Prepared by the Coastal Resource Centre with inputs from residents and fishers of Ennore

Through historical, ethnographic, scientific, cartographic, and co-design methods, this document explores "The People's Plan for Eco-restoration of Ennore Wetlands," examining Ennore's past and present to craft a more just and ecologically restorative vision of the 'Good City' from and with Ennore Creek.

Drawing on narratives from Ennore's residents and elders, the People's Plan also visually explores this reimagination, weaving together stories of past (ghosts), present (monsters) and future (dreams) to provide context and illustrative support to the People's Plan.

The People's Plan for Eco-restoration of ENNORE Wetlands

Prepared by the
Coastal Resource Centre
with inputs from residents
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The People's Plan for Eco-restoration of ENNORE Wetlands

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The People's Plan is about reviving and strengthening lost relationships, even as it is about calling out and discarding traditional relationships that are oppressive.

Setting the Context for Eco-restoration

The past never goes away; it lives on buried in the folds of landscapes, in the ebbs and flows of waterscapes, and in the memories of its people, ready and waiting to re-ignite struggles over the many meanings of water and land. The People's Plan for the Eco-restoration of the Ennore Wetlands recruits the living and buried stories from and about the denizens of these sprawling tidal wetlands to present a plan for its revival that goes beyond conventional actions of deepening, desilting, vegetating and beautifying. The plan is based on an acknowledgement of the complex ecological, economic, cultural and social relationships that are embedded in and woven around landscapes and waterscapes. The People's Plan, therefore, is about reviving and strengthening lost relationships, even as it is about calling out and discarding traditional relationships that are oppressive. It also challenges and corrects the elite historiography of industrial transformation in the Ennore region, and the "Good City" narratives associated with the making of modern, industrialised Chennai. The plan is based on Ennore communities' aspirations that emerge from the intersections of economy (jobs and livelihoods), health, ecology, and culture embedded in the local lands and waters.

Note: Throughout this report, the words river or *aaru* will be used to refer to the River Kotralai (a.k.a Kosasthalaiyar) and its floodplains and backwaters. The word *paraval* will be used to refer to the backwaters which include rainwater and tidal floodplains on either side of the perennial channel. The word wetlands has been used to refer to all areas that are perennially or seasonally wet, and include salt pans and freshwater bodies within and in the immediate vicinity of aaru and paraval.

An Introduction to the Wetlands

Created at the confluence of the River Kotralaiyar (a.k.a Kosasthalaiyar) with the sea, the Ennore wetlands are a complex of different wet habitats – salt marshes, river floodplains, estuary, mangroves, islets. The barrier island of Kattupalli that forms the eastern boundary of the wetlands separates the backwaters from the Bay of Bengal. Kattupalli is characterised by rolling sand dunes with sparse vegetation closer to the sea and dense tropical dry evergreen thickets dotting its western slopes. This mosaic of a landscape sustains a rich diversity of terrestrial and aquatic life, and multiple – cultural, economic, ecological – uses by diverse human communities.

In 1970, TANGEDCO (then known as Tamil Nadu Electricity Board) set up the coal-based Ennore Thermal Power Station (ETPS), setting in motion a juggernaut of fossil-fuel-based industrialisation in the region. Coal-fired power plants, coal stacking yards and ash ponds, two ports handling oil, gas, coal and automobiles, a mega petrochemical complex anchored by the state's largest oil refinery, coal conveyors, oil and gas pipelines, and roads and bridges have all come up inside and in the vicinity of the wetlands in Ennore and Manali to the south.

In powering visions of a Good City, the Ennore wetlands have suffered immensely. Discharge of untreated sewage and industrial effluents, leakage of coal ash from ash dykes and ash slurry pipelines, and the construction of industries and industrial infrastructure have transformed the diverse life-sustaining wetland complex into a toxic wasteland. According to an estimate by the Save Ennore Creek Campaign, more than 3000 acres of wetlands have been lost to industrial encroachments and infrastructure. A 2022 report by the Joint Expert Committee set up by the National Green Tribunal in a case filed by an Ennore fisher reports that a carpet of coal ash 1 to 8 feet thick covers 1000 acres of the wetlands extending "up to 2 km upstream and 4 km downstream of ash pipeline" (p. 157).

Promises to local people of pollution-free industrialisation and quality jobs by successive administrations remain unfulfilled. The industrial transformation of the waterscape has ended up impoverishing local communities by robbing them of livelihoods and increasing health expenditure. New kinds of environmental pollution and land-use change have disrupted the complex webs of interrelationships between aquatic and terrestrial flora and fauna.

The impacts of the degradation are not merely local. Nor are they restricted to

A carpet of coal ash 1 to 8 feet thick covers 1000 acres of the wetlands extending "up to 2 km upstream and 4 km downstream of ash pipeline."

Source: Report of Joint Experts Committee, NGT OA 8/2016

fisher livelihood impacts and related food security implications. A healthy wetlands system offers substantial protection from flooding and water scarcity to the city and surrounding regions. By storing stormwater and recharging groundwater, healthy wetlands perform a dual hydraulic function – of mitigating floods and improving water security.

The floods of December 2015 and December 2023 revealed the devastating consequences of blocking the wetlands, canals and backwaters. Vast portions of the densely populated North Chennai remained under water for days after the rains stopped with flood waters showing no signs of receding, because the backwaters naturally designed to hold stormwaters had been diverted for industrial infrastructure leading to a swollen river and a flooded city.

Fishers, especially from the three villages of Kattukuppam, Mugatwarakuppam and Sivanpadaiveethi Kuppam, have spent the last five decades protesting against the wanton degradation of the Ennore wetlands. Overtly, their fight may appear to be about protecting their livelihoods and their economic relationship with the wetlands. However, the outcome of their campaigns has implications for the entire region.

Photo: Amirtharaj Stephen

In 2017, perhaps as a result of the heightened visibility of the degraded state of the Ennore wetlands and as an after-effect of the 2015 floods, the Government of Tamil Nadu announced a project for the "Restoration of Ennore Creek" by the Chennai Rivers Restoration Trust (CRRT). Rather than being welcomed, the project was criticised by local fishers and activists as being low on ambition and for failing to reflect local understandings of the wetlands, their extent and meanings to local communities. CRRT's plan, for instance, covers a meagre 22 percent of the total wetland extent requiring attention.

In 2019, the fishing villages of Ennore, assisted by city-based solidarity activists from the Save Ennore Creek Campaign and Coastal Resource Centre, began the process of developing a People's Plan for the restoration of the Ennore wetlands. What began as an alternative spatial plan in response to CRRT's plan, grew into one that was deeper, incorporating the need to respond to the multiple ways in which relationships between people and place, people and people, and people and non-human communities have evolved in the region. The process included:

1. Multiple consultations with representatives of 8 fishing villages.

2. Gathering of stories from fishers, salt pan workers, and other Ennore residents to tease out a historical baseline of the people's relationship with space and place.

3. Field and archival research by academics and a review of documents gathered by the Coastal Resource Centre of The Other Media.

4. Scientific analysis of the distribution of toxins in the area.

5. Development of plan targets, spatial plan and road map for eco-restoration of the wetlands and rejuvenation of the Ennore region.

Values Underlying Eco-restoration

1. Social equality.

2. Ecological justice – an acknowledgement of the right of all life to exist.

3. A celebration of the cultural and ecological diversity.

4. Respect for diverse ways of knowing and being – institutional and expert science has its place and uses, as do other ways of knowing and doing things.

5. Metrics of restoration and development should account for mental, physical, cultural and ecological wellbeing.

6. Humans within and as part of nature, not above it.

7. People's right to know, to be heard and to influence decisions.

Objectives of a Successful Eco-restoration

1. A healthy, diverse ecosystem.

2. Healthy living and work conditions.

3. Increased protection from natural disasters – sea level rise; salinity intrusion; droughts (water scarcity); intense rainfall; cyclonic winds and storm surges.

4. Increased protection from industrial disasters – ship- or land-based chemical/ oil spills, explosions; ash dyke breaches and coal ash spills; toxic gas or oil leak from storage installations or conveyance infrastructure.

5. Revival of cultural uses/meanings of water-lands, and creation of new and meaningful cultural relationships.

6. A healthy, vibrant and diverse local economy – with focus on self-employment, trades and services, women and small businesses – addressing basic needs

7. Well-protected and locally governed commons.

8. Social relationships of equality, trust and respect.

9. Just solutions – solutions cannot become problems down the socio-political-ecological hierarchy.

In the following pages, we present a plan that:

a) acknowledges the different meanings the river holds for different users (various human communities, non-human life);

b) critiques and builds on the various efforts underway to address the degraded condition of the wetlands;

c) identifies the historical trajectory of transformation of the wetlands from a healthy living system to a badly abused and ailing ecosystem;

d) names the agencies and circumstances responsible for the transformation;

e) highlights the multiple dimensions of impacts on local human and non-human communities;

f) identifies threats due to natural and proposed land-use changes;

g) highlights the efforts taken by local communities to protect and restore the wetlands (chronology of protests);

h) demarcates the extent of the wetland to be targeted for restoration;

i) elaborates on the multiple spatial changes required to deal with:

>> restoration of damaged wetlands and healing of affected communities.

>> restoration of damaged ecological, economic and cultural relationships.

j) elaborates on the governance changes required to restore a relationship of trust between people and the government through a strengthening of democratic norms and the promotion of a culture of inclusive governance and public participation in the protection and maintenance of the wetlands and environment.

The Many Meanings of the River and the Sea

"Perhaps they see it only as a body of flowing water. That is why they have no problem discharging wastes into it. For us, the river is everything – our livelihood, our mother." – A fisher from Kattukuppam, Ennore

Kosasthalaiyar is 136 km long, with a catchment of 3727 sq km and an anticipated flood discharge capacity of 110,000 cubic feet per second. That is the state Public Works Department's technocratic definition of the river – as a waterway, as flowing water or as a drain to protect the city from drowning or a carrier of the city's wastes to the sea.

The Chennai Metropolitan Development Authority views the wetlands as industrial real estate; the state electricity utility uses the backwaters as a dump for coal ash from its power plant

or a site for erection of electric transmission towers. But that is not how the residents living around the aaru's tail-end, where the river meets the sea, know the waters. To them, the sea, the river and the Kattupalli island separating the two are home, a source of joy – and increasingly sorrow, and livelihood, belief and identity. It is a wetland peppered with memories, stories and relationships between and with people, places and non-human life.

In contrast with the capitalist emphasis on private property, life here revolves around the poromboke commons whose variety engenders unique cultural practices and nourishes diverse identities.

CULTURE

Gods, Spirits and Ghosts

There is real magic in this landscape. Fearful and protective spirits, goddesses and their beasts, ghosts of lost seafarers and the nine Annamaars who are born to the sea goddess still roam these lands that are dotted with haunted spaces and sacred spots. The sense of belonging to the land manifests itself in the diverse and distinct micro-cultures shaped by the tapestry of land, water, sand and sea that is Ennore. Here the spoken word, rituals, cuisine, place names and belief systems refuse to fit within homogenising averages of culture, language

Sembada Thatha by Elavarasan
Graphite on paper

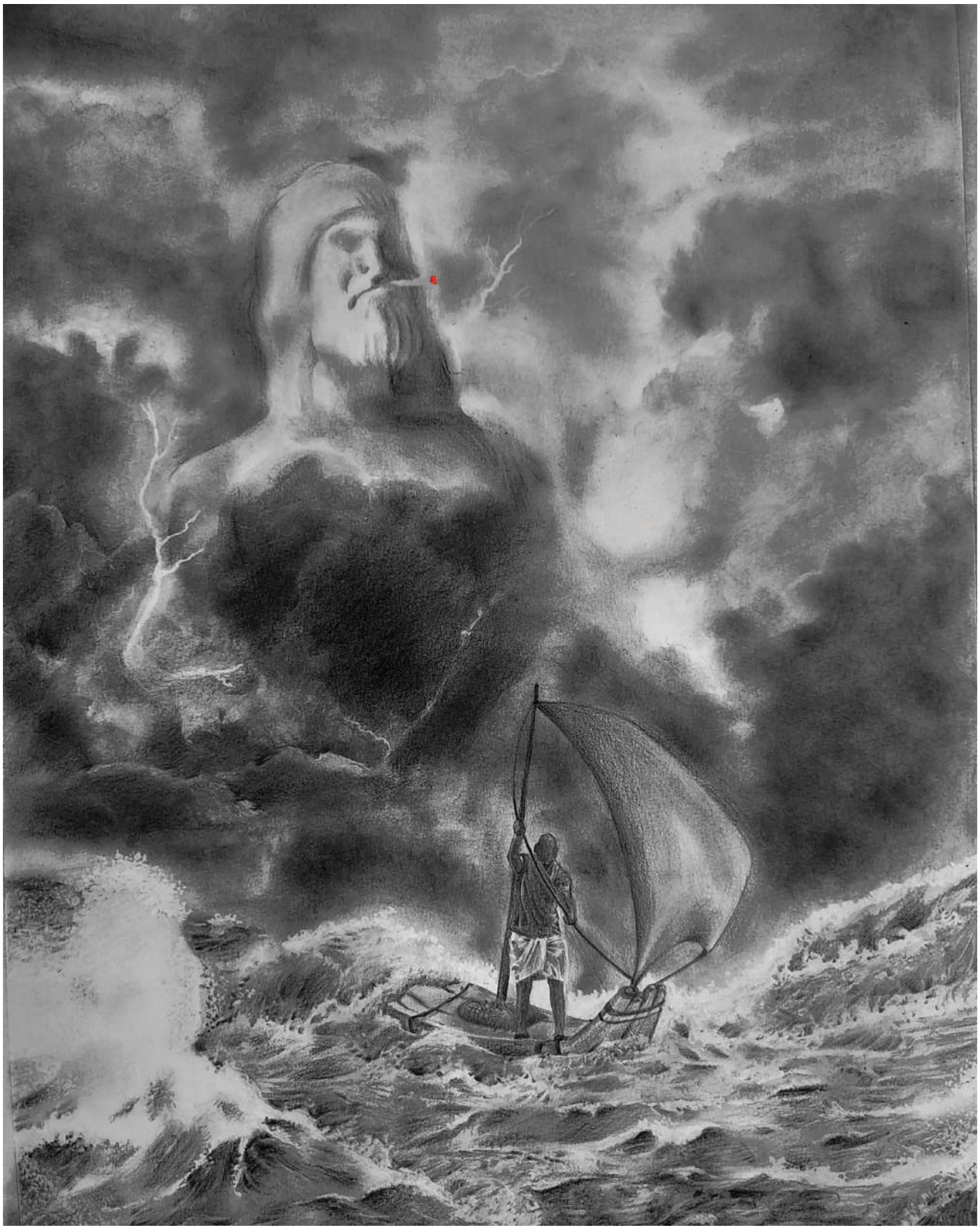


Photo: Palani Kumar

The sense of belonging to the land manifests itself in the diverse and distinct micro-cultures shaped by the tapestry of land, water, sand and sea that is Ennore.

or religion. What may appear to an uninformed eye as a beautiful waterscape, or mounds of sand or the vast nothingness of an ocean actually hides multiple layers of stories and beliefs that tie local people to their water-lands. In Thazhankuppam, a village named after the thickets of Thazhan (screwpine) plant, the elders speak of Sembada Thaatha, a fierce grandfatherly apparition with love and awe. Thaatha (Tamil for grandfather) haunts the nearshore waters off the estuary, and has been seen by many striding on the water with a glowing cigar clutched between his fingers. Fishers pray to Sembada Thaatha for safe passage across the surf.

Unless you are looking for it, you may miss the Kanni Kovil (Kanni temple) that guards every fishing village. These are not high-brow deities demanding imposing shrines. There may be that too in a fishing village. The Kanni deities – brightly coloured terracotta figurines of horses, elephants and nine human-like idols – are housed in a modest thatched shelter that belies the centrality of the shrine and its inhabitants to this region's fishers. M. Vanam, an elderly woman from Mugatwarakuppam, explains: "The nine gods are children of Gangaiamman. . .The elder one is Kumarasamy. Then we have Thanduthookum Pullai, Aayakoluththum Pullai, Agnichatti Pullai and Thalaathookum Pullai." Thandu (pole) and Thalaa (paddle) are key tools of the fishing trade, and the deities guard over, secure and bless not just the space but also the craft and gear used by fishers. [Photo: Kanni Kovil on road side]

Here's a sample of two stories – simple stories from simple people – to highlight how ecological restoration can be informed by cultural norms.

Thazhambu for the Sea Goddess

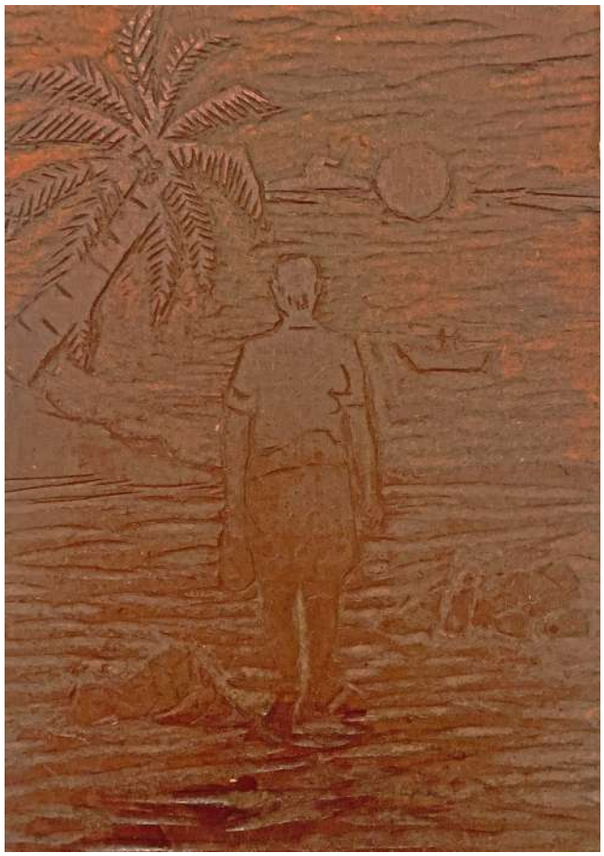
As told by Jadamuni (name changed), Konakalvai, opp. Kamarajar Port Ltd

Chenchuvaramma by Elavarasan
Indian ink on paper

Our goddess, the protector of the Irulars, is Chenchuvaramma. She does not have a form. We go to the sea to find her. She is very powerful. There are many kinds of flowers that she likes – thazhambu (screwpine flowers), thamarai (lotus), mullai (jasmine) from the forest. Thazhambu is her favourite and the plant is found in thickets near the seashore. When we want to gather thazhambu as an offering, we have to offer special prayers. Ordinarily, we would find it everywhere quite easily. But when you venture out specifically to gather it, none will be seen. The day before we are to go and gather flowers for the goddess, we would pray to her and tell her "We are going to get flowers for you. Make sure there are some to be found." When we get to the thazhangadu (screwpine thicket) and find a flower, we would first poke it with a stick until the snake hiding in it emerges. It is not a big snake. It'd only be the size of your hand. But we believe that it is Amma. It is a very powerful snake. We'd then gather the flowers, wrap it in a yellow cloth and carry it so that none can sense its fragrance until we offer it to the goddess.

Note: The sandy beaches of Ennore once had dense thickets of screwpine (Thazhankadu). After the Chennai harbour and Royapuram fishing harbour were constructed, the coast to the north eroded. Between a landward moving sea and a seaward moving city, the Thazhan groves cherished by Chenchuvaramma vanished.

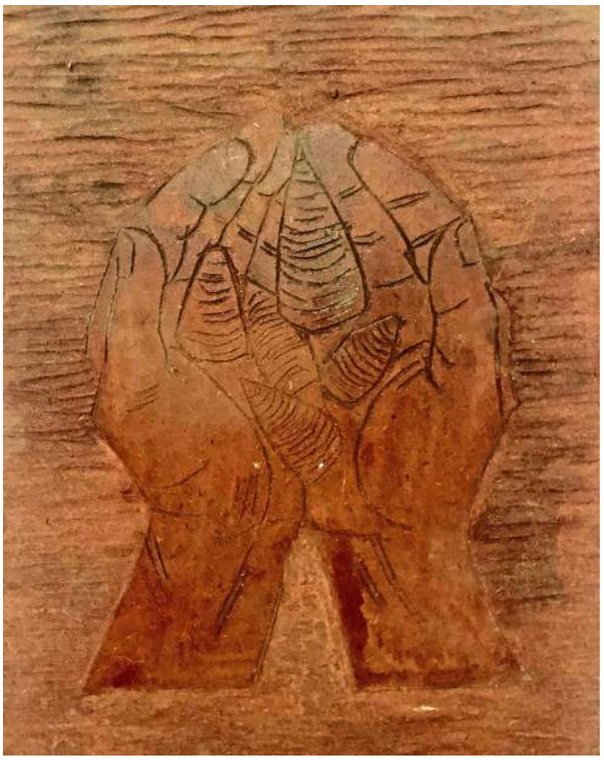
Illustrated recipe by Rajesh
Wood Cut, 6 pieces

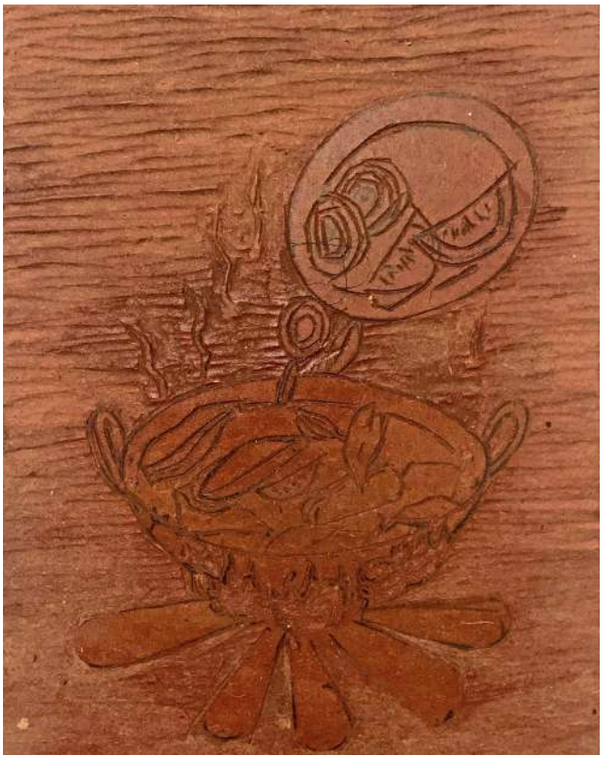


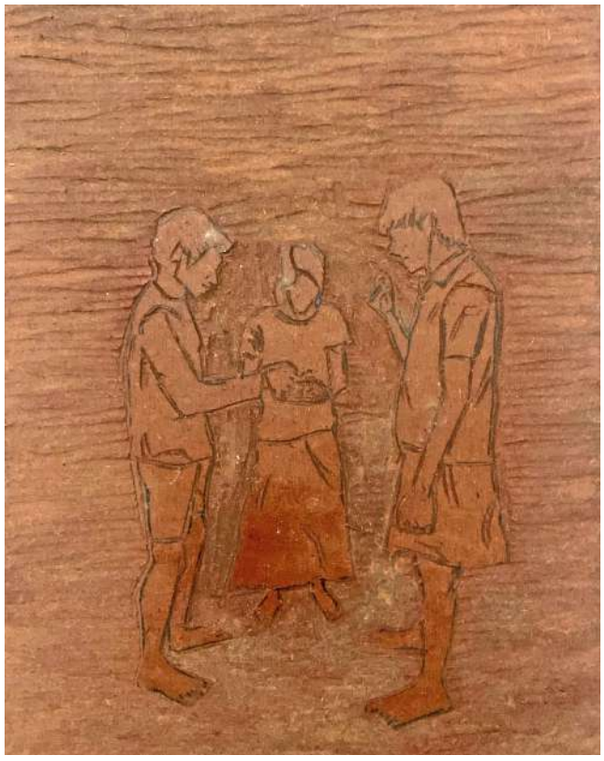
Varuththa Matti & Idli (Fried Clams with Idli)

As narrated by Mariaal, Athipattu Pudunagar

Clam meat is very tasty. It has a taste not unlike prawns. We make a fried dish with it. Once you pry open the shell using a knife, you can find the meat inside. Scoop out the meat and put it in a vessel. Add lots of water and wash it four times. Now, if you cook the washed meat in a pan, it will ooze out a milky liquid. You should take that and store it separately. Now add lots of oil and diced small onions (shallots) and large onions, and tomatoes and garlic to it, and fry well. Add the milky water that you have stored to the pan along with chilli powder, turmeric and salt to taste. Continue to fry it until cooked. It is super tasty. Have it with Idli or with rice and sambar or rasam, and you will enjoy it. It keeps for 2-3 days without spoiling.







Poromboke: The Water-lands Keep Giving

Jobs are transient. A power plant may last 30 years; a port a 100. The river is chiranjeevi (everlasting). It never stops giving.

– Justice (Retd) D. Hariparanthaman, April 2016

Poromboke, a medieval Tamil agrarian revenue term, denotes spaces reserved for communal uses like beaches, roads, grazing grounds, wood lots and waterbodies. Besides hosting multiple uses by different human communities, poromboke commons also serve as an important biodiversity refuge. The Ennore wetlands and its surroundings can be viewed as a patchwork of different porombokes – the high salinity kadarkazhi at the estuary, the saline uppankazhi tidal floodplains with mudflats and salt marshes, the kazhuveli freshwater floodplains, eri (irrigation tanks), kulam (ponds), kalvai (canals), oothukaal (dune spring-fed canals), kadarkarai (coast) and kadal (sea) and aaru.

Ennore has long been a hub for land- and water-based livelihoods drawing people from near and far. The salt works in Vallur, Athipattu and Puzhuthivakkam provided 7 months of work for men and women. In the rainy season, there would be work in the

farmlands or in fisheries.

The 1960s saw waves of settlers from within Tamil Nadu and from far away nations. After a military dictator usurped power in Myanmar in 1962, Tamils who had settled there fled the country to escape persecution. Thousands of them made their home on a sandy beachfront poromboke and named it Annai Sivagami Nagar (aka Burma Nagar) in honour of the then Chief Minister K. Kamaraj's mother. This community of Burma Tamils have woven themselves into the fabric of the city. Even today, some of the best Burmese cuisine – Atho (a dry noodle dish), Mohinga (fried noodles in banana stem soup) and Bejo (a spiced Bhel Puri-style dish with crushed boiled egg) – is found in Ennore.

Walking 80 km after some quarrel in their ancestral seaside village of Kovalam, a handful of Muslim boatmakers too arrived in Kattukuppam and built their lives there, repairing and making boats for salt transport and fishing. Their descendants have been inducted into the fishing village with full fishing rights. Meanwhile, closer to home, from Sunnambukulam on the western banks of Pulicat lagoon, waves of fishers emigrated to settle in Kattukuppam. They arrived in search of the manja matti – yellow clams – and stayed here as the estuary-fed wetlands yielded not just clam, but prawns, crabs and fish.

Locations in rivers are not identified using the impersonal survey language of chainage and elevation. River fishers know each stretch of the river by a distinct name, each referring to a fishing ground – known locally as paadu – where stake nets can be set by fishers who use it in rotation and by turn. An 18 km stretch of the

Locations in rivers are not identified using the impersonal survey language of chainage and elevation. River fishers know each stretch of the river by a distinct name, each referring to a fishing ground

river, for instance, is sectioned off as 52 distinct paadus each with an endearing, personal name derived from a landmark, structure, tree or a landscape characteristic. Velamaram, Karukkumaram, Kandachedi, Munthirimaram and Puliyamaram paadus invoke names of plants or trees that may have stood or still stand at the paadu. Bungalow vaasal, Lock munai, Kattu bridge and Conveyor refer to man-made structures as place-markers. Konamudukku and Aruva paadu derive their names from the nature of the river – meanders in these two cases – as it traverses the fishing grounds.

Ennore's famed fisheries attracted the government's attention. By the 1960s, the Madras Government had set up a marine biological research centre in Ennore to study the fisheries potential of these waters. A 1965 article in the Madras Journal of Fisheries notes that: "The fishery potentiality of the estuary was such that there was continuous and regular fishery throughout the two years. More than 65 species were identified. Among them 35 species constituted 94.5 percent of the catch. Oysters and prawn were the most popular."

Fish, salt and farmlands kept people occupied and alive. A former salt pan owner and worker from Kuruvimedu recalls: "Even when the NCTPS (North Chennai Thermal Power Station) was commissioned, we were offered employment, but we didn't accept the offer." Between 6-7 months of work in the salt pans, and the remainder of the year in agricultural farms, they had enough. Fishers from Kattukuppam recount similar stories from when early industries like Ashok Leyland came with job offers to fishers. But the lower-paid, 8-hour job with its monthly salary was not enough to tempt fishers who earned more for less work and had cash at the end of each day.

Fish and salt coexisted comfortably. The canals dug for drawing in water for the salt pans, and for the movement of salt-laden boats between pans and markets turned into new habitat for birds, fish, clams, oysters and prawns, and productive fishing grounds for the fisher community. A thriving barter economy linked fishers, farmers, boatmen and salt workers. The poromboke commons and the lands they served were and remain a particularly important source of livelihood and income for the most marginalised – those that are invisible to the state and society. But salt work was strenuous and not without its pains.

Photo: Raju

Dead sea shells by Kiruba
Monoprint B\W

Living off Dead Shells

As told by Jebarupa (name changed), Sattankuppam

I got married young to a man in Sattankuppam. My husband died very early. For the last 35 years, I have survived by harvesting seashells from the beach and selling them. Earlier, a lot of shells used to be washed down to the beach. Now there's not much. Would you believe it if I told you that there was a time when one cartload would sell for a meagre Rs 50? Now I get Rs 500 for one bullock cartload of shells. To fill a cart, I would need 64 large baskets of shells. If I managed to sell 4 to 8 cartloads, I would somehow manage to keep body and soul together. That's how I brought up and educated my children. Life has been so difficult. If I say more, I will start crying. There have been times when I had only one meal a day.

Unsettled by Aadhi
Paper cut collage

I am a Farmer

As told by Farmer, Athipattu Pudunagar

Before we moved to Athipattu Pudunagar, we had a different life. I am a farmer. My land was in the place where the North Chennai Power Station currently sits. I had close to 2 acres of agricultural land. We consumed whatever we produced. Our lands were fertile. Each acre yielded 15 sacks of rice. We sowed paddy that took 6 months to harvest. We had different varieties too – ponni, vaada samba, siru mani, kaada kaluthaan. Kaada kaluthaan looks like the pearls one wears around the neck. We also sowed pani payir (winter crops) like green gram during the winters and groundnut during the summers; these were veyyil payir (summer crops). Most crops we sowed took 6 months to harvest. Even though we had the option to sow high-yielding paddy, we avoided them because of their size and taste. Since we were the primary consumers, we chose native rice varieties for their taste. Since we were dependent on rains, droughts were a major danger. The elders used to say that a drumstick tree and a buffalo can save you during such times. Boiled moringa leaves and cheese from buffalo milk are food for the hard times.

Since we were the primary consumers, we chose native rice varieties for their taste. Droughts were a major danger.

Blinded by Salt

As told by Farmer, Athipattu Pudunagar

Under the bright sun, the white salt crystals were blinding – like diamonds. In our village everyone has had both their eyes operated upon. And then there is the problem of the razor sharp crystals. Inevitably, we would cut our feet in the salt pans. By mistake if we step on a stone or stub our wounded feet against something, the searing pain would be unbearable. If we are walking barefoot, we should be careful to not walk on sand or step on stones. It will take at least 3 months away from the pans for our feet to heal.

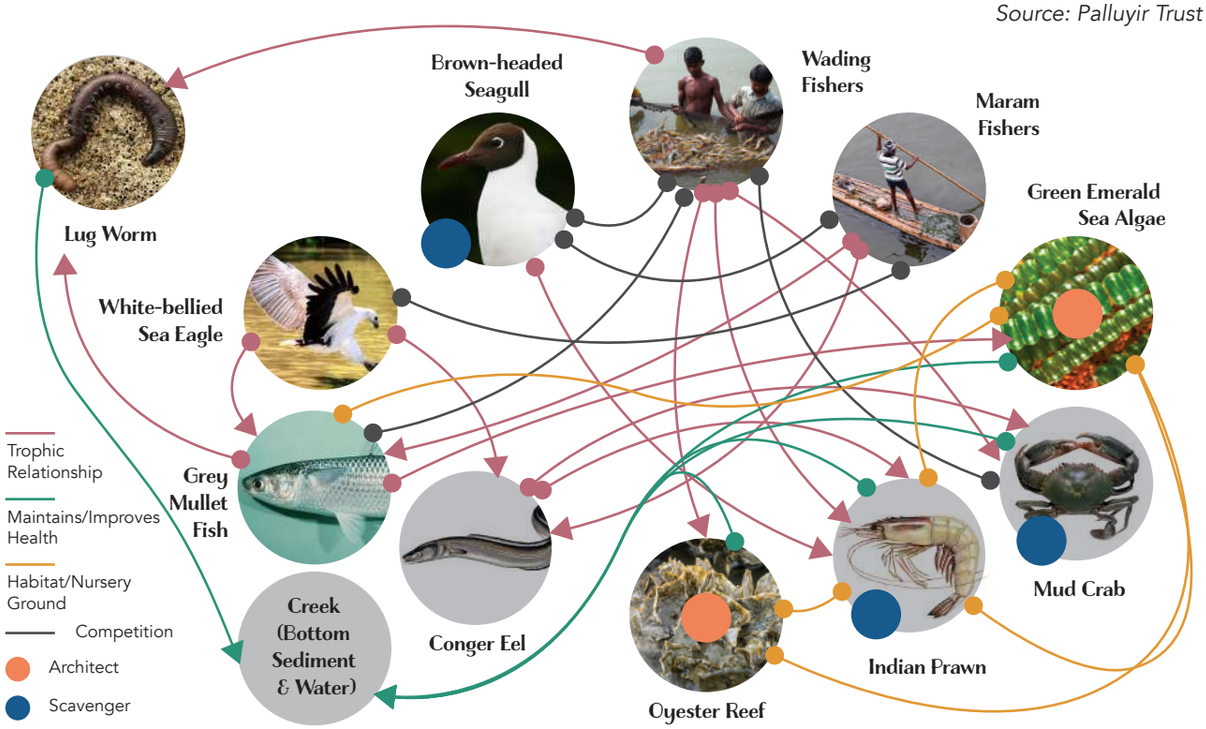
Panorama by Aadhi
Mixed media relief

The Ecology of Ennore

Kaala, Katta Keesan, Paal Sura, Sippili, Tholpaarai, Koduva, Sembadaka, Padangnan, Vari Paarai, Vellaazhi – all these varieties of fish and oysters are no longer seen in our rivers.

– P. Mahendran, Fisher, Kattukuppam

Source: Palluyir Trust



Nature shapes life, human cultures and the inanimate world. These forces in turn shape nature, exposing as artificial the boundaries between nature and the human-made. This is evident in the Ennore–Pulicat wetlands. Even as industrial development attempts to enclose and degrade the wetlands, nature pushes back, while fishers, farmers and those that live by the land occupy, reclaim and imbue the spaces with the spirit of the commons.

A healthy ecosystem is characterised by a healthy baseline of webs of interrelationships between and among species. The actual relationships prevalent in an ecosystem go beyond the simple predator–prey binary and are built on a foundation of benthic/sedimentary micro- to meio-flora and fauna. Ecosystem disturbances by way of introduction or entry of new species or removal of existing lifeforms may result in the disturbance, collapse, reorientation or rearrangements of the webs.

Aazhi-Nandu by Elavarasan
Mixed media sculpture

Fiddlers for Life

A composite story based on separate narrations by Yuvan Aves, naturalist, and S. Kumaresan, Fisher, Kattukuppam

The estuary used to be dotted with tidal islets called aazhi thittu created by vella-aazhi (white oysters). Many of the aazhi thittu (oyster beds) are degraded or destroyed now. Just last year (2022), they dumped construction debris to erect transmission towers and hurt the thittu near the railway bridge and the Vallur conveyor bridge. They don't know what they are destroying, and they don't bother to learn. Oyster beds take ages to grow, and they are a sign of a healthy tidal wetland. Did you know that oysters, and in fact all life in a tidal wetland, rely on the activities of tiny champions like the vannathi nandu (fiddler crabs). In a healthy wetland, you can see thousands of these tiny crabs carpeting the intertidal mud, waving their one oversized claw up and down like a washerwoman thrashing wet clothes. Watch them closely, and you will notice that they wave their claws in synchronised rhythm. It is said that the crabs behave not as individuals but as a collective consciousness.

In this saline environment, leaf litter and dead organic matter that fall off the mangroves or float in with the tide do not break down easily. Fiddler crabs do the job of breaking these down and releasing them as tiny bundles of energy into the water. It is this nutrition that the oyster draws on to grow and build formidable reefs. Vannathi nandu and oyster beds that were so commonplace in Ennore are now restricted to a few pockets. Our dream is to see the crabs and the oysters return to their homes in our waters.

History of Transformation

In the Ennore region, area under wetlands, including salt pans, mangroves and other waterbodies, has shrunk from 855.69 ha in 1996 to 277.92 ha in 2022. Meanwhile, during the same period, built-up land increased from 0 ha to 259.87 ha, and area covered by fly ash increased from 0 ha to 260.28 ha.

– Report of Joint Expert Committee to Hon'ble National Green Tribunal, OA 8 of 2016.

The seeds for the transformation of the Ennore wetlands began with the British colonial quest for revenue through monopolising salt production. Beginning in the 19th century, vast spreads of salt marsh and tidal mudflats were turned into salt pans. Salt and its attendant infrastructure – canals, roads and railroads – brought the first wave of industrialisation to Ennore's waters, integrating the region into the colonial capitalist economy.

This conversion and the subsequent metamorphosis of the region closely followed the decline of the word poromboke or commons in popular usage to a pejorative in colloquial Tamil – to denote waste, wastelands or a worthless person. The making of waste was instrumental in addressing the British government's appetite for land in colonial India, and set in place the subsequent enclosure, privatisation and degradation of the commons in independent India.

Salt and fish appear to have got along just fine. Under the British, salt farming became an industrial, though a relatively low entropy, activity. Salt production was a seasonal occupation, possible only as long as the sun shone. From October to January, the northeast monsoon would flood and flatten the carefully crafted salt pans, returning them to a semblance closer to marsh than pan. The flooded pans turn into productive fishing grounds until dry weather returns. The channels established to convey salt water to the pans at high tide and the canals dug to facilitate the movement of crafts carrying salt cargo became new territories for mangroves, and habitats for fish, prawns, crabs, mussels and oysters.

The second and third waves of industrialisation in the 1970s and the 1990s onwards were different. They were respectively flavoured with the distinct national preoccupations of the time – of industrial growth, electrification, food security and self-sufficiency in the 1970s, and the neoliberal restructuring in the 1990s. Ironically, salt – born of and by wasting the poromboke in Ennore – was thriving in the 1950s but lost its value by the 1990s. Salt production was no longer deemed a worthy use of the watery lands. By then coal and petroleum had established themselves drivers of the state economy. In the 1970s, the coal-powered Ennore Thermal Power Station was established on the eastern bank of the Kosasthalaiyar and the two public sector behemoths – Manali Refineries Ltd (now Chennai Petroleum Corporation Ltd) and Manali Fertilisers Ltd – in the Manali marshlands to Ennore's south. This fuelled the growth of a host of petrochemical and fertiliser industries.

Unlike salt which transformed the region but co-existed with fisheries and farming, the erasures of the 21st century, first to realise India's aspirations to

The Snake Canal by
Dhavalya Sagar
Mixed media sculpture

SIDEBAR

Paambu Odai

As narrated by
elder woman fisher,
Mugatwarakuppam

Ennore Kuppam and Mugatwarakuppam used to be across the river. In the 1990s, they moved us from there to the southern side of the river. Our village was very beautiful. We had a stream running through our village. The stream originated in Vannan Kulam and emptied into the river at the Mugatwaram. There were many snakes in the river and many fiddler crabs (vannan nandu) in the Vannan Kulam. That is why the stream was called Paambu Odai. The snakes that were found there were the ordinary variety of water snakes. Paambu Odai used to be full of prawns and fish. Only people from our two villages were allowed to fish there. We would use the suthu valai to catch prawns and fish. At its deepest, it was as deep as the long wooden pole that we used to push our boats through water. Now look at the stream. This life-giving Paambu Odai has been converted into a dump for hot water from the North Chennai Thermal Power Station.

become self-sufficient, food secure and eradicate poverty and then to serve a neoliberal agenda, were different. They necessitated permanent and perennial, not seasonal, changes. Under the British, unowned, and therefore unproductive, marshlands had to make way for salt. In neoliberal India, salt lands had to work harder or be considered surplus and turned over to the market. From 1991, salt lands in Ennore began to be monetised and handed over to accommodate coal power plants, ash dumps, port infrastructure, oil storage depots and their related infrastructure.

The 1990s saw the emergence of a Janus-faced state. Punctuated by events like the 1984 Union Carbide gas leak disaster in Bhopal and a growing global acknowledgement of a looming environmental crisis, India began developing robust-sounding environmental laws, even as neoliberal compulsions forced these laws to concede to the industrialisation agenda. Where the law stood in the way of industrialisation, as it did in Ennore, the governments openly violated the law or committed fraud.

In 1996, the Government of Tamil Nadu published a union-government-approved coastal zone management plan (CZMP) and map that declared the entire extent of the Ennore wetlands as a No Development Zone under the Coastal Regulation Notification, 1991. Less than a year later, this map disappeared from the public domain to be replaced by a map which had a polygon titled "TIDCO Petrochem Park" obliterating the river and the backwaters. This map that was presented as the updated government approved map, was proven to be a fraudulent one, when the National Green Tribunal ruled in February, 2021, that the only approved CZMP map was the one that was prepared in 1996.

In the interim, though, the Ennore–Manali region had turned into South India's densest hub of climate-changing fossil fuel infrastructure. It hosts 3,330 MW of coal power plants, two multicargo ports including Kamarajar Port which can handle 900,000 automobile units per year, 16 mtpa and 5 mtpa of coal and LNG respectively, a shipbuilding yard, a coal stacking yard capable of storing 8.4 million tonnes of coal, two coal ash ponds spread over more than 1300 acres, a 11 million tonne per annum petroleum refinery,

The updated government approved map was proven to be a fraudulent one, when the National Green Tribunal ruled in February, 2021, that the only approved CZMP map was the one that was prepared in 1996.

more than 34 large hazardous petrochemical facilities and busy movement of heavy diesel container vehicles and tankers to and from the two ports.

Railroads and roads, and conveyor bridges and pipelines to transport coal, coal ash, oil and gas, and seawater for cooling thermal power plants have replaced the canals of yesteryears, and introduced new impediments to the flow of stormwater and tidal exchange. The degradation of water and sediment quality due to industrial and household discharges and the introduction of alien material (construction debris, sea sand) and species has proven even more disruptive than the direct encroachment of wetlands by industrial structures and infrastructures.

Soil and construction debris brought in from other places and dumped in the wetlands have brought with them seeds from distant places that have sprouted into lush thickets of invasives. Commenting on the meagre floral biodiversity, but increased species richness, in Ennore in her contribution to the NGT-appointed Joint Expert Committee's (JEC) report, Dr Jayshree Vencatesan notes that invasives and coloniser species dominate the numbers. Equally, the JEC highlights the poor diversity of mangrove and associate species like Pandanus (screwpine or Thazhan) and attributes their decline to degradation and pollution in the area. "The absence of some of the ubiquitous mangrove-associate plants indicates the degradation or pollution in the area."

The JEC also found that more than 1000 acres of the wetlands were buried under 1 to 7 feet of coal ash. Fisher elders name at least 32 natural and man-made kalvais (canals); most have either disappeared, degraded or been encroached upon. Maan kalvai (Deer Canal) lies buried under Bharat Petroleum's oil storage terminal. Its neighbour Hindustan Petroleum has obliterated the majestic Jamarangal kalvai through which large salt-laden boats would pass. Manja Machine and Manja Machine Shed kalvais have now been reduced to carrying fine coal ash slurry from TANGEDCO's sprawling ash dyke to the backwaters. NTPC's Vallur power plant blocks the Kuruvimedu kalvai, leading to the flooding of Athipattu Pudunagar, while its ash pond was built over a maze of canals including the Vichoor kalvai and Vazhitharai kalvai.

Of the 52 famed fishing grounds or paadus used by the Ennore fishers, 30 have been abandoned as they have been rendered unproductive by flyash, construction debris, toxic dredged sand from the harbours or because of the erection of transmission towers that have disrupted tidal flows.

Fisher elders name at least 32 natural and man-made kalvais (canals); most have either disappeared, degraded or been encroached upon. Maan kalvai (Deer Canal) lies buried under Bharat Petroleum's oil storage terminal.

Along the coast and on Kattupalli island, the transformation has involved the flattening of sand dunes, relocation of settlements, erosion of the coastline, breach of the Ennore and Pulicat shoals for the shipping channels, enclosure of productive fishing grounds by the harbours and conversion of nearshore seas into port land. The industrialisation of the region has also altered the demographics of the region even as it has resulted in the mushrooming of informal and vulnerable new settlements to accommodate the tens of thousands of migrant workers scraping a tenuous living at one or the other industrial facility.

With no regard for water or land, state-backed or -owned developers have recklessly interfered with the wetness of the region. The breakwaters constructed for the ports on Kattupalli island have triggered erosion along the northern coast, robbing fishers of spaces to park their boats or deploy the communal shoreseine net. Meanwhile, the accumulated sand south of Kamarajar Port's southern breakwater has blocked the river mouth endangering the city and impeding the tidal exchange.

The Impacts of Industrialisation in Ennore

"The Ennore I remember was a beautiful, resource-rich land, with marshlands, a refuge for all kinds of birds. Now we are surrounded by polluting industries, and there is pollution everywhere, even inside us."

– Woman, KH Road, Kattukuppam

Photo: Durga Moorthy

Transformations such as what have unfolded in Ennore are manifest in every realm of life, affecting culture, economy, ecology and health. Perhaps the most troubling from a governance perspective is the trust deficit that the transformation has created between people and agencies of the government. The post-independence story of Ennore is an unbroken history of state-sponsored assault on the land, water and air of the region. Dominant historiography has portrayed the power plants and industries in Ennore–Manali as the engines of the state's progressive-minded Dravidian model of development. But this simple narrative obscures the stories of historical and ongoing violence wreaked by this model on marginalised water-worlds, peoples and non-human life.

Job creation and employment generation, offered locally as the justification for industrialisation, differed distinctly in character between the pre- and post-liberalisation era, albeit with similarly negative consequences of environment and nature-based livelihoods. While the former provided for some social mobility and long-term employment tenure – secured mostly through struggle and unionisation – post-liberalisation development has been marked by jobless industrialisation and low-quality, insecure and contractual employment.

In September 2009, Kattupalli Kuppam was evicted on an assurance given by the state cabinet and the then Chief Minister Kalaignar Karunanidhi, of a rehabilitation and resettlement package to be mutually decided upon. The

Photo: K. Saravanan

village voluntarily moved after being assured of 140 permanent jobs (one job per ousted family) and unhindered access to their sea livelihoods. Despite the Chief Minister's written promise, the permanent jobs failed to materialise even 15 years after the village's eviction.

As for their sea livelihoods, the construction of the port eroded the coast robbing the fishers of beach space to park their boats, even as their access to the sea was blocked off by walls enclosing lands newly acquired to set up facilities for the port. Women, who played a major part in adding value to the beach-based fishing economy, dropped out of the labour market as the beaches disappeared or became inaccessible.

Women remain the most vocal and articulate critics of industrialisation in the region, invoking memories of simpler times when money was scarce but health was robust. The failing health of the people and the environment in Ennore, and the refusal of the government to acknowledge it is the single most important cause for resentment among the region's residents.

Consider the following testimonies by local women from a public hearing held on 1 January 2024, to protest against an ammonia leak at Coromandel International and spotlight the perverse, toxic nature of the normal that people are forced to return to after every gas leak, oil spill, ash discharge or other man-made disaster.

"The air is laced with sulphur. Metals like silver are oxidised and turn black. If that is the fate for hard metals, imagine what the air is doing to our lungs. I am 40 years old. I have a 6-month-old. I took the child to the doctor and was told that the child's lungs are not developed. How can that be? The baby's lungs have been hurt because I breathed polluted air." – Woman 2, Periakuppam.

"The government must decide whether it wants us to live or the companies. If it wants these companies to operate here, it should bomb us or release a gas and finish us off. We do not want this company. This company should be closed down." – Woman 3, Ennore. The following stories gathered from local people highlight the depth of the impacts and the need for a holistic restoration that revives and strengthens degraded or lost cultural, economic and ecological meanings, and brings back a healthy living environment.

The Awesome Goddess

As told by a group of Kattukuppam fishers

The deity is very old, undated. Three clear-water wells surround the deity. One well has a massive arasam tree (Ficus religiosa) growing out of it. It is rumoured that the Ellaiamman goddess' jewels are buried in that well. Her statue is tall – between 12 and 14 feet – black and ferocious, with fearsome eyes and demeanour. Confronting the deity alone is not for the weak-kneed. The statue was buried under a mound of sand after the tsunami that struck Kattupalli, hundreds of years ago. Entire villages were wiped out, including one that had people of the Karungavali community. You can still find potshards from the early settlers strewn around the island.

The deity may have been buried but we could still feel its presence; the statue remained hidden until it appeared in the dream of a local villager who then mobilised the village to unearth the statue and re-consecrate it. Since then (undated), we have had a thiruvizha (temple festival) at the temple every year during the month of Chithirai (April-May). Three villages – Kattupalli Kuppam, Thiruvottiyur Kuppam and Nettukuppam – come together to organise the Thiruvizha.

The Ellaiamman Koil is a marker for the Koil Munai paadu where we fish. There are many mischievous spirits that hang out near the paadu. You can sense their mischief at night. In the still of the night, suddenly you hear the water splash as though someone has hurled a rock into the water. We ignore it and get on with our business. To pay attention to it is to attract danger. But we take courage and reassurance in the presence of the Amman nearby. We know that no evil spirit will dare approach us when our amman is standing by.

About 25 years ago, they started building the Kamarajar Port. They walled off the entire area, closing off our access to the temple. This really enraged the people because we could no longer have our annual thiruvizha for the amman. For two years, despite our attempts to convince them and our protests, the port management refused to let us have the thiruvizha. It was only after people threatened to break down the wall that the General Manager yielded. Now there is an agreement between us. The port has broken down a section of the wall near Koilmunai Paadu and installed a door. The door remains closed throughout the year. Every year for a week during Chithirai, the door is opened. Passes are given to pilgrim visitors. Thousands of people come, stay and pray. It is like the Periyapalaiamman Koil vizha – very festive.

It is rumoured that when the port construction began, they had a lot of problems and a lot of workers died. All that stopped only after the port management acknowledged the power of the deity and propitiated the Amman. Till date, any contractor that has work inside the port will not dare begin work without visiting the Amman and giving prayers there.

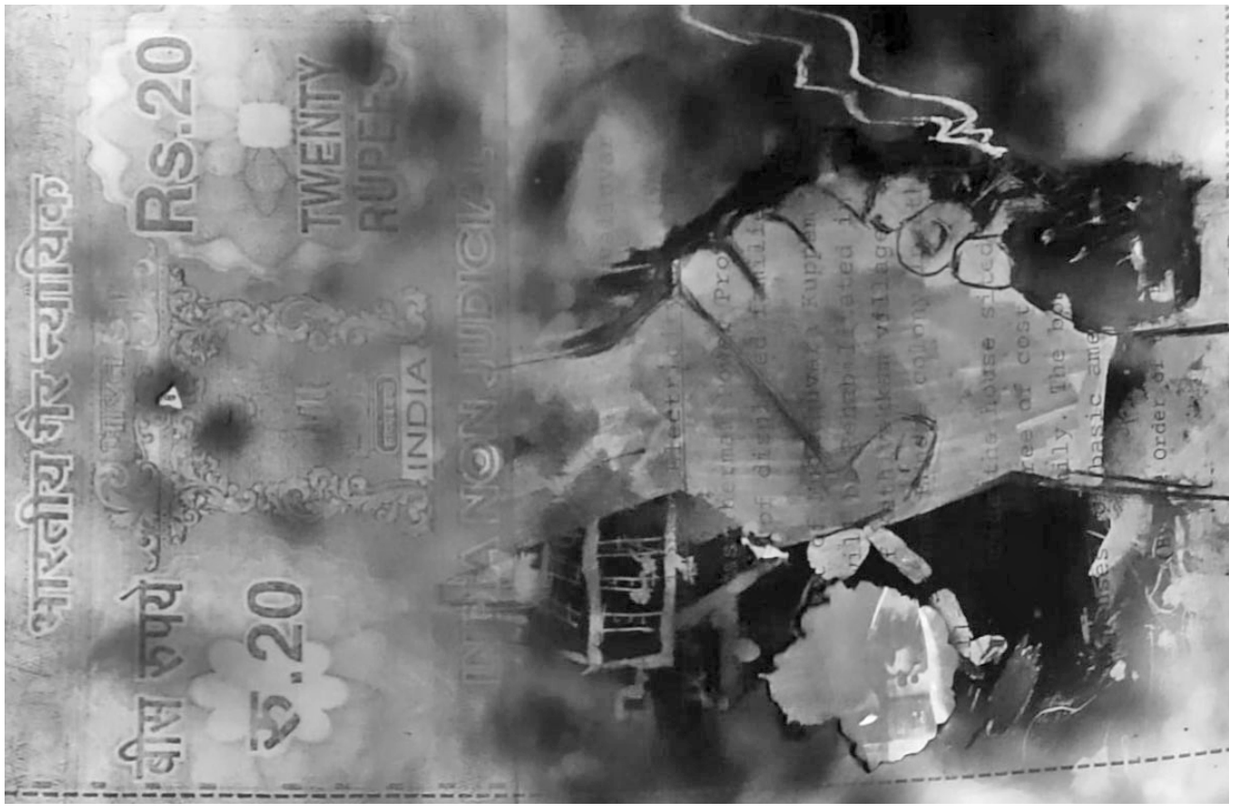
Till date, any contractor that has work inside the port will not dare begin work without visiting the Amman and giving prayers there

Ellaiamman by Aadhi
Mixed media sculpture

Two Broken Promises

As told by male fisher, Ennore

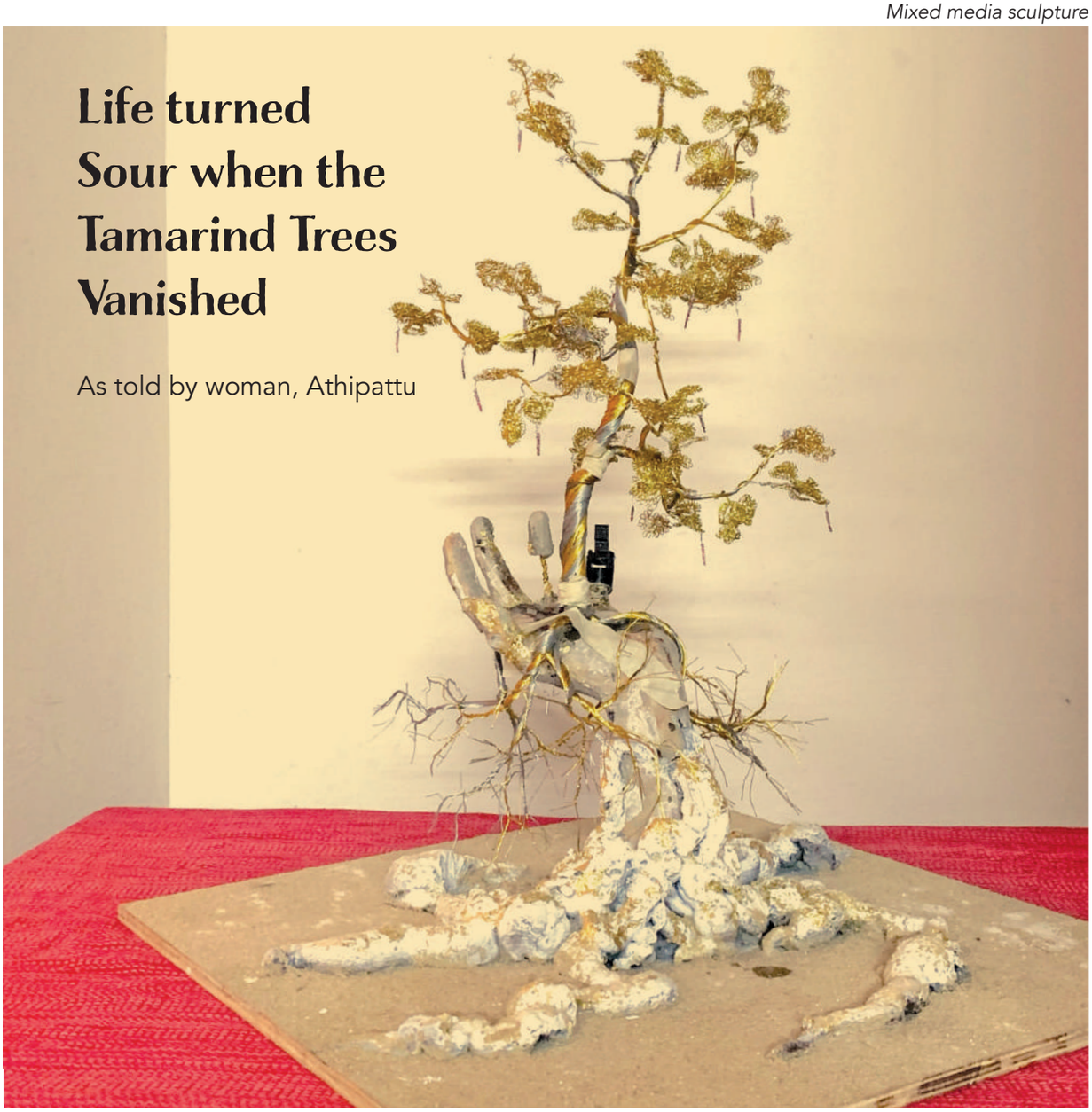
The Deed by Rajesh
Candle burn on stamp paper



Our village used to be at the river mouth on the other side, on Kattupalli island. In the 1990s, the government wanted our lands to build a power plant. We were river fishers. We did not venture out to the sea. We lived a simple, healthy life fishing in the river and working the little lands we had on the Kattupalli island. When the government asked, we had no option but to move. They told us that we'd be given 3 cents of patta land, and some assistance to get us started. They promised us one government job per family and assured us that the power plant will not harm fishing. We felt that was a fair deal. One son would be taken care of by the government job. The river will take care of the others. We were cheated. The ash from the power plant has destroyed the river. And we are still waiting for the promised patta.

Note: In 2021-2022, educated fishers from the villages of Mugatwarakuppam and Ennore Kuppam renewed their campaign to get pattas (title deeds) for the lands on which their homes stood. The campaign is still on at the time of writing.

The Tamarind by Elavarasan
Mixed media sculpture



Life turned Sour when the Tamarind Trees Vanished

As told by woman, Athipattu

There were only tamarind trees at the time when salt pans existed. There were totally 18 tamarind trees, 9 each on both the sides of the path. I paid Rs 1300 for the tender from the government to harvest the tamarind from the tree.

I employed laborers to pluck the tamarind. We would peel it, dry it in the sun and sell it. People from the village used to stand in queue to buy the tamarind. This supplemented our income during the off-season of salt pans. The last tamarind tree also died after the companies were set up in the village.

Note: The famous Athipattu salt pans which were part of the Ennore wetlands were lost to NTPC-owned NTECL Vallur power plant and its ash pond.

Fox & Fish by Kiruba
Indian ink on paper

Food for the Fox

As told by male fisher, Kattukuppam

In those days before the companies came, our river was teeming with fish of different kinds. After a day's fishing, we would sit on the riverside taking the fish out of the nets. The foxes would hang out at a safe distance watching us. Every now and then, we would toss a few fish for the foxes. That was a long time ago. The river is dying. Now there are no foxes. . . or fish in the river for the foxes.

The Black Coloniser

As told by a group of Kattukuppam fishers

The backwaters are carpeted by Kaaka aazhi (Mytella strigata), a black-coloured mussel that is foreign to these waters. When I was 15 – I'm 45 now – I remember seeing this for the first time. But then, it was a rare sight, to be found in ones and twos growing atop oyster reefs near the river mouth or on the columns of bridges. Oysters were plentiful and bridges rare then. Since 2021 we have been seeing denser colonies of these mussels. The storm may have had something to do with pushing the mussels deep into the backwaters. Now oysters are rare, and bridges and conveyor belts criss-cross every part of the river. The columns of bridges and the unremoved debris between the columns became covered with Kaaka aazhi. Over the last two years, they have colonised the entire riverbed, starting with areas that are covered in coal ash or construction debris, and then moving even to other places. Kaaka aazhi has wiped out yellow clams and prawns and hurt our income. In some places, the aazhi has grown so thick that it sticks out of the water at low tide making it impossible for boats to pass.

Note: Native to South America, Mytella strigata or Charru mussels have invaded tidal wetlands in several parts of the world by travelling across continents in the ballast waters or attached to the hulls of ships. The larvae of the mussels invade estuarine waters in the vicinity of ports aided by tides, and manage to push deep into the tidal water bodies propelled by storm surges. In Ennore, they have found a welcoming habitat in man-made structures such as pillars of bridges and in degraded river beds where the living sediment (uyir seru) has been replaced by alien material like coal ash and construction debris. The disruptive infestation of Kaaka aazhi in Ennore backwaters represents the violent transformation resulting from the convergence of capitalism, climate change and land-use change.

Chronology of Protests

"The government must decide whether it wants us to live or the companies. If it wants these companies to operate here, they should bomb us or release poison gas and finish us off. We do not want this company. This company should be closed down"

– Female resident, Ennore

Photo: K. Saravanan

Early December 2023, even as this document was being finalised, heavy rains caused widespread flooding in North Chennai, and floodwaters discharged from Chennai Petroleum Corporation Ltd's refinery in Manali carried oily wastes that spread across the Ennore backwaters as an oil slick that invaded homes, coated birds, fishing boats and gear, poisoning the air, water and sediment before escaping out to the sea. The spill and the protests that followed generated national media attention. But fishers were quick to point out that oil pollution from CPCL has been a routine affair since 1970 when the refinery was commissioned. By year-end, yet another disaster struck Ennore. Ammonia leaked from a pipeline, owned by Coromandel Fertiliser at midnight sending people from several villages running for their lives. Since 27 December, the day after the December, residents of 32 localities have been sitting on a relay strike at a public place till this time of writing.

The Ennore Thermal Power Station (ETPS) and CPCL (formerly Madras Refinery Ltd) were the earliest polluters to draw the ire of Ennore's inland fishers. Letters and government orders from the Tamil Nadu fisheries department, unearthed from the state archives, reveal that fishers from Sivanpadaiveethikuppam, Kattukuppam and Mugatwarakuppam had petitioned the government in 1972, 1973 and 1975 complaining about oil pollution from the refinery and noise pollution from the dredgers operated by ETPS to keep the estuary mouth open. The

dredgers, the fishers said, drove away the fish trying to enter the estuary from the sea. On at least two occasions, in the 1980s and around 2003, Kattukuppam and Sivanpadai fishers had blocked the Buckingham Canal using sandbags to prevent waste oil released from CPCL from entering the backwaters.

If the Ennore waters have degraded from being a biologically productive fishing grounds to a toxic soup, it is despite consistent efforts by the region's fishers to protect the wetlands – often at considerable risk to themselves.

The government on the other hand has not merely ignored fisher concerns, but continued to encroach upon, degrade and delay corrective action despite court orders. Protesting fishers have even been threatened with police action and arrests.

Since 2013, fishers have been joined by city-based solidarity activists, including artists, lawyers, scientists and youth. Nature too joined hands with the fishers in highlighting the importance of the wetlands. The December 2015 floods, and the crippling water scarcity of 2019 both allowed fishers to refocus the city's attention on the wetlands as a natural shock absorber against floods and droughts. These events have added meaning to fisher campaigns in the public and legal fora. In July 2022, a five-year long legal battle between Ennore fishers and TANGEDCO ended in a win for the fishers and the wetlands. The National Green Tribunal ordered the Government of Tamil Nadu to notify the full extent of the Ennore backwaters under the Wetlands Notification, and develop a Detailed Project Report for its eco-restoration.

Need for a People's Eco-restoration Plan

In the immediate aftermath of the 2023 oil spill disaster, the media was awash with government statements on the steps being taken to clean-up the oil and restore normalcy. The People's Plan for Eco-restoration of the Ennore Wetlands, in particular, and the region in general is premised on a need to question and challenge the "normal" – a normal where the air is unhealthy, youth are unemployed, the river is struggling to stay alive, and the land begins to lose all material and cultural meaning for its people.

A People's Plan is different from

expert-led plans prepared by the Government in that it reflects the understandings, priorities and aspirations of communities. Official plans, especially for eco-restoration of damaged landscapes, will not engage with the history of how things came to be, let alone reflect history accurately. The true cost of industrialisation-led development will never be revealed in the dominant narrative. If the eco-restoration of the Ennore wetlands has to have relevance beyond its catchment, it can be possible only by spotlighting and building on the diagnosis that social discrimination of the kind that forms the basis of industrialisation in Ennore will lead to ecological destruction and that this will tear asunder the cultural fabric of society.

Currently, there are at least three separate, but overlapping, initiatives underway with the professed objective of improving

ecological health of the wetlands:

1. Chennai Rivers Restoration Trust's (CRRT) "Eco Restoration of Ennore Creek" (aka CRRT Plan): Initiated in 2017, this World Bank-funded project is currently being implemented on the basis of an October 2020 Detailed Project Report (DPR).

2. Remediation of ash-contaminated areas of the Ennore wetlands: In its July 2022 judgement on a lawsuit (OA 8 of 2016) filed by Ennore fishers, the National Green Tribunal directed the Government of Tamil Nadu to finalise a consultant and carry out a Detailed Project Report for remediation of ash-contaminated wetland areas by December 2022. As of January 2024, the Government of Tamil Nadu has not even identified the consultant.

3. Restoration of the Ennore wetlands: In the same judgement of July 2022, the NGT directed the Government of Tamil Nadu "to conduct a study regarding the unutilised Ennore Wetland on the basis of the 1996 CZMP as directed by this Tribunal... and protect that area against further development and declare the same as part of Ennore Wetland under the Government Wetland Mission and develop a plan for restoration of the fragile Ennore Creek ecosystem and the wetland complex of Ennore." This direction too has not been complied with.

Work segments and agencies responsible

1. Sewage and Sanitation – Interception and Diversion

Chennai Metro Water Supply & Sewerage Board

2. Solid Waste Management - Removal of Solid waste and transfer to dump yard : *Public Works Department*

3. Removal of incomplete pile structures

Public Works Department

4. Mangrove replantation: *CRRT*

5. Construction of training walls at river mouth:

Public Works Department

The first of the NGT-directed interventions is limited to the ash-contaminated stretches of the backwater and its scope defined by the Terms of Reference prescribed by the NGT. While the scope for the second – namely, "Restoration of the Ennore Wetlands" – is broader, the specific manner in which it will be defined remains unknown at this time.

The CRRT's ongoing interventions in the creek are ill-informed, inadequate and unlikely to help the wetlands or the communities dependent on it.

The CRRT Plan; Its shortcomings

The CRRT plan is outlined in a DPR prepared in 2020, and accessed using Right to Information Act. The Plan was never voluntarily published. It was prepared by Voyants Solution, a consultant that failed to compensate for its lack of familiarity with the wetlands by engaging with the local communities. Public consultation had to be forced by protests and representations from the fishers seeking to be involved in the design of the project. Public inputs, though, appear to have had only minimum effect on influencing plan outcomes. The DPR's prescription for the wetlands ailments is covered in five work segments with a government department or agency assigned to execute each.

Of the five work segments, work on sewage and solid waste management, or removal of debris and pile structures between columns of bridges have not commenced. Only Items 4 and 5 are ongoing. Mangrove replantation is being carried out in un-remediated ash and sewage contaminated areas.

There are even more fundamental flaws in CRRT's approach:

Arbitrary definition of the Creek Boundary - The extent and boundaries of the Creek ought to have been defined based on the hydrology, biology, topography and past land-use. CRRT's definition appears arbitrary and subjective, relying solely on revenue classification of individual survey numbers. Even this criterion is vitiated by arbitrary exclusions. The area covering the most gravely impacted portion of the wetlands is captured in Sheet No. 2 of the 1996 Coastal Zone Management Plan map. This Government of India-approved map demarcates 10,000 acres (40 sq km) as a tidal wetland. CRRT's plan covers a meagre 9.2 sq km or 2200 acres.

No baseline: Despite being alerted to the need for a spatial baseline and the availability of the 1996 CZMP map, now acknowledged by the NGT as an authentic baseline for the tidal wetlands, CRRT failed to define a historical reference point. This lapse allows for the legitimisation of illegal industrial and infrastructural structures inside the wetlands.

Ignores root-causes of degradation: Apart from identifying the low-income settlements on the banks of the Canal and the river as sources of sewage and garbage, the plan fails to name any of the other sources of oil, coal ash and chemical pollution. Neither does it identify and plan for industrial accidents and incidents that may affect the wetlands and local communities.

Dredging without a baseline: The absence of meaningful consultation from the region's fishers who know the wetlands intimately has meant that the dredging plans and proposed actions for removal of leftover concrete between the columns of bridges will not be done with reference to any baseline. Bathymetric charts are available only for the Buckingham Canal.

Public consultation had to be forced by protests and representations from the fishers seeking to be involved in the design of the project

No bathymetric charts are available for the perennial backwater channel, and the tidal and rainwater floodplains (paraval) on either side of the channel. There are community bathymetry methods relying on remembered depths as reported by fisher elders, along with core sampling to identify depth to native sampling.

There are many more shortcomings in CRRT's plan, but rather than focus on what the CRRT plan lacks, the People's Plan presents a framework for a holistic approach that defines restoration not merely as a repair of a damaged aquatic ecosystem, but also an act of care to nurse degraded relationships to health – by returning people to nature, building relationships of trust and respect among people and between people and the government.

The People's Plan for Eco-restoration

"We were not rich. But we were healthy. We never realised how healthy we were until this power plant came up. Now, we have pucca road access. We have TVs and motorcycles, but we have flyash in our noses, in our lungs, in our stomachs. Look at all the leaves. They are coated with ash. If we don't cover our food or water properly, ash settles on it. We are breathing and eating ash. Our stomachs get bloated. Bring a doctor and ask him to do a scan of our stomachs. You will see. Between the wind and the lorries that take ash, our air is loaded with ash."

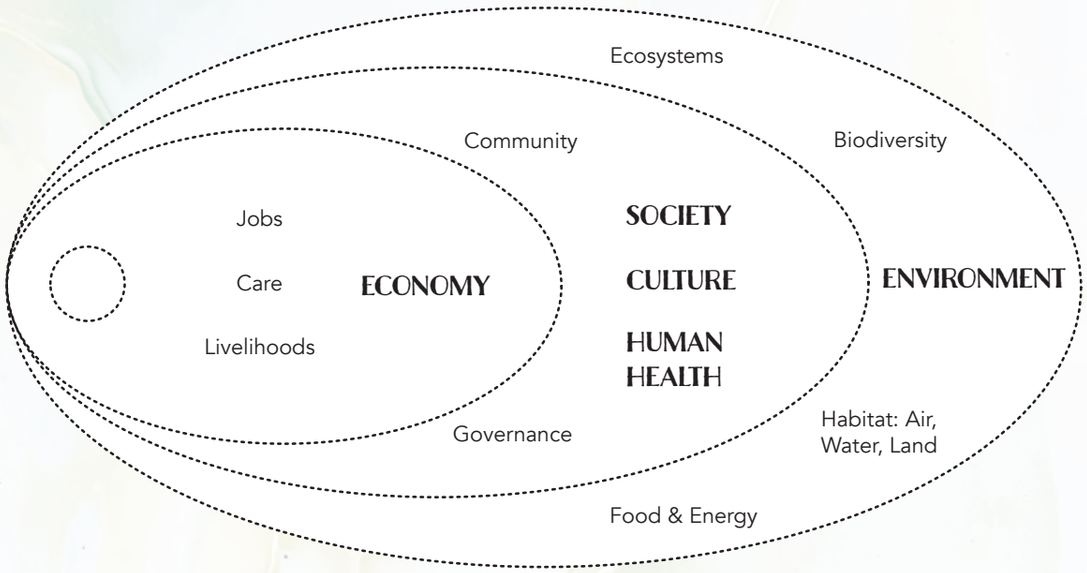
– Venkatesh (late), Kuruvimedu, Vallur

A People's Plan for the eco-restoration of the Ennore wetlands would be incomplete without a change for a better living environment for human and non-human communities in the catchment. Even as this plan was being drafted, two sensational incidents – an oil spill from CPCL on 4 December, 2023, and an ammonia gas leak from Coromandel International Ltd's fertiliser facility on 26 December, 2023 – spotlighted the need to safeguard the wetlands and surroundings from industrial disasters and routine pollution. Any restoration that is done without first identifying and addressing human-made sources of routine pollution (sewage, industrial etc) and human-made or natural catastrophic events will annul any gains derived from

an expensive eco-restoration exercise.

State and expert-led wetland restoration plans suffer from an inability to break free from disciplinary compartmentalism, anticipate and address imminent threats to the restored ecosystem or deal with unquantifiable relationships and values. Taking inspiration from the fluidity and liminality of water-lands, the People's Plan for Eco-restoration of the Ennore Wetlands provides a framework for holistic restoration that straddles four interacting, overlapping spheres of relevance – namely, health (human health as part of ecosystem health), economy (jobs and livelihoods), culture and ecology.

Restoration plans cannot be viewed as one-off interventions aimed at addressing the legacy issues plaguing the target ecosystem. Rather, they also need to anticipate other likely human-made and natural developments, account for planned projects for urbanisation or industrialisation or phenomena such as sea level rise, salinity intrusion, extreme weather events (rains, droughts, winds and storm surges) or man-made disasters. The latter is particularly relevant for the



Ennore wetlands as the targeted ecosystem complex and the settlements adjoining it are vulnerable to multiple industrial hazards – toxic gas leak and explosion hazards, coal ash spills including catastrophic ash dyke breaches, and oil and chemical spills from land-based installations and ship-based incidents.

The Eco-restoration plan aims at an ideal of ecological and social equality, where – borrowing from the principles of the North American environmental justice movement – there is clean air to breathe, clean water to drink, healthy living and work spaces and safe spaces for the young of all human and non-human life to play and grow up in. The plan has two components

1. a map-based spatial plan identifying restorative interventions

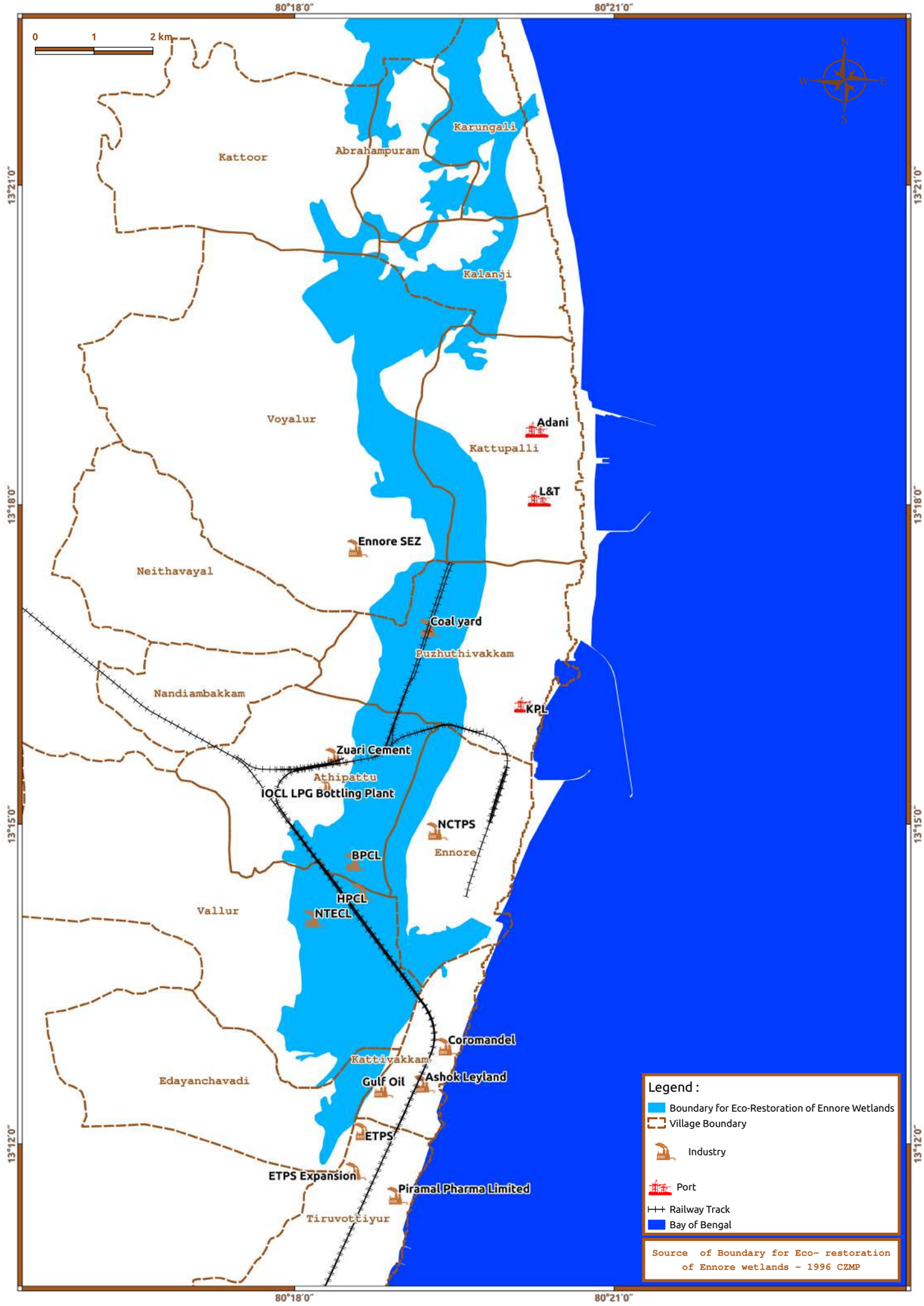
2. a narrative plan identifying policy and social interventions required to achieve above-mentioned objectives

Spatial Plan

The spatial plan for eco-restoration targets the demarcated area of the wetlands with different kinds of remedial interventions that aim at or aid in achieving one or more of the objectives. Where these interventions do not yield direct dividends, they put in place the natural and spatial infrastructure for local and state governance initiatives to play out and for healthy relationships to resurface and/or be created.

Spatial interventions including rezoning, dredging, decontaminating, removal of alien material (sewage sludge, dredged sand, coal ash) and encroachments, restoration of ecological character of native soil/sediment and revegetation and restocking of wetlands and immediate catchment.

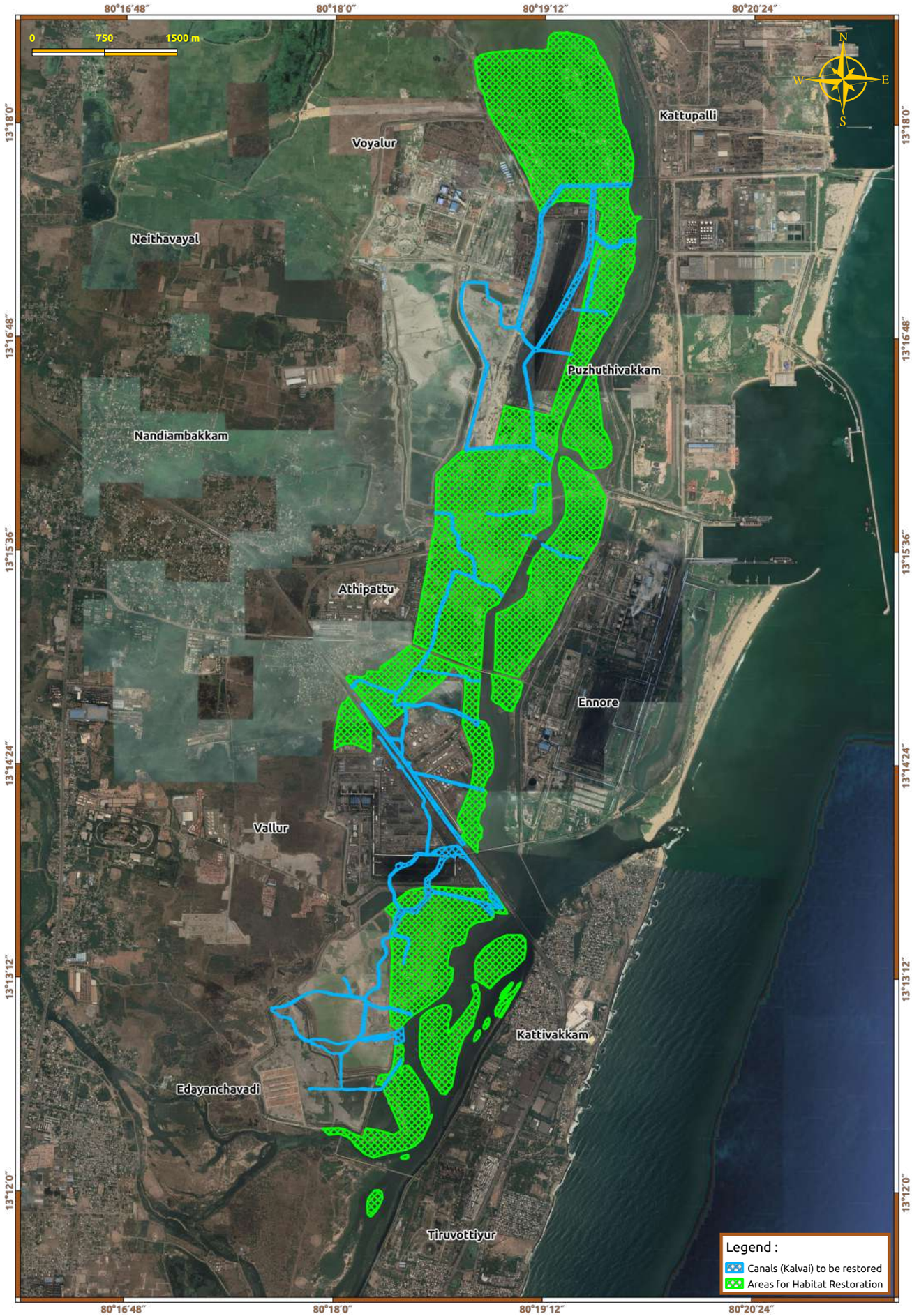
MAP SHOWING BOUNDARY OF ENNORE WETLANDS FOR ECO-RESTORATION



MAP SHOWING BOUNDARY OF ENNORE WETLANDS

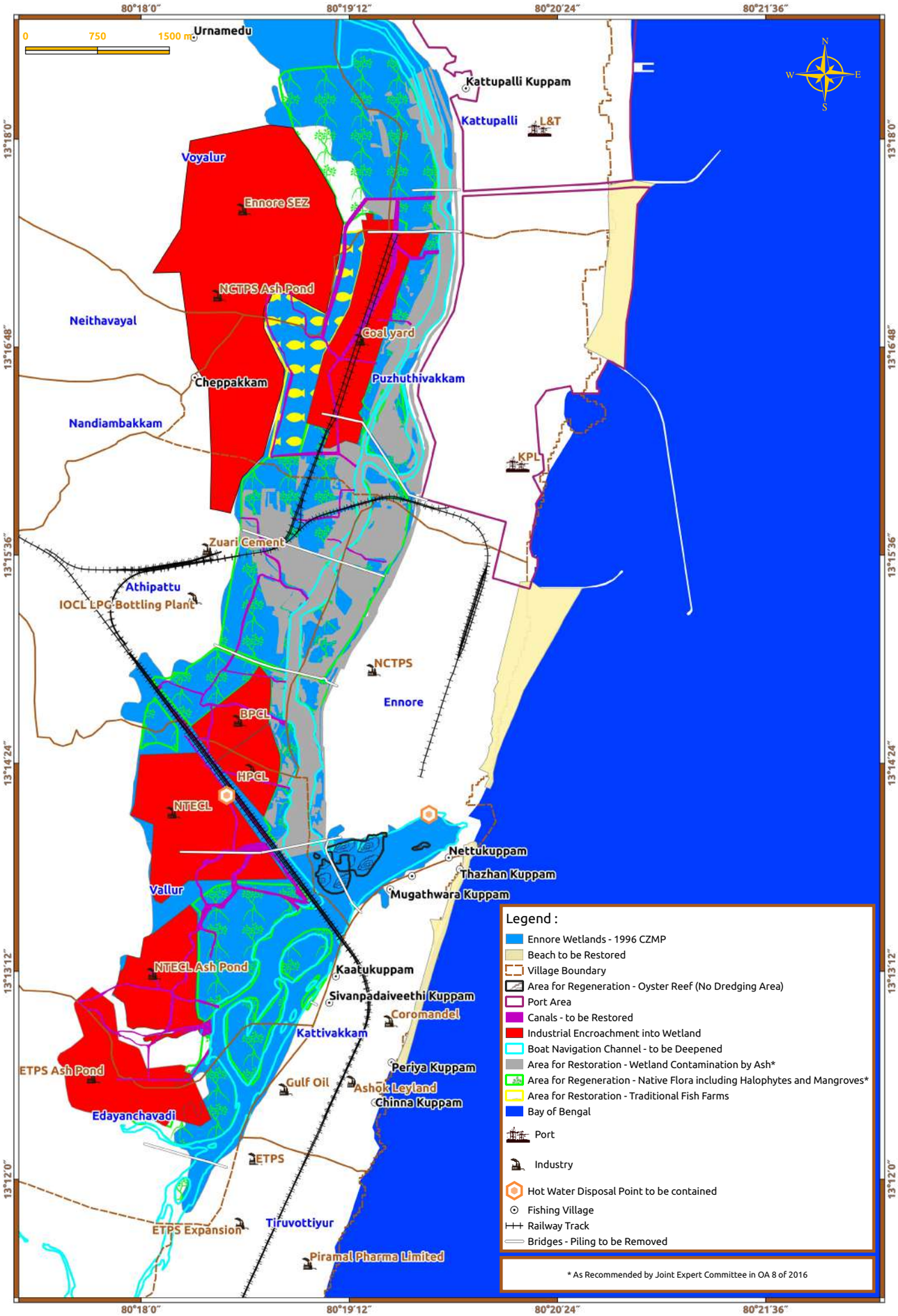
MAP SHOWING AREA TO BE DREDGED & DEEPENED FOR ECO – RESTORATION

MAP SHOWING AREAS WHERE HABITAT RESTORATION TO BE CARRIED OUT



MAP SHOWING INDUSTRIAL AND SEWAGE OUTFALL TO BE PLUGGED

PEOPLE'S PLAN FOR ENNORE CREEK ECO – RESTORATION PREPARED BY LOCAL FISHERFOLK



The NGT South Zone's July 2022 judgement in OA 8 of 2016 contains two important directions:

1. to prepare a DPR and execute the remediation of the ash-impacted wetlands as per the Terms of Reference (ToR) prescribed.

2. to demarcate and notify the full extent of the wetlands using the 1996 CZMP map as the basis and protect and restore the encroached portions of the wetlands.

NGT's endorsement of the 1996 CZMP map of Ennore as the only Government of India-approved plan for the region provides a sound legal basis for demarcation of the tidal wetlands. Additional areas, including sensitive catchment areas with direct and significant potential to impact the wetlands, may be included for different kinds of interventions aimed at reviving and maintaining the ecological character of the wetlands.

The ToR prescribed by the Joint Experts Committee of the NGT (SZ) comprehensively covers the way forward for remediating and restoring the ecological character of the wetlands currently contaminated by flyash.

The ToR is reproduced in full in Annexure 1.

The rest of the narrative plan is in two parts:

>> Proactive, i.e. to build on what we dream of and aspire to. The plan identifies areas of study and policy/social intervention.

>> Reactive, i.e. in reaction to what we know, are facing and what we can anticipate.

Pro-active plans

OBJECTIVES	RECOMMENDATION
Healthy living and work conditions	Healthy homes – Develop policies in consultation with local residents to improve quality of homes through better ventilation, climate-sensible building material, preservation and rejuvenation of open spaces. Healthy playgrounds – Develop small to medium play spaces in a decentralised manner in addition to parks. Create healthy and state-of-the-art, but decentralised sports training spaces recognising the prominence of north Chennai as a hub of sports persons.
Revival of cultural uses/meanings of water-lands, and creation of new and meaningful cultural relationships	Protect and ensure access to places of daily and seasonal worship Conceive of water- and land-based sports and recreational activities in tune with local culture Protect shorefront spaces from privatisation, enclosures, commercialisation and keep it open for appropriate socio-cultural uses, including as gathering spaces, play spaces, physical exercise spaces for elderly or performance spaces for arts.
Healthy vibrant and diverse local economy – with focus on self-employment, trades and services, women and small businesses – addressing basic needs.	Consult with women fish vendors to develop plans to upgrade, enhance income through interventions such as upgradation of markets, cold storage facilities. In consultation with farmers, livestock herdswomen, develop plans for improving ecological character of grazing poromboke commons. In consultation with local merchants association, and 32-village committee, develop plans to rejuvenate local economy. Set up Information and Education Centres in Ennore, Kattupalli and Kattur to use local experts (fishers, elders, farmers, potters and grazers) to educate city residents on Ennore's history, the story of its transformation through struggle from an industrial wasteland to a vibrant living environment. Culturally appropriate eco-tourism and water sports that engages local businesses and local labour. Ensure prioritised employment opportunity for local people, particularly educated youth, in local industries. On a modest retainer, engage trained local youth – particularly fisher youth – as first responders for disasters.

The Girl from Manipur by Kiruba
Yarn embroidery on jute

Manipur Tamizhachi in Ennore

As told by Woman, Annai Sivakami Nagar

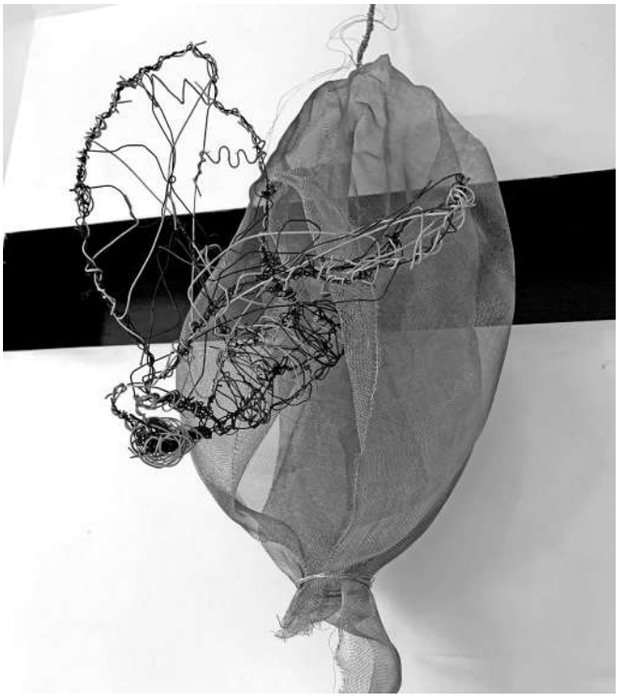
I studied till 10th std in Manipur. My family lived in a village called Moreh in Manipur. My father and mother bought goods from Burma and sold them in Manipur which was our livehood. My town would look like a green blanket spread with so much plants and trees and even the road was a mud road. If someone wanted to go to college, they had to walk five kilometers to reach the city from our village. My parents were afraid to send us alone in the forest for college. Hence I, my elder sister and younger sister were all married at the age of seventeen and eighteen. I came to India only when I got married. There were some problems in Manipur in the year 1996. Everyone came to Tamil Nadu due to that reason. Now there are only 50 families in Manipur.

Future Tense by Rajesh
Wireframe art

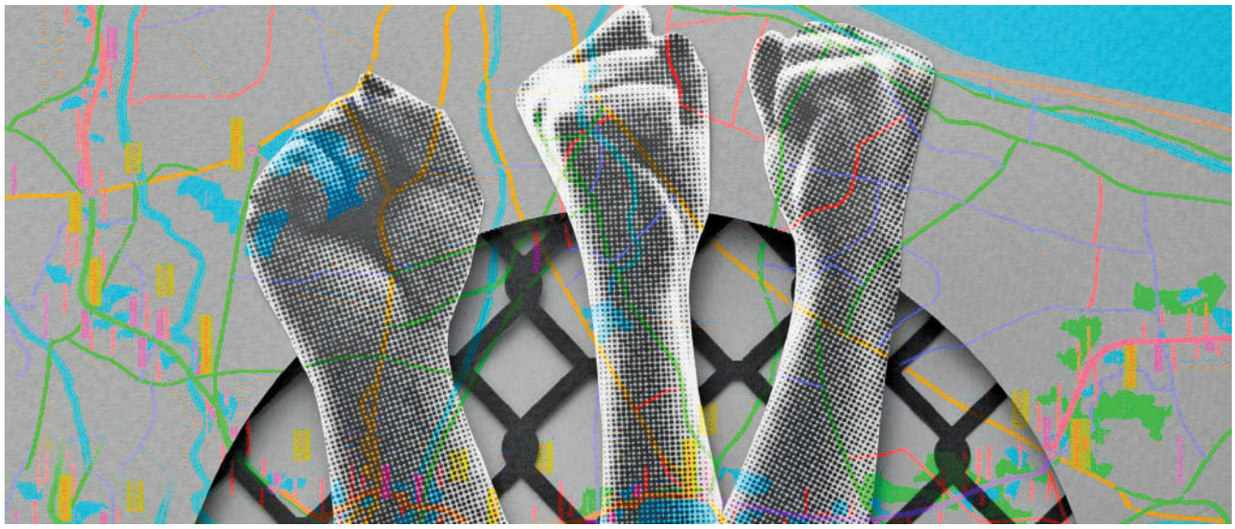
SIDEBAR

Best of Both Worlds

As told by Woman fisher, Ennore Kuppam



Ennore Kuppam was on the other side (2 km north) of the river, before the government moved us to this plot south of the river. In our old village, life was hard, especially for women. It was like living in a forest. There were foxes running everywhere and howling through the night. Women had to be like multi-handed goddesses. We had to take care of food, the sick and elderly. We had to fetch water from far. Then we had to take the fish caught from sea by the men and walk 2 km south to Mugatwarakuppam to take a boat to the other side to sell the fish in the Ennore market and return in time to go gather firewood. We would return and cook on firewood stoves. There were no mixies or grinders. Everything had to be done manually. We had no leisure. But then, that place had its good points. The sand was soft and soothing beneath our feet. The water was good, and if we lay down in the coconut grove, there was good breeze and clean air. There we had our fishing. We didn't have much, but we were healthy because we led active lives, ate healthy and had clean air. Now, we have all been moved to the Ennore market side (south of the river). The market is near us. We have all the gadgets for cooking, washing and we don't have to struggle the way we did in the old village. But we don't have clean air. Wherever you turn, there is coal dust from the power plants. The floor of the terrace is dark with coal. If you walk there, your feet will turn black. And then, there is the big question about jobs for our children. There is no proper employment. How nice it would be to have the best of both worlds!



OBJECTIVES	RECOMMENDATION
Well-protected and locally governed commons	Enable socially just regimes for governance of commons, focusing on empowerment of and free access to commons of the most marginalised Irular (Scheduled Caste) residents of Ennore. Enhance the wet character of local lands, prioritising the health of open, unbuilt spaces to mitigate flood risk and improve water security. End arbitrary administrative practice of alienating poromboke commons without public consultation.
Social relationships of equality, trust and respect	Promote use of public spaces to hold multicultural events that bring together people from diverse cultural (religious, caste) backgrounds Set up Local Area Environment Monitoring Committees to play a watchdog role and assist government. agencies in identifying environmental issues, violations etc. Identify and rectify governance/legislative/accountability deficit that has led to continued pollution and insenstive overburdening of an overstressed region/population despite environmental and town planning regulations.
Just Solutions – Solutions cannot become problems passed down the socio-political-ecological hierarchy	Evaluate all interventions from the perspective of the most marginalised – namely, marginalised and historically oppressed human communities, non-human lifeforms, and unborn generations

Reactive plans

ISSUES	RECOMMENDATION	DEPARTMENT
No title deed (pattas) for long-term residents and TANGEDCO oustees	Long-term residents in places like Burma Nagar, and TANGEDCO oustees in Mugatwarakuppam, Ennore Kuppam, Athipattu Pudunagar should be given title deeds (pattas)	TANGEDCO District Collector Commissioner Revenue Administration
Informal, vulnerable, substandard housing for migrant workers employed by ports in Kattupalli	Force employers to ensure adequate quality housing for migrant worker	District Collector, Thiruvallur Labour Department

Legacy Health issues

ISSUES	RECOMMENDATION	DEPARTMENT
Industries – Smokestack, Fugitive Emissions *Vehicular emissions, particularly from heavy container/tanker vehicles and buses* *Resuspended road dust due to poor road conditions* *Decentralised garbage disposal and burning, and Kodungaiyur dumping ground* *Construction activities*	Commission a study for preparation of a Masterplan for bringing air quality in Ennore-Manali airshed to healthy living condition.	Chennai Police (Traffic) Transport Department Greater Chennai Corporation (Roads) Greater Chennai Corporation (Public Health) TNPCB

Health degradation due to industrial and vehicular pollution *Fisher health degradation due to contact with/exposure to contaminated water/sediments*	In the immediate term, invest in enforcement to ensure that industries are compliant and accountable, and regulatory authorities are held liable for failure to enforce. Enforce compliance of industries/vehicles with air and water pollution (prevention and control) norms. Conduct a primary health survey to establish the health status and needs of local communities. Upgrade PHCs in the region to draw patients away from expensive private health care institutions. Equip PHCs to respond to illnesses induced or aggravated by pollution. Convert PHCs into treatment and data gathering centres	TNPCB Transport Department Greater Chennai Corporation (Health)

Ongoing Pollution and Degradation of Wetlands and Environment, including Legitimised Development & Encroachment

ISSUES	RECOMMENDATION	DEPARTMENT
Thermal Power Plants and attendant infrastructure, including coal and coal ash conveyor and storage/disposal installations.	Enforce compliance with relevant laws – Water Act, Air Act, Flyash Notification, 2022, Environment Protection Act. Refer to ToR of Joint Expert Committee (JEC) of NGT (SZ) in Annexure 1 NTECL Vallur TPP and NCTPS TPPs should be forced to operate Electrostatic Precipitators 24x7. Violation of norms as recorded in CARE Air Centre's real-time stack emission database should be immediately attended to for corrective and punitive action	TANGEDCO Water Resources Department TNPCB State Coastal Zone Management Authority
Thermal Power Plants – Discharge of Hot Water: Currently hot water is being discharged in estuary and backwaters	Shift discharge outlet to deep sea using suitable technologies to minimise impact to receiving waters	TANGEDCO/ NTECL TNPCB State Coastal Zone Management Authority

Sewage and garbage pollution from North Chennai, including Thiruvottiyur, Kodungaiyur, Manali, Madhavaram	Identify points of entry of untreated sewage between Cooum and Ennore estuary; intercept and treat sewage and use treated wastewater for industrial purposes. Refer to CRRT's DPR for Restoration of Ennore Creek (Chapters 6 & 8) Implement Municipal Solid Waste Management Rules, 2016	CMWSSB Greater Chennai Corporation TNPCB
Sewage and garbage discharged in and around tidal wetlands and springs in Kattupalli island from informal settlements housing employees from KPL, L&T and Adani Ports	Relocate worker settlements to habitable units inside port premises or in Athipattu with facilities for sewage and garbage management as per the respective Environmental Clearances of the three ports	KPL L&T Shipbuilding Adani Kattupalli Ports (MIDPL) TNPCB Kattupalli Panchayat

Legacy Pollutants, Encroached and Unremoved Alien Material

ISSUES	RECOMMENDATION	DEPARTMENT
Ash deposits in wetland, including backwaters, floodplains and sea (near estuary)	Removal and restoration of ecological character as per NGT order of July 2022. Refer to ToR of JEC in Annexure 1. Refer to Figure 1.3.9 "Fly ash extent in the Study Area", Page 130 of JEC report reproduced as Eco-restoration Map 1	TANGEDCO TNPCB Department of Environment, Forests and Climate Change, Govt of Tamil Nadu
Dredged sand dumped by Kamarajar Port Ltd (KPL) to build port infrastructure	Removal and restoration of ecological character	KPL TNPCB State Coastal Zone Management Authority

Dredged sand and concrete pilings dumped by TANGEDCO to construct coal conveyor corridor for Ennore SEZ (NCTPS Stage IV) power plant	Removal and restoration of ecological character of wetlands as per Madras High Court order in WP 16353 of 2021	TANGEDCO TNPCB State Coastal Zone Management Authority
Dredged sand, flyash dumped by TIDCO to construct Tamil Nadu Polymer Industries Park Ltd in wetland area	Withdraw Special Leave Petition filed in Hon'ble Supreme Court against NGT order in Appeal No. 11 of 2020 Remove dumped material and restore ecological character of wetlands as per NGT order in above appeal	TIDCO Government of Tamil Nadu State Coastal Zone Management Authority
Construction debris, flyash dumped by TANGEDCO in backwaters and perennial channel for constructing illegal ash pipeline for NCTPS Stage III.	Properly remove dumped material and restore ecological character of wetlands as per NGT order in 122 of 2021	TANGEDCO TNPCB State Coastal Zone Management Authority
Illegal roads laid for laying of oil/gas pipelines by IOC	Remove roads laid using construction debris and restore ecological character of wetlands	Oil company State Coastal Zone Management Authority

Unremoved pile structure between bridge columns in following bridges (South to North) *1. Thiruvottiyur-Sadayankuppam bridge* *2. VNC bridge (Kathivakkam-Athipattu bridge)* *3. Conveyor corridor – NTECL Vallur TPP*	Remove all debris and dumped material to depth of native soil from between columns and restore tidal flow At VNC bridge remove dumped earth along northwestern edge of the structure	Greater Chennai Corporation NTECL Vallur
Illegal coal conveyor road bridge across Konamudukku Canal connecting KPL to Chettinad Coal Terminal. The river that spanned nearly a kilometer at this point has been reduced to two channels of 25 m each.	The conveyor belt/road bridge may be removed and replaced with a bridge with multiple columns to facilitate better tidal exchange	Chettinad International Coal Terminal Pvt Ltd
Areas infested by invasive Charru mussels (in backwaters and on piers inside harbour areas)	Periodic removal of invasive mussels Strict enforcement of ballast water discharge by port authorities	KPL L&T Shipbuilding Adani Kattupalli Port (MIDPL) State Wetland Authority

Electric transmission towers inside wetlands	Remove illegally sited transmission towers and restore wetlands Remove construction debris dumped to construct access roads and platforms for erection of legally sited transmission towers and restore wetlands	TANTRANSCO Water Resources Department (PWD) TNPCB

Proposed Encroachments and Activities Likely to Lead to Further Degradation of Wetland

ISSUES	RECOMMENDATION	DEPARTMENT
Adani Kattupalli Port MIDPL expansion – 2000 acres of sea to be converted to port land 3000 acres of wetlands to be converted to industrial park Ponneri Industrial Township Authority intends to convert 2200 acres of Poromboke commons, including 1734 acres of wetlands poromboke, to industrial real estate.	Government should instruct Tamil Nadu Maritime Board to withdraw in-principle clearance given to MIDPL's proposal Government should withdraw the Government Order promulgated for Ponneri Industrial Township Area and include the wetlands area in restoration plan	Government of Tamil Nadu Tamil Nadu Maritime Board
	Government should withdraw G.O. Ms. 36 Industries (MIE.1) Department dt/26.02.2015 for acquisition of lands	Industries Department, Govt of TN
	Government should withdraw G.O. Ms. 99 Animal Husbandry, Dairying and Fisheries (AH2) Department dt/28.02.2020 granting NOC for alienation of grazing poromboke commons	Animal Husbandry, Dairying and Fisheries Department, Govt of TN
Kattur Heavy Engineering Hub – 653 acres, including 398 acres of Poromboke commons	Government should, in consultation with local community, develop agri-fisheries-based livelihood enhancement schemes in the region by improving the health and wetland character of the region.	Kattur Panchayat

Electric transmission towers inside wetlands	Remove illegally sited transmission towers and restore wetlands Remove construction debris dumped to construct access roads and platforms for erection of legally sited transmission towers and restore wetlands

Man-made Disasters/Industrial Accidents/Spills, Leaks and Explosion Hazards

ISSUES	RECOMMENDATION	DEPARTMENT
Industrial accidents, including: 1.Heat Radiation Effects caused by liquid pool fires, and Boiling Liquid and Expanding Vapour Explosions (BLEVE) – LPG, Crude Oil, Naphtha, Kerosene, Methyl Ethyl Ketone, Benzene, Propylene Oxide, Ethylene Oxide. Vapour cloud explosions can also be caused by all of the above and ammonia, hydrogen, carbon monoxide 2. Toxic Gas Dispersion Effects due to release of toxic vapour clouds of ammonia, chlorine, hydrogen fluoride can cause significant lethality as they disperse far when wind and meteorological conditions are stable (worst case scenario).	Carry out a detailed study of Maximum Credible Accident scenarios for individual units, and for instances that can trigger knock-on accidents in nearby installations. Identify areas of habitation and high people thoroughfare that fall within danger zone. Relocate non-conforming industrial installations or reduce quantities of hazardous material stored onsite. Publish the detailed study to alert people of proximal hazards Conduct credible monitoring of industrial safety, and insist on audited statements on the same. Hold auditors and DISH staff liable/accountable. Prepare and publish Offsite and Onsite Emergency Preparedness plans and conduct annual drills and training programs for community members and leaders, police and fire department, revenue officials. To minimise road accidents involving explosive, improve road conditions,	Manali Industries Association TANGEDCO NTECL Vallur Industries in Ennore, including Piramal Pharma, Coromandel Port authorities Police (including traffic police) Coast Guard Fire & Rescue department CMDA State Disaster Management Authority

1.Coal stacking yard fires may not result in offsite fatalities but have the potential to cause long-lasting and intense effects over large distances. 2. Oil spills 3. Road accidents involving tankers carrying hazardous cargo 4. Marine spills and incidents	restrict vehicles to operate only at scheduled times on approved thoroughfares, insist on credible safety certification of tankers, provide quality training for traffic police and fire department in responding to accidents. Spills and accidents involving hazardous material, including oil or chemicals, require special rapid response protocols to be developed and shared with port authorities, coast guard, revenue authorities, environment and forest department, TNPCB, fisheries department and fisher village administrations. Declare densely populated areas as mixed or primary residential, and relocate hazardous facilities from the vicinity of such areas. Oil spill response plan including for discharge of oily wastes along with floodwater (ref. December 2023 CPCL oil spill) must be prepared. Stormwater retention ponds of adequate capacity must be constructed inside Manali industries to ensure that contaminated stormwater does not leave industry premises.	District Collectorate – Thiruvallur/ Chennai
Industrial Accidents impacting newly constructed Tamil Nadu Urban Habitat Development Board tenements on lands reclassified as Primary or Mixed Residential zone from the original "Special Industries and Hazardous Use" zone. This includes the TNUHDB tenements in T.S.No.11pt., Block No.19 (Old S.No.317 to 329 Except S.No.326) of Thiruvottiyur Village and the 38,000 unit TNUHDB complex in Ernavur, adjacent Ennore Thermal Power Station (ETPS).	The Thiruvottiyur tenements have been constructed within impact zone of multiple petroleum and petrochemical installations in Manali Industrial Area. More densely populated areas are located to the south of the plot, and also within impact zone of toxic, explosive and fire hazards. A decision to relocate industries must be taken urgently. The 38,000 unit TNUHDB complex in Ernavur is adjacent the ETPS site. No new polluting industry should be permitted at this site	CMDA TNPCB Manali Industries Association Government of Tamil Nadu TANGEDCO TNUHDB District Collectorate – Chennai

Coal Ash Dyke Breach	The Flyash Notification, 2022, sets out detailed regulations concerning concurrent disposal of flyash, utilisation of accumulated ash from legacy sites, and the mechanisms for monitoring and enforcement of the Notification and sets out penalties for non-compliance. As per JEC's report to NGT, the legacy site (TANGEDCO's Seppakkam unlined coal ash dump) must be emptied of accumulated ash by ensuring its time-bound utilisation. Similar action must be taken for NTECL's unlined coal ash pond in Kuruvimedu, Vallur, and the dyke emptied of all accumulated coal ash as per the Flyash Notification, 2022. The residents of Seppakkam and Kuruvimedu must be relocated to a secure and suitable place as soon as possible. In the interim, they should be provided with adequate clean water and measures must be taken to minimise exposure to ash dust. Upon removal and utilisation of the legacy ash, the site must be restored to its wetland character.	TANGEDCO NTECL Vallur TNPCB

Natural Disasters and Imminent Natural Threats

ISSUES	RECOMMENDATION	DEPARTMENT
Intense Rainfall & Flooding Droughts (Water Scarcity) Salinity Intrusion	Restore wetlands to increase capacity of backwaters and floodplains to store floodwaters and mitigate flooding in catchment in Ponneri, Madhavaram, Manali, Washermanpet and Thiruvottiyur areas. Minimise urbanisation in tail-end catchment of Kosasthalai and Arani Rivers to reduce rainfall run-off, maximise groundwater recharge, and stay within holding capacity of backwaters and flood discharge capacity of Ennore estuary. Withdraw and reject all plans – including Kattur Heavy Industries Hub, Ponneri Industrial	Water Resources Department Environment, Forests & Climate Change department, Govt of TN CMDA Relevant local bodies

	Township Area and Adani Kattupalli MIDPL port -- to industrialise wetlands, floodplains and adjacent catchments. Notify 10 km Eco Sensitive Zone around Pulicat Wildlife Sanctuary, particularly to the sanctuary's south and southwestern stretches as part of the "wise use" of the wetlands. Stop commercial extraction of groundwater from Kattupalli island, and regulate groundwater extraction in the Araniyar Kosasthalai Basin (AK Basin) Strictly regulate urbanisation/commercialisation and industrialisation in the AK Basin, Ponneri Taluk, to ensure low-density development with plenty of open, unbuilt land.	Chennai Metro Water Supply and Sewerage Board
Cyclonic Wind Damage and Storm Surges	Restore wetlands, including with propagation of mangrove species and oyster beds/reefs where appropriate. Protect the tall sand dunes of Kattupalli island; prohibit activities that involve dressing of sand dunes or changes in land cover. Vegetate sand dunes where possible with appropriate native vegetation Reverse port-induced coastal erosion through soft engineering measures, including nourishment of the eroding beaches at the cost of parties responsible for causing erosion. Declare Kattupalli Barrier Island as a Biodiversity Heritage Site to ensure its protection and local management.	Environment, Forests & Climate Change Department, Govt of TN CMDA Relevant local bodies State Biodiversity Authority For reversal of erosion: Chennai Port KPL L&T Shipbuilding Adani Kattupalli MIDPL

Sea Level Rise	Demarcate an appropriate Hazard Line that takes into account the extent of anticipated SLR in this region, and ensure that human habitation and sensitive infrastructure are not allowed on the sea- or water-wards side of the Hazard Line. See Map of Anticipated SLR	CMDA Relevant local bodies National Centre for Sustainable Coastal Management State Coastal Zone Management Authority

Annexure 1

Recommendations for Terms of Reference for Preparation of DPR for Remediation of Ash-contaminated Areas of Ennore Wetlands by Joint Expert Committee appointed by Hon'ble National Green Tribunal (SZ) in OA 8 of 2017.

TERMS OF REFERENCE

1. Assess the state of the Ash Dyke

>> Structural integrity

>> Storage capacity, including original capacity and any subsequent enhancement; current storage levels

>> Environmental integrity – impact on groundwater, surface water, ambient air

>> Environmental integrity – impact on surface hydrology and flooding

>> Measures to be taken to prevent continued impact on groundwater, surface water, ambient air

>> Disaster risk assessment and management: Ash dyke breach

2. Coal Ash Generation and Disposal; Measures to Prevent Ash Pollution, Ensure Compliance

>> Current state of record-keeping of coal ash mass balance, daily coal ash generation and disposal, including storage in ash dyke

>> Measures to improve record-keeping of coal ash generation, disposal and mass balance

>> Quantity of Coal ash generated, disposed, quantity stored in dykes and unaccounted for by all units in NCTPS from beginning of production.

>> Quantity of unaccounted-for fly ash leaked/ discharged/present in(into) wetlands and nearby areas in study area.

>> Quantity of unaccounted-for fly ash discharged to air through stack and fugitive emissions (extrapolated estimate based on measurements and TNPCB emission data)

>> Report on compliance of Stage I and Stage II with Fly Ash Notification, 1999 as amended

>> Proposal to ensure compliance with Fly Ash Notification, 2022, including time-bound proposal for utilisation of legacy ash stored in Ash Dyke

3. Detailed baselines to be drawn up for:

>> Assessment of depth and spread of fly ash distribution in area of study (See Scope of Study above), including a detailed depth wise assessment of sediment quality to assess the depth of sediment that has to be removed and remediated; and the disposal options for dredged sediment.

>> Leachability test for metals may be performed on sediment samples

>> Surface water, groundwater and sediment quality assessment for heavy metals and other physico-chemical characteristics

>> Historical data and current baseline of flora in study area, with an emphasis on aquatic, salt marsh and estuarine flora

>> Historical data and current baseline of fauna in study area, with an emphasis on aquatic, salt marsh and estuarine fauna

>> Bioaccumulation of metals at various trophic levels of flora and fauna in aquatic food chain

>> Economic evaluation of Ennore wetlands in terms of goods and services, including ecological services, provided

>> Air quality in study area with an emphasis on identification of contribution to Particulate Matter pollution load by NCTPS and other thermal power plants in area

>> Health of residents and occupationally exposed persons in the study area

>> Health Infrastructure Assessment: Carry out an assessment of adequacy of available health infrastructure, including in public and private sectors, to cater to general health needs and needs specific to pollution impacted communities.

>>Recommend measures to improve health infrastructure.

>> Enumeration of fishers, including SC/ST women fishers, and persons engaged in other impacted occupations dependent on Ennore wetlands/ backwaters for livelihood

>> Availability and quality of drinking water

>> Regulatory infrastructure, mechanisms and challenges for enforcement of environmental laws.

>> State of ash dyke and impact of ash dyke on air, water.

>> Land-use, land cover

>> Comparison of baselines with historically available data regarding landuse, land cover including from traditional and community knowledge

4. Impact and Damage Assessment Studies

>> Detailed Impact and Damage Assessment as a result of current state of pollution on Environment – flora, fauna and environmental medium

>> Eco-toxicological study to determine risk to aquatic organisms;

>> Detailed assessment of impact on drainage including identification of areas made vulnerable due to compromised drainage

>> Health Impact Assessment: Carry out an assessment of health impacts of pollution due to NCTPS/TANGEDCO among local communities including women, children, power plant worker and fishers that are exposed coal toxins through inhalation, ingestion and dermal contact.

>> Carry out health risk assessment (cancer and non-cancer risk) for different sub-populations including children, fishers that are in contact with contaminated sediment and water, and others exposed through multiple routes

>> Livelihood impacts on vulnerable population, including factory workers, fishers (including SC/ST and women fishers), farmers

>> Assessment of compensation and liability

5. Remediation and Restoration

>> Develop risk-based environmental standards and remediation goals for air, water, land.

>> Remediation target levels to be holistic and based on biological, hydrological and livelihood criteria.

>> Restoration criteria to consider the multiple habitats in the study area, the measures to be taken to bring back target species, habitat resilience, ecological functionality.

>> Explore, in consultation with local fishers, and recommend on the option of restoring oyster beds/reefs (edible oyster Magallena bilineata) as a suggested remediation target for Ennore wetlands

>> Develop remediation and restoration plans, with costs and recommendations, for groundwater, surface water, sediment and flora/fauna/health and livelihood

>> Present plan for restoring native vegetation, including mangroves, in various habitats

>> Present a plan for flood mitigation in upstream areas, and improving drainage (of rain floods, storm surges, and daily tidal flows), including by reviving channels that have been lost due to contamination or encroachment

>> Present plan for habitat-specific restoration including of backwater channel, Buckingham Canal, salt marshes, salt pans etc.

>> Prepare a detailed waste handling, management and disposal plan

>> Present a detailed cost breakdown covering pre-remediation, remediation and long-term post-remediation works.

>> Steps to be taken to prevent pollution from ash ponds, including lining of ash dyke; decommissioning options in line with Flyash Notification, 2022

>> Present a plant to strengthen technical and regulatory measures to prevent future contamination due to ash handling from TANGEDCO's thermal plants in Ennore region.

6. Post-Remediation

>> Detailed plan for post-remediation monitoring with community involvement

>> Identify bioindicator species, and develop protocol for short and long-term monitoring of bioaccumulation of heavy and trace metals in various trophic levels

>> Proposal for documentation of pre-remediation, remediation and postremediation interventions to serve as a guide or manual for other similar initiatives

Objective:

1. sources of pollution and interventions required;

2. imminent threats and measures to be taken;

3. measures to be taken to ensure jobs and livelihood;

Annexure2

List of Large Red Category Industries in Ennore Manali Region

CPCL Refinery 1, 2, 3, Captive Power Plant

CPCL Propylene, Butylene Lube Plant

CPCL Resin Upgradation Plant

CPCL Hexane Plant

CPCL DHDS Plant

Madras Fertilisers Ltd

Tamil Nadu Petroproducts Ltd (LAB)

TNPL EPH

TNPL HCD

Manali Petrochemical Ltd (MPL - I)

MPL - II

Kothari Petrochemicals Ltd

NATCO Pharma Ltd

CETEX Chemicals

Indian Additives Ltd

SRF Ltd (Textile)

Balmer Lawrie Leather

Balmer Lawrie Grease

Balmer Lawrie Barrel

IOT Infrastructure & Energy Services Ltd (CPCL LPG Storage)

CPCL 20 MW Captive Power Plant

CPCL Tertiary treatment plant

CPCL Crude Oil Pipeline project

Madras Fluorine Products Ltd

INOX Air Products Ltd

Manali Petrochemical Ltd

Indian Oil Corporation Ltd, Bengaluru Pipeline project

IOCL, ATF pipeline, Airport

IOCL, Madurai Pipeline

CETEX Petrochemical

MFL

North Chennai Thermal Power Station, Stages I, II, III (Under construction), IV (Under construction)

NTECL, Vallur TPP

Kamarajar Port Ltd

L&T Shipbuilding

Adani Kattupalli MIDPL Port

Chettinad International Coal Terminal

Ashok Leyland

Gulf Oil

Piramal Pharma

Coromandel International Ltd

Kothari Fertilisers