TAMIL NADU ENVIRONMENTAL REPORT CARD

THE PATH BEHIND AND THE WAY FORWARD

POOVULAGIN NANBARGAL

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Tamil Nadu Environmental Report Card - The Path behind and the way forward ● Editors : K.Kavitha Muralidharan ● M.Vetriselvan ● V.Prabhakaran ● L.Satheesh | P.Lokesh ●

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INTRODUCTION

Tamil Nadu has seen an increased number of protests around the environment in the recent years. It has also seen a greater number of natural disasters in the last decade or so than before. While political parties have started looking at environmental issues seriously – some have even set up an environmental wing – will that be just enough?

Tamil Nadu is heading towards a historic election that will perhaps seal its fate for the next few decades to come. Even as political parties are battling it over the electoral ground – in the absence of two tall leaders who had helmed the elections before – there is one striking aspect that this election will be known for Environment. There is perhaps an increased consciousness about environmental issues in Tamil Nadu in the last few years. It reflects in the elections. Manifestos of several political parties have included environmental concerns raised by several environmental groups over the years. At least one political party speaks of Paris Agreement in its manifesto. The parties have spelled out plans for water management, waste management, etc besides promises to scrap development projects that have seen the general public protest.

DMK, one of the two major Dravidian parties in the State, and which had ruled the State till ten years ago has started an environmental wing a few months before the elections. Karthikeya Sivasenapathi, who is the secretary of the DMK's environmental wing, is also contesting elections this time. Similarly, actor Kamalhaasan's Makkal Neethi Maiyam also has an environment wing, the secretary of which – Padma Priya – is also a contestant in the polls. Tamil Nationalist Party Naam Thamizhar's chief Seeman has announced that he was contesting from Thiruvottriyur to stop the expansion of Kaatuppalli port, against which the locals are up in the arms. Several other important players in the State politics like the Ambedkarite party Viduthalai Chiruthaigal Katchi(VCK), Marumalarchi Dravidar Munnetra Kazhagam (MDMK), Paattali Makkal Katchi (PMK) have been environmentally active over the years standing with people on their various struggles against projects that were both environmentally hazardous and posed a challenge to their livelihoods. This election also saw the ruling party promise to the voters to stop the expansion of the Kaatupalli port, ironically for which it was responsible.

The elections thus see the platforming of environmental issues. But the electoral validation of environmental concerns did not happen in a day. There were several social and environmental movements like Poovulagin Nanbargal, Chennai Solidarity Group, May 17, and Ilanthamizhagam which consistently propagated among the general public on environmental issues that affect the State. The public is now hit by the reality of climate change when their fish catch is significantly down when compared to two or three decades ago. Also, Tamil Nadu has seen many natural disasters – floods, cyclones, drought, etc – which experts opine is a result of climate change.

Tamil Nadu is a land of protests. According to data, Tamil Nadu tops the list of the most number protests held in India from 2009 till 2017. On average, 20,000 odd protests are happening in the State every year. Observers say Tamil Nadu's character is essentially restive. From anti-Hindi agitations in the 1930s to till date, protests define the State's character.

Yet in the last decade or so, Tamil Nadu had witnessed a large number of protests around environmental concerns. The Kudankulam protests of 2011 redefined the character of protests in Tamil Nadu. The protests at Kathiramangalam and Neduvasal against hydrocarbon projects made the rulers promise what was till then otherwise unthinkable – no anti-farmer project will be implemented. The protests against Sterlite in Thoothukudi district touched the State's raw nerve. From Kudankulam to Kaatupalli, public protests against 'development' projects have become a norm of the day – perhaps indicative of the increased environmental consciousness. From Kudankulam to Kaatupalli, the development projects have either come up or coming up at the cost of the livelihood of the poor. Environmental issues are now hitting the livelihoods of the poor. It is hence not surprising that they are also becoming electoral issues. For Tamil Nadu, this is just the beginning. In years to come, we may witness a more aggressive and sustained campaign of environmental concerns actively taken up by mainstream political parties, failing which they might have to lose the patronage of the poor. This 2021 election has sowed the seeds for just that.

This environment report card is a comprehensive study of environmental concerns raised over the last few years. The last decade or so is turbulent in terms of environmental issues. There have been protests, disasters, etc. In this report, we have identified some issues that are fundamentally connected to the people, and which pose serious environmental challenges to the State. A team of us have delved into these issues, on what kind of impact the issues had, the reactions, and results. We are particularly grateful to Nityanand Jayaraman and Chennai Solidarity group for their invaluable inputs that have gone into shaping this report. This report is in a way looking behind but also thinking forward.

By looking behind, by seeing how it has been addressed by the political parties including the ruling entity, we believe we could learn some invaluable lessons that will stand us in good stead in the future. We do this because we wanted to remember and remind. The idea is to serve as a reminder, as a warning for political parties to act. Because when it comes to environment, there is no possibility for a course correction.

WATER

Water is a major challenge in a state like Tamil Nadu. A 2019 water scarcity in Chennai hit international headlines like never before. The depletion of groundwater resources continues to pose major challenges to the State. This section elaborates on these crisis and explains what went wrong, and whether the steps to set things right yielded any fruits.

Chennai water crisis 2019

Considered one of the liveable cities in India, Chennai faced a historically unprecedented water crisis in 2019. This was however not the first incident of water crisis to hit Chennai. The city has faced severe drought in 1947, 1954, 1968, from 1972 to 1975, 1982, 1983, and 2000 to 2003. Yet the drought of 2019 was the worst and remains unprecedented.

The water crisis that usually begins around the months of April or May in Chennai started in February 2019. According to The Rain Centre, a study conducted in the 24 wells of Chennai around that time revealed that eight of them were dry. In February 2019, the water was distributed to the general public of Chennai only once in six days. This speaks volumes of the enormity of the crisis that had hit Chennai. That the drought came in barely four years after a massive flood – which left the city ravaged – left its ordinary citizens baffled. Chennai's daily drinking water requirement stands at 830 MLD. Chennai's water resources could only meet 550 MLD of this requirement. Generally, besides the water provided by the Chennai Metro Water department, the rest was met by groundwater resources. But in 2019, the groundwater was depleted, leading to a massive drought.

According to Chennai Metro Water, there was a stock of only 893 MCFT of the 4969 MCFT water resources by February 2019. The situation continued through April and May, and in June the water crisis reached its zenith. Several IT companies had to ask their employees to work from home (and this was much before the Covid onslaught). Around 20,000 employees in Chennai worked from home at that point. Several hotels and restaurants were closed due to water scarcity. A private hospital in Chrompet – a suburb of Chennai – struggled without water even to treat its patients. The surgeries that had to happen on daily basis were stopped because there was no water. The 13 government hospitals in Chennai required one crore liter of drinking water daily but the Chennai Metro Water could only supply 60 lakh litres every day.

A Tanker lorry of water (amounting to 12,000 litres) sold at Rs 1200 during normal days was sold at Rs 4000 in 2019. The Tanker lorries had to be sent off to long distances to procure water.[2] Sometimes this was done at the cost of people living on the outskirts. AT Thiruvallur, a district near Chennai, the people came to the streets protesting the 'theft of their water.' Villagers from at least seven villages in this district claimed that their groundwater was being stolen to sell to high-rise Malls in Chennai and held a series of protests. They claimed an alarming number of borewells also came up for the purpose in a short span of time, turning detrimental to their livelihoods. The villagers said that a well that was serving them for a century now without getting dry had dried up after the borewells came up. Experts call this phenomenon as a cone of depression – wherein when the water is drawn from a well, the lower pressure inside it pulls water from sources around into itself. The zone of lower pressure is called the cone of depression.


2018


2019

The drought that brought international attention The severe, unprecedented drought of Chennai and the suffering of its citizens attracted international attention. It was even covered in the USA's New York Times. The New York Times dated June 21, 2019, carried an article titled "Chennai, an Indian City of Nearly 5 million, is running out of water". The article written by Somini Sengupta had satellite images depicting the drought.[3] The images showed how Chennai is starved of water, how the lakes of Chennai – one of the biggest cities in India – were running dry. The report showed images of Puzhal lake taken on June 15, 2018, and in June 2019.

Internationally acclaimed actor Leonardo Di Caprio who had acted in famous films including Titanic and The Revenant shared the BBC's coverage of Chennai's drought on his Instagram page. He said in the post: "Only rain can save Chennai from this situation." A well empty, and a city without water. The southern Indian city of Chennai is in crisis after the four main water reservoirs ran completely dry. The acute water shortage has forced the city to scramble for urgent solutions and residents have to stand in line for hours to get water from government tanks. As the water levels depleted, hotels and restaurants started to shut down temporarily, and the air con was turned off in the city's metro. Officials in the city continue to try and find alternative sources of water - but the community continues to pray for rain."[4]

The response of political parties.

Almost all the political parties joined the general public in protesting the unprecedented water crisis and the government's stated apathy.

The severe, unprecedented drought led to largescale public protests by people on roads with empty vessels. On June 22 in 2019, the opposition party DMK organized demonstrations at all district headquarters in the State condemning the water crisis. The posters read: The water is dry. The eyes are full of tears. In a statement issued by the DMK on water scarcity [5], it says "What was the action taken to solve the water crisis? The government was well aware that there was a depletion of groundwater yet why dint it take any step? Even the High Court judges have raised this question to the AIADMK government. Despite all this, the AIADMK Ministers and the Chief Minister have been giving interviews that delegitimize the protests held by the general public and poking fun at women struggling to find some water. Restaurants are being closed, Students are struggling without water in schools, Hotels are being closed and IT employees are asked to work from home. People of Chennai and Tamil Nadu continue to be in distress because of this water scarcity. Yet the government claims that there is no water crisis. We condemn the indifference of the AIADMK government and demand that the water crisis problem is solved in war-footing."

Tamil Nadu Congress Committee president K S Azhagiri said that there was no action taken on the unprecedented water crisis and despite complaints from the general public, the rulers continue to shift their responsibilities. He accused the government of lacking any foresighted plan for water management. He also pointed out that no water body in Tamil Nadu was till then desilted[6]. He said the State government led by the AIADMK had not introduced any irrigation scheme in the last ten years it was in power. He demanded to know how much has the government spent on water management. The Dravidar Kazhagam president K Veeramani said the government had failed to foresee the crisis despite sufficient warnings from water experts and retired bureaucrats.

The response of the government

In March 2019, the state government had declared that 24 of 32 districts have been hit by hydrological drought. At least 19 districts have reported a fall in groundwater levels in 2019, compared to only three districts in 2018. But in May 2019 when Chennai and many districts of Tamil Nadu were reeling under water crisis, the State government came up with a weird response to hold yagnas across 4000 temples in Tamil Nadu seeking divine intervention to end the crisis. A circular issued by

the Hindu Religious and Charitable Endowments (HR & CE) department has urged the authorities of temples under its control to perform yagnas to beget rains. Dated April 28, the circular explains the ways by which the yagnas are to be performed. This includes constructing a water tank around Nandhi and filling it with water to the level of Nandhi's neck, and arranging music concerts involving ragas like Amirthavarshini, Megavarshini, and Kethari that would supposedly please the rain gods.

But after widespread protests and reactions from all quarters including the general public, political parties, and courts, Chief Minister Edappadi Palanisamy made an important announcement. He said Rs 65 crore would be set aside for bringing 10 MLD water to Chennai from Vellore through separate trains. Steps were taken to bring one crore litre of water every day through wagons from July 12. But for various reasons, for each wagon, only 25,000 litres of water were brought to Chennai[7]. From July 23, it was raised to 50,000 litres. The work was coordinated by metro water authorities and involved over 50 personnel. The Cauvery joint drinking water scheme water was brought to Chennai every day in two trains – morning and evening. In total, the water came to Chennai 159 times and amounted to 420 million litres of water.[8]

The water trains were stopped after Chennai had enough supply of drinking water by August. By that time, there were also sufficient water levels in Veeranam, Poondi and Chembarambakkam lakes. At around the same time, water was taken from 210 irrigational wells in Thiruvallur district to handle the crisis. 65 MLD of water was taken on a daily basis from villages including Pullarambakkam, Maamandoor, Movur, Sathurangapettai, and Gandhi Nagar. Water was also taken from 22 quarries including the stone quarry Chikkarayapuram.

The Chief Minister and Local administration Minister who claimed that there was no water scarcity anywhere in Tamil Nadu at the beginning of 2019 had to give in to the pressure mounted by the opposition parties, general public and the courts and took the steps. They followed it up by speeding up the plans for a reservoir in Thervai Kandigai which came into use by 2020. The government had also planned to convert the Chikkarayapuram stone quarry in the Kanchipuram district as a new reservoir. The stone quarry serves up water to be used during drought. At present, the State has plans to convert it into a permanent reservoir and works have been initiated by the Public Works department for the same. It has been estimated that this will involve a cost of Rs 25 crores. It has been planned to bring in the excess water let out of Chembarambakkam lake to this reservoir through a small channel. The Chennai zone's water resources management team working under the Public Works department is currently working on a project report for this.

THE DEPLETION OF GROUNDWATER

According to the Tamil Nadu water resources department, of the 34 big rivers in the State, 17 have been categorized as river basins and 177 as basins. Indian Meteorological Department says the average rainfall of the State is 920.90 MM. The total surface water resource including the 249 TMC water received from neighboring states based on agreements is at 885 TMC [9].

Experts say the groundwater resources in Tamil Nadu stand at 22,423 MCM. About 60 percent of this has already been depleted and currently, we have only 40 percent (8875 MCM). According to the study conducted by the Water Resources department, of the 1166 firkas, 462 have been classified as over exploited, 79 as critical, 163 as semi critical, 35 as saline, and 427 as safe. According to this data, a ban exists on taking groundwater from 541 firkas. Yet across the State groundwater continues to be stolen illegally and without permission.

The State capital (Chennai) faces a water crisis every time there is a monsoon failure. Chennai's everyday drinking water requirement is about 850 MLD. But in summer only 500 MLD to 550 MLD of water are distributed every day. The remaining requirement is met by groundwater. It is only when there is a monsoon failure coupled with groundwater scarcity, the crisis hits. 2019 faced such a crisis. The city's water requirements were completely dependent on private tanker lorries. Rainfall plays an important role in fulfilling the drinking water and irrigation needs of Tamil Nadu. Of the 920.90 mm average rainfall, the rainfall during Winter, Summer, Southwest, and northeast monsoons are respectively 3 percent, 14 percent, and 48 percent.

Tamil Nadu gets rainfall in both the important monsoon seasons. During the Southwest monsoon (June to September), there is about 35 percent of rainfall and during the Northeast monsoon

(October - December), there is about 48 percent of rainfall. The rainfall during the Northeast and Southwest monsoons helps increase the groundwater resources and other resources used for water distribution. This helps the State cope up with the demands till the next seasonal rains.

The average rainfall during the winter (January-February months) was around 31.3mm. But in 2018, Tamil Nadu received only 16.7mm rainfall in those months. This is 47 percent below the average. The average rainfall during summer (March-May) was around 128mm but in 2018 it was 153.7mm. This is 20 percent higher than the average. The average rainfall during the Southwest monsoon (June-September) is 321.2 mm but in 2018, it was around 282.9 mm. This is 12 percent below the average. The average rainfall during the Northeast monsoon (October-December) is 440.4mm but in 2018, it was at 336.5mm which was 24 percent below the average. In total, Tamil Nadu received only 789.9mm rainfall in 2018 than the average 920.9mm which was 14 percent below the average. It was because of this that there was an acute water scarcity since the beginning of 2019 across Tamil Nadu. There was rampant illegal groundwater extraction across the State owing to this.

The response of political parties

Several political parties across Tamil Nadu held demonstrations against illegal groundwater extraction. The problem was widespread and there were protests everywhere. In July 2019, the people of Madurai led by the ruling party's MLA SS Saravanan laid siege to the office of Corporation commissioner protesting the non-availability of water in several wards ever since the Corporation had started distributing water once in every four days.[10] While the DMK, CPI(M), and Congress held some protests, most of these protests were spontaneous outbursts of the general public. In 2018, the general public at Rameswaram held a protest by tying flowers on their ears (symbolizing getting cheated) to protest the illegal groundwater extraction despite the court order and demanding action[11]

In 2017, SDPI State president Tehlan Bagvi, Pachai Thamizhagam president SP Udayakumar and coordinator of protection of environment movement in Tamil Nadu SP Mugilan led the protests against groundwater extraction for private industries in Thoothukudi. They held the protests along with goats and dogs at Srivaikundam bus stand [12]. Since 2019 was also an election year, the opposition parties used the opportunity to speak about water scarcity. Interestingly the ruling AIADMK

appealed to the Election Commission to hold elections in a single phase since May will witness a huge water scarcity [13].

The response of the government

The State government took steps to set right the unprecedented water crisis in 2018 and 2019 after the opposition parties and the general public held a series of protests. The State also declared 24 districts and 38 zones of seven districts as hit by a hydrological drought in a 2019 Government order[14]. Following this, the State also allotted Rs 288.78 crore from the State disaster relief fund to cope up with the drought and water crisis.

Of this, 56.05 crores went to Municipal administration, 19.84 crores to local panchayats, and 43.24 crores to Tamil Nadu Water Supply and Drainage Board (TWAD). The Chennai Metro Water received 169.65 crores. After the Madras High Court order directing action against groundwater extraction, illegal industries and water can production companies were sealed and closed by the district administrations. Since the Ground Water Resources Document Centre did not have the authority to seal the industries, a committee temporarily constituted under the district collectors took the action after field visits. The committee continues to monitor the availability of flow meters in companies, whether the industries stick to the stipulated water quantity and whether there is any illegal groundwater extraction. The State decided to empower the Ground and surface water resources data centre to do this work and set up a groundwater tribunal under it. The tribunal will have PWD, Revenue, and Judiciary as its members. The PWD has announced that this tribunal will oversee the process of no-objection certificates to be given to industries doing groundwater extraction, take action against industries that do illegal extraction, levy a fine, recommend prison sentence, etc.

WILDLIFE AND FOREST

Wildlife and forest have been turning into a major environmental concern for two major reasons: the rising man-animal conflict which leads to losses on all fronts including the economy. Also, the rising elephant deaths in the State, some of which are an outcome of the man-animal conflict. This section presents the growing man-animal conflict and its consequences. While it is largely not a political concern, parties and civil society has reacted whenever it involves a 'barbaric attack' on an elephant.

The rising Man-animal Conflict

According to the State of Forest Report released by the Central government in 2019, the forest cover in Tamil Nadu is about 26,364 square kilometers. It is 20.27 percent of Tamil Nadu's total landscape. The report says that the forest cover has grown by 83 sq km since the 2017 census. Even though the cover has increased, the incidence of animals leaving the forests has also increased.[15]

Responding to a question raised in Parliament, Central Agriculture department Minister Narendra Singh Tomar said that in the last three years, incidents of animals stepping out of forests and destroying crops have increased in Tamil Nadu.[16]

He said that there were 1,976 such incidents in 2017, 2158 in 2018, and 3,478 in 2019. The fact that there is an increase in incidents of animals leaving forests and destroying crops despite the growing forest cover points to increasing encroachments in the forests. The Central Minister said that around 181.41 lakhs were awarded as compensation for destroyed crops in Tamil Nadu in 2017, 215.51 lakhs in 2018, and 41 lakhs till November 2019.

In the last five years, 246 persons have been killed by elephants in the State. While between 2016 to 2019, the number of those who died by elephant attacks was less than fifty, in 2020, the figure crossed 50 for the first time. In Tamil Nadu, if a crop is destroyed by an elephant, bear, or a wild boar, a farmer should appeal to three different officers – Village Administrative officer, forest officer, and horticultural department officer to avail compensation. With the numbers of such incidents on the rise, the farmers have also started to demand that the process of getting compensation to be simplified.

Increasing elephant deaths

According to the 2017 census, the number of elephants in Tamil Nadu stands at 2,761. But there is an increasing number of elephant deaths due to various reasons including deforestation, encroachment of forests, water scarcity, and construction in forest areas. The following information on elephant deaths has been obtained from the Tamil Nadu forest department under RTI

2015 - 61

2016 - 98

2017 - 125

2018 - 84

2019 - 108

Till September 2020, 85 elephants have died. This means that 561 elephants have died in the last six years.

It was also revealed that till July 2020, 7 elephants including three calves were electrocuted. The forest department says that 167 elephants have died in Erode zone, 134 in Coimbatore Zone, and 89 in the Dharmapuri zone in the last six years.

Encroachment of forests

One of the important reasons for animals to leave forests is the encroachment of forest lands. The Chennai High Court in 2011 had stayed the construction of restaurants and hotels encroaching the elephant path in Masinagudi village near Mudhumalai sanctuary in Nilgiris district. The court also directed the landowners and hotel owners to handover their residential properties to the district collector.

An appeal was made in Supreme Court by those affected by the order. The case was tried along with another case filed by one Rangarajan demanding a ban on construction activity on the elephant paths.

In an affidavit filed in this case in November 2018, then Nilgiris district collector Innocent Divya said that 39 resorts were encroaching the elephant paths. This included 309 buildings including restaurants. There were 390 houses, 27 encroachments including public toilets, 9 tea estates, 77 farm-land encroachments, and 9 miscellaneous construction sites. In total there were 821 encroachments.

The response of political parties

As far as elephant deaths are concerned, Tamil Nadu's political parties are not as aggressive as they are in other issues. Individual politicians and animal activists however keep up the momentum. DMK MLA and former Minister Thangam Thennarasu raised his voice against the elephant deaths through his social media pages. But the political parties strongly condemned the recent incident wherein a male elephant in Masinakudi was set on fire by owners of a private resort. The owners hurled a burning tyre on the elephant leading to its death in few days.

The response of the government

In response to concerns raised by environmental activists on elephant deaths, the Tamil Nadu forest department claimed that the deaths were 'natural.' But bowing to pressure from the general public and political parties, the State constituted a committee to look into elephant deaths.

A committee comprising principal chief conservator of forest Shekar Kumar Neeraj as president and Madurai district forest officer Anand as secretary was formed in July 2020. The committee had nine members in all.

The committee was directed to file its report by December 31, 2020, on various issues including the number of elephants in Tamil Nadu, steps taken to prevent man-elephant conflict, steps to be taken in the future, action plan on improving the elephant path, research on birth and death of elephants and steps to be taken to reduce elephant deaths. But the committee is yet to submit its report.

The local administration has also set up beehives in places identified as 'intruded by elephants' following the demands of farmers associations to stop the man-elephant conflict.

The farmers association is also consistently raising their voices demanding that the process of applying for compensation for crops destroyed by animals be made simple.

In totality, the political parties make an issue of this crisis only when there is an eventuality like a death of an elephant. It reflects a sad state of affairs in Tamil Nadu.

CLIMATE CHANGE AND TAMIL NADU

Climate Change in today's global order has become intertwined with electoral politics, the Presidential elections in the US are a recent example. As it threatens the very existence of humans in this world it is a critical issue that would affect TN very much. TN has a diverse geography, with 1,076KM length of Coastline, seasonal rivers that depend on the Western Ghats, Delta which was once the rice bowl of Tamil Nadu. With the UNCCD report saying that 30% of the world's landmass getting desertified TN also faces this major issue. Climate change gives a clarion call to humanity that includes civil society groups, political parties, and others.

Intergovernmental Panel on Climate Change (IPCC) special report says: Climate Change related risks depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options. India is already one of the most vulnerable countries to climate change. CSE study says that between 1901 and 2017, India has warmed by almost 1.2˚C more than the global average temperature.[17]

A report of the Ministry of Earth Sciences says that "India's average temperature has risen by around 0.7°C during 1901 – 2018. In the recent 30 – years period (1986 – 2015), the temperature of the warmest day and the coldest night of the year have risen by about 0.63°C and 0.4°C, respectively. By the end of the twenty–first century, these temperatures are projected to rise by approximately 4.7°C and 5.5°C, respectively. Sea surface temperature of the tropical Indian Ocean has risen by 1°C on average during 1951 – 2015, markedly higher than the global average warming of 0.7°C. Ocean heat content in the upper 700m of the tropical Indian Ocean has also exhibited an increasing trend over the past six decades (1955 – 2015), with the past two decades (1998 – 2015) having witnessed a notably abrupt rise. The summer monsoon precipitation (June to September) over India has declined by around 6% from 1951 to 2015, with notable decreases over the Indo-Gangetic Plains and the Western Ghats. The overall decrease of seasonal summer monsoon rainfall during the last 6-7 decades has led to an increased propensity for droughts over India. Sea-level rise in the North Indian Ocean occurred at a rate of 1.06-1.75 mm per year during 1874-2004 and has accelerated to 3.3 mm per year in the last two and a half decades (1993-2017), which is comparable to the current rate of global mean sea-level rise. The frequency of very severe cyclonic storms during the post-monsoon season has increased significantly during the last two decades (2000– 2018)[18].

The climate of Tamil Nadu is strikingly different from the general climate of the country. Due to its topographical features and geographical area, the climate of Tamil Nadu is referred to as semiarid and tropical monsoon.

The draft Tamil Nadu State Action Plan on Climate Change (2019) says that the "State is frequently subjected to extreme weather conditions such as flooding in the coastal districts and severe droughts in some areas due to monsoon failure, which consequently affects the production and productivity of the food grains. Drought, water depletion, soil erosion, seawater incursion, forest fire, species extinction, and thermal discomfort, etc. are the major evidence of climate change. Additionally, due to

Climate Extremities, the State is facing noticeably higher incidence of Extreme Climate Events and hence, immediate action is required to analyze the current and future climate trends of the State."19

Climate Change Projections of Tamil Nadu

The regional climate change projections for the State of Tamil Nadu done by experts say that "for the Tamil Nadu as a whole, the projections of maximum temperature show an increase of 1.0, 2.2, and 3.1°C for the periods the 2020s (2005–2035), 2050s (2035–2065), and 2080s (2065–2095), respectively, with respect to the baseline period (1970–2000). Similarly, the projections of minimum temperature show an increase of 1.1, 2.4, and 3.5°C, respectively. This increasing trend is statistically significant (Mann-Kendall trend test). The annual rainfall projections for the same periods indicate a general decrease in rainfall of about 2–7, 1–4, and 4–9 %, respectively. However, significant exceptions are noticed over some pockets of western hilly areas and high rainfall areas where increases in rainfall are seen. There are also indications of increasing heavy rainfall events during the northeast monsoon season and a slight decrease during the southwest monsoon season."[20]

Action Plan on Climate Change:

Though India was a signatory to the UN Framework on Climate Change (1992) and Kyoto Protocol (1997), the National Action Plan on Climate Change was formulated only in the year 2008. As such Tamil Nadu Action Plan on Climate Change was formulated in the year 2014. Thereafter a draft Tamil Nadu Action Plan on Climate Change was notified in the year 2019 for public opinion. The said draft is pending finalization by the State of Tamil Nadu.

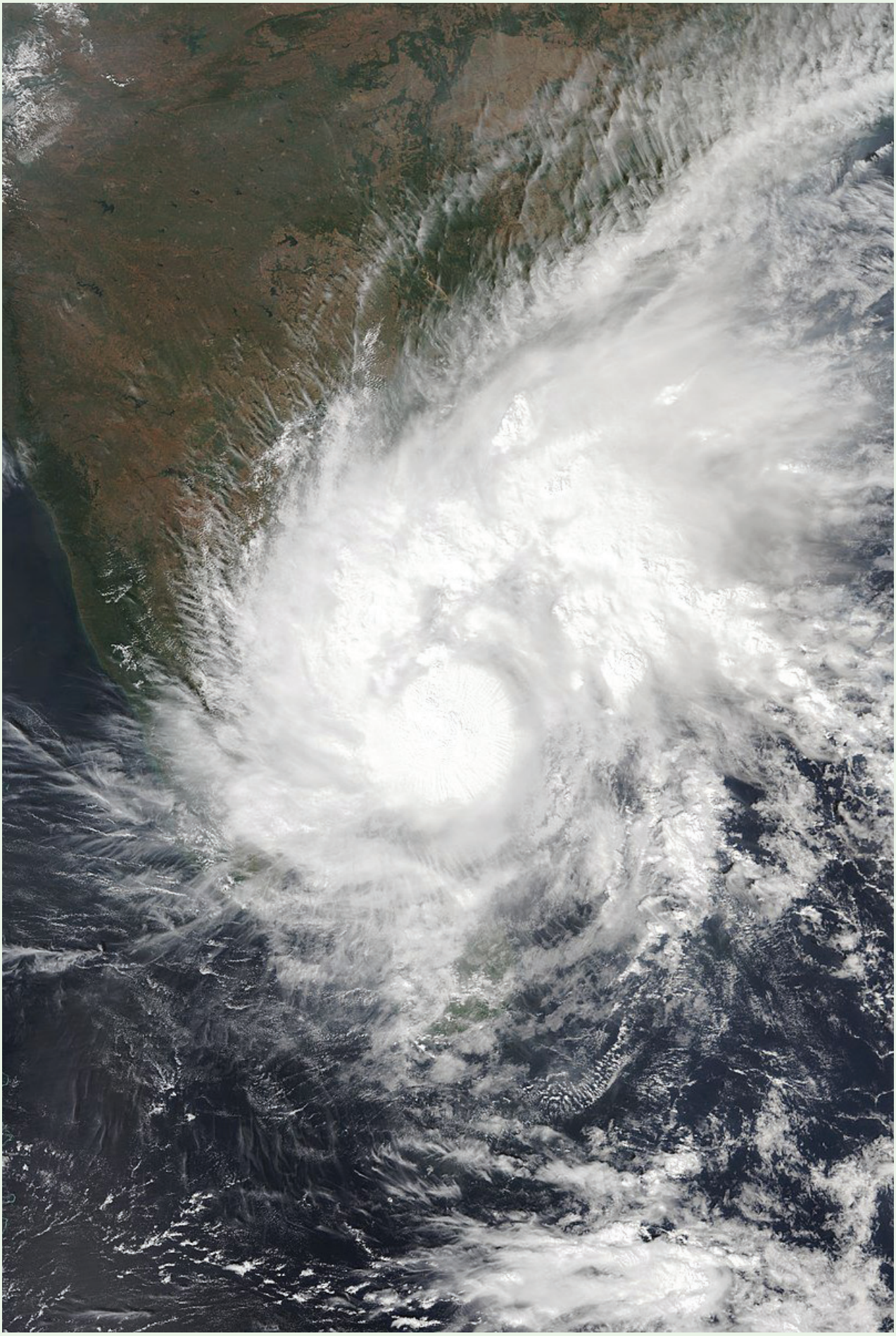
Vulnerabilities of Climate Change:

Climate change affects agriculture in several ways, including massive changes in average temperatures, rainfall, and climate extremes (e.g., heat waves); changes in pests and diseases; changes in atmospheric carbon dioxide and ground-level ozone concentrations; changes in the nutritional quality of some foods, and changes in sea level. The Agricultural vulnerability of Tamil Nadu to Climate Change has shown that all districts in an agro-climatic zone do not fall under the same category of vulnerability. The Current Agriculture Vulnerability for the Districts of Tamil Nadu has been assessed by GIZ and Integrated Natural Resource Management. Chennai district has shown very high vulnerability (There is no agriculture activity) which is located in the North-Eastern zone of Tamil Nadu. Further, Ramanathapuram, Thoothukkudi, Virudhunagar, Dindigul, Nilgiris, Sivagangai, and Kanyakumari districts fall under the high vulnerability category.

The major contributing factors include food grains yield, irrigated area, net sown area, fertilizer consumption, milk and egg production, low livestock and poultry population. [21]

As per current water vulnerability, Erode, Krishnagiri, Namakkal, Thoothukkudi, Karur, Salem, and Virudhunagar districts have shown very high vulnerability. The major contributing factors include higher drought frequency, lower surface water availability, and high crop water stress. Further, Madurai, Kanniyakumari, Dharmapuri, Tirunelveli, Vellore, Tiruvannamalai, and Ramanathapuram fall under the high vulnerability category and nine districts namely, Tiruppur, Sivaganga, Viluppuram, Kancheepuram, Tiruchirappalli, Dindigul, Coimbatore, Pudukkottai, and Thiruvallur fall under the moderate vulnerability category. The overall water resources vulnerability of the districts is projected to decrease towards the mid-and end century when compared to the current conditions.[22]

A drastic climatic change has severe impacts on various ecosystems especially the forest ecosystem and its biodiversity. It is likely that changing temperature and precipitation patterns will produce a strong direct impact on tropical forests. Besides, for forestry, the climate change-induced modifications of frequency and intensity of forest fires, outbreaks of insects and pathogens, and ex-



treme events such as high winds, topsoil erosion may be more important than the direct impact of higher temperatures and elevated CO2.

Academic papers have suggested that the changing climate through recent vagaries in the temperature and rainfall, and their impending impact on tropical ecosystems. Because of the long lifespan of trees in forest ecosystems, they cannot adapt easily to major changes to the climate. There is evidence to prove that climate change has had an impact on the fish catch in places like Pamban of Ramanathapuram district.

Climate change and increasing cyclones

It is important to note that the historical record of cyclonic storms that crossed the coast of Tamil Nadu in the last three decades shows that an average of two cyclonic storms occurred in a decade [23]. In November 2000, a severe cyclonic storm crossed the coast at Cuddalore at 110 kmph wind speed. Cyclone Nisha in 2008, cyclone Laila in 2010, and cyclone Thane in 2011were the worst-hit cyclones of Tamil Nadu coast along with cyclone Jal in 2010, cyclone Nilam in 2012 and cyclone Phailin in 2013, Flood at Chennai in 2015, Vardah cyclone in 2016, Ockhi cyclone in2017, and Gaja Cyclone in 2018. In addition, the Projection of climate change-induced sea-level rise for the coasts of Tamil Nadu accelerated rise in sea level due to changing climate poses a serious threat to coastal resources and coastal communities of Tamil Nadu.

Climate Change Vulnerability assessment

An index-based vulnerability assessment done in Coastal districts of Tamil Nadu choosing groundwater, agriculture, and fisheries sectors says that Villupuram and Thanjavur districts exhibited very high vulnerability in the groundwater sector, while Ramanathapuram and Thoothukudi districts showed the highest vulnerability in the agricultural sector and Thoothukudi and Villupuram districts in the fisheries sector. From the overall composite vulnerability assessment, Thoothukudi and Villupuram districts required immediate attention as it falls under high to very high vulnerability category in all the three sectors among 13 coastal districts.[24]

Impacts under Sustainable Habitat have been categorized into Housing, Drinking Water, Urban Development, Health and Sanitation, Waste Management, Transport, Energy, Pollution and Greening of Urban Spaces.

Concerning the present climate, 5 districts, namely Ramanathapuram, Vellore, Viluppuram, Krishnagiri, and Nagapattinam, fall under the very high vulnerability category followed by the 6 districts, Dharmapuri, Thoothukkudi, Ariyalur, Cuddalore, Virudhunagar, and Sivaganga, under high vulnerability; 13 districts, namely Karur, Thanjavur, Pudukkottai, Salem, Tiruvannamalai, Dindigul, Tirunelveli, Perambalur, Thiruvarur, Kancheepuram, Thiruvallur, Tiruchirappalli and Madurai, under moderate vulnerability; 5 districts, Erode, Namakkal, Nilgiris, Theni, and Kanniyakumari, under low vulnerability and 3 districts, Coimbatore, Tiruppur, and Chennai, under very low vulnerability category. [25]

Climate change and Floods

Tamil Nadu generally receives copious rains during the Northeast monsoon. Heavy downpour within a short duration results in a severe flood, causing great risk of damage to life and property of the people and the States assets like irrigation infrastructure, roads, etc. Every year the most vulnerable coastal districts such as Cuddalore, Nagapattinam, Thanjavur, and Thiruvarur are prone to floods. Urban flooding is another significant problem in Tamil Nadu. The city of Chennai and its suburban areas are worst affected by floods, because of improper drainage, encroachment of water bodies and waterways. In the last three decades, Chennai metropolitan area has experienced heavy floods during the years 1976, 1985, 1996, 1998, 2005, 2007, and 2008. The2015 flooding was caused by torrential rain over four weeks in October and early November which was compounded by the more seasonal monsoon storms that hit the region in late November.

Delta Vulnerability

One of the vital issues confronting the Cauvery delta is subsidence (or sinking delta) says Prof S.Janakarajan and warns that today's subsidence may become tomorrow's submergence. He also points out that, withdrawals of water, oil, and gas cause sinking of the land surface at rates more rapid than geological subsidence. Cauvery delta is located in the low elevation coastal zone, facing the huge threat of seawater rise, cyclones, storm surges, coastal erosion, and saltwater intrusion, and so forth. Furthermore, climate change-induced sea-level rise poses more threat to the Cauvery delta. On the whole, the socio-economic conditions of farmers are dreadfully vulnerable.[26]

Media on Climate Change

Though news relating to extreme climatic events, like floods, cyclones are widely covered by both print and visual media, still there exists more vacuum on reporting policy-wise decisions on climate change. Moreover, less space has been accorded to the international perspective of climate change-related discussions. The importance of the Paris agreement on climate change was not adequately reported. Much has been reported on the science of climate change and the impacts of climate change, but less has been reported on the politics of climate change. The role of State instruments in safeguarded people from the impacts of climate change has not been adequately reported.

The Hindu, New Indian Express, Times of India, Frontline, Fountain Ink, made more contributions than their Tamil media counterparts, in reporting climate change-related issues. Climate Change Policy framework such as Paris Agreement, India's Nationally Determined Contributions, National Action Plan on Climate Change, Tamil Nadu State Action Plan on Climate Change, and other National missions on climate change are poorly reported.

The response of political parties

Unfortunately, the 2021 State Assembly election manifesto of all the major political parties (including DMK and ADMK), are silent on climate change related issues. Neither, mitigation nor adaptive plans needed for tackling climate change are mentioned. Relief for cyclone affected peoples has been mentioned in the manifesto of DMK. Biodiversity conservation steps actions needed for tackling climate change doesn't find any place in the manifesto.

Paatali Makkal Katchi (PMK) is the only political party to speak about Climate Change and Paris Convention in its manifesto. The manifesto says steps will be taken to implement the suitable ideas from Sustainable Development Goals 2030, Paris Climate Agreement 2015, New Urban Agenda 2016, Post-20 Biodiversity Framework, and Targets and Sendai framework for disaster risk and reduction (2015-2030). The manifesto also promises to declare a climate emergency if the alliance it is part of is voted to power. However, except for the PMK, no other political party seem to have given a thought to climate change.

A revised draft of Tamil Nadu's Climate Change Action Plan in February 2020 aims to undertake 199 activities falling under seven sectors – sustainable agriculture, water resources, forest and biodiversity, coastal area management, strategic knowledge for climate change, disaster management and mitigation, and health and sanitation – to address the vulnerability caused due to climate change. But there were several inadequacies in the draft, including not being translated into Tamil – something that is fundamental when it involves players like farmers and other vulnerable communities.

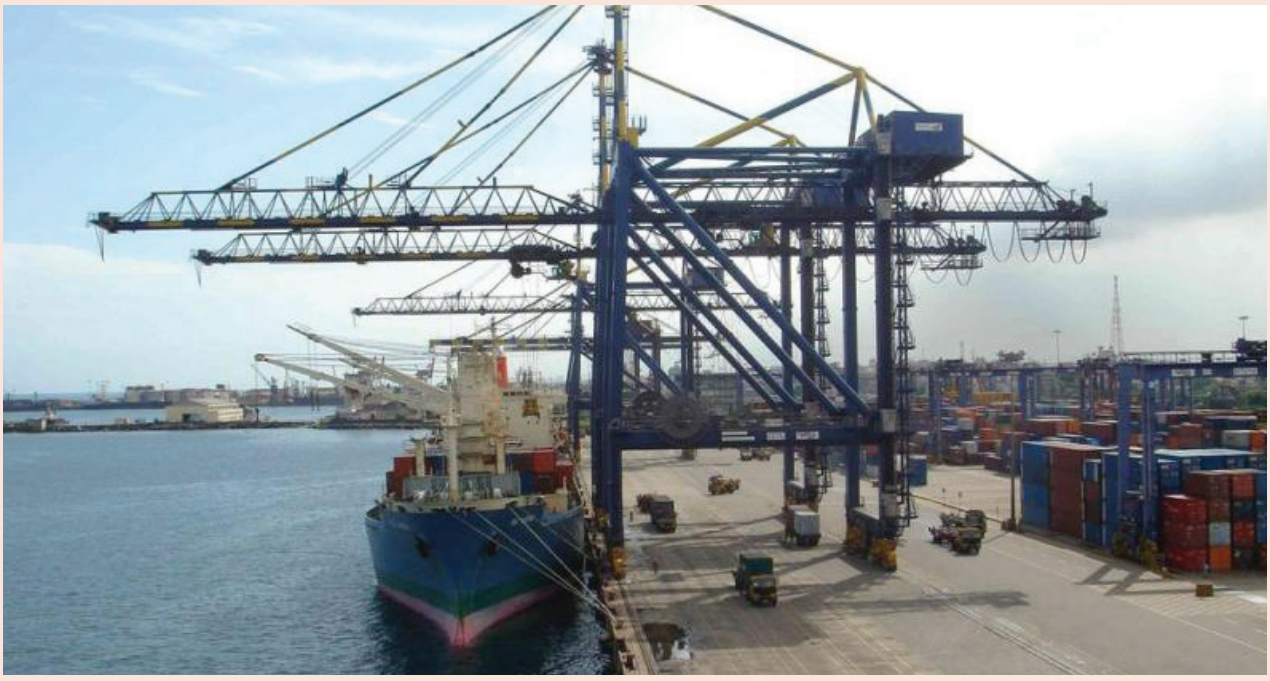
TRANSPORT

In its report, the Intergovernmental Panel on Climate Change 2014 said ' "Without aggressive and sustained mitigation policies being implemented, transport emissions could increase at a faster rate than emissions from the other energy end-use sectors and reach around 12 billion tons of CO2e annually by 2050". It also says decarbonizing the transport sector will be challenging for many countries but by developing well-designed policies that incorporate a mixture of infrastructural design and modification, technological advances, and behavioral measures, co-benefits can result and lead to a cost-effective strategy.[27]

In Tamil Nadu, public and private transport contribute equally together. In comparison to other heavily populated cities and villages in different states, the public transport in Tamil Nadu is well-built. But, still, it is not adequate to combat the rising effects of climate change. There are of course different plans of expansion like four-lane road and six-lane road aimed at reducing the congestion on roads. The increasing population and vehicles on roads, due to rapid urbanization, are undoubtedly environmentally hazardous. The Metro rail scheme which was brought with the idea of reducing the congestion on roads has received very poor patronage. There are public protests against the Chennai-Salem expressway project and the expansion of the port in Kaatupalli. The parties and public have been protesting such projects that they see as detrimental.

Sea transport

Tamil Nadu has three major harbours and 17 minor important harbours. Chennai port is India's second largest container harbour. It has been functioning even before India got its independence. After the construction of Chennai harbour, erosion of the sea on the North led to the submerging of a hamlet called Nallathanni Odaikuppam. The Tuticorin VOC port is among the 13 most important ports of India and second largest in the State.



Public protests

Tamil Nadu witnessed protests in 2018 against the increased bus fare. There were protests in Thanjavur and Madurai organized by the CPI(M). Opposition parties including the DMK, PMK, and Tamil Maanila Congress (TMC) also held demonstrations condemning the price hike [28]. When the railways increased the fare of shorter distances last month, it left the general public shocked[29].

The expansion of Kaatupalli port has witnessed large scale protests. Except for the BJP and the AIADMK, every political party in Tamil Nadu had condemned the expansion. Parties like the VCK and Naam Thamizhar held massive demonstrations in Kaatupalli protesting the expansion (please refer to a separate note on Kaatupalli in projects and protests).

The state's announcement of a 1900 hectare Chennai-Salem eight-lane road which involved the acquisition of farmlands, forests, and hills led to widespread protests. Poovulagin Nanbargal, PMK's MP Anbumani Ramadoss, and lawyer Suryaprakasam and others filed over 50 cases in Madras High Court demanding the scrapping of the project since it was detrimental to the environment and livelihood of people. The Court ruled that the State G.O. stands canceled and the lands acquired for the purpose should be handed back to the public. An appeal has been made in the Supreme Court by the National Highways Authority of India[30]. The Supreme Court has allowed the appeal and said that land acquisition notices can be served before EC is obtained, but EIA and Public hearing are essential pre-requisites for commencing work.

Metro rail

The Chennai Metro Rail launched in 2015 had poor patronage due to high prices. But due to the increase in petrol and diesel prices in the recent months, and due to increasing traffic snarls on roads, added with reduced price has led to an increase in patronage[31].

Transport and emissions

There are about 2.5 crore vehicles plying on Tamil Nadu's roads. The State has 24 lakh cars which means that a person travelling one kilometer by car will cause a carbon emission of 140 g. but travel on the public transports leads to a carbon emission of 15 g. As part of several steps to implement the Paris Convention agreement, the State has bought 525 electric buses under the Central Government's FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles). The first AC bus was launched by Chief Minister, Deputy Chief Minister, and Ministers on the Thiruvanmayur-Koyambedu route. The government says it has plans to use these vehicles in various districts including Chennai, Coimbatore, Madurai, Tiruchy, Salem, Erode, Tiruppur, Vellore, and Thanjavur[32]. In the 2021-22 budget, deputy chief minister and finance Minister O Paneerselvam said that the State had plans to buy 2000 e buses to achieve zero-emission[33].

However, experts feel this is not feasible. Tamil Nadu transport said in its affidavit filed to the National Green Tribunal that the "Government of Tamil Nadu has not been able to introduce more new fleets to phase out older vehicles, due to financial crisis and paucity of funds. This is evident from the fact that the revenue during the year 2019-20 from the Transport department is Rs.10366.39/- crores whereas the expenditure is Rs.14800.16/-crores, causing a shortage of Rs. (-)4433.77/-crores. In such circumstances shifting of LNG/CNG/Electric vehicles will not be feasible immediately, since, the expenses incurred already is higher than the collected revenue". However hardly any political party has raised a question about this.

The response of the political parties

As in the case of Climate Change, political parties have remained largely silent on this issue of transportation not because they are not aware (as could be in the case of Climate Change) but a clear unwillingness to act. Unlike in other environmental concerns wherein a public connection is in-

volved, a problem in transport with relation to the environment has hardly been a controversial or a sensational issue. The political parties have therefore maintained a conspicuous silence on the issue.

The response of the government

A new policy for the E vehicles "Tamil Nadu electric vehicle policy 2019" has been formulated by constituting a committee to increase the use of e-vehicles. This policy on electric vehicles has been introduced for the reduction of pollution is caused by the vehicles in the state. The emission standards are being improved by the latest Bharat Stage Standard(BS) and BS-VI engine vehicles are low emission. As per The Honorable Supreme Court's directions, the state procurement agency has been instructed by the Transport department to procure BS-VI Engine vehicles only. Since BS-VI emission norms were effected from 01.04.2020 government also canceled the order of already sanctioned BS-IV vehicles. And the Government of Tamil Nadu, Transport Department has come out with the concrete plan regarding phasing out of old vehicles which are more than 10 years used for commercial purposes. By doing this government thinks vehicle pollution being caused on account of their plying on road will be reduced by the introduction of buses with BS-VI vehicles and e-vehicles in a phased manner.

AIR POLLUTION

Of the 30 severely polluted cities in the world, 22 are in India. Air pollution today may be synonymous with Delhi, yet Tamil Nadu especially Chennai is not far behind.[34] Several districts in Tamil Nadu including Chennai, Cuddalore, Tuticorin, and Mettur have been hit by air pollution due to rapid industrialization.

While research suggests that annually 10,500 people die of air pollution in Delhi alone, Chennai has matched up with Delhi on air pollution at least on two occasions. Between November 4, 2019, to November 9, 2019, the air pollution in Chennai was equivalent to air pollution in Delhi. On November 6, 2019, the air pollution at Delhi was at 242 AQI while in Chennai it was 271 AQI[35]. Besides, the PM2.5 measure was at an alarming 334mg/cubic metres n Manali, 321mg/cubic metres in Velachery, and 317 mg/cubic metre in Alandhur. In July 2015, Chennai was in a similar situation wherein the air pollution was higher than in Delhi [36].

While weather experts like Pradeep John [37] claimed that the air pollution in Chennai was part of air pollution in Delhi (which was also ironically picked up by the media), the Tamil Nadu Pollution control board and IMD categorically denied the claim and attributed the smoke to heat and air pollution [38]. Meanwhile, disaster Management Minister R B Udayakumar sought to downplay the impact by claiming that it was nothing alarming and that air pollution 'existed only in few areas.' He also urged the general public to not believe the rumours on air pollution [39].

Steps taken by Tamil Nadu government to mitigate air pollution

1. Ban on burning of tyres, branches, and waste within the limits of Chennai Corporation and suburbs. Violators to be punished.
2. Onus on contractors and building owners to keep pollution under control.
3. Monitoring the vehicular pollution
4. Monitoring the pollution control through Tamil Nadu pollution Control Board and other departments concerned.[40]

The state government however was conspicuously silent on the industrial pollution and thermal plants which were responsible for 60 percent of the greenhouse gas emissions. Given that air pollution was increasingly becoming a cause of concern in the State, civil society groups came up with a list of demands to mitigate it.

They included:

1. Bring Chennai within the National Clean Air Program since it has high levels of pollution for a minimum of 130 days in a year.
2. Create awareness among the general public through television, radio, and social media on the health hazards of air pollution and safety measures to be taken.
3. Take into account climate change, an area's weather conditions, geographical location, population, transport, and resultant pollution when deciding on the expansion of cities and satellite cities.
4. Sufficient allocation of funds in the budget for monitoring and reducing air pollution
5. Increase the number of continuous monitoring stations. 38 places in Chennai have been identified as vulnerable points. The stations should be set up in all 38 points.
6. Steps should be taken to close thermal power plants in North Chennai, Vallur, and Ennore which release a high number of poisonous gases and PM2.5 particles which pollute the air. The State should explore the possibility of alternative energy to fulfill its electric needs.
7. The State should identify polluting industries in the vicinity of Chennai and take steps to reduce pollution. The State should announce that no new industry that will pollute the air will be given permission.
8. Efforts should be taken to improve public transport. Reduction of fares of Chennai Metro Rail, modern roads, and constant availability of public transport will help mitigate the pollution.

The State should set up parks and green parks across the city. [41]

Following the demands, Chief Minister Edappadi.K.Palanisamy declared to open 25 air monitoring stations at a cost of 45 crores in the State [42]. The demands have also found a place in the manifestos and plans of several political parties. The Pattali Makkal Katchi has demanded that the State should implement the 42 actions recommended to mitigate air pollution by 20 to 30 percent before 2024[43]. The DMK Manifesto also speaks about plying CNG smokeless buses across Tamil Nadu [44]. The AIADMK has promised to introduce 5000 electric buses and free solar stoves for citizens[45]. The Amma Makkal Munnetra Kazhagam (AMMK)'s manifesto promises reduction of fares in Metro rail[46].

INDUSTRIAL POLLUTION

Industrial pollution is rampant across Tamil Nadu from Ennore near Chennai to Thoothukudi in southern Tamil Nadu. But industrial pollution continues to be a neglected issue, what with industries and administration working for hand in glove. But political parties today are seeing industrial pollution as an issue to reckon with because thanks to a combination of various factors, the issue is affecting the lives and livelihoods of the people. Here are few serious issues of industrial pollution in the State.

Ennore-Manali Industrial Pollution:

There are 34 large red category industries including thermal power plants, oil refineries, petrochemical refineries, chemical fertilizer factories, polymer and chemical plants, huge landfills, coal ash ponds, and coal storage facilities located in the Ennore-Manali area that pollute the surroundings.

The resulting water and air pollution have severely affected the environment and people's lives in the area for many years. There are more than 19 water-polluting factories operating here [47], especially in the area where petroleum companies, thermal power plants, and chemical plants draw excess water, which is then discharged into the water bodies as sewage and water pollution. From the Ennore estuary to the Kosasthalai river, sewage is polluted mainly affecting fish production. Thus the livelihood of the fishermen of the area is directly questioned. These factories are responsible not only for water pollution but also for air pollution in North Chennai. There are 16 highly polluting 17 category industries and 16 red category industries and five orange category industries located in the industrial complex that can cause severe air and water pollution. People in North Chennai who inhale toxic gases such as sulphur dioxide (SO2), nitrogen dioxide (NO2), ammonia, chlorine, and harmful PM10 and PM2.5 particles are exposed to various diseases.

A study conducted by the Chennai Climate Action Group CCAG found that the six major polluters in the Manali industrial complex were in violation of prescribed air pollution norms for 59 percent of the time in 2019-2020 [48].

After careful observation of the six following industries for a period of 18 lakh hours in 2019, North Chennai Thermal Power Station (NCTPS) Stage I, NTECL Vallur power plant, Chennai Petroleum Corporation Ltd CPCL, Tamil Nadu Petroproducts Ltd -TPL), Manali Petrochemicals Ltd MPL, and Madras Fertilizers Ltd (MFL), it was revealed that the Madras Fertilizer Factory polluted the air 77% of the year, and does not properly monitor hydrogen fluoride gas 62% of the time and ammonia gas 77% of the time. The study found that the North Chennai Thermal Power Station had committed irregularities 58% of the time of the year and the Vallur Thermal Power Station had been violating the norm 82% of the year by releasing sulphur dioxide into the air[49].

Factories with many ecological disorders are already in the Manali Ennore area, with plans to expand to four new thermal power plants of 3000MW capacity, a plastic industrial estate, a industrial townships Area in Ponneri, and a port expansion of 320 million tonnes in Kaatupalli. People fear that this will make North Chennai more polluted and uninhabitable.

The people of the area have waged various struggles against these environmental disorders.

Crowds of people from 16 fishing villages rallied on 03.01.2018 to condemn the Kamaraj port administration's plans to set up factories on another 1,000 acres of outlying wetlands in 2018.[50]

Demands of the people of North Chennai:

1. No more factories should be set up in Ennore, Manali, Ponneri, Pazhaverkadu area.
2. Steps should be taken to restore the environment and sanitation of the area which is already deteriorating.
3. Immediate action should be taken against the companies involved in the violations,
4. Continually violating companies should be pulled down and shut down.

The fishing villages of Ennore, notably Kattukuppam, has been at the forefront of this campaign, Political Parties such as Makkal Needhi Maiam, DMK, CPI(M), and organizations like Coastal Resource Centre, Save Ennore Creek Campaign, and Poovulagin Nanbargal have been vocal in their support for the fishers' demands.

Despite the demands of the people that no more factories should come into the area, the government is making plans to start businesses there in the name of 'development'.

Thoothukudi Industrial Pollution:

DCW- Dharangadhara Chemical Works

The toxic chemicals from the DCW factory operating within the Kayalpattinam municipal limits in the Thoothukudi district have been mixed in the Kayalpattinam waters for a long time in violation of government regulations.

The company used the most dangerous metal - mercury until 2007 (for about 50 years) to make caustic soda. There are a number of supporting studies on the presence of mercury in the stomachs of dead fish that were seen habituating in the water released through the effluent.

Caustic soda was the first product DCW started manufacturing in Kayalpattinam. (Its current production volume is 1 lakh tonnes. Revenue is Rs. 210 crores.) The raw material for this is salt. (Purchase Rs. 14 crores.) Excess chlorine gas is produced in the production of caustic soda. DCW had been mixing this gas in the air for many years. This has caused smog in Kayalpattinam. The government has not punished DCW for this. No compensation was paid to the affected people.

The SDPI party staged a massive protest in December 2014 demanding the closure of the plant. The people of Kayalpattinam have been waging various struggles for the last 20 years demanding the closure of the factory due to air and water pollution and the villagers are suffering from various ailments including cancer and skin diseases. It is evident that the demand of the people of Kayalpattinam has not received political support, with even major parties like the DMK and the AIADMK apparently indifferent about the issue.

About 4 times in April last year, the gas emitted from that factory could be felt in the northern part of Kaayalpattinam. On the morning of (15-4-2020), the gas released from the DCW factory turned the sky in the area into smoke. The Pollution Control Board and the District Collector were informed about this but no action was taken.

Sterlite plant:

Sterlite, a copper and steel factory in the Thoothukudi district, has been operating since 1997. The plant, which produces 4 lakh tonnes of copper a year, has been accused of continuing to commit irregularities. In September 2010, the Madras High Court issued an order urging the closure of the Sterlite plant citing gross irregularities, after which the plant management went to the Supreme Court and obtained permission to resume operations. Following the outbreak of cataracts in the area in 2013, the District Collector announced that an increase in sulphur dioxide gas from a factory leak in the area where Sterlite is located after which the Pollution Control Board conducted inspections[51]. In 2013 alone, there were 84 leaks of sulphur dioxide at the Sterlite plant, according to an affidavit filed in the Madras High Court on behalf of the Tamil Nadu government[52].

MDMK general secretary Vaiko, who has been fighting the Sterlite plant since its inception, filed another Wrip Petition against the Sterlite plant in 2013[53]. Along with MDMK, parties like VCK, SDPI, Manidhaneya Makkal Katchi, and movements like May 17 and Makkal Athikaram also joined the agitation. The Sterlite plant was shut down in 2013 by order of the state government due to the gas leak. The company later appealed to the National Green Tribunal and reopened. The Tamil Nadu Pollution Control Board has denied permission to reopen the Sterlite plant in April 2018 after it was closed for 15 days for maintenance work in March 2018. Even though the people in the area were already suffering from various diseases and respiratory problems, including cancer, due to the Sterlite plant's negligence, the company went on to appeal for expansion in order to increase its copper production from 4 lakh tonnes to 8 lakh tonnes and to extend their company's environment clearance for another three years.

On May 22, 2018, 13 innocent people were shot dead on the last day of a 100-day protest against the expansion of the Sterlite plant. Hundreds of people were seriously injured.[54]

The CTO Renewal (Consent To Operate Renewal) application submitted by the Sterlite plant was rejected on May 23 was rejected and the plant was closed. The DMK spoke against the Sterlite plant and the government's firing. But Tamil Nadu Chief Minister Edappadi Palanisamy blames the DMK for allowing the expansion of Sterlite. The DMK claims that it was during the AIADMK government that the first permit was issued for the construction of the Sterlite Company[55]. Apart from the two main parties in Tamil Nadu blaming each other for the Sterlite incident, neither of their election manifestoes said that they would not allow Sterlite, which is trying to reopen if any of the party came to power.

Neyveli Thermal Power Station:

On 01.07.2020, 14 contract employees were killed when a boiler exploded in the 5th unit of NLC's second thermal power plant in Cuddalore. A further 17 people were admitted to the government hospital with serious injuries.[56,57] This is not the first time such an accident has occurred at the Neyveli Thermal Power Station.

Assuming that there have been 3 accidents in these two months, various minor accidents in the last six years have been happening at the Neyveli Thermal Power Station from time to time. Each time an accident occurs it does not appear to have explored and corrected the central problems except that the individual has been misrepresented by management.

Most of the thermal power plants in Neyveli are outdated. The main reason for the continuing accidents is that the thermal power plants, which were supposed to be closed by 2011-2015, are still operating. Having a station that can operate for only 25 years continuously but used up to 30-40 years will increase the chance of an accident. Most of the thermal power plants operating in Neyveli are over 25 years old.Operating such outdated thermal power plants decreases their efficiency, increases safety & maintenance, and causes environmental damage and the occurrence of such major accidents. Following the crash, the National Green Tribunal called for a safety audit of thermal power plants across the country.[58]

A protest was held on behalf of the PMK and Tamilaga Vazhvurimai Katchi condemning the accident at the Neyveli Thermal Power Station[59]. But the government has not heeded the people's demand that most of the thermal power plants operating in Neyveli be shut down immediately to protect the people and the environment as they have been operating for more than 25 years.On May 7, 2020, 12 people were killed in a styrene gas leak at the LG Polymers factory in Visakhapatnam. A few days later, people were affected by an ammonia gas leak at the Manali Madras Fertilizer Factory. The Union Ministry of Environment announced that pre-inspections of toxic hazardous factories operating after a long period of freezing should be operated only after government approval, as an effect of the LG polymer accident. In Tamil Nadu alone, there are more than 118 MAH (Maximum Accident Hazard) factories that can cause such major accidents. It is noteworthy that the Neyveli accident and the Madras Fertilizer accident took place as a result of permitting them without adequate prior inspection during the general freeze.

Vellore Tanneries Pollution:

There are 124 large tanneries located in and around Vellore including Jolarpet, Vaniyambadi, Nadrampalli, Gudiyatham, Alangayam, Madanur, Peranampattu, and Ambur. The region is home to 26,36,331 people from 336 villages - (Census 2011). Groundwater has been affected by a series of industrial activities and in turn, it has severely affected agriculture in the saline area of the land. Production has dropped from 60 tonnes per acre in the last 30 years to 15 tonnes per acre today[60]. The water in the lake is also polluted as the factory continues to mix their waste into the lake and so in an environment where water is polluted, it cannot be used for bathing and construction work. The Vellore Ranipet area was listed as one of the 10 worst polluted places in the world in a 2006 report by the New York-based Blacksmith Institute.

The response of the government

The government promoted the treatment of the area by setting up Common Effluent Treatment Facilities (CETP) centres. This was followed by the setting up of a total of 10 CETP stations in the area, through which the wastes of the tanneries were safely disposed of. Although the government has implemented a policy of not setting up new toxic factories in the Ranipet area, no action has been taken so far to repair the already polluted groundwater, lakes, and saline agricultural lands.

Cuddalore Industrial Estate Pollution:

The people of the Cuddalore district in Northern Tamil Nadu have been suffering for a long time due to the ecological damage caused by the Cuddalore industrial area. Residents of Pachaiyan Kuppam, Kudikadu, Sedapalayam, and Chemmankuppam have claimed all along that the declining air quality and toxic air pollution were due to the operations of 25 factories operating in the Cuddalore SIPCOT industrial area.[61] It is reported that people often suffocate due to the smoke coming out of the factories especially at night. In 2011, more than 120 people from Gudikadu, Ichchankadu, and Nochchikadu areas were admitted to the hospital due to a bromine gas leak in the area.

From June to September 2015 alone, the people of the area lodged 14 complaints with the Tamil Nadu Pollution Control Board alleging irregularities in the Goldfish Oil Company. On July 8, 2015, the Cuddalore Pollution Control Board Office recommended to the Expert Committee that the goldfish oil company be shut down due to a series of ecological problems, but no action was taken. Police arrested people from Semmanguppam village on March 1, 2016, for fighting against this.

The response of the government

1. Measures have been taken to reduce air pollution and water pollution in factories.
2. Some companies recycle their wastewater, while other factories also treat the wastewater and dump it safely into the sea.
3. Water quality is monitored by Water Quality Watch and Air quality is monitored by Care air Center in Chennai.

Despite constant monitoring, people in the area continue to suffer from eye irritation, itching, skin problems, and shortness of breath from time to time. Groundwater in the area is affected and stinks due to wastewater from toxic chemical plants. So Cuddalore SIPCOT provides 15 liters of water per person per day to 700 people[62]. The AIADMK and DMK in Cuddalore do not take the Cuddalore industrial pollution seriously, but parties like PMK, TVK, and CPI(M) which have some influence in the area, are raising their voices. The Bill was passed in the Tamil Nadu Legislative Assembly on 20.02.2020 declaring the Cauvery Delta as a Protected Agricultural Zone[63]. However, it is important to note that Cuddalore industrial estate has been exempted from being part of the protected agricultural zone. It is noteworthy that just days before the announcement, Haldia Petrochemicals signed a Memorandum of Understanding (MoU) for a Rs 50,000 crore Petrochemical Zone (MOU) in Cuddalore in the presence of Chief Minister Edappadi K.Palanisamy[64].

Mettur Chemplast Sanmar Factory Pollution:

92 factories are operating in the Mettur area alone, including three thermal power plants and 61 chemical factories. Due to a large number of chemical factories, water pollution and air pollution like Cuddalore and Ennore are affecting the people. People have struggled to get good water and clean air every time they are affected by water and air pollution. The majority of the protests have been against the chemical plant Chemplast Sanmar, which manufactures PVC resins, caustic soda, fluorochemicals, refrigerant gas, and industrial salts.

An examination of the groundwater in the area revealed that it contained high levels of chemicals that could be harmful to the body. In particular, the chloroform was 87.5% higher than that present in drinking water. The chemical vinyl chloride was thousands of times more abundant [65].

In 2009 alone, there were 21 protests against Chemplast Sanmar, which was responsible for the Chlorine gas leak. In addition, the company dumped massive mercury waste around it. The people of the area have been waging various struggles against Chemplast for the last 40 years. The National Green Tribunal appointed an expert panel in September 2019 to investigate Chemplast's violations.

The expert panel visited the company three times and submitted its report on 01.06.2020[66]. The study revealed that Chemplast did not fit air pollution monitoring equipment and did not safely dispose of toxic waste. While the ruling AIADMK is not yet taken any serious action against Chemplast, the main opposition DMK too has not taken any stand on the issue.

Tiruppur Dyeing units Pollution:

About 20,000 acres of agricultural land in the villages of Salinga Kattupallam, Attipalayam, Anjur, and Noyyal in Karur district have been devastated for the past 22 years due to dyeing units operating in Tirupur district discharging wastewater into the Noyyal river in violation of the Supreme Court order.

Wastewater discharged from dyeing units operating in Tirupur using rainwater from the Noyyal River during the rainy season enters the Noyyal River from the Orathupalayam Dam in Tirupur District and mixes with the Cauvery. In addition, when cattle eat them, they also have stomach upsets and problems with digestion. Also, since this is wastewater when it enters the Cauvery River, it mixes with the drinking water wells of other districts besides Karur district, including Trichy, Tanjore, Madurai, and Ramanathapuram. Continuous discharge of non-treated and semi treated effluent, that is characterized by the high load of Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), colour, heavy metals, Total Dissolved Solids (TDS) and suspended solids, over long period of time, lead to water quality deterioration, as water becomes unsuitable for drinking and even for irrigation. This may result in three main kinds of ecological risks, i.e. loss of soil productivity, groundwater pollution, and the accumulation of pollutants in the food chain[67]. The water is directed to Veeranam lake which in turn meets the needs of people in Chennai. A long-standing demand of the general public and farmer's union to the Tiruppur and Karur district administration is to prevent this. The farmers' union alleges that the district collector and the pollution control board officials have not taken action despite repeated complaints. As a result of a series of struggles by agrarian organizations, the DMK and the Communist Party, the AIADMK government, led by then-Chief Minister Jayalalithaa in 2012, introduced several schemes to prevent the mixing of dyehouse effluent into the river by disease.

The response of the government

1. New technology to reach zero levels in wastewater discharge at Tirupur Public Wastewater Treatment Plant has been introduced at Arulpuram Public Wastewater Treatment Plant operated by Tamil Nadu Water Investment Corporation.
2. In public wastewater treatment plants, Rs. 10 crores will be required for each treatment plant to adopt one of the two new technologies. In total, Rs 200 crore will be required. This amount was provided by the Government of Tamil Nadu as an interest-free loan.
3. As per the order of the Chennai High Court, a fine of Rs 62.37 crores must be paid before the tribunal in order to distribute the amount with interest rates to the victims of the industrial accidents.
4. The Government of Tamil Nadu can take steps to inspect the affected lands through the Tamil Nadu Agricultural University in Coimbatore and advise the farmers on what can be grown on those lands.
5. Tamil Nadu Chief Minister Edappadi Palanisamy has allocated Rs. 150 crores for the development of the Noyyal river in Tirupur in 2018.

These activities aside, the dyehouse water in the Noyyal River is still occasionally mixed[68]. A study published in September 2020 concluded that the disease caused high levels of lead-like toxic metals in the river[69].

Kodaikanal Mercury Waste issue:

Mercury pollution in the Kodaikanal area was caused by the thermometer plant of Hindustan Unilever Ltd was operating in Kodaikanal. Due to growing awareness in developed countries about the polluting industries, the Bond Company-owned thermometer factory in the United States was split up and relocated to India in 1982. In 1987, the thermometer factory owned by Ponds India was transferred to Hindustan Unilever. The factory imported mercury from the United States and exported thermometers to the United States and European markets. During the year 2001, many workers in the factory complained of kidney and related diseases.

This area itself is heavily polluted by mercury. In some places, there is 50,000 times more mercury than there should be in nature. Their children are also severely affected "[70]. Ponds' HLL Ex-Workers Association and Chennai-based groups such as Chennai Solidarity Group and Community Environmental Monitoring mobilized public opinion by highlighting Unilever's mercury pollution through a rap video that went viral.

In 2016, Unilever entered into a settlement with workers harmed by mercury exposure in the workplace. Hindustan Unilever has announced that it will dispose of its mercury waste due to pressure from a series of protests. But Unilever has set a purification limit of 20 mg of mercury in just one kg of soil witch is against world standards. The people of the area are still raising their voices against the Hindustan Unilever scam and urging it to clean up the world of mercury waste. Kodaikanal Hindustan Unilever's mercury toxins will be safely disposed of to international standards, according to the AMMK's (Amma Makkal Munnetra Kazhagam) manifesto for this election.[71]

SOLID WASTE MANAGEMENT

In India, municipal solid waste management has become a very challenging problem, especially in megacities like Chennai which generates nearly 0.71 kg of municipal solid wastes per capita every day, accounting for the highest in the country, the growing waste generation is mainly due to population growth, economic development and changing lifestyles. While the Tamil Nadu state has 15 corporations,121municipalities, 528 town panchayats, 48% of the total population living in urban areas. The solid waste generated in the state is 14,228 TPD and the city of Chennai alone generates solid waste of 5,400 TPD [72,73].

The major issue is that the generated municipal solid waste is simply collected, transported, and dumped without treatment or processing. And the various types of waste, which require different types of handling and treatment, are disposed of together as mixed wastes. In addition to this, a substantial amount of waste remains unattended at collection centers, roadsides, and water bodies. This is mainly because the primary authority responsible for waste management, i.e., the municipalities and local agencies have been ineffective in tackling the waste problem. For instance, in Chennai, the segregation and processing of municipal solid waste are very low. Chennai being a metropolitan city generating more than one-third of the solid waste in the state, segregation of solid waste in Chennai is less than 50% and only 8% of the collected waste is carried out for processing [74], which is very low

when compared to other cities in the country. Due to poor processing and segregation, the solid waste generated in Chennai is unscientifically dumped into landfills.

Overflow of Dumping grounds:

The two dumping grounds, Kodungaiyur(2600MT) & Perungudi(2400MT) are already overflowing and making Chennai city's waste management a terrible story [75]. Both sites are overloaded with garbage and are causing serious health problems for nearby residents. Not only in Chennai, but this story is also the same in many corporations and municipalities across Tamil Nadu. Un-scientific and illegal dumping of municipal solid waste near residential places and in water bodies create public nuisance and serious health care issues. Open dumping in dumpsites has become the reason for the breeding of more dangerous diseases, and also leachates generated in unsanitary dumpsites heavily contaminate the groundwater.

Tamil Nadu Budget Allocation for Solid Waste Management:

Usually, a substantial amount of the municipal waste budget (around 75 percent) is spent on street sweeping, with only 20 percent on transportation and less than 5 percent on disposal.

But as a positive note, in the 2019-20 Tamil Nadu budget, Rs.5,259 crores of the fund have been allotted for reclamation of Perungudi and Kodungaiyur dump yards. A comprehensive solid waste management project for the collection and transportation of solid waste in eight zones was allotted a total cost of Rs.1,546.04 crores [75].

But unfortunately, in the last two state budgets, no specific funds have been allocated for Solid waste management projects. It is also noted that in the recently released election manifestos by both the ruling party (ADMK) and opposition party (DMK), not much importance is given to SWM. Thus, creating more landfills as a solution to the waste problem is no longer an option. A waste management strategy that emphasizes segregation at the source level, and recycling and reusing instead of centralized approaches like landfills are the need of the hour.

BIO - MEDICAL WASTE MANAGEMENT

The generation of biomedical waste is an unavoidable outcome in the modern-day Hospital's healthcare and practices. The rapid mushrooming of hospitals, both in the public and private sector to meet the societal demand has collaterally increased the biomedical waste generated. Being a pioneer state in health care with 23,277 health care facilities across the state, Tamil Nadu is generating around 58,272 Kgs of biomedical wastes per day [76].

The Problem:

Even after two decades of the Union Environment Ministry making it mandatory for states to ensure safe disposal of healthcare waste, cities in Tamil Nadu still face serious problems in handling its biomedical waste. In cities like Chennai, nearly 2/3rd of its medical waste remains untreated and disposed of in landfills and public places including water bodies. Biomedical waste not only adds up to environmental pollution by releasing unpleasant smells and aiding the multiplication of vector insects but also transmits various dangerous diseases including HIV, cholera, and typhoid.

Inadequate CBMWTF:

The complication in handling the bio-medical waste in cities is mainly due to the lack of CBM-WTF (Common Bio-Medical Waste Treatment Facilities). There are only 10 Common Bio-Medical Waste Treatment Facilities operating in Tamil Nadu. The overall capacity of these facilities is collectively around 47,200 kgs per day. That means more than 11,000 kgs of medical waste turns out to be untreated each day.

From 2009 till 2017, a sufficient number of treatment centres were not built by the state government. Since 2017, only three centres have been built. In comparison, states like Karnataka, Maharashtra, and Kerala have more than 25 centres with Maharashtra alone having 38 treatment centres to treat medical wastes.

In Tamil Nadu, even many developed districts do not have any Common Bio-Medical Waste Treatment Facility. For instance, there is no treatment facility in Madurai, but nearly 1,500kgs of medical wastes are generated daily and need to be transported to a treatment facility named Ramky energy & environmental ltd present in virudhunagar. Ramky treatment facility is running short in handling the wastes as it has only a capacity of 3188 kgs per day. In addition, it has to handle medical wastes from five neighbouring districts (Madurai, Dindugul, Ramanadhapuram, Theni & Virudhunagar). This makes the facility inadequate and due to this many hospitals in Madurai dump their medical wastes illegally. On 10th Aug 2020, Madurai Corporation slapped a penalty of Rs.50,000 on a private hospital for dumping biomedical waste inside and near a common dumper bin placed on Melur Main Road (ward 44), near the Central vegetable market. The Hindu also reported that the staff of Dindigul Government Headquarters Hospital is dumping all kinds of waste outside the isolation ward, in total disregard to the laws and rules governing the safe disposal of biomedical waste [77].

The worrying scenario is not restricted to Madurai, it extends to all the major cities of Tamil Nadu. The Times of India dated 17th December 2019 reported that "Less than 15 tonnes or 25% of

the estimated 60 tonnes of toxic biomedical waste generated every year in the Chennai city is sent for safe disposal by hospitals and labs and the remaining 75% is strewn in and around the city posing serious hazards to residents and animals"[78]. The New Indian Express alone has reported instances of biomedical waste including expired medicines, being dumped in areas like Anakaputhur, Kundrathur, Vandalur, and Poonamallee. In Tiruneermalai alone, three such instances were reported. And in most cases, these were discarded along river banks and on water bodies [79]. In the report on 23rd January 2021, The New Indian Express had highlighted that Tiruneermalai lake is a rich water resource for the local farmers and due to industrial pollution and the recent bio-medical waste pollution, the water quality was getting degraded. This also had affected the local people living there. Despite complaints to the Chief Minister's cell by the residents, no action has been taken [80].

In similar cases, The New Indian Express in 2019 had written about biomedical waste being dumped in the vicinity of Nazarathpet but no offender was held. The Madras High Court, in 2019, also directed the secretaries of the State Health department and Tamil Nadu Pollution Control Board to make periodical inspections, say every once in two months of all the medical institutions to check the implementation of bio-medical waste management Rules, 1989 as amended in 2016. In November 2019, TNIE had also cited that despite more than dozen reporting on biomedical waste dumping being reported a year, authorities had registered only two cases.[81]

Taking cognizance of a report in TNIE titled "Biomedical waste dumped near Chennai's Thiruneermalai Lake not removed even after a week", the NGT questioned the government bodies on why no action has been taken despite repeated instances of open dumping and directed them to

file a report by 23rd March 2021[82]. Justice K Ramakrishnan, Judicial Member, and Saibal Dasgupta, Expert Member, in their order on 5th February, said that this is not the first incident of such a nature being brought to the notice of the tribunal through newspaper reports.

Bio-Medical Waste during Covid :

In addition to the existing situation in handling medical wastes, the current corona crisis has added pressure on the Government because of the increasing number of infections, and mishandling these wastes, in turn, increases the spread of the disease.

In India, in normal conditions, the rate of generation of hospital waste is estimated to be 1.59 to 2.2 kg/day/bed and out of which 10-15% is found to be bio-medical waste[83]. But during covid times it has increased three-four times resulting in an average of 1kg of biomedical Covid waste per bed. The sudden increase in the generation of waste and the absence of an adequate treatment system made many health care facilities face huge challenges in disposing of their medical wastes. Without denial, many illegal dumping incidents were seen happening during the Covid lockdown period. On 15 June 2020, medical wastes were found on the roadside of Chennai MGR Medical University. In July 2020, indiscriminate dumping of waste such as syringes, medicine bottles, and similar products at a vacant spot near Manivakkam lake in Vandalur (Outer Ring Road) was reported. In January 2021, Biomedical waste including PPE kits, medicines, and syringes was found dumped alongside the service road in Nazarthpet, near Poonamallee in Chennai. In Madurai due to the absence of facilities to handle the medical wastes, tonnes of wastes were dropped in the Madurai Veera Paanjanil canal.

The response of the government

On 20.06.2020 Tamil Nadu, Pollution Control Board released a report stating that it has cleared 4,90,046kgs (490tonnes) of medical waste in 3months' time (from mid of March to 20 June 2020). Poovulagin Nanbargal an environmental organization based in Tamil Nadu blames the TNPCB officials for under reporting the covid medical wastes. It says that "having an average daily medical generation of 58.2tonnes in the state, the three month general bio medical waste generation could be 5238 tonnes, hundreds of lakhs of kgs of covid wastes are added to this then it is definitely under-reporting count by TNPCB". Till now, Proper accountability and transparency are the two important demands from the civil society to the government officials on handling Covid medical waste.

SAND MINING

Rivers not only provide water but also rich sediments and sand and contribute to the environment. If we use these in moderation we will continue to have these resources. But in the present era water and sand have become a commodity. Differential seasonal variation in Paleo - environment, the rocks become tighter in winter and expand and break more easily in summer. Thus the crumbling rocks are rolled by the rainwater during the rainy season, breaking and turning into small particles of sand. The sand of this nature cannot be artificially created by man. Although naturally occurring, sand is not a material that can be formed in a few months or years. It takes at least 100 years for a cubic foot of sand to form.

Illegal sand mining had been on the rise since the 1990s. As the industries grew, so did the number of constructions and illegal sand mining. Large quantities of sand are being exploited in the Palar river bed, Vaigai river bed, and Thamirabarani river bed and sold at high prices not only in Tamil Nadu but also in the states of Kerala and Karnataka. The sand was said to be loaded in 5500-6000 lorries per day exploited by the public works department. But sources figure around 55000 lorries of sand were exploited per day illegally. As a result, the Government of Tamil Nadu lost Rs. 19,800 crore in 2013.

The exploitation of the Paalaru River Basin

In 2013, the atrocious illegal sand mining was exposed by the People's Union for Civil Liberties (PUCL) by photo and video documenting the sand looting in the Palar river. More than a hundred people, several tractors, and trucks digging sand up to 9 feet deep were all filmed. The contractor committee said that only 50 hectares of land as approved by the district collector was taken but it was revealed that 200 hectares of sand had been exploited. Later, it was legally forbidden to take sand there. Regarding this, Gunaseelan from Palayaseeviram village said that no officials took action despite giving many complaints to the concerned officers[84].

Thenpennai river 2016

Thenpennai river is the most important river in Central Tamil Nadu. In a sand quarry in the Villupuram district, about 2500 to 3000 lorries carry sand on a daily basis. Over 7 feet of the river bed was being exploited. Sources alleged that if a lorry carried 20 tons, then up to 50,000 tons of land would be exploited in a day. And two quarries of the same size were allegedly being exploited for sand in the Thenpennai river[85].

Kudakannar river 2020

The farmers' union informed the district collector that the groundwater in the Kudakannar river area is being severely affected due to the high level of soil exploitation. They also said the sand was being exploited in full knowledge and support of the local police and public works department[86].

Thoothukudi 2020

The sand exploitation did not stop even during the pandemic curfew. In the village of Navalakkanpatti near Ettayapuram, sand has been continuously exploited during the Covid lockdown. Despite petitions from political parties and the public, the district administration did not respond[87].

In August 2019, the Madurai High Court banned sand mining in Vaipaaru. However, sand mining resumed in May 2020. Residents say about 200 trucks a day are loaded with sand. The Lorry Owners' Association had informed that the sand was taken with proper license, but the District Collector denied that saying no license had been granted for sand mining. So a few lorries were seized and the Collector ordered that strict action would be taken against illegal sand miners[88].

Sand Ore Mining

Rocks formed several thousand years ago begin to decompose & This integrate slightly as they dry in the sun, soak in the rain, expand in the heat, and shrink in the cold. During the this integration minerals in the rocks fall off. The fallen mineral particles are eroded and transported by the geolagical agent.

These minerals, which are washed away by the river, are somewhat sedimentary along the riverbanks and river beds. Most of the minerals are deposited in sediments at depths of several cubic feet along the coast. Dense minerals such as ilmenite and rutile are highly concentrated along the coast as sedimentary sand and beach sand are trapped in waves and washed back and forth. The heavy minerals are high in densities and largly deposited along the southern source of the Tamiraparani River, which originates in the Western Ghats and joins the sea. In particular, Kanyakumari, Tuticorin, Tirunelveli, Ramanathapuram, Tirunelveli, and Nagapattinam districts are rich in concentrated heavy minerals. Government records state that about 9.8 crore tons of ilmenite and 0.5 crore tons of rutile are deposited along the coastline of South Tamil Nadu.

The onset of mineral ore mills

As a result of globalization, the government allowed private companies to take mineral sands since 1995. The Mining and Minerals Regulation Act of 1957 without any amendment and approval of the Parliament allowed private owners to possess nuclear-related minerals. More than 120 licenses have been issued for taking sand ore on Tamil Nadu beaches. Of these, 71 ore sand quarries in operation were reported to be involved in illegal activities and corruption. Mineral sands from more than 100 villages in Kanyakumari, Tirunelveli, Tuticorin, Trichy, and Madurai districts are being extracted and exported.

Silicon ore sand is also extracted. Silicon ore used as a raw material for making ceramics, glass, soap, etc. is widely extracted in Gujarat, Tamil Nadu. In Nagapattinam district alone, 8 private companies are extracting silicon ore and exporting it abroad.

Violation of basic rules

- Land must be secured from leased land 500 metres away from the residential areas along the coast
- Sand should be taken only 500 meters away from the line of the high tide of the sea.
- Avoid mining beach sand, using machines.
- After extracting the minerals from the seashore, the remaining waste sand should be filled in the ditches at the own cost.
- Boundary stone, nameplate should be set.
- Groundwater should be inspected once a year.

None of these are properly complied with by the sand mining companies.

Impacts of mineral sand plunder

The exploitation of mineral sands by machinery can lead to economic loss to the state, damage to

the industry, degradation of natural resources, environmental degradation, and increased biomass from radiation.

The coastal line from Rameswaram to Kanyakumari is known as the Gulf of Mannar. It covers an area of about 140 sq. km. The Central Government declared the Gulf of Mannar as a Biosphere Reserve in 1986. On the recommendation of UNESCO in 1989, the 560 sq km area covering 21 islands and its surrounding coral reefs was established as a national park. It is the first maritime national park to be established in India and Southeast Asia.

It is an offense to extract minerals from lands and forests protected under Rule 5, 5 (2) of Tamil Nadu Minor Minerals 1959. However, sand quarries are permitted to mine sand even from the national park where various endangered species live. Mineral sand looting is going on beyond the permitted area[89].

Loss of economy to the state

The Indian Mineral Corporation charges 3% of the monthly sales value of the garnet mineral as a royalty for mineral ore, as determined by the Central Government.

Royalties are set at 2% of the selling price for minerals such as Ilmenite and Rutile. The royalty amount will vary for each mineral ore. There is no system or test to monitor what the exported mineral is. So this royalty money has not been duly paid to the government by the sand ore exporting companies and there is an allegation that the royalty has not been properly accounted for.

Land grabbing

The neighbourhood that leased government land will also expand to neighbouring lands. They will occupy the outlying lands, temple lands, and Patta lands and plunder them. Those who refuse to sell the land will be intimidated. Sand leveling has also taken place in seawater as there are lands within the sea.

Sea erosion

Global warming and climate change are causing more sea erosion around the world. Sand dunes, Mangroves, swamps, trees, and forests were used as defenses against sea erosion or high tide. But

now they have all been destroyed by sand mining on the beach. Thus the impact of sea erosion is increasing.

Destruction of the turtles

Olive Ridley, also known as Panguni turtles in Tamil, comes to the coast of Tamil Nadu to lay their eggs in December. The turtles come to the well-drained sand and lay their eggs along the shores of Chennai, Kodiyakkarai, Kudankulam, Idinthakarai, and many other coastal regions. The eggs hatch by themselves and go into the sea. The arrival of turtles has come to a complete standstill as beaches pitch sand dunes and sand wave companies laid roads creating traffic. As a result, changes have taken place in the marine environment and food chain.[89]

Radiation

The sand on the beach is high in radiation. Thus the risk of cancer is high among people living along the coast. Mineral sand companies excavate, segregate and dump radioactive sand, dumping waste sand, increasing the impact of radioactivity and increasing the effects of radiation on the people. Scientists warn that skin diseases, tuberculosis, heart disease, and radiation can attack the genes and pass on cancer to the next generation and that radiation can kill fish and crabs.

Disasters effect

Sand dunes, sandhills, Mangroves, and lagoons saved the coastal region from natural disasters such as hurricanes, cyclones, floods, and tsunamis. All of these have been looted by sand miners. In times of calamity, floodwaters have depleted seawater-infiltrating systems such as river mouths, estuaries, tributaries, streams, and bays. Thus high waves and disasters directly strike fishing habitats.

The marine environment is affected by the mining of sand on the beach and by the usage of machines. Marine life is affected due to the variability of sea currents and pollution of the marine environment. So they face destruction or migrate to other parts of the sea. Creatures including prawns and crabs that breed in coastal swamps are becoming extinct. This forces fishermen to go long distances and catch fish.[89]

People struggles

There were sporadic protests against sand looting since 1995. An interim ban was imposed in 1996 in response to a road blockade on Panchal Beach. In 1997, there was a series of hunger strikes on behalf of the anti-garnet sand mining movement[90].

In 2013, following a report by Tuticorin District Collector Ashish Kumar, fishermen and coastal communities in the Tuticorin and Tirunelveli districts demonstrated various protests, demonstrations, rallies, and blockades.

In December 2010, the Chennai High Court heard various public interest litigation cases against sand mining and ordered the Tamil Nadu government to set up a commission to monitor sand quarries and receive petitions related to sand mining[91].

In 2013, sand mining in dried river beds in Kanchipuram district was completely banned for one year (District Gazette Notification No.10 dated 13.11.2013). The ban was announced to be extended for another year (District Gazette Notification No.16 dated 13.11.2014). The ban was later extended to May 2015 due to a lawsuit filed by the National Green Tribunal[92].

The protest was held in the Kambankurichi-Tavittupalayam area of Karur district last year on behalf of the Cauvery Protection movement. 340 social activists who participated in the protest were arrested.

According to R.Nallakannu, the senior leader of CPI Tamil Nadu, who was also arrested that day, "Only 2 sand mining machines were permitted but how did15 machines involved in the sand min-

ing?". He pointed out that this would soon destroy groundwater and quoted the Madras High Court statement in 2015 as why there is no ban on sand mining in the Cauvery River as similar to the 5 years ban imposed in Thamirabarani river[93].

Sand Politics

Political parties have also been involved in the fight from time to time claiming that people are being harmed by the exploitation of sand. Organizations including the Fishermen's United Front, the Centre for the Defence of Human Rights, and the Tamil Kalam have been waging mass protests against sand ore mining. Both the BJP and the Congress, the national parties in India, support sand mining, claiming that sand mining will boost industrial development. The DMK and AIADMK, the prime parties in Tamil Nadu, have been maintaining a false silence on the issue of mining ore sand and river sand from the same position.

J. Jayalalithaa, former Chief Minister of Tamil Nadu, signed a contract with Tata companies in 2002 to set up a Titan factory in Tirunelveli district. After Tata's study, the agreement was amended and signed in 2007 by then Tamil Nadu Chief Minister M Karunanidhi. PMK, DMDK, PuthiyaThamizhagam, and the Communist Party staged a series of protests saying that the livelihood of people would be affected if the factory was set up and the ore sand was dumped. Due to dissent and protest from all the parties except DMK, Tata shut down the plant. The sand mafias are the force that determines the political centers and the success or failure of the legislative and parliamentary candidates. Political parties are dependent on sand miners for electoral politics because of their large donations to parties.[89]

The response of the government

Since 2003, the responsibility of taking and selling sand from the river bed in Tamil Nadu has been given to the Public Works Department. A project director has been appointed to organize, monitor, and coordinate the practices of the sand quarries. Under the control of the Chief Engineer, Water Resources Department, 5 Minerals and Surveillance Divisions are headquartered at Chennai, Trichy, Madurai, Villupuram, and Thanjavur, operating under the guidance of the Project Director.

Since July 17, various revival activities in the sand quarry movement, "Sustainable Sand Quarry Management Instructions, 2016" have been carried out. Launched in July 2017, the "Tamil Nadu Sand Internet Service" (www.tnsand.in) website and mobile phone processor (tnsand app) have been running successfully and since October 2017, the public and truck owners have been able to access the sand by paying online. Vehicle verification camps are conducted at regular intervals in order to detect counterfeit vehicles across the state and sand is distributed only to registered skies. Boundary stones have been planted in the quarrying area, indicating the depth of the sand dune, the river bed, and the proposed level of sand. The road from the river bank to the quarry is paved only with compostable materials (cane husk, straw). Only vehicles contracted by the Public Works Department are used to transport sand from the quarry to the Government Sand Depot. GPS equipment is also installed and monitored in sand trucks. Surveillance cameras have been installed at the entrance to the quarry only the government sand depot and the exit points and sand loading sites. The Customer Service Center also operates in the control room to provide immediate redressal of customer grievances.

Imported sand

The Government of Tamil Nadu has permitted the Department of Public Works to import about 5 lakh metric tons of river sand per month from abroad for construction purposes of the State at the ports of Ennur Kamaraj Port, Kattupalli Port, and WAC Port. Currently, river sand is imported from Malaysia and sold online through the Public Works Department from Ennur Kamaraj Port and Kattupalli Port94. So far sand has been imported by 2 ships and the sale is going on.

DISASTERS

Tamil Nadu continues to be a state that has been hit by the highest number of natural disasters in India. The sea levels are rising due to the impact of climate change in the Bay of Bengal and the Arabian sea. As a consequence, many cyclones have made landfall on South Indian Coast. Several cyclones including Thane in 2011, Nilam in 2012, Vardha in 2016, Ochki in 2017, Gaja in 2018, and Nivar and Burevi in 2020 wreaked havoc in Tamil Nadu.

Besides cyclones, a flood in 2015 left Chennai devasted while heavy rains spelled disaster in Delta and Southern districts during January 2021. Tamil Nadu started showing some concerns about disaster management after Tsunami hit the State in 2004. But it would obviously be difficult for any administration to set right the city after any disaster. In 2015, when floods hit Chennai it was the fishermen who rescued several members of the public trapped at different places. Political parties competed with each other to do relief work. Chennai flood was a result of the AIADMK government's indifferent approach which led to opening the cruises of Chembarambakkam lake without proper warning. But the AIADMK as a party was involved in the relief work. Several Ministers and MLAs of AIADMK oversaw the relief work at various places.[95]

The DMK – opposition party – announced helpline numbers for relief work. The DMK said it reached thousands of affected people through the helpline members. MK Stalin, then a treasurer with the DMK, also met the victims in Cuddalore and Chennai districts in person. Opposition leader M Karunanidhi announced that the party will contribute Rs 1 crore to the State government's relief fund.

Similarly, many other political parties including the Left and regional parties like the DMDK, VCK, MDMK, PMK, Naam Thamizhar, TMMK, etc were involved in the relief work. The parties continued to be involved in relief work when the State was hit by natural disasters. The Central government did not allot sufficient funds for relief work during disasters.

2011 – 12 When Thane hit Tamil Nadu, the State had sought a fund of Rs 5249 crore for relief work, but the Centre allotted only Rs 500 crore.

2012 – 13 – 19988 crore was sought during drought but the Centre gave only 656 core.

2015 – 16 – The State had sought 25912 crores for relief work during the Chennai floods but the Centre allotted only 1738 crore.

2016 – 17 – The State demanded Rs 39565 crore during drought but was allotted only Rs 1748 crore.

2016 – 17 – The state sought 22573 crores during the Vardha cyclone and was allotted only Rs 266 crore.

2017 – 18 – The State demanded 9302 crores during the Ochki cyclone but was given only Rs 133 crore.

2018 – 19 – the State demanded 17899 crores during Gaja but was allotted Rs 1146 crore [96]

When the Centre was so indifferent, the work done by the political parties helped the rehabilita-

tion of victims. By this time, the parties were also aware that a comprehensive and improved disaster management plan was the need of the hour in Tamil Nadu. The parties pushed the demand after every disaster.

The response of the government

A disaster management policy in Tamil Nadu was formed in 2004. A renewed and updated version was released in 2013. A State disaster management plan was again formed in 2016. In 2018 it was updated and called as State Disaster Management Perspective plan 2018-2030 [97]. The state also implemented several welfare schemes for fishermen who were most hit by natural disasters. With the financial assistance of the World Bank, the State set up a fisheries management plan under the Coastal Disaster Risk Reduction Project [98]. Through this, welfare schemes worth Rs 107.50 crore was being implemented for fishermen in 13 coastal districts of Tamil Nadu. The fishermen were given life-savers (49,500 – two jackets per boat), and 25 watt VHF devices for 2535 mechanized boats. A cluster of 20 fishing boats has also been given 2 satellite phones, three Navic, and 2 Navitex devices. 80 clusters have received 1500 devices. Besides, the Tamil Nadu government also implemented several schemes for fishermen including seaweed farming.

PROJECTS AND PROTESTS

From the Anti Kudankulam nuclear movement to the struggle against Adani port expansion, Tamil Nadu has been the epic center of various people's struggles for the past two decades. The Kudankulam Nuclear Power Plant was planned as early as 1979 when the then Soviet Union initiated a nuclear power deal with India. Thereafter on November 20, 1988, President Mikhail Gorbachev and Indian Prime Minister Rajiv Gandhi signed an agreement to build reactors in Kudankulam, Tirunelveli District. Opposition to the project began the very next month, with a massive rally in Tirunelveli followed by a protest in Nagercoil in January 1989. In May 1989, around 10,000 protestors assembled under the banner of the National Fish Workers Union, opposing Kudankulam and its proposal to draw water for reactors from the nearby Pechiparai reservoir.[99]

Kudankulam nuclear project got stalled with Rajiv Gandhi's assassination and the disintegration of the Soviet Union in 1991. Thereafter, in the year 1997, Prime Minister H.D.Deva Gowda and Russian President Boris Yeltsin signed a supplement to the 1988 agreement. In 2002, construction of the Kudankulam nuclear power plant finally began.

The People's Movement Against Nuclear Power (PMANP) – later renamed PMANE, a local organization, was formed in 2001, with the agenda to oppose Kudankulam nuclear power plant. It began raising issues related to the plant's safety and quality and its impact on the region, creating awareness about the consequences of low-level waste and hot water ejected into the sea by the plant, threatening marine life as well as the lives of fishing communities.

On the backdrop of the Fukushima nuclear disaster, from the year 2011, the agitation against nuclear plant got intensified and become more vibrant with the start of daily sit-in protests and structured planning, in and around Idinthakarai village, by the members of the newly formed "Struggle Committee". The Struggle committee mainly consists of S.P.Udayakumar, M.Pushparayan, M.P.Jesuraj, Fr.F.Jayakumar, and R.S.Muhilan. It was during this period, Idinthakarai in Radhapuram Taluk become the "epic centre" of the struggle.

The incidents emerged after Fukushima is narrated by S.P.Udayakumar on behalf of the Struggle committee in a press release dated December 17, 2012:

"Our people watched the Fukushima accident on March 11, 2011, on TV at their homes and understood the magnitude and repercussions of a nuclear accident. Right after that on July 1, 2011, the KKNPP announced the 'hot run' of the first reactor that made so much noise and smoke. Furthermore, the authorities asked the people, in a mock drill notice, to cover their nose and mouth and run for their lives in case of an emergency. As a result of all these, our people in Kudankulam and Idinthakarai villages made up their minds and took to the streets on their own on August 11, 2011. Then we all together decided to host a day-longer hunger strike on August 16 at Idinthakarai and a three-day fast on August 17 – 19 at Kudankulam. On the 17th itself authorities invited us for talks and asked us to postpone our struggle to the first week of September because of the upcoming Hindu and Muslim festivals. In a few days, the chief of the Department of Atomic Energy (DAE) announced that the first reactor would go critical in September 2011. So we embarked upon an indefinite hunger strike on September 11, 2011."[100]

The indefinite hunger strike went upon for about three years. Apart from the hunger strike, people were carrying out massive rallies, campaigns, public meetings, and other demonstrations. Supportive demonstrations, public meetings happened throughout the State.

The fishing community constitutes a majority of the working population of the coastal villages that were actively participating in the protest against the plant. Tirunelveli district, where Kudankulam and Idinthakarai are located, has approximately 23,000 fishermen going out to sea every day, from seven villages along its 48km coastline. The struggle was sustained with the contributions from the community of these villages.

On September 15, 2011, the then Tamil Nadu State Ministers Chellapandian, Chenthur Pandian, Shanmuganathan, and Members of Legislative Assembly Nainar Nagendran, and Rajendran, along with District Collector, the Superintendent of Police, the Revenue Divisional Officer, and few other officials of Radhapuram Taluk, meet the struggle committee members at the epicenter of struggle - Idinthakarai.

On September 19, 2011, the then Chief Minister of Tamil Nadu, J.Jayalalithaa issued a statement in support of the people's protest against Kudankulam nuclear power plant, stating that her Government will not support any project affecting people's livelihood.

On September 21, 2011, the then Chief Minister J.Jayalalithaa met the struggle committee members and got a cabinet resolution passed the next day asking the Union government to halt all work until the fears and concerns of the local people were allayed.

On October 7, 2011, the struggle committee members along with the Catholic Bishops of Kottarand Thoothukudi and the Chruch of South India Bishops of Tirunelveli and Thoothukudi, members of parliament and Tamil Nadu ministers met with the then Prime Minister of India Manmohan Singh under the leadership of the then Tamil Nadu Finance Minister O.Panneerselvam, the then Minister of State V. Narayanaswamy, Sreekumar Banerjee, the then head of the Department of Atomic Energy, S.K.Jain, the then head of the Nuclear Power Corporation of India, and Shivsankar Menon, the then National Security Advisor were also present at the meeting.

On November 8 and 18, 2011, M.Pushparayan and Mi.Pa.Jesuraj met the central government's expert group and held talks at the collector's office.

On February 29, 2012, S.P.Udayakumar, M.Pushparayan, S.Sivasubramanian, and R.Ramesh met the then Chief Minister.

Things changed dramatically thereafter. On March 19, 2012, prohibitory order under 144 of Cr. P.C was passed by the district authorities, wherein it was stated: "Under such circumstances, the Prohibitory order under Section 144(1) CrPC was passed for preventing political parties, organizations and others who help/assist the movement against Atomic Energy and to prevent such activity which will be detrimental to the tranquillity of the public at Kudankulam and to prevent such persons from obstructing the employees in the power plant from attending their duties and in order to give protection to life and property of the public and with a view to prevent riots and preserve peace and tranquillity and to prevent such of those persons helping the agitators against the Power Plant and to restrain them from instigating the agitators, from entering the limits of Radhapuram Taluk from 3.00 p.m. on 19.03.2012 to 3.00 p.m on 02.04.2012.political parties, organizations, and movements were restricted from entering Radhapuram Taluk."

Even the Madras High Court refused to interfere with the prohibitory order.[101]

By this prohibitary order movements of the People of Radhapuram Taluk were also restricted. Soon after, S.Sivasubramanian, K.Rajalingam, and 178 persons, including 42 women from Kottapuli, were arrested and remanded. The then DIG V.Varadharaju made a statement that "during the course of their agitation they (PMANE) have indulged in various unlawful activities, including preventing officials from discharging their lawful duties, damaging public properties, and spreading malicious rumours to create fear amongst the innocent public."[102] After the imposition of prohibitory order, access to food, water, electricity, and other essential commodities were blocked for the people of Radhapuram Taluk, for many, it reminded of emergency.

During this period, many of the protestors were detained under the Tamil Nadu Prevention of Dangerous Activities Act, 1982, by the District authorities. Sundari, Selvi, Roselin, Xavier Ammal, Saveriyaal, Eskalin, Prabakaran, Sam, Durairaj, Muthukumarasami, Balagurusami, Ashokan, Chelladurai, Thangai Kailarasan, Lingadurai, Muthuraja, Bhaskar, Chithirai Kumar, Kosalram, Arockia Aruldoss, Suyambu, Murugesan, Selgih Rajan, Paulraj, Murugan, Suresh, Chandrabose, Lourdhusamy, Jesu are some of the protesters, who were detained. While releasing them on bail, Justice T.Mathivanan, Madras High Court, observed: "Though, right is guaranteed under Constitution of India to express their protest and to demonstrate agitation it shall be within the limit, enshrined by law. Law is just like a Cobra. It will remain silent like a hay rope until it is disturbed. No sooner than,

it gets disturbed it will bite. Not only the agitators but the law Enforcing Authority also must bear this principle in mind."[103].

During the course of the struggle against the nuclear plant, a large number of criminal cases have been foisted against thousands of agitators belonging to PMANE. The criminal cases were filed against them under several sections of the Indian Penal Code 121, 124-A, 147, 148, 353, 395, 307, and also under section 3 of the Tamil Nadu Public Property (Prevention of Damage and Loss) Act, 1992. More than 300 cases were registered against several agitators in 3 police stations viz. Kudankulam, Radhapuram and Pazhavur. Children from Kudankulam were booked under Sections 147, 148, 353, 121, 124, 129b, 307 read with 149 and also under and Section 3 of TNPPDL Act.On May 6, 2013, in a case filed by Poovulagin Nanbargal, the Supreme Court granted permission for the commissioning of KKNPP, on compliance of 15 directions. The directions include, ensuring the quality of various components and systems of the nuclear plant, Spent Nuclear Fuel generated needs to be managed in a safe manner to ensure the protection of human health and environment, establishing AFR facility, establishing DGR for storing nuclear waste, withdrawal of all criminal cases against the people [104]. In compliance with the supreme court direction, by order dated 9.10.2014, the State Government made a withdrawal of 213 cases against the people. But still, there are about 130 pending against the people of Radhapuram taluk.

Media vs People Struggle

It is said that the media has failed in its duty to be unbiased and independent while reporting the Kudankulam Struggle. Wide allegations of foreign funded struggle were reported without any verification. Dinamalar happened to be the most ruthless agitator against the struggle movement. Addresses along with phone numbers of S.P.Udayakumar, Pushparayan and Mai.Pa.Jesuraj was published on the front page in Dinamalar. Continuously stories of wild allegations, hateredness, were made upon against the people of Radhapuram.

The Hindu carried a story under the caption "Centre pulls the plug on three NGOs: Action follows PM's statement that some US-based NGOs are behind Kudankulam stir".

Paragraph 1 of the news item reads: "Close on the heels of the publication of Prime Minister's Manmohan Singh's assertion in an interview in the latest issue of Science that some United States-based NGOs are behind the agitation against the Kudankulam Nuclear Power Plant."[105]

Further the online edition of "The Hindu" dated 24 February 2012 published the interview of Dr.Manmohan Sigh quoting: "Then, referring to the protests at Kudankulam, he said: "the atomic energy programme has got into difficulties because these NGOs, mostly I think based in the United States, don't appreciate the need for our country to increase the energy supply." On the allegations made against PMANE, S.P.Udayakumar made a legal notice through his counsel M.Radhakrishna, against the then Prime Minister for withdrawal of the false statements, which has no substantial evidence.

Political Parties on Kudankulam:

National Parties such as BJP and Congress are in favour of the nuclear plant. Though CPM opposes the concept of Nuclear Park, they are in favour of Kudankulam Nuclear Power Plant Units 1 & 2 and against the construction of units 3 & 4. DMK is also against the construction of units 3 & 4. MDMK opposed the entire project. Likewise many regional parties oppose the entire project.

As far as the withdrawal of criminal cases filed against the protestors, DMK has promised in its 2021 election manifesto, for withdrawal of cases. Though Chief Minister Edappadi.K.Palanisamy has made a statement on the withdrawal of cases, it has not been mentioned in the manifesto.

Hydrocarbon issue

ONGC has been planting natural gas and oil wells in Tamil Nadu and Pondicherry since 1984. There are 768 well set up from 1984 till now. Of this 185 are active today. Under the circumstances, the Central Petroleum Ministry brought the open acreage licensing policy in 2017 which brought an open permission policy. Under this policy, the Central government has been giving permission for various companies to extract hydrocarbon on a tender basis.

There were sporadic protests by affected farmers against Hydrocarbon projects in Delta districts. But the opposition to the Hydrocarbon project gained State attention because of the protests that had happened in two villages – Kadiramangalam and Neduvasal.

31 places across India were identified as having small levels of Hydrocarbon. Following this, there were reports in February 2017 that initial works for hydrocarbon extraction will soon begin at Neduvasal. This led to widespread protests by Farmers of Neduvasal. The protests turned into a long struggle. The struggle had support from various quarters across the State with several personalities visiting the village to express their solidarity. Almost all the opposition parties in the State joined the struggle directly in Neduvasal. The struggle lasted for 174 days after which the struggle committee met with Chief Minister Edappadi Palanisamy. The Chief Minister gave an assurance to the struggle committee that no project against farmers will be implemented. Vijayabhaskar, a Minister from the Pudukottai district, visited Neduvasal in person to convey the government's decision. Accepting this, the struggle was withdrawn on October 2.

Similarly, there was a year-long struggle in Kadiramangalam of Thanjavur district against frequent oil leaks at the oil wells of ONGC. The State government to begin with foisted the protestors with cases and used lathi charge against them, in an attempt to suppress the protests. A large possession of policemen were posted at Kathiramangalam to act as deterrence against any entry. Proff. Jeyarman, of Anty - Methane struggle Movement played vital role in all these adications. Many cases hasbeen foisted against him and others. Condemning the dictatorial attitude of the State government, students and political parties started protesting across the State. Even as the State government

was struggling to handle the protests, the Union Petroleum Ministry gave permission to companies like ONGC, Vedanta, Indian Oil, Hindustan Oil, etc to set up new Hydrocarbon oil in the Cauvery delta area under the Open Acreage Licencing policy. In 2019 alone, the ONGC and Vedanta had applied for environmental clearance to set up 489 hydrocarbon wells in Tamil Nadu and Pondicerry. Of this Vedanta applied for 274 wells and ONGC for 215 wells.

The number is more than half of the number of wells set up in Tamil Nadu in the last 35 years.

According to information obtained under RTI from ONGC, Tamil Nadu has had 768 wells since 1984 and currently, 187 wells are in operation.

The list is as below

Thiruvarur	78
Nagapattinam	57
Thanjavur	12
Cuddalore	4
Ariyalur	1
Ramanathapuram	35

With frequent monsoon failures in Tamil Nadu, farmers continue to face a livelihood crisis. So when the government plans to set up an unprecedented number of Hydrocarbon projects in the Cauvery Delta with help from the Centre and agencies like ONGC, the farmers are shocked. This led to widespread protests across the State. Parties like Pattali Makkal Katchi (PMK) which is an alliance partner of the ruling AIADMK also opposed such schemes.

The response of the government

The government was forced to act after a series of protests by farmers and pressure exerted by political parties. Attending a meeting at Salem in 2020, Chief Minister Edappadi Palanisamy announced that the AIADMK government will not approve of any project that is anti-farmer. He said the government will not give a go-ahead to the hydrocarbon projects in Delta districts. He had also announced that the Delta will be declared as protected agricultural zone. In February 2020, a bill to this effect was passed in the State Assembly. The act was a response to the long and consistent struggles of the farmers and political parties.

Protest against Kaatupalli port expansion

The L&T-owned port, located at Kattupalli near Chennai, has been in operation since 2012. In 2018, the Adani Group bought a 97% stake in the for Rs 1,950 crore.

The Adani Group has applied for an environmental permit to expand the 330-acre port to 6,100 acres. The company has also published an environmental impact assessment study on the environmental impacts of implementing the project [105]. The Tamil Nadu government had also announced that it would hold a public hearing on the project on January 22.

After examining the environmental study for this project, it seems that the environmental impact is likely to be high. The most important vulnerabilities are the following.

1. Land Occupancy:

Of the 6100 acres of land required for the project, 1882 acres are government land, 1930 acres are owned, and the 330 acres already occupied by the port are planned to occupy about 2000 acres of sea area by pouring sand up to about 6 km.

2. Change in land use:

For this project, in the name of land reclamation (Sea Reclamation) sand will be dumped in an area of about 6 km in the coastal muddy areas such as karungalli seru, aalamaram , lakku seru, kalanchi seru, and koda seru. Filling the sea area with sand and changing it from its natural state will cause irreversible ecological damage.

3. Impact of Fisheries & Fisheries Livelihood:

These areas are shallow sea areas with muddy reefs. This is where most of the prawns, crabs, navara fish, kelangan, and mackerel are available.

If this project is implemented, the fishery resources will be severely reduced and the livelihood of more than 50,000 fishermen from 80 Tamil Nadu and Andhra Pradesh's fishing villages including Abrahampuram, Kalanchi, Karungali, Kattur, Vayalur, and Kattupallikuppam will be severely affected.

4. Ecological risk:

Pazhaverkadu Lake, the second largest brackish water lake in India, is located north of the forthcoming Kaatupalli Area. It is declared an ecologically important area and CRZ-1 (critical for maintaining the ecosystem of the coast) as it is surrounded by the Ennore estuary in the south and the Buckingham Canal in the west. Implementing this plan has the potential to destroy important areas of the environment.

5. Flood risk:

During the monsoon season, the Pazhaverkadu Lake, the Kotralai River, and the Ennore estuary act as drainage areas and protect Chennai from drowning.

Already, due to the expansion of the Chennai Kamaraj Port and the creation of the Ennore Port, the beach which was a few km between the Kotralai River and the sea has now shrunk to a few hundred meters.

With only 8 km left between the Kattupalli port and Pazhaverkadu, there is a risk that if the Kattupalli port is expanded, the rest of the beach will be eroded and merged with the river. After that, no one can stop Chennai from floating in the floods. About 35 lakh people from Chennai and Tiruvallur districts will be at risk of floods.

6. Sea erosion:

The Kamaraj Port, which was already under construction in Chennai, was affected by sea erosion in Ennore as a result of the Ennore ports. Satankuppam was ousted in 2012 after the arrival of Kaatupalli port. Thirteen villages, including Koraikkuppam and Vairavankuppam, have come close to the sea. If the existing Kaatupalli port will be expanded by 20 times as announced, many fishing villages will be drowned in the sea leaving Pazhaverkadu demolished by sea erosion.

7. Seawater intrusion:

Pazhaverkadu and Ennore coastal areas are already affected by environmental pollution and ecological degradation due to indiscriminate industrial development projects. The project will further increase seawater infiltration, especially in the Pazhaverkadu area. This will affect the agricultural lands of the area to the extent that it is not possible to cultivate.

8. Loss of biodiversity:

Through this project, the Ennore-Pazhaverkadu area has the potential to destroy the natural environment and its biodiversity. The depletion of fish stocks will call into question the livelihood of the fishermen in the area.

Through the estuary where the sea and the Pazhaverkadu lake converge, the seawater rises once every six hours; for the next six hours, the lake water will enter the sea. It is a natural phenomenon for marine life to enter the lake, breed, and leave to the sea during high tide.

This has led to an increase in biodiversity in the area, which is home to more than 160 species of fish, 25 species of floating worms, a variety of Mollusca, white shrimp, tiger prawns, squid, insectivorous shrimp, mud lobster, squid, and three varieties crab.

In addition, Pazhaverkadu is home to hundreds of species of birds such as flamingos, pelicans, sea urchins, egrets, herons, spoonbills, and kites that visit the sanctuary.

Are we going to have fun watching the extinction in the name of Pazhaverkadu lake development which is the source for such a variety of creatures?

9. Arani-Kotralai Rivers:

It will destroy salinities, swamps, lagoons, shallow and deep water bodies in the region. This natural structure prevents saltwater from seeping into the freshwater areas of the Arani-Kortralai River. Turning this into an artificial one could lead to an irreparable catastrophe.

10. Danger to Indigenous Peoples:

The Ennore-Pazhaverkadu area is home to many tribal communities, including the Irular. They have set up their exclusive livelihoods with the fishery and natural resources available in this landscape. They have set up their habitats based on the freshwater source available especially in the area. In this situation, if the Adani port project is implemented, the livelihood of the tribe will be completely destroyed. The people of the fishing villages from Kattupalli to Palaverkadu had strongly opposed Adani's port project. The Government of Tamil Nadu has announced to hold a public

hearing on the project on January 22 at Jain College, Meenjur, as the next steps can be taken after consulting the public on the project. Chennai Solidarity Group, Poovulagin Nanbargal, CCAG, Save Ennore Creek Campaign, and the fishing villages of Pulicat and Kattupalli have also raised a voice against the project.

On one hand, the majority said that if a referendum is held 16 km away from the proposed Kaatupalli port area, how can they go there and register their protest, while some Fishermen's organizations claimed that for a project which is against the people and the law, a public hearing must not be held in the first place. A group of politicians announced that they will demonstrate massive protests if the Adani project will be pursued any further. Following the announcement of the protests from multiple stakeholders, the Tamil Nadu government has postponed the referendum indefinitely due to the Corona situation.

The main parties in Tamil Nadu who opposed the plan were DMK leader Stalin, Viduthalai Ciruthaigal Katchi (VCK) leader Thirumavalavan, MDMK general secretary Vaiko, Tamilaga Vazhvurimai party leader Velmurugan, IJK's leader Jawaharlal Nehru, SDPI state leader Mubarak, Congress leader Rahul Gandhi, and Naam Tamilar Katchi party chief coordinator Seeman registered their dissent against the Adani project. It is noteworthy that Makkal Needhi Maiam party leader Kamal Haasan and Pachai Tamizhagam party coordinator Udayakumar had issued statements condemning the project. [106,107,108.]

A forum meeting on behalf of the DMK Environment Team and several protests on behalf of the VCK were held in Pazhaverkadu and Naam Tamil Party in Thiruvottriyur received the support of a large gathering of people who registered their protest against the Adani project.

The election manifesto of the parties mentioned above also stated that they will stop the Kaatupalli port project.

On 11.02.2021, thousands of Kattupalli Kuppam village fishermen staged a sit-in protest at the port entrance, claiming that the Kattupalli port administration was confiscating their lands and cheating them for the past ten years by not giving them a permanent job [109].

On March 15, 2021, fishermen staged a sit-in protest by sea and land, demanding the abandonment of the new Kaatupalli port expansion [110].

On 18.03.2021, the Deputy Chief Minister of Tamil Nadu O. Panneerselvam told the public during the election campaign in the Thiruvottriyur constituency that they would not allow the expansion of the Kaatupalli port if they came to power again [111].

CONCLUSION

The chapter on fundamental duties of the Indian Constitution defines the duty of every citizen towards protecting the environment. Article 51-A (g), states that "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers, and wildlife and to have compassion for living creatures". Article 48-A, states that "The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country".

It is illustrated through this research that in recent years in Tamil Nadu, environmental issues have been at the forefront of the political agenda. Yet the situation is not as desirable as any environmental activist would want it to be.

In an alarming study, Chennai has lost two-thirds of its farmlands in the last eleven years. Researchers of Anna University say that Agricultural land shrunk from 52.14 sq km in 2005 to 18.28 sq km in 2016. While water bodies shrunk by 12.54 sq km, around 1/3rd of the area in 2005, wetlands shrunk from 14.37 sq km to 10.05 sq km. This unregulated development will leave the city without buffers, making it more vulnerable to natural disasters. Similarly, the dredging of Pallikaranai wetlands is another ecologically insensitive idea by the government. Studies suggest that the marshland has significantly shrunk in its size since 1965. According to reports, the size of the marshland was about 5,500 ha in 1965 but only 600 ha in 2013. This large-scale development of Pallikaranai as a residential area and reduction of size has led to groundwater depletion in the neighbourhood.

But these issues remain largely unaddressed by the political parties, media, or any other players simply because they are neither sensational nor controversial. Issues like sea-level rise, air pollution, land degradation, water pollution, land use, and land change need more attention in policymaking and space in political debates. This election has perhaps thrown the biggest environmental surprise. Deputy Chief Minister O Paneerselvam has made an electoral promise that his party will not permit the proposed expansion of the Kaatupalli port,[112] this indicates a significant shift in their position. IF this is possible, it is also possible to wholly protect the environment with some commitment from all the actors including the parties, government, and general public. After all, it is not just about protecting the environment, it is about protecting our future.

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