Vanishing Waters

Loss, Transformation, and Resurgence of Water Systems

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This essay investigates the disappearance, transformation, and partial survival of Traditional Water Systems through four situated case studies: the Valli da Pesca Aquaculture System of the Venice Lagoon in Italy, the Sassi di Matera Water Harvesting System in Italy, the Budj Bim Aboriginal Eel Aquaculture System in Gunditjmara Country, Australia, and the Hiti Pranali Water Stone Spout System of the Kathmandu Valley in Nepal. Traditional Water Systems are understood as complex socio-ecological infrastructures shaped by long-term interactions between humans, non-humans, water, and landscape. By analysing the triggers, effects, and impacts of their disruption, the paper shows how neoliberal economies, urbanisation, infrastructural development, colonisation, land expropriation, environmental change and mismanagement have altered these systems. Their loss is not only material, but also cultural, social and political, affecting local communities, ecological relations, and fundamental rights such as access to land, housing, public space, and water. At the same time, the cases reveal forms of resistance, restoration, and care through which communities continue to protect, reinterpret, or remember these water landscapes. The essay ultimately asks whether such systems should be revived, functionally restored, or preserved as fragile memories of more situated ways of living with water.

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Fig. 1
Abandoned cason di valle in Valle Olivara, Northern Venice Lagoon. Adapted from a photograph by Amina Chouairi.

Many traditional water practices have slowly disappeared, often without being documented, photographed, or drawn in ways that preserve their memories. In other cases, these practices have been disrupted by environmental shifts, transformed into different activities, and partially absorbed into modern infrastructure. A few traditional water systems studied in the Circular Water Stories lab were selected to reflect on why such practices have been lost and why contemporary society often feels disconnected from water.

Some water systems remain and continue to function today. The circumstances that led to their destruction, disappearance, transformation, or restoration were investigated by examining four cases: the Valli da Pesca Aquaculture System, the Sassi di Matera Water Harvest System, the Budj Bim Aboriginal Eel Aquaculture System, and the Hiti Pranali Water Stone Spout System.[1]

Rather than approaching disappearance only as heritage loss, this chapter treats vanishing water systems as analytical sites through which contemporary design research can understand the conditions that sustain, interrupt, or transform situated water practices. A framework for these investigations was proposed based on triggers, effects, and impacts. Key questions guide the analysis: What types of vulnerabilities can be found in specific systems depending on their geographical or social contexts? How do these conditions accelerate the changes and what is done to slow them down? What can future projects involving Traditional Water Systems learn from these examples, especially when restoration is not simply a matter of rebuilding physical structures, but of rethinking the relationships that once allowed them to function?

Traditional Water Systems are ingeniously and carefully designed, with complex water structures resulting from years of interaction between humans, non-humans, and landscapes. At the same time, they are physical infrastructure and social constructs deeply embedded in local and planetary political and cultural contexts. The survival or disappearance of such systems is closely tied to the sociocultural, political, and economic drivers of the culture in which they are developed and managed. If tested for crises and ruptures, these drivers might profoundly influence, transform, and sometimes destroy Traditional Water Systems.

At the origin of such disruptions, specific roles and responsibilities need to be acknowledged: those of the perpetrators and those of the subjugated. These roles are not always fixed or simple, and involve different degrees of agency, exposure, and vulnerability. Two intertwined questions guided the analysis: Who or what has contributed to the system's transformation and/or destruction? Moreover, who or what has suffered from these actions?

In many cases, perpetrators operate through political and economic interests, which are among the most influential forces affecting Traditional Water Systems and producing inequalities in access to water (Swyngedouw, 2004). Often, the most impacted are those whose systems' everyday functioning, stewardship, and care are affected. In human terms, this may include communities with lower social status or income, racialised communities, disabled people, women, older people, and other groups who may experience the consequences of environmental disruption, infrastructural change, or climate vulnerability in uneven ways. In non-human terms, native species and local ecological communities may also be affected when altered environmental conditions favor stronger, non-native, or invasive species. In this sense, the disappearance of Traditional Water Systems should be understood not only as the loss of material infrastructure but also as the disruption of social, ecological, and political relations that sustain them.

Through the Traditional Water Systems of the Valli da Pesca dikes and ponds of the Venice Lagoon (Chouairi, 2020), the Sassi di Matera Water Harvesting reservoirs of Basilicata (Gao, 2023), the Budj Bim Aboriginal Eel Aquaculture System of Gunditjmara Country (Zúñiga, 2020) and the Hiti Pranali Stone Spout System of Kathmandu Valley (M. Zhang, 2023a), the chapter examines processes of erasure and destruction. It analyzes the triggers that cause systems to be destroyed or undergo severe changes in their effects. Their physical, functional, and cultural dimensions and the impact of partial or complete loss on local communities, environments, and water relations. Each case also considers relevant efforts towards preservation, restoration, or renewed care.

Each case foregrounds a different mechanism by which Traditional Water Systems may vanish, transform, or partially survive. Valli da Pesca shows how economic devaluation, governance failure, and reduced maintenance can weaken a productive landscape. The Sassi di Matera reveals the limits of formal restoration when a water system is preserved as heritage, but no longer functions in everyday life. Budj Bim foregrounds the relationship between colonial erasure, land rights and indigenous resurgence. Hiti Pranali shows how rapid urbanisation, groundwater extraction, and the loss of recharge areas can undermine both water access and communal water cultures.

VALLI DA PESCA DIKES AND PONDS OF THE VENICE LAGOON, VENETO, ITALY

The Valli da Pesca of the Venice Lagoon represents a millenary system of dikes and ponds devoted to extensive aquaculture. From a nomadic practice, they were formalised over the last four centuries through the construction of earth embankments, ultimately settling along the margins of the Venice Lagoon. The term 'valle' comes from the Latin word vallum, meaning 'wall,' which refers to fences made of intertwined branches built and placed in shallow waters as enclosures for fish cultivation. Today, they cover over one hundred square kilometres, almost one-fifth of the surface area of the lagoon. They are still in operation, albeit with significantly reduced production yields, and are owned by the central Italian Government, but managed by private companies and individuals through concessions. (Figures 1 and 2), respectively.

Fig. 2
Abandoned lavoriero in Valle Olivara, Northern Venice Lagoon. Adapted from a photograph by Pietro Consolandi.

TRIGGERS, EFFECTS AND IMPACTS

During the last two decades of the twentieth century, Valli da Pesca's productive system was seriously compromised by three main drivers. First, the unexpected impact of neighboring countries' differing administrative policies led to an unregulated increase in fauna, threatening the functioning of the system. The wintering ponds of Valli da Pesca, several metres deep, where the fish would lie on the bottom during the frigid winters of the lagoon, went into crisis in the late 1980s when the European cormorant population increased uncontrollably. The Province of Venice, which is responsible for the environmental management of Valli da Pesca, was directly affected by this phenomenon. Billions of Italian lire were promised to be reimbursed for damages. However, after several confrontations, the idea of protecting the wintering ponds by saving capital (i.e., the fish) on which Valli's activity depended became welcomed. This was the first signal of the technical and managerial origins of a productive crisis that preceded an economic crisis. Second, the deep financial crisis, induced by the neo-liberal market's effects on small-scale, time-consuming aquaculture activities, was compounded by commercial competition from sea breams and sea basses bred in Croatia and Greece through intensive mariculture. Croatian and Greek fish were sold at a price of exactly 40 per cent of Valli da Pesca products, which meant that the production system went into crisis relatively quickly.[2] Third, the administrative and governmental inability to respond to the illustrated emergencies led to the partial abandonment of Venice Lagoon's Valli da Pesca Aquaculture System.

On the one hand, the accumulation of pressures induced the rapid loss of specific functions, while on the other hand, the most profitable activities prevailed, were preserved and intensified, such as hunting activities, which paid off more quickly than aquaculture operations and required less workforce. In addition, the reduced productive capital led to the abandonment and disappearance of the physical portions of the valli's extent, affecting the system's roles in impacting, benefiting, and sustaining. Finally, global technocratic and hyperproductive realities undermined the system's competitiveness and significantly reduced yields.

The gradual disappearance of the Valli da Pesca Aquaculture System affects Venice Lagoon in multiple ways. Performative management activities keeping pieces of the landscape 'cultured and alive'—avoiding invasive species from proliferating, landsliding and erosion, surveying and observing changes while on the territory, etc.—are lost. Despite their abandonment, they remain fenced state properties privately managed, where hunting activities are practiced, keeping the Valli da Pesca away from the people's imagination of the Venice Lagoon, secluded and segregated, inaccessible, and unknown.

The limbo of Valli da Pesca, an almost-but-not-entirely dismissed millenary productive system, epitomises what Tsing (2015) describes as 'capitalist ruins' in her book *The Mushroom at the End of the World*, which she defines as 'spaces of abandonment for asset production.' However, nothing is lost because 'these places can be lively despite announcements of their death; abandoned asset fields sometimes yield new multispecies and multicultural lives. In a global state of precarity, we do not have choices other than looking for life in this ruin.'

EFFORTS

Despite economic difficulties, a few examples demonstrate the resilience of the Valli da Pesca water system. One is the WWF Oasis Valle Averto in the Central Venice Lagoon, which still partially serves its role as an aquaculture site. Since 1989, Valle Averto has been listed as a wetland of international importance and recognised under the Ramsar Convention (Ramsar Sites Information Service, 1998). The area, covering approximately 200 ha, includes large expanses of brackish water, reed beds, wet meadows, hygrophilous wood, and canals (WWF Italia, n.d.-a). However, Valle Averto covers only five square kilometers of an almost hundred-and-ten-square-kilometer extended water system in Valli da Pesca. The recently concluded EU Life Project FORESTALL, which aims to restore and conserve calcareous swamps and alluvial forests, reiterates the importance and specificity of these environments, emphasising the need for active protection measures (WWF Italia, n.d.-b). Examples such as Isola Falconera, Azienda Marina Averto, and Azienda Agricola Santilario sum up the Valle Averto case study, seeking to support and further the history and ingenuity of Venice Lagoon Valli da Pesca.

SASSI DI MATERA WATER HARVESTING SYSTEM, BASILICATA, ITALY

Owing to its warm Mediterranean climate and low annual precipitation, water is scarce in the Basilicata region of Italy, once known as Lucania. Since the Bronze Age (3300–1200 BC), people have excavated soft rocks, the Calcarenite di Gravina, to create cave dwellings and cisterns to store rainwater for domestic use and irrigation. This water harvesting system includes many water features such as wells, catchment basins, ponds, cisterns, condensers, fountains, and nevieres, that is, large rock-carved spaces where snow is stored to cool food. In Matera, approximately 2,210 cisterns were identified within the so-called Sassi, including 2,039 small bell-shaped cisterns, 170 neighborhood cisterns, and two large cisterns, each with a capacity of 1,300 and 5,000 m^3, respectively. (Manfreda et al., 2016) (Figures 3 and 4)

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However, from the 1920s onward, through its piping system, the Acquedotto del Sele water infrastructure began to deliver water directly to the houses of Matera. A few years later, the grabiglioni drainage canals were covered and turned into vaulted sewers with streets above them. Since the 1950s, the

Fig. 3
Inside one of the water cisterns in Sassi di Matera. Adapted from a photograph by Isabella Banfi.

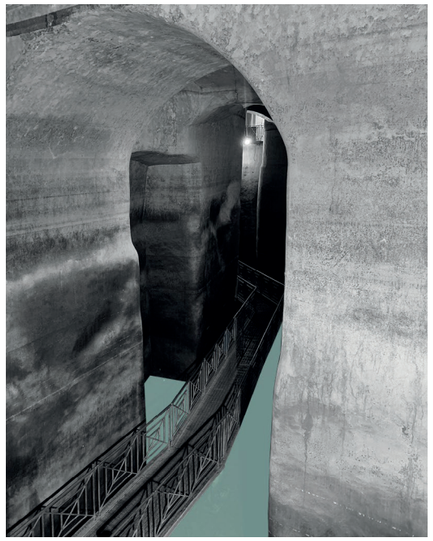

Fig. 4
View over Matera. On the left is Vico Solitario, and on the right is Torrente Gravina. Adapted from a photograph by Pietro Consolandi.

inexorable abandonment and loss of Matera's Traditional Water System began due to the pressures of post-war urbanisation, industrialisation, infrastructural development, and a deteriorating living environment. In 1952, when the town was labelled a 'national shame' because of its poor living conditions, from a hygienist perspective, the historical residents of Sassi were evicted by the Italian Government and relocated to new surrounding neighborhoods outside the rioni 'Sassi'(Bernardo & De Pascale, 2016).Owing to the increasing population, cisterns have been transformed into living spaces. By the end of the 1960s, about 15,000 inhabitants had left the community's historical center and moved uphill to newly built houses (Laureano & Cirella, 2004.)

Consequently, the cave city was emptied. Material expansions—such as the new rural village of La Martella and the urban project of Spine Bianche—see the substantial removal of the water element as a socio-cultural bonding entity.[3] Even if both projects draw formal and spatial inspiration from the antique urban system of Matera, they fail to integrate the water component, sustaining its physical existence.

The Traditional Water System of Sassi has been formally restored, but has yet to be reintegrated into service. Nowadays, modern life in the water system is characterized by gentrification, touristification, and musealisation trends. Caves have been transformed into hotels, restaurants, courtyards, and alleys. Nevertheless, reactivating the water system was deemed infeasible owing to the modern water quality, hygiene, and flow demands. However, although the water-harvesting system is no longer used, many locals have taken commercial initiatives to preserve certain water features, such as public fountains. Even without water, the importance of the system is recognized as a part of Matera's history.

The once-florid culture of living with water in Matera has now been lost. The disappearance of water elements and technologies has changed people's social space and lives. Water spaces were hidden, silenced, and confined. Space for water metamorphosed into space for traffic and commercial activities.

EFFORTS

In 1993, Matera became a UNESCO World Heritage Site because of its unique combination of site-contextual living and water harvesting systems (UNESCO, n.d.-a). Today, Matera welcomes more than 700,000 visitors annually and, thanks to this recent florid transformation, was selected as the European Capital of Culture in 2019 (Fondazione Matera Basilicata 2019, n.d.). However, explicit efforts and projects to promote the formal and functional restoration of Matera's water harvesting system have not advanced. In the past, the Italian Government tried to reconstitute social and cultural bonds among residents and their living dignity through new housing projects but not by restoring Sassi spaces. Today, only enthusiastic private owners are willing to restore and transform former water cisterns into hospitality spaces, while reintroducing the social dimension that once characterised them.

BUDJ BIM EEL AQUACULTURE SYSTEM IN GUNDITJMARA COUNTRY, SOUTHWEST VICTORIA, AUSTRALIA

Traces of the Budj Bim Eel Aquaculture System can be found in the Gunditjmara Aboriginal people's country in southwest Victoria, Australia. Budj Bim, today known as Mount Eccles, is a volcano that erupted thousands of years ago, causing extensive lava flow that transformed the landscape. The lava flow, relentless burning and melting, and the rain excavated creeks and meanders, provided the basis for the aquaculture system developed by the Gunditjmara people. An extensive network of canals, traps, and weirs was once a highly productive aquaculture system constructed to breed, trap, store, and harvest eels. Currently, it is recognised as one of the world's oldest and most extensive aquaculture systems. (Figures 6 and 7), respectively.

TRIGGERS, EFFECTS AND IMPACTS

Large parts of the Budj Bim landscape system have disappeared, not only due to environmental changes over time but also due to modifications to the site during British colonization. The British reached Budj Bim in an 1841 expedition to South West Victoria, when Chief Protector of Aborigines, George Augustus Robinson, reported the existence of an immense piece of ground trenched and banked, resembling the work of civilised man, but which on inspection I found to be the work of the Aboriginal natives, purposefully constructed for catching eels (McNiven, 2017). Between the 1830s and 1860s, several violent conflicts over the possession of the Western District, South West Victoria, followed until British colonists definitively occupied the Gunditjmara Aboriginal people's land and subjugated Indigenous people, either

Fig. 5
A Budj Bim ranger demonstrating the use of a traditional woven basket (modern version) to harvest eels. Adapted from a photograph by Rodney Dekker.

Fig. 6
The landscape of the Budj Bim Aquaculture System. Adapted from a photograph by Rodney Dekker.

through displacement or death. Under these circumstances, the Gunditjmara Aboriginal people were systematically forced not to perform millenary survival practices for decades and, over time, were devastated by the settlers' violence and the uncontrollable spread of diseases. Gunditjmara Aboriginal people 'were eventually pushed onto several church missions in the area, where colonizers undertook a genocidal project of cultural erasure.' (Gattuso, 2020). For almost a century and a half, Aboriginal eel aquaculture, the bereft of those who once breathed life into the system, languished in oblivion. The system's tangible and intangible features withered, lost to the mists of time and the shadow of death. In addition, the relentless and systematic expropriation of Aboriginal lands and the scourge of racial discrimination were violently imposed by British and Australian settlers during colonisation.

EFFORTS

Over the last few decades, careful work has been carried out within the Budj Bim cultural landscape to restore and reconstruct the traces of the Aboriginal eel aquaculture system. After almost disappearing, indigenous associations and corporations completed formal reconstructions and partial functional reactivations in collaboration with research groups and institutions (Rose et al., 2016). Since the early 1980s, various court rulings have acknowledged the validity of Aboriginal claims, and in 2007, the Australian Government officially recognised Gunditjmara land rights. Today, the Gunditjmara people hold a native title, or traditional ownership rights, over almost 1400 square kilometers of ancestral land and jointly manage Budj Bim National Park with the Australian Government. Aboriginal rangers are now focused on 'rehabilitating the damaged wetlands and reinstating traditional fishing practices by teaching young people to catch eels with woven grass baskets' (Gattuso, 2020).

Today, the Budj Bim Cultural Landscape is managed by the Gunditj Mirring Traditional Owners and Winda-Mara Aboriginal Corporation, protecting Gunditjmara-owned properties along the lava flow (Davey, 2019). The traces visible now reflect the cultural practices of many generations, who deeply understood their land and lived in a dynamic relationship with water, materials, nature, and climate. The most recognizable features are structures built from basaltic rocks. This material was used to constrain the water in canals, shallow races, and sinkholes. Stones were also piled across waterways to form weirs and dams. Timber fences were set across rivers and served as traps with woven baskets placed to catch eels (Zúñiga, 2020). In 2019, the Budj Bim Cultural Landscape Site was inscribed on the UNESCO World Heritage List (UNESCO, n.d.-b). The efforts to obtain just credit and recognition of Australian Aboriginal culture and heritage testify that 'Australia has come a long way since G.A. Robinson's recordings of Aboriginal social and technological complexity were sidelined' (McNiven, 2017).

HITI PRANALI WATER STONE SPOUT SYSTEM OF THE KATHMANDU VALLEY, NEPAL

Hiti Pranali is a traditional stone-out water-supply system in the Kathmandu Valley of Nepal. The system's history began during the Licchavi Kingdom (c. 400–750 AD), while many more Hiti were built during the Malla period (c. 1201–1779 AD). Hiti Pranali provides water to people living in the city through canals constructed to follow the topography of the surrounding valley. Mountain water is channelled through these canals to ponds in the city center. Through infiltration, pond water feeds the shallow aquifer and people use channels to discharge water directly into the stone spout. (Figures 7 and 8), respectively.

TRIGGERS, EFFECTS AND IMPACTS

Today, the Kathmandu Valley is in a water crisis, as both water quality and quantity have been and are still affected by anthropogenic activities. Rapid urbanisation and a large influx of rural population into urban areas have increased the pressure on water resources and their availability. The population of the Kathmandu Valley is among the fastest growing in South Asia, increasing nearly fivefold from 1971 to almost 3 million by 2021.

With the advent of piped water supply systems and Kathmandu's uncontrolled, unplanned urbanization over the last few decades, this ancient water supply system is under threat (Shrestha et al., 2022).[4] The construction of modern infrastructure, destruction of the valley's recharge zone, and lowering of the water table due to massive groundwater extraction are the main reasons for the drying up of the traditional water supply system. Much of the public open space within the Kathmandu Valley that serves as rainwater catchment areas has been encroached upon or heavily concreted over, and many ponds have been filled in to make way for building construction.

Fig. 7
Alko Hiti, a 15th-century drinking fountain in Patan, Nepal. Adapted from a photograph by Rajesh Dhungana.

Meanwhile, most underground structures used to lay diversion pipes that filter rainwater have been destroyed by haphazard construction, and building foundations block underground waterways that feed spout taps. To cope with the increasing water scarcity, hotels, construction companies, and private businesses are drilling their own wells, leading to a dramatic drop in the water table. Declining groundwater levels have further exacerbated the drying of traditional water supply systems. In addition to flow rates, water quality is threatened by sewage seepage, septic tanks, industrial spills, and agricultural runoff, all of which are likely to contaminate it. However, with the rapid decline and contamination of groundwater from dug wells and the drying up of the hiti system, people living in poverty in the Kathmandu Valley are increasingly facing water shortages and security problems. The Kathmandu-based NGO Forum for Urban Water and Sanitation (NGOFUWS) reports that low-income communities depend most on spouts because the water is free. When the tap dries up, it directly affects low-income people. The rich have alternatives; the poor do not' (Mathema, 2014).

The disappearance of the Hiti Pranali System threatens the physical and functional aspects of stone waterspouts as well as the wider socio-cultural intangible characteristics associated with living with water in the Kathmandu Valley. Hitis reflects the valley's evolution through various civilisations, and has historically involved community participation, creating a sense of collective responsibility and social cohesion. This communal dimension fosters relationships among residents and promotes knowledge sharing regarding water management practices. Rich religious significance and folklore surround the water system, which serves to educate and instill respect for water sources. Stone spouts are often adorned with symbols and statues of deities, such as Lord Shiva and Bhagiratha, emphasizing the spiritual connection between water and the divine. This imbues the water supply system with religious significance, linking it to rituals and local folklore and reinforcing community ties. These stories perpetuate the cultural significance of water and reinforce its role in daily life and community identity (Joshi, 2022; Poudel, 2022).

EFFORTS

The Nepalese Government is attempting to clean and restore damaged sites. For example, in 2019, the government restored Yanga Hiti, which had fallen into disrepair due to neglect and was clogged with murky water, weeds, and garbage. Locals, youth, and governance bodies worked together for eight months to clean up the Hiti area and restore it to its current condition. The Kathmandu Valley Hiti has been included in the 2022 World Monuments Watch List, a selection of 25 heritage sites of global significance compiled by the World Monuments Fund (World Monuments Fund, 2022). Heritage conservationists say that including Hiti on the Watch List will encourage Nepal to continue its efforts to conserve and rehabilitate the heritage of the Kathmandu Valley. The ongoing efforts to preserve and restore the Hiti Pranali System in response to urban pressure underscore the resilience of cultural practices. The community's recognition of the importance of these traditional water sources demonstrates their commitment to maintaining their heritage and adapting it to contemporary challenges. The stone spouts symbolise a water supply system and the valley's identity, reflecting the relationship between people, nature, and spirituality. This connection plays a critical role in shaping a community's values and priorities concerning resource management.

Fig. 8
Ga Hiti in Thamel, Kathmandu. Adapted from a photograph by Rajesh Dhungana.

BETWEEN LIFE AND DEATH

The four case studies— Valli da Pesca, Sassi di Matera, Budj Bim, and Hiti Pranali—reveal different ways in which Traditional Water Systems disappear, transform, or partially survive.

Their trajectories are shaped by distinct but often overlapping pressures: economic crisis and governance failure in the Valli da Pesca; post-war urbanisation, forced relocation, and musealisation in the Sassi di Matera; colonisation, land occupation, and indigenous dispossession in Budj Bim; and rapid urbanisation, groundwater extraction, and the destruction of recharge areas in the Hiti Pranali. These triggers show that Traditional Water Systems rarely vanish because they are outdated or technically obsolete. Often, they are weakened when the social, ecological, economic, and political relations that sustain them are interrupted.

The effects of these transformations are material and intangible. In Valli da Pesca, the partial loss of the system's features was due to both the economic devaluation of fishing and the consequent loss of competitiveness, as well as a preference for giving even more space to profitable activities such as hunting. At the same time, the lack of skilled labor, reduced to the bone by an uncompetitive market, has also contributed to the loss of the Valli da Pesca landscape. In the Sassi di Matera, while the water infrastructure has been restored to its original form, it has completely lost its functionality and connection to the local community. In the Budj Bim case, the water system has been entirely lost in both its tangible (technologies, elements, works, etc.) and intangible (practices, skills, movements, etc.) forms. In Hiti Pranali, the loss of portions of the physical extent due to recent rapid urbanization has affected the system's sustaining role by reducing its extent. The partial or complete loss of soft skills, beliefs, and managerial knowledge characterised the case studies presented. The impacts on the surrounding communities and environments have increased social inequalities and the perpetuation and legitimisation of subjugative practices.

Across the four cases, the loss of Traditional Water Systems raises questions about access, rights, and responsibility. To date, the contemporary regulation of Valli da Pesca of the Venice Lagoon is part of a heated debate concerning the right to a just, open, and accessible city-lagoon public space. Apart from being located along the conterminazione lagunare

[lagoon perimeter] at the margins of the Venice Lagoon, most Valli da Pesca constitute inaccessible places because of their management regime—concessions where private entities control state property—and the hunting reserves they host, which, by law, must be fenced off. From the 1950s expropriations to the recent gentrification and commercialization operations of Matera's historical center, the disappearance of the cisterns' traditional water system threatened the right to housing and inhabiting the city. Through their care for the Buddhist cultural landscape and Aboriginal water systems, the Gunditjmara people have fought, secured, and reaffirmed their legitimate right to land and indigeneity, or their 'right to be free of fear' (Martinez, 2014). The slow disappearance of the Hiti Pranali in the Kathmandu Valley threatens the right to water security and free and accessible drinking water (Sultana and Loftus, 2020). The increasing privatisation and capitalisation of drinking water severely undermines the survival of the lower-income segments of the Nepalese population, menacing socio-cultural behaviors associated with these open public spaces.

Therefore, restoration cannot be understood only as the reconstruction of physical structures. The cases show that restoring a Traditional Water System also means engaging with the relationships that allow it to function: maintenance, access, stewardship, knowledge transmission, ecological continuity, and collective responsibility. A cistern, pond, dike, canal, spout, or weir can be preserved as a heritage object; however, without the practices and communities that sustain it, its role as a living water system may be lost. Conversely, even partially damaged or fragmented systems may continue to generate forms of care, resistance, and resurgence when communities recognise their value and reclaim their meaning.

Despite the risks and threats they face, active communities have fostered resistance to protecting and reappropriating their cultural water landscapes. The maintenance, preservation, and care of Traditional Water Systems involve the diligent and perseverant conservation of sociocultural equilibria and the defense of tangible and intangible heritage from oblivion, removal, and loss. Therefore, this comparison suggests that the future of Traditional Water Systems lies neither in simple revival nor in passive remembrance. Some systems may be functionally restored, while others may be partially reactivated, protected as cultural landscapes, or remembered as evidence of lost ways of living with water. What matters is to understand, case by case, which relationships can still be repaired, which practices can be sustained, and which forms of knowledge should not disappear. For contemporary water design, these systems offer more than historical examples; they reveal situated forms of intelligence, adaptation, and care. Their disappearance asks designers, planners, and communities not only how to bring water infrastructure back to life, but also how to create the social and ecological conditions that allow it to endure.

NOTES Vanishing Waters

1. The author gratefully acknowledges the research work conducted by Wenting Gao on the Sassi di Matera, Italy; Maria José Zúñiga on Budj Bim, Australia; and Maozhu Zhang on the Hiti Pranali, Nepal, within the framework of the Circular Water Stories lab
2. Zanetti, personal communication, 18 January 2022.
3. *La Martella* was designed by Italian architects Ludovico Quaroni, Luigi Agati, Federico Gorio, Piero Maria Lugli, and Michele Valori (1952–54) while *Spine Bianche* was designed by Carlo Aymonino, Carlo Chiarini, Marcello Girelli, Sergio Lenci, and Mario Ottolenghi (1954–59).
4. A study conducted by the Kathmandu Water Supply Development Board (KVWSMB) in 2019 recorded 573 spouts in the Valley and pointed out that among the previously documented spouts, 94 were lost entirely. Among the 479 available spouts, 224 were functioning at the time of the survey and had a total discharge of 2433,348 litres daily.