
C-PACT WATER BULLETIN

CPACT & the WSP (Water Science and Policy) Program present a bulletin with latest news from India and abroad on debates, concerns, and events related to water.

Sumerian Civilization: The use and abuse of water

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Lessons about the management of water resources are available aplenty in history. Evidence from the Sumerian Civilization is explored here. Here, we analyze the Iraq water crisis in the socio-ecological feedback framework from the historical perspective of the Sumerian Civilization. This provides a strong narrative on the role of water in socio-ecological systems, and understandings of the use and abuse of water.

Water is a life support system on earth, in its multiple forms and myriad functions. These life-supporting functions are generated by water as a controller of the stability and resilience of the earth's ecosystem. Further, water is also a victim of change due to human impacts and thereby a driver of change of the ecosystem, often leading to ecosystem regime shifts or collapse (Rockström et al., 2014).

Let us look at one of the earliest civilizations to thrive, the Sumerian civilization, in the land between two rivers Tigris and Euphrates, known best today as Ancient Mesopotamia. The Bronze Age Sumerian Civilization flourished on the lower alluvial plains of the rivers, in southern Iraq, for a thousand years or more, ca. 3500 BCE-1800 BCE (mid-4th to the beginning of 2nd millennium BCE). Its grandeur, however, was no match for the Ubaid Period (of the 5th and 6th century BCE) which preceded it, with small farming villages growing wheat and barley, and keeping domesticates of sheep, pigs and cattle emerged. Such settlements, largely of the Neolithic type proliferated in the south and north.

They reaped the benefits of rich nutrients that the two rivers carried. However, the climatic conditions were not as favourable to those in the south as to those living up north: insufficient rainfall with less than 200 millimetres of rain and long hot dry summers were conditions that were less propitious for agriculture. It was in these conditions that the first civilization occurred. People adapted to conditions and developed farming by managing the water. Settlements grew into towns and then into the cities in greater numbers during the Uruk period (3rd to 2nd millennium BCE, ca. 3200-2400 BCE). When settlements in Southern Mesopotamia grew into towns, the largest was Warka. City-states emerged in this region by 3200 BCE, and we note the presence of powerful elites, rich burial practices, and royal temples owning vast swathes of land. At this time, rainfed agriculture gave way to irrigated agriculture and the majority of towns and cities were all interconnected with canals and irrigation networks.

However, it is to be noted that water management in the region existed well before the city-states. Irrigation ditches were constructed by early settlers and canals by villagers independent of imperial states and rulers. This tells us that water management existed as enabled by multiple decentralized actors and their purposes; states and rulers facilitated large-scale irrigation. The evidence, therefore, contradicts the Wittfogel (1957) theory that the states empires of the ancient world represent the ability to control irrigation practices.

Given the topographic advantage of the elevated river, irrigation channels and gravity-led canal constructions could be built with minimum alteration to the water flow. Furthermore, extensive water management could only be carried out by the community coming together and constructing barrages and canals from bricks or reeds. The contemporary texts in cuneiform, suggests that the decentralized model

was further governed with equitable distribution and management from canal inspectors' known as 'Gugallum' (Postgate, 2017).

Water as a control variable from irrigation and a network of canals created an entire agro-ecological system of intensive farming and a social system of food security and trade. The intricate network of a vast topography of irrigation channels enriched the alluvial soils and thereby increased crop yield multifold times. Further, the rich sediment deposits enriched harvests, of many kinds of vegetables, herbs and fruits. Water intensive crops such as flax which can be only grown in the river and irrigation canals were cultivated (McCorrison, 1997; Mithen, 2012). Further, the network of waterways both natural and manmade helped inhabitants in southern Mesopotamia to trade in agricultural produces, and other items for building materials and exotic items. Contemporary inscriptions inform us of the maritime trade of vast surplus of grains. The annual yield, despite the occasional floods and droughts, represented great skills at water storage systems, and creations of flood mitigation structures such as earthen dykes.

As the uses of water played a crucial role in the 'rise' of the Sumerian Civilization it also played a detrimental role, gradually converting the Fertile Crescent into a desert. With the extensive irrigation to meet the growing settlement needs and the use of water as a weapon in the power struggle between kings, the soil became saline and infertile over the years. For instance, when Entemenak of Girsu diverted the river Tigris following a dispute with Umma, this newly irrigated land saw the salts of the rocky mountains of the north being settled down as sediments, as the water evaporated the sodium ions of the sediments settled down in the root zone causing crops loss. Historical texts found after this incident point to the presence of salinity in the soil, wheat being replaced by salinity resistant barley in this region. Evidence also shows that eventually, all the crop yields had declined by 1700 BC (Jacobsen and Adams, 1958). The codes of Ur-Nammu (2115–2085 BC) also indicate the empire-state actions to control the extensive irrigation practices by penalties. This process of salinization that occurred across southern Mesopotamia over centuries eventually lead to shifts in the ecosystem from fertile land to desert. The decline in the habitat manifested in the social systems, with the Third dynasty of Ur coming to an end, and people moving up north. Perhaps the issue of salinization was taken into cognizance by Hammurapi (1792–1750 BC, Fig. 1), who framed a law, no 53 in his Code, imposing a heavy penalty for the breaching of dams. The salinization of soil altered the ecosystem forever; the ability to adapt to the new desert environment was capable only to the tribes who revived the traditional knowledge of alternative fallowing. But in the 19th century, the innate greed of the British rule destroyed the traditional systems through new canals from irrigation projects, leading to more salinization of soil.

Humans for centuries have changed the landscapes and ecosystems around them. But in the Anthropocene, the ability of the system to recover has been hampered. The socio-ecological feedbacks that occur with the use and abuse of water are to be recognized as crucial for stability and resilience. Short term gains fashion long term ecological regime collapses; hence we need to take cognizance of the various manifestations, and use and abuse of water within our contemporary ecosystem.

References

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Fig. 1. Votive slab, limestone, Showing Hammurabi with his right arm raised in worship, Old Babylonian, 1792-1750 BCE, Abu Habba (Sippar), Iraq, The British Museum, BM 22454



Fig. 2. Map of the World, Clay Tablet, 9th century BCE, Late Babylonian, Akkadian, Abu Habba (Sippar) Iraq, The British Museum, BM 92687

Fig. 2. Shows the world as a disc, surrounded by a ring of water called the "Bitter River"; "Babylon" is marked as a rectangle at the right end of the Euphrates which flows south to a horizontal band, of which the right end is marked "marsh" and the left end is marked "outflow". The text at the beginning of the obverse of the tablet declares:

... ruined cities ...
 ... whom Marduk watches ...
 ... the ruined gods who ... in the midst of the sea
 ... serpent, great dragon, between Anzu, scorpion-man
 ... mountain-goat, gazelle, zebu, leopard, bison
 ... lion, wolf, stag and hyaena
 ... the animal which Marduk created upon the rolling sea
 ... Ut-Napishtim, Sargon and Nur-Dagan king of
 ... their interior no-one knows"

Thanking Dr. Sudeshna Guha for the edits and the pictures.

Students Reinventing Cities



the Students Reinventing Cities initiative is progressing very well. Across the world, we are seeing a lot of enthusiasm from cities, academia and students to collaborate and to imagine together a more green and just future. [Read more:](#)

Odisha has most contaminated sites in India: CPCB data



Of the 112 sites in India contaminated by toxic and hazardous substances, 23 were in Odisha followed by Uttar Pradesh (21) and Delhi (11) [Read More:](#)

World's freshwater fisheries are under threat of extinction, finds wwf report



A new report lists all the ways freshwater biodiversity is facing extinction and also comprises a list of solutions that can help bring it back from the brink. The report, titled World's Forgotten Fishes, has been published after a combined effort from 16 global conservation organisations including the World Wildlife Fund (WWF). [Read More:](#)

Work Underway In Projects Worth Rs. 1.91 Lakh Crore Under Jal Jeevan Mission: Jal Shakti Minister In Rajya Sabha



According to Jal Shakti Minister Gajendra Singh Shekhawat, Telangana government has provide tap water to each and every household in the state., in Gujarat, 83 per cent and in Himachal Pradesh 76 per cent of the people had tap water connections [Read More:](#)

Rahiman Paani Rakhiye: 130 stepwells in rejuvenation mode in HP's Dharamshala



Block development officer Abhineet Katyayan says his office in collaboration with Centre for Urban and Regional Excellence has conducted a water assessment study in Dharamshala block covering nearly 200 stepwells [Read More:](#)

IIT Madras releases a music video on river conservation



A video launched on Earth Day by IIT Madras alumni combines ragas, eminent singers and a message. [Read More:](#)

Academic news: scholarships

IGCS Summer School 2021 on “Sustainable Water Management at the Saltwater – Freshwater Interface”



The IGCS invites young and interested students to apply for the upcoming IGCS Summer School! Kiel University (CAU), Germany in collaboration with The Indian Institute of Technology Madras (IITM) in India, will host it and look forward to welcome 30 PhD and Graduate students studying at Indian or German universities. [Read More:](#)

Hemendra Kothari Fellowship



TERI SAS with support from Hemendra Kothari Foundation, Wildlife Conservation Trust, Mumbai provides merit fellowship to MSc students of Environmental Studies and Resource Management (ESRM), Climate Science and Policy (CSP), Geoinformatics(GEO), Plant Biotechnology (PBT) and Water Science & Governance for initiating projects /research ideas that synergizes with the work areas of Hemendra Kothari Foundation and TERI SAS. [Read More:](#)

Water conservation course- 400 hours of free online courses



ConservationTraining is an open and free learning community that offers conservation-based training materials from The Nature Conservancy and our partner organizations.

With over 20,000 users from over 200 countries enrolled, our mission is to share training with our conservation colleagues across the world. [Read More:](#)

Conference/ Course/ Training Seminar

Call for abstracts for the 15th World Aqua Congress



15 th World Aqua Congress (XV WAC), an annual international conference in water organised by Aqua Foundation, is scheduled on September 14 th - 17 th , 2021 - a virtual event. The theme of the conference is Valuing Water (Beyond Pricing, Environmental, Social and Cultural Value). [Read More:](#)

Online training: Evaluating recharge potential of borewells in rural and urban areas



This training programs aims to equip the participants with the necessary knowledge and

skills for executing effective bore well recharge interventions in rural and urban areas. [Read More:](#)

National Recreational Water Quality Workshop: the week of April 6-8, 2021



This virtual format, 3-day workshop will be a forum for recreational water quality managers, stakeholders, researchers and public health officials at all levels to share information and ideas about implementing a successful recreational water program. [Read More:](#)

Beating the pandemic, the graduating batch (WSP class of 2021) doing fieldwork in March-April 2021.



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