance the thinking embedded in the work of the late Deborah Bird Rose. She advocated for a “border zone in which Indigenous ecological knowledge, Western scientific knowledge and Western philosophical and poetic inquiry converge” (2007, p. 9). This approach is both intelligent and imperative and is evident in some of the articles included here. In addition, we take our general cues from Anthropocene scholars including Steffen, Crutzen and McNeill (2007), Stoermer and Crutzen (2000), and Palsson (2013). They have provided detailed geological and biosocial data and accessible information about the impact of the human species on planetary life, weather changes, global warming, and climate change projections within the Anthropocene perspective.

More specifically and more recently, there has been a turn to the humanities and social sciences to explore other integrated possibilities that include interspecies relationships in a more equitable and sustainable way. This perspective on human-animal and human-nature relationships invites us to critically consider the impact of anthropocentrism and speciesism, as, for example, in the work of Martin Lee Müller on salmon in various cultural contexts. Müller questions the mindset underlying Western practices of fishing, fish farming and river damming, which annihilate fish as agents and protagonists of their own lives:

[...] the story of human domination has suffused the modern lifeworld in ways that are thorny, resilient, and ubiquitous, reaching into the legal, political, economic, and scientific imagination, propagating itself through technology as well as through social institutions, resounding even in grammar or particular speech habits, and subtly shaping even the ways in which we humans inhabit space and time (2020, p. 65.)

Similarly, while scrutinizing water practices, Janet Donohue, in line with Heidegger, argues that dwelling in a riverscape does not primarily involve “the application of technology to water, or the management of water. It is about the ability to care for water and to take care with regard to water.” (2020, p. 86)

One of the things we would like to affirm is the way we align our research ‘thinking’, and ‘doing’ to effectively bring differences together in a sustainable and potent alignment. Pedagogical expert Biggs (1996) explains constructive alignment as the flow from outcomes-based learning approaches or Intended Learning Outcomes (ILO). This aligns teaching and assessment methods to those outcomes through Teaching and Learning Activities and Assessment Tasks (ATs). This idea not only applies to classroom learning and teaching. We propose, along with some of the articles featured in this issue, that constructive alignment between research intention and thinking, practical learning activities and outcomes could also be better aligned to facilitate more meaningful and coherent climate change solution and mitigation research. As some of the articles show, citizen science and participatory engagement between hard science and everyday people affords many opportunities for projects to intentionally align what they hope to discover, with specifically designed activities and engagement that will lead to those discoveries and their elaboration.

We have intentionally invited papers from *across* fields, as well as papers that include inter-disciplinarity as a field in itself. We open with a contribution by Meulenbergh, Hawke, Cavaion, Kumer and Lenarcic “Understanding Interdisciplinarity through Adriatic Maricultures and Climate Change Adaptation”. The acceleration of climate change arising from the Anthropocene (Hawke and Palsson 2017; Steffen, Crutzen and McNeil 2007), and the associated effects on land and sea biodiversity necessitates a new way of doing research. Inter-disciplinary research serves to connect science, social sciences and humanities, technology and engineering, as well as welcoming citizen scientists into the research environment, working towards common goals. In this article, through the example of shellfish marine cultures they explain our view on inter-disciplinarity, particularly through marine biology, health and well-being, social

science and cultural geography. They all come together at the interface between nature, culture and climate change mitigation strategies.

Kimberly Noble and Elena Marie Enseñado present an empirical paper entitled “Analyzing Co-creation Levels of Urban Living Labs in Europe”. In their article, they introduce the concept of the Urban Living Lab (ULL), and its application as a framework for future climate change activities. They further ask which characteristic of ULLs that focus on urban sustainability, can most enhance its level of co-creation involving different stakeholders. They collected data in an online survey which involved 30 ULLs in Europe and established that the “aim” of ULLs is the most important characteristic that enhances co-creation. Their approach builds on the idea that optimization of characteristics of a successful ULL can positively affect co-creation levels, ultimately improving its outcomes and shared aims. These outcomes can position the ULL model as a methodological tool in climate change and water research for the future. The authors also draw attention to the difficulty of delivering co-creation outputs without organizational clarity and field specificity.

A more positional and provocative paper comes from Jan Jagodzinski, on “The E(thi)co-Political Aesthetics of ‘Designer Water’: ‘Becoming Water’ in the Anthropocene”. He affectively politicizes the global condition of water in the context of “designer capitalism” by analysing its commodification through a colonial discourse that romanticizes indigeneity to sell its “bottled purity”. The ethical concerns of “designer water” (bottled water) are raised within the broader agenda of ecosophy as inspired by Gilles Deleuze and Félix Guattari’s essay *The Three Ecologies* (2000). This develops an aesthetic trajectory sustained by “anti-globalization” forces of protest and an astonishing multiplicity of artists who are sensitizing us toward “becoming water”. In short, Jagodzinski juxtaposes capitalism’s “designer water” to performative artists working with ice and water who raise e(thi)co-political issues within the Anthropocene problematic.

In “Water Management: Pragmatic and ethical issues for species-inclusive and sustainable water policies”, Helen Koprina and Veronica Strang draw on their earlier work that appeared as a blog called: “Re-imagining Water Management on World Water Day”. (Springer Nature: Sustainability Community)² and lead us towards understanding water respect both as an everyday necessity and as an inter-species concern. They apply E.O Wilson’s “Nature Needs Half” (NNH) as

² Koprina, H. and Strang, V. (2020) Re-imagining Water on World water Day <https://sustainabilitycommunity.springernature.com/posts/63674-re-imagining-water-management-on-world-water-day>

a way of advancing equity and access not only for humans but also for all living things. For the authors, a major impediment to addressing water scarcity, climate change, biodiversity loss, and pollution is the dominance of anthropocentrism, which positions humankind as separate from and "above" a non-human world. The need for sharing the planet more equitably is readily visible in societies' engagements with water. Within the larger problem of anthropogenically-caused climate change, overusing freshwater and degrading waterways places the surrounding ecosystems under increasing strain, threatening water, food and energy security. Decisions about water management and use are often driven by short-term responses to these pressures that, as well as sacrificing the rights, needs, and interests of less powerful human communities, override those of non-human species and ecosystems.

A Bachelardian (Bachelard, 1999) poetics of both water and space for example, is evident in the eco-poetic paper "Life's Shared Dependence on Water: A potential wellspring of ecocentric concern and interspecies kinship" by Joe Gray. An ecocentric world view holds that non-human life has intrinsic value – a worth that is independent of any benefits that human beings may derive from such life. As an example of this, a salmon matters for reasons that are far greater than simply being potential calorific input into a human digestive system or a possible flavour on a human tongue. A parallel tenet of an ecocentric world view is that moral issues permeate beyond the merely human world and into wider nature. Furthermore, this world view foregrounds the unfolding mass extinction of life on Earth as the arch-crisis of our times. This, in turn, is being driven by an array of interconnected emergencies including rapid anthropogenic climate change and diminishing freshwater supplies. In the case of water, shifting rainfall patterns and increasing pressures on water extraction to support a growing human population are causing suffering and rendering landscapes unliveable, to humans and non-humans alike. All life is united in its dependence on water. This shared elemental need offers a potential touchpoint for citizens of all age groups to develop a sense of kinship with non-human others and to become more ecocentric in their value systems. Ultimately, a groundswell of ecocentric concern will help generate policies and foster practices that support broad socio-ecological justice in water usage and in other domains, of what the author describes as sharing lives with Earth-kin.

Michael Paulsen's eco-poetic paper, "Oceanic and Tethysian Being-in-the-world - An Essay on the Human Self and World Understanding in the Anthropocene", takes us on a journey through deep space and time from the Greek Deities of Oceanus and Tethys to artist installations in the twenty first century. A

constructive yet creative alignment of sorts is at play. He invites readers to approach the lifeworld as a Heideggerian *being-in-the-world* with awe and wonder through the uptake of the *berlberl* installation³ as an inter-elemental meeting place and reminds us that alignment doesn't always need to be scientific, pedagogical, or philosophical. It can be alignment of mind, body and spirit as the nature learner explores the environment as natural phenomena of learning about the lifeworld and our place in it, as well as through artistic and creative industry that represents the natural world.

As these articles demonstrate, we humans have become dangerously alienated from our source of life. The evidence is overwhelming that the predominant anthropocentric and Eurocentric angle of vision has been how to organise water for primarily human concerns; how to trap it, pipe it, store it and, equally important, how to over-use it to feed an eternally thirsty agrarian monoculture, and industrial military complex. We have not only come to think of regulated, dammed, and canalised rivers as the normal state of being for living waters. Indeed, their containment is also an apt metaphor for our thinking and existence: "living like a river in a concrete bed" (Hawke and Spanning, 2022). This has merely served to guide us along a narrow line of thinking and action in which water is dominated by the logic of capitalism and technology. In this Special Issue we have endeavoured to open up the space of a more intertwined river or waterscape, particularly to convey our propositions about interdisciplinarity, polyvalence and interspecies communities, in the attempt to avoid the metaphorical dammed river flooding our interspecies communities and lifeworld. "[...] The concept of living with water as a complex entity, inseparably connected with all three levels of existential complexity - individual, social, and ecological" (Simmons, Woog and Dimitrov 2007, p. 275), feeds directly into our intention to produce an equilibrium that is ecologically, economically, and socio-culturally productive and reflects the balance and alignment required for planetary sustainability of all life.

In such a water-centric world the challenge ahead is to transform our thinking and practice - to re-align it and re-wild it with intelligence and insight - given that climate change crises have become the urgent driver within whatever vision and action we can now imagine. To re-iterate what Donohoe says, "Our cultivation, ... is about the ability to care for water and to take care with regard to water. In doing so, we can find ourselves more attentive to water in its waterness, thereby bringing our own placemaking in line with water in allowing it to reveal itself as

³ <https://berlberl.world/>

what it means that the place of water must be (no pun intended) fluid" (2020, 86). How we will do this is our urgent responsibility.

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Funds

SMH was funded by a European Commission Grant Agreement No. 101003534 Smart Control of the Climate Resilience in European Coastal Cities SCORE. RS was funded by the Austrian Science Fund FWF (I 4342-G, 2019-2022). The license holder of the MOOC is the University of Innsbruck.

Citation

Hawke S.M., and Spannring R. (2022) Editorial: Critical inter-disciplinary and inter-species approaches to water sustainability and climate change issues *Visions for Sustainability*, 18, 7115, 3-10 <http://dx.doi.org/10.13135/2384-8677/7115>



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