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Water, Culture and the SDGs as Living History

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At a time of climate change, sea level rise, flooding, drought, and changing groundwater and rainwater patterns, water managers need to adjust their current practices and develop new approaches. Technological innovation remains a key element in adaptation and mitigation; but technological innovation is not enough. Changing water patterns will affect everyone and every structure. How we manage water depends on local conditions, spatial and social developments and cultures as well as decisions of the past. That is why water management needs to go hand in hand with sustainable practices that are connected to the context of specific places, social systems and cultures and their changes over time. Sustainable development also requires recognizing the long-term impact of buildings and human-made structures. They may have been erected in the past for specific purposes and functions that have disappeared or are no longer welcome, yet the buildings and landscapes still exist. Sometimes they are valued cultural heritage; sometimes they are considered a nuisance, standing in the way of future development. Finally, water managers and other decision-makers may need new tools and methodologies for a holistic approach to sustainable development, which accounts for local particularities, achieves buy-in from society at large, and acknowledges historic path dependencies. Culture has shaped ecology and water systems. As a first step toward such an approach, this chapter reflects on the UN Sustainable Development Goals through the lens of water and culture.

KEY THEMES

< *Fig. 1 Aerial view of Bhorley waterfall and Tamakoshi River, Dolakha district, Nepal (Source: Nammy H. Kirat, 2018;* CC BY 4.0, *via Wikimedia Commons).*

Introduction

Water has long been at the heart of human living and well-being on sea and land. Humans have created locally adapted structures for drinking water, for irrigation and energy generation, for shipping, fishing, and maritime practices. They have addressed the multiple threats that water poses – in the form of floods, tsunamis and sea level rise – to human survival, creating unique artifacts and ways of doing things, developing institutions and laws. Some of these systems have lasted for a long time. Many have changed over time in line with technological, political, economic and social transformations. Once erected, buildings and institutions can have an impact over decades or centuries. To paraphrase Winston Churchill: First we shape our water systems and then our water systems shape us. Understanding how people have worked with or against water and how it has shaped people's lives, work and traditions can help illuminate the possibilities of future water-based ecosystems.

Sustainable Development as Living History

Humans have developed water systems over time and through space; they have also changed them in line with political, economic and technological transformations. Some systems have worked for a long time, creating a balance between different needs and interests of spaces, societies and cultures; others have relied on disbalances, with frameworks of gender and social justice embedded in laws and policies. Some have evolved slowly, others have experienced abrupt change. The existence of socio-cultural frameworks has been key to the long-term existence of historic water systems. Some traditional systems have disappeared, others are today praised for their circularity and sustainability serving local populations as living heritage, yet others have fallen into disuse and are maintained as heritage sites. While we may admire many of these systems today, we would no longer agree with all the socio-cultural conditions that existed at the time, and have made changes to some of them.

Following industrialization, the large-scale construction of public water systems helped improve human health and feed larger populations. It also changed traditional forms of living with water. As water practices developed into larger spatial systems, public systems replaced community-based ones. While the number of people served increased, their involvement in water management decreased. In some parts of the world, the development of public water infrastructures provided a much healthier environment, while in others, notably where colonization or other forms of exploitation took place, this process often led to a decline in living conditions. Today we are again facing a transition toward more circular practices, and the UN Sustainable Development Goals (SDGs) aim to make this transition work for all of humanity. Studying historic space and practices of water and the socio-cultural conditions they entailed can uncover sustainable traditions and avoid the perpetuation of systemic inequality, thus informing a more equal and just future.

To better understand how to live with water in the future, it is helpful to explore the ways humans have lived with water in the past and to draw lessons from both positive and negative experiences. Exploring the past helps us look more holistically at new approaches and explore why specific solutions were chosen at a select moment in time. It helps us explore future scenarios by understanding the trade-offs of the past and their effect on humans and ecosystems. Understanding historic water systems

^ *Fig. 2 Ceremony and festival at a rebuilt riverbed at Arima Onsen in Japan (Source: Carola Hein, 2016).*

through time does not mean that we should repeat the past or that past practices can solve contemporary challenges. The past is not the solution, as the Dutch Water Envoy Henk Ovink poignantly put it (UNESCO 2021). Historic water sites may not be able to serve contemporary needs. Yet, at a time of changing water patterns due to climate change – sea level rise, flooding, new rainwater patterns, drought, etc. – an understanding of historic water systems and the relationships that have linked space, society and culture in the past can serve the future.

Water Systems as Spatial, Social and Cultural Networks

Water in all its forms connects space, society and culture. Infrastructures are more than spatial physical networks that allow for exchange through space; they also have a socio-cultural dimension (Larkin 2013). New water-cleaning technology, bigger and stronger dikes, larger and more powerful water energy generation systems and new porous street surfaces can play a role in adapting to changing water patterns. But determining whether and where these

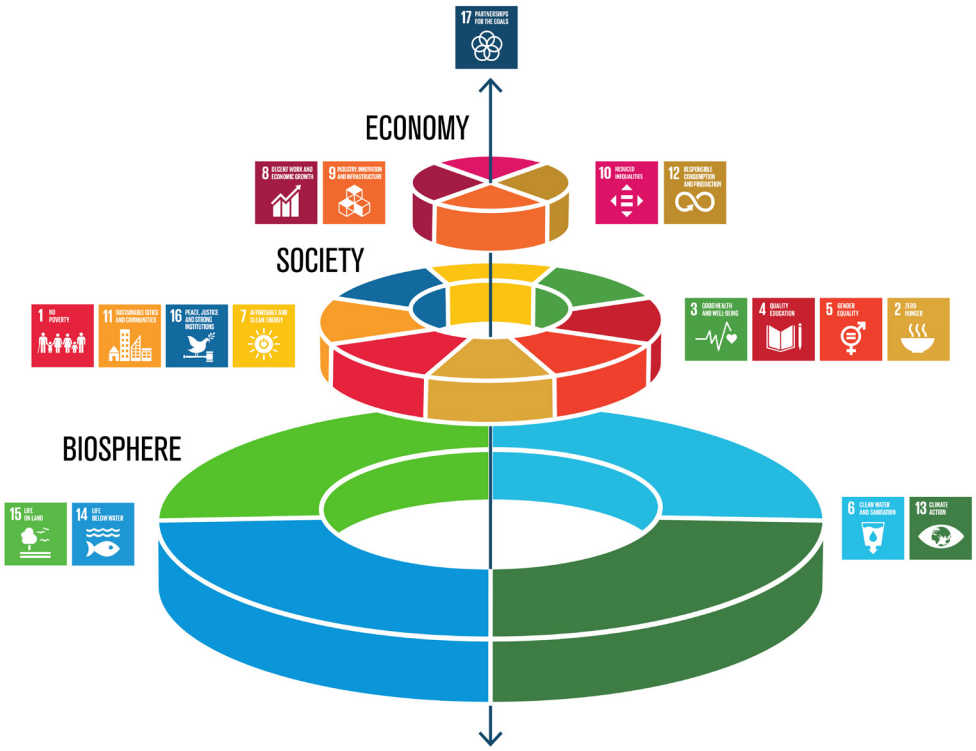
technologies can be beneficial, and to whom and how, requires considering all the affected parties and their socio-cultural perspectives. From basic water access, to recreation related to water – sailing, canoeing, swimming – and transportation and energy generation, changes in water policies need to be made in ways that respect environmental, societal and gender justice. Interdisciplinary planning and the collaboration of local citizens is essential. Yet, experience has shown that water management is not always inclusive and just. In line with the OECD Better Life Initiative (OECD 2020) and the United Nations Sustainable Development Goals (SDGs), we need to develop a society where water in all its forms, fresh and salty, serves human well-being.

Rethinking water and culture in the SDGs from a holistic, socio-cultural, long-term ecosystem perspective can illuminate their interconnection and promote comprehensive/systemic approaches to sustainable development projects. Several authors have conceptualized the SDGs as a group. The "wedding cake" (fig. 1) proposed by the Stockholm Resilience Center is one example. It argues that the biosphere is the foundation for economies and societies and that we need to move away from contemporary sectoral approaches. Other more systemic approaches to the SDGs have since followed, but they do not address the role of culture. UNESCO has therefore developed the 2030 Culture Indicators as a way to understand the role and potential contribution of culture in sustainable development, taking into account tangible and intangible heritage as well as natural heritage (UNESCO 2019).

Building on such approaches, this article aims to rethink the relation between water and SDGs by connecting the biosphere and "water SDGs" (6, 14 and 15) in relation to the others and the larger context of societal and cultural practices and values. Figure 2 is a first attempt at visualizing the SDGs in a broader framework of nature-culture interaction and tangible spaces and intangible practices around water. The visualization shows how people live with water as a result of cultural decisions. This approach can capture different forms of living in a certain place and help us understand how water-related spaces, institutions, practices and their relationships have changed over time. The illustration proposes an understanding of water systems in relation to human activity and nature (blue semicircle). The ways in which humans engage with water is determined by framing conditions of climate and energy. Natural conditions – e.g., those in a desert versus in the Arctic – and societal conditions shape human strategies of climate adaptation, energy production and consumption (green semicircle). In this context, humans have developed built spaces and cultural practices in line with their values (yellow semicircles). Understanding how people have worked with or against water and how water has shaped the way they live, work and celebrate can help illuminate the possibilities of future water-based ecosystems.

A Holistic Approach to the SDGs

Water and culture are considered here in the broadest sense. Water is understood in relation to the hydrological cycle, from groundwater to rain, from snow to mist, from freshwater to saltwater, from drinkable to black water. It is also explored in its full dimension, as something natural and cultural. Similarly, culture is seen here in the broadest sense, including the many ways humans engage with their surroundings and with each other, how they organize society and evaluate different development paradigms. Such an understanding expands on current



^ *Fig. 3 The "wedding cake" (Source: Azote Images for Stockholm Resilience Centre, Stockholm University, 2018;* CC BY-ND 3.0*).*

practices that distinguish, for example, water for drinking and water for shipping, or that distinguish cultural heritage and cultural (artistic) practices from everyday creative engagement. The silos of disciplines and approaches that are typical elsewhere in contemporary society can be found also in approaches to water and culture. Select institutions with their own tools, laws and policies focus on drinking water, irrigation or shipping, others focus on the preservation of heritage or on sustainable development or education. The approach proposed here would encourage interdisciplinary collaboration on integrative and sustainable solutions.

Water (Blue Semicircle): This reconceptualization of the SDGs considers all forms of water, including groundwater, sewage water, rainwater and drinking water. Natural water sites have served as foundations for human life. Water, being essential to life, connects SDG 6, 14 and 15, referring to clean water and sanitation, to life below sea and to life on land, placing them in the broader context of water. Humans have settled near drinking water sources throughout history. We can think of sites such as the Great Barrier Reef or the Everglades as natural water environments to which humans have adapted. Humans have changed water conditions continuously, building channels, dams, pipes and water towers (SDG 15). The provision of drinking water infrastructure (as well as of sewage) has been a key driver for water management throughout history (SDG 6), and we can think of fishery practices and carbon storage as part of life under water (SDG 14).

Framing Conditions (Green Semicircle): Water is a function of climate as well as an agent. Depending on local climates, water can be abundant or rare, associated with floods or drought, and can appear as ice or vapor. It is also closely related to all aspects of energy generation. How humans engage with water depends on the local climate and the availability of energy. Climate is closely related to the hydrological water cycle. Energy is key to how we live with water. SDGs 7 and 13, respectively referring to energy and climate, are therefore considered here as framing conditions for water and culture. We can use water to generate energy and we can use energy to control water. How we react to water challenges is also a cultural decision. Humans have historically adapted to water cycles and the availability or absence of water in different ways. Examples of structures they have employed to do so include water mills, qanats, water meadows and water retention basins. Practical interventions, such as dikes or stilt houses, are cultural at their source. Rather than building them, people could have decided to live in a different location, or to move seasonally as water levels changed. Yet they have made decisions to build against, above, or with water as the result of expertise, often acquired over long periods. At a time of climate change, it is very important to understand our relationship with water and what values it is based upon.

Culture(s) (Yellow Semicircles): Culture(s), understood here as the way in which we organize our spaces and practices, are as encompassing as water. Humans have developed particular spatial, social and cultural practices to live with water. They have erected physical structures and developed practices related to them, captured here in the semicircle of individual survival and community structures. They have also developed practices that are not primarily spatial to facilitate cooperation in water systems. The illustration proposes a distinction between SDGs that are key to human survival, and ones that rely on communities or larger-scale collaboration (SDG 1, 2, 3 and SDG 8, 9, 11), captured in the first yellow semicircle. It also suggests that we think of the other SDGs as socio-cultural (SDG 5, 10, 16) and procedural (SDG 4, 12, 17), where the spatial impact is secondary, captured here in the second and third semicircles. The two spheres are overlapping because physical spaces, institutions and practices overlap.

SDGs 1, 2 and 3 primarily address poverty, hunger and health. Water management has long been key to meet the most basic needs. A small well or cistern can enable a few people to survive; irrigation of a field will help grow crops. People have dug wells for thousands of years, starting in the Neolithic era. The archeological site and UNESCO World Heritage site of Hegra Al-Hijr in Saudi Arabia stands as an example of Nabataean agricultural techniques that include many wells still in use today. It is not surprising that wells also play an important role in folktales, such as in the story of the Frog King, a German folktale captured by the Grimm brothers. Capturing rainwater for drinking purposes is similarly important for human survival (Loen 2020). Providing people with water is a key condition for preventing poverty. People have channeled water to fields for thousands of years. Water meadows are just one example of historical irrigation practices (Renes et al. 2020). Clean water and sewage management, even on an individual scale, are key to avoiding diseases and a key driver of the development of planning (Lopez 2018). Archaeological evidence of cesspits goes back to Babylon, 4000 BC. Some aspects of water management are thus strictly related with the SDGs concerning human survival.

^ *Fig. 4 Conceptualization of the SDGs through the lens of water and culture (Source: Carola Hein, 2022).*

The community-based SDGs 8, 9 and 11 require collaboration among individuals. Historically, cities and communities thrived only once people's fundamental life needs had been satisfied. In the field of water and heritage, we can think of the construction of aqueducts to supply major cities like Rome with enough water for all the daily needs of a metropolis, while also allowing the city to become the center of an empire. The construction of canals, dikes and large-scale irrigation systems is closely related to the emergence of human communities with specific forms of economic development, dedicated funding and laws that can both facilitate or hinder socio-environmental justice. The water systems of Tenochtitlan, rice terraces in Indonesia, and the building of water cities like Venice and Amsterdam required diverse groups of people collaborating to manage water and to establish institutions, regulations and other practices to maintain the water system.

The organization of communities, just or unjust practices and the institutions that facilitated inclusive water management and access are tied to economic and social conditions and spatial patterns. They are captured in SDGs 5, 10 and 16. They are also related to long-term societal practices and anchored in policies, laws and built environments. Both historic and current water practices involve exploitative practices. SDG 5 and the question of gender equality is a key theme both in terms of water and heritage. The lack of access to fresh water supplies and the role of women in transporting water from the source to the village, in washing clothes, or carrying out other basic tasks exemplifies historic inequalities and need to be carefully explored when examining historical models (Zwarteveen and Ahmed 2012). Access to water and water management have historically been part of power relationships, many of which were grounded in exploitation, either

locally or internationally. The control of a water source or exploiting it through the construction of major dams can even lead to national conflicts. The Grand Renaissance dike on the Nile and conflicts surrounding it are just one example. Throughout the world we can find examples of big dams that have destroyed communities to provide water for cities or industries. Often these projects have been sponsored and financed by international institutions such as the World Bank. The UN Water Action decade has aimed to make change, but concrete effects still need to be seen.

Humans have developed many procedures and forms of intervention (SDG 4, 12, 17) to implement water systems that reflect specific values, as well as to create equitable water systems, educate children, produce and consume (SDG 12), and assure the collaboration of diverse partners (SDG 17). To create equitable water systems and to acknowledge sustainable historic water systems, we need to think about how we educate our children, our population and our professionals (SDG 4). Education is key to making people aware of water issues. From serious games to films and free online courses, education is a key factor in shaping water awareness. Museology and the preservation of heritage sites can play an important role. We also need to reflect on how we produce and consume in relation to water (SDG 12). The provision of water for industrial processes can lead to pollution in related water bodies. Large corporations have also changed processes and water use, affecting less powerful stakeholders. Water management and water diplomacy are key to peaceful development, but they can also lead to conflict. Strong (transnational and transborder) institutions (e.g., the International Commission for the Protection of the Rhine) can promote equitable development, but they can also lead to conflict and even war, such as when upstream practices conflict with downstream ones, or when water for urban development takes priority over water for agriculture (or vice versa). Strong institutions like the water courts or the Dutch water boards can help ensure that communities live peacefully. The Earth Commission as part of the Global Commons Alliance may be a way to connect diverse institutions and to empower diverse people for global stewardship (Earth Commission n.d.).

Conclusion

People have used water in all its facets – freshwater and saltwater, water in the ground and in the air – in cultural practices, artifacts, institutions and houses, cities and landscapes. They have responded to needs that were specific to their context, and made decisions based on their values. Water flows through society and culture and the balance between different interests and goals is key to sustainable development in all areas of the world. The visualization of the SDGs through the lens of water and culture provides a foundation for understanding sustainable development more conceptually. The large-scale, one-size-fits-all solutions that have dominated in the last 150 years will no longer be feasible and must be improved and reimagined through place-based approaches that acknowledge local socio-cultural conditions. New water management initiatives are not appearing on a blank sheet; on the contrary, new interventions occur in cities and landscapes that people inhabit and have created, sometimes over millennia, for better or worse. New forms of citizen engagement, capacity building and recognition of the values and cultures that underlie water management are needed to truly advance sustainable development.

Such a reading of SDGs suggests that we

should define our values as we engage in new construction practices. To address often diverging interests in water use, we need partnerships (SDG 17) that ensure the collaboration of diverse members and a balance between different interests. We need partnerships around water – including non-humans – and cultural structures that involve everyone in making choices for water-related heritage. They are key to balancing individual and community needs and closely related to climate action and the much-needed energy transition. A holistic consideration of SDGs as part of a larger value-based approach to sustainable living can help identify transformative actions. Based on the understanding of the relation between water and culture sketched above, I propose that rethinking our approach to culture(s), and developing place-specific approaches that acknowledge long-term development and socio-cultural context is necessary to realize the 2030 SDGs. Through value-based goals, policies and institutions (SDG 5, 10, 16), through transformation actions (education, consumption/production and partnerships [SDG 4, 12, 17]), we can regain agency in implementing and co-creating sustainable water management.

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