OLD WIVES' TALE OR NUANCED UNDERSTANDING OF COMMONS?

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From waterbodies that irrigate private agricultural fields to common pasturelands which support local cattle, Indian villages typically thrive on commons. The importance of wetland ecosystems in terms of provisioning for and supporting human well-being cannot be over-emphasised; more so for the South Indian state of Tamil Nadu with its fair share of rain-shadow regions. Wetlands, both natural and man-made occupy 6.92 percent of the state's total geographical area. Eris or community managed tanks along with pasturelands, common threshing floors, granaries and village seed banks constitute a chunk of the agrarian landscape that fall under the realm of commons--predominantly administered by the community. Particularly striking is the district of Ramanathapuram with 18.05 percent of its total geographic area occupied by wetlands. Archeological evidence points to the existence of settled agriculture for over 2000 years in the region. This gave people ample time to understand the landscape and devise irrigation systems that complemented local terrain. That a meandering river would create an oxbow lake over time as a result of hydraulic action eroding its banks was visualised and understood by local communities. This resulted in the community creating a series of inter-connected, mutually dependent wetland systems that augmented irrigation. The British, along with their particular penchant for centralisation brought with them systems that alienated people from the land and resources that once were their sole bastion. More than an administrative fallacy, not factoring traditional knowledge systems into current planning and policy frameworks seem more like a deliberate subversion of traditional know-how. Estranging people from processes, this has eventually resulted in the ruination of the crucial village knowledge network. For instance, the community had a thorough understanding of the hydrology of the local wetland system in the Melaselvanoor-Kelaselvanoor region of Ramanathapuram, created around 1600 AD. People have been, for centuries, able to capitalize upon traditional knowledge of the wetland's workings to ensure they remained drought-free. Modern day planning with its top-down approaches have mostly failed its management, thanks to the mediocrity with which the community and the immense ecosystem-knowledge they possess are handled. Decimation of these well-established systems coupled with haphazard planning that is completely ignorant of ground realities have led to severe water stress in an area that was kept shielded from drought for centuries. Knowledge about and a deep understanding of commons--from landscape to biodiversity--which once was customary is now slowly eroding. Any intervention, irrespective of its scale or place needs to factor in the local—local knowledge, local needs and local expertise. Action plans and eco-restoration proposals that place biodiversity at the core must appreciate the collective knowledge that rests with the community and incorporate them to make the entire process sustainable and more meaningful for there can be no better means of drawing up a blue print of an area's ecological past or the history of local commons and their archival usage than by tapping into that very traditional knowledge.

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Tamil Nadu in Southern India has had a predominantly agrarian history, with agriculture being the predominant vocation of communities in the state as early as the 5th century BC. The landscape is drained by rivers big and small; none perennial but for the River Thamirabarani in the far south. Lack of perennial rivers and a semi-arid, rain shadow location necessitates the creation of decentralised systems that help store water for use through most of the year. Despite the absence of perennial rivers and vast semi-arid expanses across the Tamil landscape, agriculture has thrived since ancient times. This leads us to believe that communities had a deep connection with, and a profound understanding of their environs. People prioritised assured water supply by channelling river water into far away fields several miles away through an intricate system of conduits and diversion weirs (locally known as *anaicut*) in addition to devising intelligent systems of distributing the resource equitably amongst all. Vaidyanathan (2001) observes that "Most of the tanks of South India date back to the early 4th and 5th centuries where local chieftains and landlords dictated their construction while the community that benefitted directly from these waterbodies were in charge of their maintenance and upkeep." According to the Manual of Administration of the Madras Presidency, 1885, 32,000 non-private tanks were recorded in the Madras Presidency from 1882 to 1883 with overall area under non-private tanks was reported to be 785 000 hectare in the same time period. And, the intricacies of tank irrigation thoroughly impressed the British (Oppen & Rao, 1987).

That local communities had a deep understanding of hydrological processes is evident by the manner in which they have sculpted the topography to their advantage to manipulate drainage. The striking manner in which the wetlands are shaped and organised in Ramanathapuram district stands testimony to the depth of traditional knowledge systems. Oriented West to East, the district is dotted with ox-bow shaped wetlands that are arranged in a series of parallel chains. A meandering river which erodes its banks through hydraulic action and abrasion gives birth to oxbow wetlands over time. Once the meander curves and its neck becomes narrower, the chances of a river cutting through it during times of flooding is very high, resulting in a now independent an oxbow lake. The almost flat terrain across most parts of the seasonal Gundar river basin made it possible for the communities to excavate feeder channels wherever needed to divert water from the river into the tanks thus constructed. Designing these cascading systems would not have been possible without a thorough understanding of the local terrain, the manner in which the river behaves as it heads closer to the coast, and, its erosion and deposition patterns as it slowly meanders its way into the sea.

Barefoot engineers and the appropriateness of indigenous technology

Cascading tanks were born out of meticulous observation. When individual tanks filled up to the brim and the excess water flowed out through natural ground escape, the next natural depression along the flow direction would accommodate the surplus downstream. And, thus the cascade expanded in a linear fashion. A profusion of tanks can be observed, especially across the semi-arid districts in the state of Tamil Nadu and it was almost always the terrain which dictated the shape and size of the tank. Traditional waterbodies were constructed in places which had a natural depression. The concavity was further deepened and a bund was erected using the excavated earth. Locally available soil was used to create the bunds which were then consolidated by making cattle and sheep walk over the freshly dumped earth.

Though this knowledge was transmitted orally and no epigraphical evidence exists to support the claim, it is too much of a coincidence that modern day rollers are called sheep-foot rollers!

A cross sectional study of a traditional tank bund reveal a homogenous structure made up of local soil while modern reservoirs have zoned sections. Modern tanks have specially constructed cut-off trenches and dedicated impervious zones to arrest seepage through the foundation as well as bund, while traditional structures have withstood the test of time without any such special arrangement. Ancient tanks have largely been free from seepage and bund breach due to piping action as the hydraulic gradient is not found to cut the bund across the rear slope. This could only mean that the perfect measurement was arrived upon by trial and error, and the technology had been perfected over time to be replicated in other places.

The flow pattern and characteristics of rivers were altered by constructing diversion weirs, locally called *anaicut*. The *anaicut* channeled river water, either directly irrigating fields nearby or through a series of tanks further away from the source, and were often constructed in a zig zag fashion perpendicular to the flow of water. Sometimes, anaicuts have also been constructed in the shape of an arch across the river for providing improved stability against the structure from turning over. The zig-zag was meant to provide an increased length for the water to flow within a restricted river width mostly to reduce the height of flow to prevent the breaching of channel bunds as is seen in many *anaicuts* across the River Thamirabarani. The offtake canal which channels the water away from the *anaicut* is usually constructed further upstream, and at an inclination to the direction of flow in the river. This design modification must have been effected after meticulous observation in order to reduce the quantum of silt flowing out with the running water as canals that are constructed either perpendicular or parallel to the line of flow draws heavy silt from the river resulting in increased maintenance by way of silt removal. Modern research backs this through both laboratory studies as well as ground analyses. Studies have shown that providing an inclination of 30 degrees to the direction of flow yields very minimum silt. The crest levels of the anaicut have been observed to be lowered on the side where the canal takes off to ensure that it receives optimum and concentrated supply on one side even during lean flow. This has again been particularly observed in the Thamirabarani Anaicut system and is also conspicuous by its absence in conventional anaicut systems.

In order to ensure judicious and equitable supply, when two canals take off from either side of the *anaicut*, the sill level of the head sluices on both banks are maintained at the same level. This is a standard practice across all traditional constructions. However, though conventional systems adhere to this thumb rule, it is not uncommon to find sluices placed at contrasting levels for different channels arising from the same *anaicut* with the best example being the Palar Anaicut system. Once the sill-level of the sluice is decided, localisation of the *ayacut* (command area of a particular tank) follows where the extent of lands that will be irrigated from this particular exit will be determined. While sophisticated levelling instruments and cartographic tools are used today for this exercise to study the gradient and determine relative levels of farm lands, all of this was done with utmost precision during ancient times; there is, however, no information available on how all this was accomplished.

Epigraphical evidence suggest that almost two thousand years ago, sluices were originally only open cuts where water was drawn through burnt clay pipes. 1200 years ago constructed sluices made an appearance for the first time. The sluice had brick work barrels through which the water would flow with brick arches to prevent the structure from caving in. The *Kumizhi thoombu*, (*Kumizhi*=plug, *thoombu*=barrel in Tamil) a contraption to regulate the flow of water using a plug rod, hole and a deeper vent which could be opened when needed came into vogue. This plug and plug rod system made water management very effective; sluice opening was restricted and discharge of water could be regulated meticulously with the help of the conical plug which ensured effective release of water. The contraption was so carfty that once irrigation season was over, the rod and the plug were removed and safely stored away until next season. In addition to the discharge of water through the sluices above the sill level, another deeper 'vent', the *seradi*, was located at the sill level which allowed tank water to irrigate fields even if water level drops below the sluice plug hole. The ingenious manner in which *seradi* and the *kumizhi thoombu* in the deep tank bed were designed made it possible to irrigate fields even when water levels dropped by tapping water in the deep bed during lean years.

At places where agricultural fields were at a higher elevation compared to the river, an arrangement was put in place to head the water up and direct it to fields and tanks close by. This temporary structure, called a *kondam*, was originally fashioned out of mud and sometimes with boulders arranged across the direction of river flow. They were also constructed across surplus course of major tanks which collected irrigation excess from fields to be redirected to smaller tanks or dry lands at higher elevations. The Arpakkam *kondam* across Dusi Mamandur tank surplus course exclusively feeds the Arpakkam tank, with an *ayacut* of its own. Conventional systems appreciated the ingenuity of this traditional know-how and retained the *kondams* across all river and surplus courses. However, in order to minimise the continuous need for maintenance of these short-lived structures, almost all mud *kondams* across rivers and surplus courses have now been converted into masonry *kondams*, reducing the burden of farmers to construct these structures from scratch every time they wash away.

Many tanks are equipped with the Calingulah, a specially designed surplus outlet arrangement of the tank. A masonry weir with removable dam stones embedded at regular intervals to regulate water flow, the Calingulah is usually found in older tanks. Here, the crest of the dam stones and not the base on which they stand represents the full tank level. This arrangement is of special interest as it ensures equitable sharing of precious resource across the cascade during lean years where partially-filled tanks in the upper reaches are expected to keep the dam stones of the Calingulah open until the tanks downstream receive minimum storage. During normal times, cut off dates were worked out upto which the Calingulah would be left open so as to allow surplus flows to tanks down beyond. This was calculated based on the requirements downstream and once the last tank is filled, the gap between the dam stones in the Calingulah are plugged to maintain the full tank level. Modernisation and reconstruction of Calingulahs have resulted in many a dam stones gone missing with solid weirs constructed up to the top of the erstwhile dam stones, i.e. full tank level, depriving tanks downstream of the assured flow which they would otherwise receive. The idea of equity that was embedded in traditional thought has been squandered, thanks to the disastrous lack of understanding of ingenious ancient engineering systems.

Another interesting example of how design helped regulate discharge in ancient times is evident in the manner in which the surplus weirs were conceived and executed. While weirs that drain the surplus water from the tanks have almost always been broad-crested, it is not uncommon to find ones with a narrow crest. As early as the 7th century, people were able to visualise and understand hydraulics and estimate flood discharge accordingly. The realisation that a sharp crested weir would be able to provide for a higher discharge over a shorter length of construction compared to a regular broad-crested one led the engineers of yore to experiment with the shape, size and orientation of the stone slabs. For example, in the Dusi Mamandur tank in Tiruvannamalai district, the architects provided the crest with a slanted and tapered edge so that it acted as a sharp crested weir, allowing more water to flow over a reduced weir length.

Silt accumulation takes centuries to affect live storage in traditional tanks while modern day reservoirs have known to be drastically silted within decades with the best example being the Mettur Dam across the River Cauvery. Estimates peg the decrease in total capacity of the Stanley Reservoir created as a result of the damming in 1934 to be around 30 percent as a result of siltation. Traditional reservoirs rarely silt up to the point where their functioning is disrupted and this can be attributed to a combination of factors of which appropriate site selection tops the list. A major chunk of older tanks' catchment areas include cultivated lands. The root system of standing crops upstream held the soil particles tightly together, as a result of which resultant silt that washed downstream was minimal. Also, unlike modern day reservoirs, traditional reservoirs did not hold water in storage for extended duration. The water that reached the tank was transferred into the fields through channels while the silt remained suspended in it. This, in addition to greatly reducing tank maintenance works, also aided in improving soil fertility in the *ayacut*. It is also worth mentioning that traditional tanks have a smaller catchment compared to modern reservoirs which could also have a direct bearing on siltation.

Ancient engineers were adept at constructing structures that are on par with modern engineering marvels in terms of both size as well as techniques. One of the world's oldest water-diversion structures, the Grand Anaicut (*Kallanai*), constructed by Chola King Karikalan in the 1st century AD is still intact and functional. "It is believed that large cyclopean stones used in construction of Kallanai would have been brought and continuously dumped across the running water in the river and in the beginning these boulders could have sank in the sandy bed and then the structure rose above to raise the water level. It is not of a solid masonry wall as believed from its name, but consists of layer of rough stones or boulder sandwiching layers of sand or clay or both in between (Globally Important Agricultural Heritage Systems (GIAHS) Initiative)." In another instance, in order to create a large storage, a narrow gorge was selected in between two hillocks to create the Dusi Mamandur tank, the second largest in the state. This reduced the need for a lengthy earthen bund, lessening the associated construction work load and material use, making the entire exercise efficient and sustainable.

Creating tanks and feeder channels was only the first of many steps which defined the economy of the region by transforming semi-arid expanses into cultivable tracts. Without efficient systems of management, it is safe to assume that the cascade links would have breached in no time.

Table 1: Traditional and conventional systems of tank construction and management

S. NO	ATTRIBUTE		TRADITIONAL SYSTEMS	CONVENTIONAL SYSTEMS
1	**Construction principle and ecological appropriateness**			
	i.	Location	Mostly plain/flat surface	Mostly undulating terrain
	ii.	Soil	Only locally available soil used	Local as well as foreign soil used
	iii.	Catchment	Smaller catchments; predominantly agricultural fields	Vast and varied catchment
	iv.	Bund composition	Homogenous	Heterogenous
	v.	Bund consolidation	Ancient times animals were made to walk to consolidate dumped earth; later heavy stone rollers used	Eight tonne roller and vibrator rollers used to consolidate bund
	vi.	Bund breach prevention	No special arrangement made	Special cut off trench, key trench and impervious zone arrangements made to prevent bund breach
	vii.	Sluice	Originally an open cut with burnt clay pipes; Improved to create a constructed sluice with a plug hole and vent - easy to maneuver; difficult to steal	Screw gearing shutters replaced plug and vent - difficult to maneuver; easy to steal
	viii.	Surplus weirs	Broad crested weirs prominent; technology to increase discharge by using narrow crested weirs known and implemented	British administrators provided weirs with regulators to control surplus flow
	ix.	Diversion weirs	*Anaicuts* or local diversion weirs in existence; Zigzag shaped to reduce height of flow; arch-shaped construction to improved stability	Duck-billed weirs - inverse of the arch *anaicut* and relatively less stable
	x.	Weir sill level	Always maintained at the same level for different sluices taking off from the same *anaicut* - Equitable sharing	Sluices placed at varying elevations observed - Equity compromised

	xi.	Off-take canal	Provided upstream at an inclination to the direction of flow - draws low silt load	Perpendicular or parallel to direction of river flow - draws heavy silt load
	xii.	Canal lining and seepage	Unlined canals; allow seepage and recharge of water	Lined canals; seepage and groundwater recharge restricted
	xiii.	Servicing canal tail-end	Water takes longer to reach tail-end plots through un-lined mud channels	Water reaches tail-end quickly through lined canals
	xiv.	Water head-up arrangements	*Kondams* used; temporary earthen embankments across supply channels to increase water flow height	Mud *kondams* converted into masonry kondams; minimises need for regular maintenance
2	**Water sharing and equity**			
	i.	Release arrangement	Plug and plug-rod system ensured effective management as release of water could be restricted based on requirement	Shutter system with screw gearing rods; less effective compared to traditional systems
	ii.	Vent at sill level	Present - helps tap water from deep bed when water levels drop in the tank	Absent
	iii.	Management	Decentralised	Centralised
	iv.	Managing authority	*Eri variyam*; village committees	Public Works Department of the government
	v.	Direct stake	Villagers had a direct stake and role in management	No direct stake for villagers
	vi.	Dispute resolution	Informal and through the *Eri Variyam*	Formal channels through the state government

By the Community, of the Community, for the Community: Social and private costs of tank maintenance

While irrigation tanks can be comfortably placed in the realms of commons, their utilisation is undoubtedly private, making maintenance tricky business. Be it tank water for irrigation or village commons such as pasturelands and threshing floors for communal use, codified norms and customary rights have guided communities in using these resources both sustainably and equitably. A varied set of externalities determined how and why tanks were maintained. The same also provide us with an insight on how grand old systems have been overrun by complete disregard and collective apathy over the centuries.

The *Eri Variyam* (roughly translates to tank committees) of ancient times clearly laid out statues and norms for all matters relating to tank maintenance, water sharing as well as dispute resolution. This ensured that *ayacutdars* (farmers cultivating in the tank's command area) were shielded from inefficient water sharing practices and arbitrary regulations that would infringe upon their usufructuary rights. *Ayacutdars* were tasked with regular irrigation infrastructure maintenance work such as clearing vegetation from field channels and strengthening bunds. Local farmers periodically removed the accumulated silt from the tank bed; infiltration was reasonable and regulated to a large extent as farmers made sure to create a dead-storage of silt that was never tampered with. This left-over blanket acted as the silt-trap which helped maintain the live storage of the tank. Farmers had a direct stake in silt-related maintenance work as this ensured the capacity their water source stayed more or less the same while also providing their plots with fertile silt on a regular basis. As tank maintenance was a shared responsibility, $1/6^{th}$ of all the harvest from fields in the tank's *ayacut* was set aside to be used by the *eri variyam* for effecting maintenance works. The revenue paid in kind would take care of the periodic maintenance of the tanks as maintenance workers such as the *Kambukattis* and *Thottis* (village irrigation workers) were paid in kind. Agricultural produce over and above what was used for making payments was sold and the funds were deposited in the *variyam*'s account. In addition to the *ayacutdars*, a host of tradesmen had a direct stake in the well-being of the local tank as their livelihoods depended on it. The *Kuyavar* (local potter) used the accumulated silt from the tank bed to craft his wares. The *Meenavar* (fisherman) was deeply invested in ensuring the tank remained shielded from defilement as the health and productivity of the fish catch was directly dependent on its well-being. The tank water along with the silty 'ozhamann', alkaline detergent-like soil top soil, helped the *Vannar* (washerman) to perpetuate his trade. This ensured all sections of the society contributed appropriately towards the maintenance and upkeep of the common resource.

The British with their penchant for centralisation brought in a series of land reforms which had a direct bearing on how village commons were used and governed. The Ryotwari system introduced by the British altered the village land and revenue fabric in that the peasants (*ryots*) were to directly pay taxes to the government in exchange for maintenance and administrative support from the latter. Under this, the government was in charge of effecting major repairs while the local communities and village associations were tasked with minor repairs. Thus started the gradual alienation of the community from the administration of commons they once held dear. Maintenance fell short and traditional water sharing arrangements slowly began to collapse. Eventually the government took it upon itself to direct ryots on how to organise themselves and get work done. A system of voluntary tank maintenance work or *kudimaramathu* was devised to be taken up by farmers for the upkeep of irrigation canals and field channels.

Post Ryotwari reforms, the village *Karnam* and *Kavai Maniam* turned out to be the top two village functionaries given the administration's primary focus on assessing and securing revenue. The *Karnam* was in charge of making revenue assessments for which he scrupulously maintained the village *adangal* register, recording field-wise cropping data for the entire *ayacut*. While the *Karnam* made assessments, ensuring the assessed amount was collected from the *ayacutdars* fell upon the *Kavai Maniam* who maintained the land use records for the entire village. As the Village Munsif, the *Maniam* was also responsible for resolving disputes that arose from the shared use of common resources. The *Maniam* was in charge of determining the duration for which individual fields were irrigated during periods of scarcity. In this, he was assisted by *Thotis* who were tasked with constructing temporary channels for water to flow into individual fields and raze them down once the *Maniam* instructed them to do so. The total irrigation time was directly proportionate to acreage and was also contingent on how much manual labour they have put in order for maintaining irrigation commons. The *Thotis* were almost always members of the Scheduled Castes (SC), the lowest sections of society, and paid in kind for their services. One SC family was selected for a pre-determined period of time to carry out the responsibilities relating to communal irrigation such as ensuring all the fields in the *ayacut* receive tank water in a fair and equitable manner. The *Thotis* were responsible for the opening and closing of the *seradi* or the deeper vent present at the sill when water levels drop in the tank to ensure the fields are irrigated. Being trained in this profession for generations, the *Thotis* were adept at calculating the time and duration for which farm channels in each of the individual fields need to be kept open to receive their share and the ayacutdars rarely questioned their methods or interfered in their business.

Unrecorded custom and practice have guided the rights and obligations between the state and the ryots in matters relating to irrigation. Whenever customary rights were violated, Indian courts made sure the violations were not approved and awarded compensation to the ryots in the process. By the Tamil Nadu Land Encroachment Act 1905, the government assumed full ownership and control over the water bodies. Along with this, Tamil Nadu Irrigation Tanks (Improvement) Act 1949 empowered the government to increase the capacity of the tanks, through appropriate activities (Gurunathan & Shanmugham, 2006). Developments with a leaning towards centralisation sounded the death knell for community ownership, as has been evidenced in several villages across the state of Tamil Nadu.

In transition: Villages along the Cheyyar

Sekkizhar, a saint poet and contemporary of Chola King Kulothunga II records the practice of irrigation through river spring channels in his tome the Periya Puranam. While recounting the history of Saiva saint Thiru Kurippu Thonda Nayanar in his 12th Century work, he fondly articulates the charm of Thondaimandalam (now Kancheepuram district) and the bounties of River Palar. He writes about how the farmers in the region worked on the sandy river bed, kneading the soil as a nursing infant would its mother's bosom to bring out springs of water that emerge from the ground, spilling over and irrigating lands on either side of the River Palar.

"Like mother's breasts whence issues milk abundant
When her suckling child touches them, the dry river
Gushes forth when farmers during summer dig
Into its sand-dunes; the water is gathered into channels
Through which it flows and then overflows on the banks
Even smashing the weirs of the vast low-lying fields." (1099) (Shaivam n.d)

The Periya Puranam confirms the existence and use of spring channels by local communities as early as the 12th Century AD in no ambiguous terms. Similarly, shallow spring channels excavated on the bed of River Cheyyar, a tributary of the Palar, were once the lifelines of Adavapakkam, a village in the Uthiramerur block of Kancheepuram district. While the canal water directly irrigated *nanjai* lands, *punjai* (drylands where rainfed farming was practiced) fields were irrigated by *kavalai etham* (traiditional lift irrigation). Spring channels essentially refer to the dug-out pits that tap shallow groundwater in the sandy river bed, each capable of irrigating a minimum of 100 acres per cropping season. The identification, excavation as well as the maintenance of the mother pit as well as the spring channels were entirely community-led. Both the spring channel irrigation as well as the lift irrigation have since vanished from the landscape because of the steep drop in the groundwater table. Circumstances are similar in the village of Sembalam, not far from Adavapakkam. The *Oothukaal* (spring channels) now runs dry and agriculture is almost entirely dependent on private sources of irrigation.

The village of Kavanthandalam thrived on tank irrigation for centuries as assured water supply from the Kavanthandalam Eri, which receives directly from the River Cheyyar, in Kancheepuram district, advanced paddy cultivation in the area. The *Vivasaya* Committee (farmer committee) constituted by local stakeholders managed common affairs with irrigation on top of their priority list. The *Vivasaya* Committee oversaw all matters relating to irrigation and agriculture--water sharing during distress periods, resolving any dispute that might arise as a result, in addition to assessing the need for minor repairs that need to be carried out in field channels. The Committee was headed by a President who was assisted by eight members; individuals from prominent communities residing in the village were invariably represented. The President and Members were chosen and changed on a rotational basis annually.

By virtue of the knowledge he possessed on the intricacies of irrigation, the *Kavai Maniam* was an influential figure who commanded respect. As Kavanthandalam had an *ayacut* of over 650 acres of irrigated *nanjai* (wet) lands, depending on the acreage that was under cultivation, anywhere between four and six *Kavai Maniams* were chosen as part of the Committee to ensure water sharing arrangements were executed in a hassle-free manner. *Maniams* were in charge of distributing the water in an orderly and sequentially manner, ensuring that all *ayacutdars* from the head to tail end receive field fillings in an equitable manner. During lean seasons, a *morai* or norm was followed under the strict instructions of the *Maniam* where no field would receive a second watering until all the fields in the *ayacut* have been irrigation once in proportion to the plot size. The system fell into disuse almost three decades back and the Committee has since been disbanded.

The villages of Adavapakkam, Sembalam and Kavanthandalam have one thing in common--increased dependence of private sources of water. A few decades back, people used water from private sources of irrigation only during the lean season. Even then, shallow dug wells were mostly used where water was lifted either manually or with the help of farm animals; private borewells were not heard of for irrigation. Tanks and spring channels irrigated two out of the three crops that were raised in all these villages. The pump-set revolution of the 1960s and the 1970s significantly altered the region’s agricultural landscape. The freedom of private sources of irrigation and its mechanisation thereof brought with it a general sense of indifference to village irrigation commons. Also, the labour requirements for traditional lift irrigation devices like the *kavalai etham* were considerable, making private sources more desirable (Farmer, 1977).

Free power supply was introduced by the Tamil Nadu Electricity Board for the agricultural sector in 1990, which obliterated the need for communal irrigation infrastructure beyond recognition (Mohan Rao, 2017).

The deleterious effects of this move on disrupting the social fabric of villages cannot be over-emphasised. When common resources were used and respected, co-operation and collective responsibility were the norm; village folk came forward to contribute physical work without anyone having to request for it. Later, codified norms were put in place to ensure that participation was rewarded, and absence chastised. With the new-found convenience of the private property cushion, people no longer felt the need to invest in common property, eliminating the need for communal co-operation from the social equation altogether. The indiscriminate extraction of groundwater over the last three decades has managed to demolish more than just the centuries-old tradition of tank and spring-fed communal irrigation. Along with unscientific and excessive river-bed sand mining, pediliction for private gains has tarnished the associated social infrastructure in the Palar-Cheyyar basin as it has across other parts of the state as well.

Commons today - Neither tradition nor modern

Modern understanding of traditional instruments and techniques has essentially meant blind replication of measurements and construction without an understanding of the basic underlying principles, be it hydrology or equity. Local mechanisms for managing tanks and the associated commons infrastructure are under severe strain due to a combination of factors. Centralisation of tank administration has been accepted as one of the foremost reasons for the age-old system's downfall, by academics and practitioners alike. Post-independence, the Public Works Department (PWD) was made the overarching body responsible for all aspects relating to tank management. This ate away into the roles, responsibilities and ownership of villagers, though informal associations with few influential leaders continue to exist in a few pockets. Mechanisation, while making farm work easy, has also stripped villagers of activities that were traditionally done, along with the sense of ownership and camaraderie that it brought. Mechanised rice transplanters and combine harvesters complete tasks within a matters of hours--activities which once would take around a week to complete involving the co-operation of several neighbours and their families in tow.

Land use change, in rural as well as peri-urban areas has impinged greatly upon the integrity of commons. Population pressure and the various demands it brings with it has resulted in common lands being encroached to service private needs. Tank peripheries, bunds and many supply channels in the Palar and Cheyyar anaicut landscape have been encroached upon over the years, creating damages that are for most part, irreversible. In addition to irrigation commons, recent years have witnessed the drastic modification of the associated village commons infrastructure. The *kalathu medu* (communal threshing floors) used by farmers in most villages is now either absent or in terrible shape as mechanised combine harvesters complete the reaping, threshing and winnowing of grains in a matter of hours, eliminating the need for an assigned space and extra time for completing these tasks. Out-migration from villages continue unabated due to dwindling livelihood opportunities. And at the root of it all resides the destruction of the social fabric of the traditional village--where members of all communities came together to utilise, manage and also conserve resources--common property to which they once felt strongly connected to. As much as the traditional village social structure was hierarchical and discriminatory, standards prescribed by mores and customary dictum ensured that village folk came together as one cohesive unit that respected and cared for village commons with the highest regard.

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