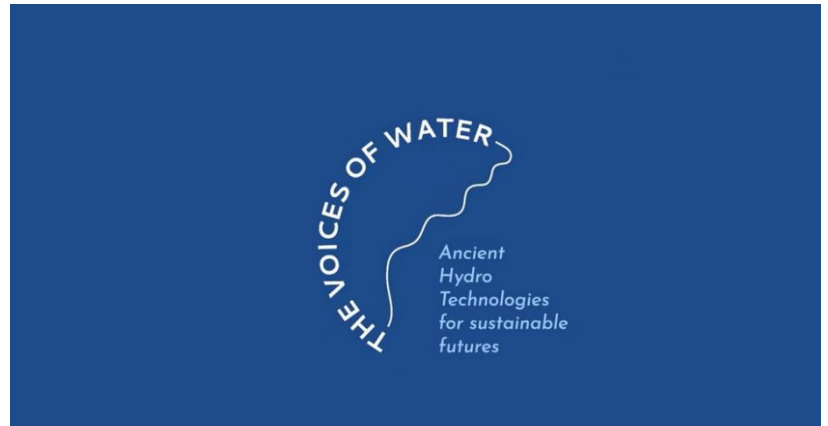


ANCIENT HYDRO-TECHNOLOGIES REVIVING THE VOICES OF WATER FOR A SUSTAINABLE FUTURE PUBLISHED BY UNESCO

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[The Virtual Science Museum UNESCO website](#) has published in 2025 the exhibition [The Voices of Water](#), produced by the [Global Network of Water Museums WAMU-NET](#), highlighting eight emblematic examples of ancient hydraulic technologies from across the continents.

Water shapes civilisations. For millennia, human communities have developed ingenious systems to collect, distribute, and preserve this vital resource. This audiovisual exhibition, unveiled at the 10th World Water Forum in 2024 in Bali, invites to rediscover these ancestral practices not as relics of the past, but as solutions for the future. Rooted in a respectful and balanced relationship between humans and their environment, these forms of knowledge offer inspiring models to respond to the global water crisis and to rethink our connection with nature. In a world where modern technologies sometimes reveal their limitations, the exhibition that reconnects science, memory, and the future, suggests a shift in perspective: learning from our predecessors to build sustainable futures based on holistic approaches, nature-based solutions, and a renewed recognition of indigenous knowledge. The Voices of Water project will continue to be developed by the Global Network of Water Museums with additional case studies as a contribution to the 11th World Water Forum in Riyadh (2027).



The voices of Water

[Algeria. Methods of capture and use of flash floods in the M'Zab valley.](#)

Desert oases represent highly productive anthropic ecosystems built by communities. Thanks to participatory methods of natural resource management, they manage to thrive through intensive agriculture with high added value. In such arid environments, water conservation from irregular rainfall and flash floods is crucial to establishing human settlements. The M'Zab valley lies in the heart of the Sahara and is home to five *ksours* (fortified villages), founded between 1012 and 1350 AD. Over centuries, local communities have ingeniously preserved groundwater through a combination of small dams and infiltrating trenches that collect the water from flash floods. These ingenious geoengineering techniques not only allow water capture but also preserve fertile soil - unlike recently introduced intensive agriculture which makes unsustainable use of aquifers.



[Australia. Between nature and culture: the heritage of the Martuwarra River.](#)

The Martuwarra Fitzroy River has historically been managed by Indigenous Nations employing distinctive hydro-technologies. Today, it stands as Western Australia's largest Aboriginal cultural heritage site, holding national heritage status. Aboriginal people maintain a deep connection with water, as shown by expressions such as 'Yi-Martuwarra' ('I belong to the River'). The Council of Elders asserts the right that the river embodies sacred ancestral serpent beings that are at the center of the universe and have the right to flow. This worldview is in stark contrast to Western notions of property and paradigms of over-exploitation. The Martuwarra Council actively promotes regenerative culture and tourism economies of well-being that preserve the River and counter the increasing threats of unsustainable extractions of resources that disregard the sacredness of Nature.



Brazil. Technologies and lifestyles respecting freshwater ecosystems.

Since time immemorial, the Javaé indigenous people has maintained a profound bond with the Araguaia River which runs through the Cerrado biome. Over centuries, they have developed ingenious hydro-technologies for activities such as fishing, building wooden boats, and constructing canals and small dams for water conservation. All technologies are rooted in the fair use of natural resources. At the core of Javaé's water management paradigm lies a system of beliefs aimed at preserving natural habitats and sustaining biodiversity. By safeguarding aquatic ecosystems, they foster a worldview which recognizes the interconnectedness of all living beings. Today, however, Javaé's lifestyles and technologies face a myriad of threats including impacts of large dams and unsustainable agricultural and mineral overexploitation, compounded by the effects of climate change.



Ghana. Hydro-technologies of the pile-dwelling lake village of Nzulezo.

The pile-dwelling village of Nzulezo, which means 'surface of water', is located on Lake Tadane. This outstanding settlement exemplifies the harmony between humans and nature achieved in this region. According to tradition, Nzulezo was founded by a clan from the ancient Ghana Empire, who arrived here guided by a snail. The settlement is the result of sophisticated and resilient building technology on water. All daily activities - including schooling, rites, baptisms, and burials - are ultimately connected to the lake and watery conditions, as symbolized even by the pounding of *fufu*, a traditional meal. This unique combination of natural and cultural heritage underscores a sustainable relationship with water. However, a plan for the dynamic conservation of this village must consider a type of tourism that does not harm the community's livelihood and pace of life.



Indonesia. The Subak system of terraced rice fields and landscape in Bali.

Subak is a sophisticated system of water management tailored to the landscape and agricultural practices of Bali. Central to this system are intricate networks of canals, locks, and hydraulic structures aimed at distributing water across fields in an equitable manner. Rice production is the pillar of local cultural identity. This traditional irrigation system promotes the fair distribution of water among farmers and fosters a sense of community and cooperation. Decisions are made through consensus-building processes that prioritize the collective welfare of the community over individual interests. Water temple rituals emphasize the community's dependence on the life-sustaining forces of Nature. Indeed, the *Subak* is based on the Balinese principle of 'Tri Hita Karana' which integrates the realms of the spirit, humans, and nature for harmonious coexistence.



Iraq. Floating architectures and traditional boats on the Tigris and Euphrates Rivers.

Iraqi river and wetland heritage, including vernacular architectures and boats, demonstrate rich craftsmanship and traditional ecological knowledge. Boats, making effective and elegant use of local materials, were key to accessing resources and connecting communities throughout the region for millennia. Along the Tigris and Euphrates rivers, locally-led Heritage Boat Clubs and workshops are reviving ancient crafts on the verge of extinction following decades of war and escalating climate change. A remarkable set of ancient boat types has been recovered, including the Meshouf and Tarada (wooden canoes of the marshes), Shasha and Zaima (cane or plant fibre boats), Isbiya (barge of Anbar), and Guffa (coracle of central Iraq). Building on this knowledge, the Open Museum Initiative for Water Culture revitalises the rivers' role as a means of connection and cultural knowledge-sharing.



[Morocco. The khetaras, ingenious water management in desert oases.](#)

For centuries, oases have played a vital role within the complex network of trade routes that crossed some of the planet's driest regions. *Khetaras* (also known as *foggaras* in Algeria or *qanats* in Iran) are several kilometres long underground tunnels that gently draw water from geographical areas located at higher altitudes to the oases. Water channelled through *khetaras* is suitable for all human uses but is mainly used to irrigate land through intensive agriculture, which, according to agroecological principles, combines perennial tree crops and seasonal crops in the same plot. Desert oases stand out as highly productive anthropic ecosystems. Thanks to the farsighted use of groundwater, they not only sustain local communities, but also generate a surplus of high value. If properly managed, oases are self-sufficient systems that are sustainable by definition.

[Peru. Cultivated terraces and hydraulic systems in the Willka Qhichwa.](#)

The terraced agroecosystems of Willka Qhichwa, nestled in the Andes, near the Urubamba sacred valley to the Incas, were built between 1000 and 1400 BC. These water distribution systems served as the agricultural backbone of the Inca empire. The terraces and related hydraulic structures were built with unique expertise, employing extremely advanced and resilient construction techniques. These systems demonstrate remarkable resilience to extreme climatic events because they have stabilized large portions of the mountains at hydrogeological levels. Today, these areas continue to be cultivated and managed by local communities according to tradition. Beyond their technical and architectural value, the significance of these agroecosystems lies in their preservation of an essential relationship between people and the ecosystem through an extremely rich and articulated cosmovision.

To know more

[The Voices of Water in UNESCO Virtual Science Museum website](#)

[The Voices of Water in watermuseums.net website](#)

[Global Network of Water Museums](#)

