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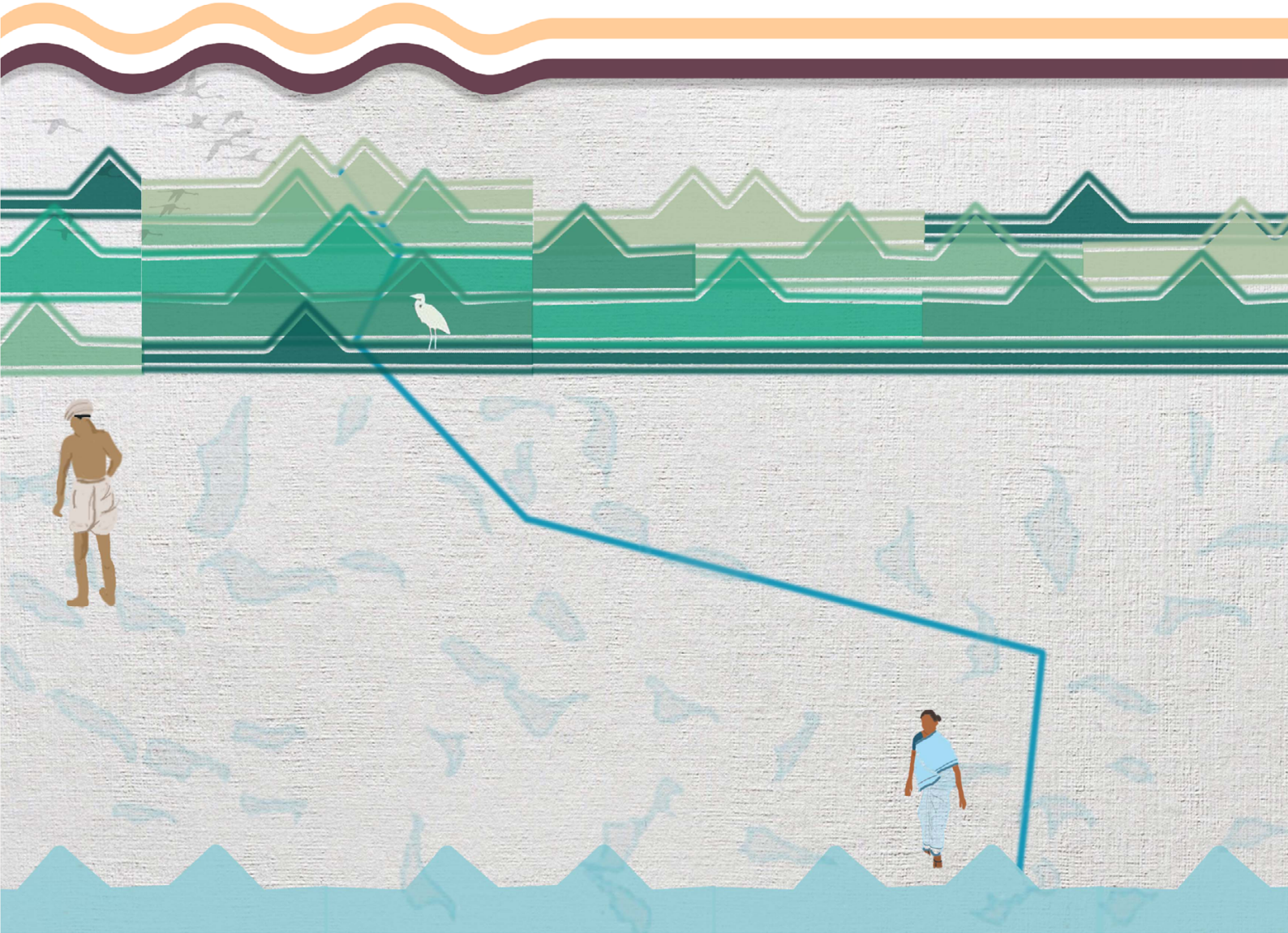
Policy Brief

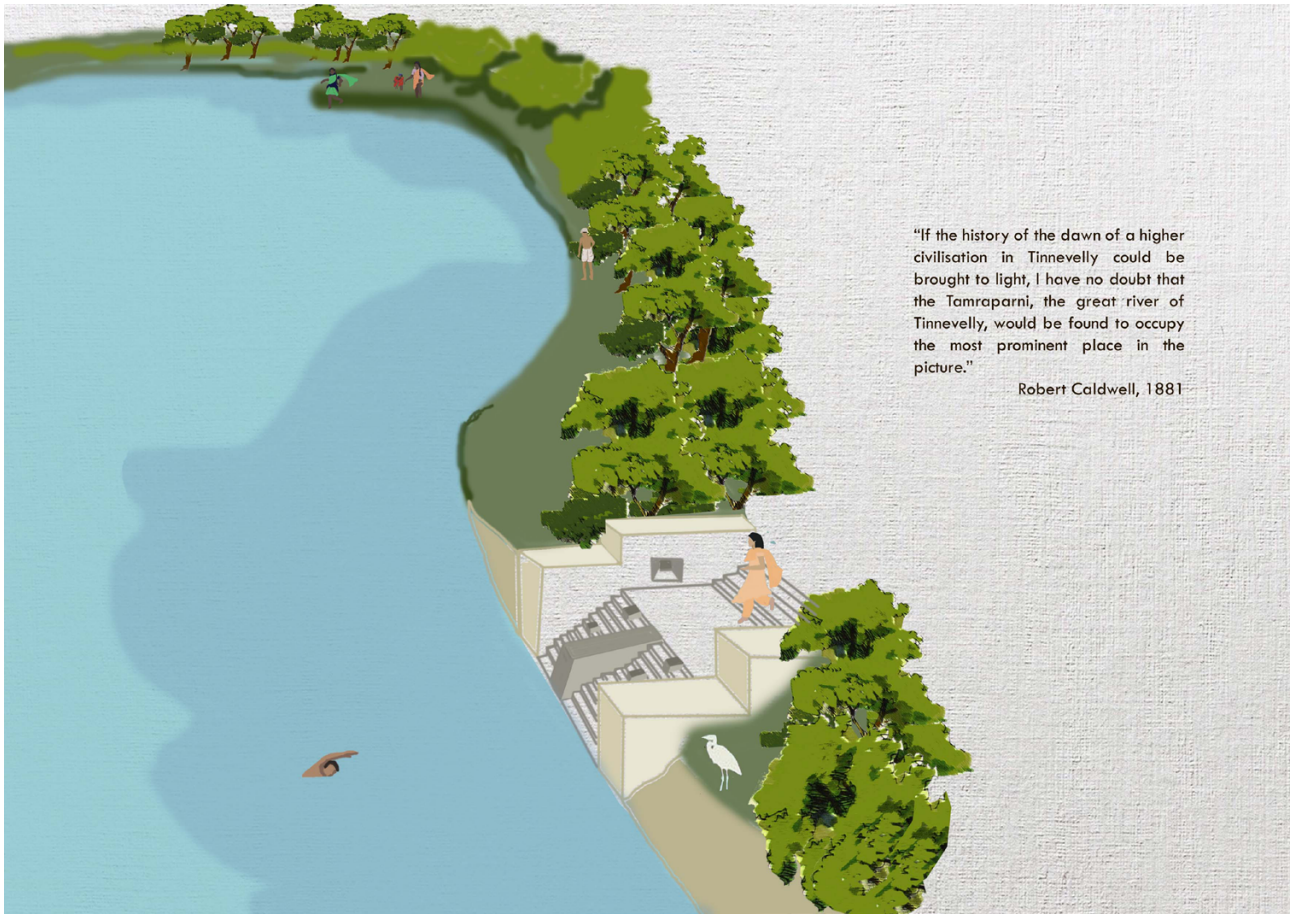
Fostering Resilience through *Kulams:*

Traditional Water System of Southern Tamil Nadu

Saranya Dharshini

Water Seekers' Fellow 2021





Traditional stone Sluice pillars

Thamirabarani is also known as Porunai in Tamil language. Culturally significant, the river plays host to the Kumbh Mela / Pushkaram festival once in every 12 years to commemorate one revolution of the planet Jupiter.

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Acknowledgement:
Community of Perungulam
Dr. S. Suresh, INTACH Tamil Nadu
Elamuhil S, DHAN Foundation
Engineer's from PWD, Srivaikundam
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Fostering Resilience

With the onset of a new decade, climate change is increasingly being acknowledged as a threat to towns and cities. As India reaches the milestone of 75 years of independence, it is inundated with developmental pressures accelerated by climate change. As the nation gears up for the future, it is necessary that we look back at our historic past for traditional knowledge systems to provide guidance. Traditional knowledge on adapting to evolving environments and heritage sites can assist as a repository for fostering resilience to climate change. In 2020, International Council on Monuments and Sites [ICOMOS] declared a Climate and Ecological Emergency to safeguard heritage, mentioning that absence of heritage and traditional knowledge bearers would be a lost opportunity in climate adaptation planning (ICOMOS 2019)

In the Conference of the Parties [COP26] held in 2021, the protection and preservation of heritage, being a catalyst to the global ambition for climate resilience, was vocalised by the Climate Heritage Network's Race to Resilience session (Potts 2021). At the intersection of Climate and Heritage, the traditional knowledge systems of Water Heritage have a critical role to play in building climate resilience through a culture-nature perspective. This perspective aims to build confidence in communities and water managers, by utilising past responses to changing climate conditions that can aid in conservation and adaptive strategies.

The focus of this study is on the Traditional *Kulam* Water Network System along the Thamirabarani River in Southern Tamil Nadu. Floods are a recurrent phenomenon in India but so are droughts, not only in different regions but also frequently in the same region (Das, Gupta, and Varma 2021). Tamil Nadu is one such region, especially the southern part of the state along the Thamirabarani river basin. After the devastating floods in 2015, conditions of drought prevailed Tamil Nadu with the pitiable rainfall in the last 140 years, including the district of Tirunelveli and Thoothukudi, where the river Thamirabarani starts and ends respectively (Waghmare 2017; Asian Development Bank [ADB] 2017).

> *"If the history of the dawn of a higher civilisation in Tinnevelly could be brought to light, I have no doubt that the Tamraparni, the great river of Tinnevelly, would be found to occupy the most prominent place in the picture." (Caldwell 1881).*

Thamirabarani is also known as Porunai in Tamil language and the archaeological sites of Sivagalai and Korkai are considered to be part of the Porunai civilisation (Caldwell 1881; Tirumalai 2003: 203). The river is mentioned in *Mahabharata* (epic Indian literature) and Ptolemy referred to the river as *Solen* in Greek literature (Caldwell 1881). Culturally significant, the river is host to the Kumbh Mela / Pushkaram festival celebrated once in every 12 years. Apart from ancient settlements along the river basin of Thamirabarani, it also has a historic water network system to irrigate cities, towns, and villages in the district of Tirunelveli and Thoothukudi. This water system comprises dams and water

bodies called *anicuts* and *kulams*. This vast traditional water system dates back to the Pandya period (4th BCE to 14th CE). The earlier settlements built by the Pandyas during the initial two Sangam (gatherings or conferences of writers or poets of eminence) periods were destroyed by frequent floods, receding land, and erosion due to the changing climate around 10,000 BCE - 2000 BCE and the dwindling rainfall from 50 CE to 200 CE (Karashima 2014; Mohanakrishnan 2001).

As a climate-adaptive mechanism, water structures were built along the north and south banks of the Thamirabarani River, utilising the natural geography of southern Tamil Nadu that gradually slopes from the Western Ghats to the Gulf of Mannar. The river emerges from the Pothigai hills and is located in the rain shadow of the Western Ghats, which misses the dependable rainfall of the southwest monsoon. However, it receives more rainwater in short spells from the northeast monsoon, which is less dependable and often accompanied by storms and cyclones. (Tirumalai 2003: 200) This type of geographical and climatic conditions and destruction from the previous Sangams necessitated an annual water storage system, which led to the creation of a hydrological cultural landscape that has cascading water structures. The water flows from one *kulam* to another, creating a sustainable and interlinked water network system; the *kulam* water system.

Significance of Kulams

In Southern Tamil Nadu, especially in the Thamirabarani region, *kulams* are the water bodies that are linked by canals and dams that developed over the centuries to fulfil the needs of the community. The *kulams* in the Thamirabarani region are historic water structures that receive water from the rain as well as from the river. There are many towns and villages in the Thamirabarani region that have names eponymous to the *kulam*. For example, Perunkulam (Perungulam), Sathankulam, and Karunkulam, among others are named after the town or village kulam. In Tamil Nadu, this type of water structure is known by different names. For instance, it is known as *Eri* in Northern Tamil Nadu. The Public Works Department addresses it as a tank. In the larger context of Tamil Nadu, the *Kulams* or tanks play a vital role in irrigation as well as maintaining the local ecosystem where 26% of wetlands are tanks or ponds (Tamil Nadu State Wetland Authority (n.d.). The concept of wetlands is indigenous to the Thamirabarani region. Since the Pandya period, the land in every town or village was categorised under *Nirarambam* (wetlands), *Kadarambam* (drylands), *Thottam* (garden lands), and *Kadu* (forests), among others. To this day, property lands are classified as *Nanjai* (wetlands) and *Punjai* (drylands) (Mohanakrishnan 2001). To an extent, this continuity of the traditional knowledge system has aided in the preservation of these wetlands, however, there is a need for more recognition and conservation efforts for long term sustainability.

The *kulam* water system thrives on the interrelationship between the cultural and natural heritage of the Thamirabarani region. It bears testimony to the traditional

knowledge systems and climate-adaptive ingenuity in Southern Tamil Nadu. The built heritage of a *kulam* is evidenced through the physical elements of the *ghats* (steps), *anicuts* (dams), stone *madais* (sluices), canals, and channels. The intangible heritage of a *kulam* thrives on the living tradition of the folklores, temple rituals along the ghats, and their daily use. On the nature front, the water system shapes the regional biodiversity, where migratory birds such as flamingos are sighted in *kulams*, for instance in Perunkulam (Perungulam) in Thoothukudi (Ashoka Trust for Research in Ecology and the Environment [ATREE] 2021). The cultural landscape of this water system has been decisively harnessed by the prolific prospectus of the patchwork of wetlands. The hydrological engineering deployed the water flow to cascade, store, and irrigate the towns and villages along the Thamirabarani river basin, while illustrating the dynamic culture-nature interrelationships and interactions through the purposeful modification and design of the river basin.

The *kulams* in the Thamirabarani river basin are harnessed by eight *anicuts* (dams) of which seven were built before the British period (1801) and the last one was built during the British period (Caldwell 1881). The pre-British anicuts show signs of previous restorations. In the past, they were rebuilt in parts by the Pandyas and also by Cheras and Cholas Cholas (Mohanakrishnan 2001). Architecturally, technical creativity was achieved in the design of the *anicuts* (dams) which were built on the riverbed at an inclined angle, either in the form of 'L' or horseshoe pattern, to enable water flow even during low flows. By increasing the length, the affluxes were contained during the floods in the river. However, this traditional pattern was ignored during the construction of the last *anicut* at Srivaikundam which was built during the British period. Built in a straight line, in 1858, the *anicut* (dam) required additional new construction of 3 k.m. long flood bank (Komathinayagam 2003).

Furthermore, the design of the water network aided in its maintenance efforts, since the chain of *kulams* was planned with the smaller ones at the head/top and the largest one at the end of the chain. By doing this, it was possible to utilize all flood and flash flows to their full potential. In a chain of cascading *kulams* with cascading flows for supply, each kulam is filled before the next lower one gets its supply. To feed the *kulams*, they built dams at higher elevations of the river course and built long canals that connected them. The surplus from the higher source provided water for the lower *kulam* to the extremity, where a large reservoir conserved as much as was possible. Additionally, the series of kulams also served as a safeguard for ensuring equitable distribution of water.

Since the British period, the *kulams* have been maintained by the Public Works Department. In India, the First Irrigation Commission was created in 1901 to report on the irrigation systems of India as a protection against famine. It is considered to be the first scientific-technical assessment made for the entire Indian sub-continent given its geographical diversity and climate variability Cholas (Mohanakrishnan 2001). This report informed on the soil, the types of the crop suited to the soil, and other local conditions. Even though it is mentioned as a first report of such kind, similar tasks or reporting were common regionally during

the Pandya period where the chieftain maintained the water systems along with the community through the *Kudimaramathu* system. *Kudimaramathu* was a traditional system in which the community maintained these kulams through restoration activities, including desilting of the tanks, cleaning channels, clearing water bodies of garbage among others. This traditional system has been adopted in the present times by the Government of Tamil Nadu (n.d.) through a scheme called *"nammaku name thittam"* meaning, "we are our own support" to create a self-reliant and sustainable community (Sundar 2017). Historic inscriptions reveal that in 1413 CE, maintenance of the water bodies were considered a meritorious act, *"A ruined family, a breached tank or pond, a fallen kingdom, whosoever restores or repairs a damaged temple acquires merit fourfold of that which accrued for them at first"* Cholas (Mohanakrishnan 2001).

Heritage Protection

In May 2016, the Government of Tamil Nadu submitted a request to the Ministry of Urban Development [MoUD] for Capacity Development and Technical Assistance [CDTA] with the view of strengthening climate change resilience of vulnerable towns in the state, including Thoothukudi. The study shows that the water demand will increase in the two river basins in Thoothukudi i.e. Kallar and Thamirabarani. However, only the Thamirabarani Basin will have surplus water attesting to the significance and value of the historic water network system that is still functioning (ADB 2017).

Enacted in 2012, the Tamil Nadu Heritage Commission Act, no. 24 of 2012, empowered the Tamil Nadu Heritage Commission for protection and conservation of heritage sites that are not covered under the Central Government's Ancient Monuments and Archaeological Sites and Remains Act (AMASR Act 1958, amended in 2010) and the State Government's Tamil Nadu Ancient Monuments and Archaeological Sites and Remains Act (TN AMASR Act 1966, amended in 1971). As of June 2021, the state government is yet to constitute this commission, according to the recent mandate by the Madras High Court (Imranullah 2021). Historically, the Madras Regulation VII of 1817 was one of the earliest laws in India, empowering the government to preserve sites of historical or architectural value (Jha 2019). Underrepresentation and no recognition on heritage lists can be detrimental to the existence of these historic water systems and by extension, damaging to the sustainable development of the urban and peri-urban areas of Tirunelveli and Thoothukudi, through which the river Thamirabarani flows.

In the national context, many cities in India have made their own effort to protect their heritage sites through a listing of heritage sites of local significance, which are managed by the local government. More than 20 years ago, Mumbai was the first city to create such a list, which included water structures such as the Banganga tank as a site of water heritage. In the international context, UNESCO defines cultural landscape as, *"cultural landscape embraces a diversity of manifestations of the interaction between humankind and its natural environment."*(UNESCO n.d. b) The cultural landscape of the kulam water system in

Southern Tamil Nadu aligns with this definition, which acts as a repository for climate-adaptive practices and sustainable land use, to maintain and enhance the cultural and natural values of the landscape. Furthermore, UNESCO emphasises the protection of cultural landscapes, *"The continued existence of traditional forms of land-use supports biological diversity in many regions of the world. The protection of traditional cultural landscapes is therefore helpful in maintaining biological diversity."* (UNESCO n.d. b). Similarly, in the neighbouring state of Karnataka, the *'Million wells* for Bengaluru' campaign addressed the revival of traditional water systems to integrate traditional practices and historical elements of the city for a sustainable future by achieving UN Sustainable Development Goals 6, 8, 10, 11, 13, 15, and 17 (UNESCO n.d. a). Furthermore, with the unfolding crisis on climate action, it is important that the State Level Disaster Management Framework includes heritage risk preparedness along with pre-disaster aspects of prevention, mitigation, and preparedness, and post-disaster issues of response, recovery, and reconstruction (National Disaster Management Authority n.d.).

The Future of Our Pasts

"Neerindri Amayathu Ulagu - When water fails, functions of nature cease" – Thiruvalluvar. Now more than ever, the protection and preservation of water heritage are of utmost importance in helping India achieve a climate neutral future, before it is too late.

Water Heritage sites can serve as opportunities for climate heritage research, education, and outreach for water managers, heritage professionals, climate scientists, policy makers and planners among others to understand past knowledge of climate impacts and solutions and develop strategies that integrate the culture-nature perspective.

The study recommends that the Government of Tamil Nadu should constitute the Tamil Nadu Heritage Commission Act and create a list of water heritage sites for protection and conservation. In addition to this, the Disaster Management Plans should include heritage management. which will encourage the local governing bodies to document heritage assets and prepare management plans for risk preparedness. Projections show that by 2050. Thoothukudi would become denser and start expanding towards the peri-urban areas which will make the protection and management of the heritage water structures more challenging. (ADB 2017) Culture and heritage associated with community and culture-nature-based solutions are a key part of the answer to climate action and sustainable development.

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