



Impacts of Coastal Coal Based Thermal Power Plants on Water
Report of Visit to Some Operational and In Pipeline Plants in Andhra Pradesh and Tamil Nadu
Manthan Adhyayan Kendra
October 2014

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Introduction

Coal based thermal power plants (CTPPs) need water in huge quantities, and hence have a significant impact on water resources in the surroundings. However, it is generally assumed that few such concerns exist with respect to coastal coal based power plants as they use sea water, which is available in virtually unlimited amounts. This is fallacious thinking, because it is based on an understanding that sees the use of water by CTPPs only in arithmetic or algebraic terms. In reality, the impact of CTPPs on water is multi-faceted and based on a multi-dimensional, complex relationship.

This report presents some preliminary findings related to the impact on water of coastal CTPPs based on a field visit to some operational and in-pipeline coastal plants in the states of Andhra Pradesh and Tamil Nadu. The visit was undertaken in early July 2014.

Annexure 1 presents the list of thermal power plants we visited with their locations and **Annexure 2** presents the same on a map.

Contaminating and Threatening Inland Water Systems

Coastal hydrology is a complex ecosystem of three kinds of waters – saline (sea water), brackish (mix of saline and fresh water) and freshwater. All three co-exist in close vicinity, and all three support different kinds of flora and fauna, and in turn, provide diversified bases for livelihoods. They exist in a delicate balance of interactions, which create vibrant ecosystems. An example is the creeks, the backwaters, the rivers and estuaries that provide some of the richest and most productive fisheries.

Coal based power plants intrude on these ecosystems and disrupt their balance.

Coastal TPPs draw vast quantities of sea water to meet water requirement of cooling water, ash disposal and other needs¹. By bringing such vast quantities of saline waters into areas with brackish or fresh water, they create serious threats of contamination of these water systems.

One argument that is made is that while the coastal TPPs draw large quantities of sea water, great care is taken that its disposal does not contaminate surroundings. The saline water drawn is either released back to the sea, and/or it is released to surrounding only after full and proper treatment to acceptable levels, and with all precautions. We found that almost every plant we visited was grossly violating this, making it a naïve belief at the best, and a deliberate misrepresentation at the worst. Indeed, we found that the ‘rare accidental discharge’ is far more likely to be a ‘routine, deliberate’ one, or a ‘routine and turning a blind eye since I can get away with it’ one, rather than accidental.

¹In several cases, coastal plant are not required to have a closed loop cooling cycle, and this means that they need to withdraw many times more cooling water than the plants with closed loop cooling cycle.

We present these examples below.

The 1600 MW APGENCO TPP (Sri Damodaran Sanjeevaiah TPP) near Nellore has started generation recently. It draws water from the sea, and is supposed to dispose condenser blow down water effluents also into the sea. Regarding other waste water, the Environmental Clearance (EC) Letter² says:

“(x) Treated effluents conforming to the prescribed standards shall be re-circulated and reused within the plant. No effluents shall be discharged outside the plant boundary except during monsoon season.”

For this, it has a large waste water disposal channel. But it is clear that this channel does not always carry treated water, and contaminated water is ‘escaping’ from this channel. When we visited the plant, we found large number of dead fish in the channel indicating contaminated water. What is more problematic is that this waste water channel empties directly into a local irrigation canal. Thus, the contaminated waste water is getting into the external water and agriculture system.



Figure 1: Google Earth image showing waste water channel coming out (circled) from APGENCO plant and meeting an irrigation canal. We found dead fish in large quantities in this waste water channel.

The 1000 MW NTPC-TNEL (Vallur Thermal Power Project) is supposed to discharge, as per the EC³

“treated effluents conforming to the prescribed standards ... in the lagoon along with circulating water of existing North Chennai TPS [Thermal Power station]”.

However, we found large quantities of water being discharged by the plant through a gap in its back wall, directly into the surroundings, which include CRZ areas, wetlands, mangroves and are close to the Ennore Creek and Kortaliyar river.

² Environmental Clearance Letter dated 17th July, 2007

³ Environmental Clearance Letter dated 18 Apr 2007



Figure 2: Photograph of water being discharged through the compound wall of NTPC-TNEL plant into surrounding mangroves and wetland.

Interestingly, the EC also required this plant to use the ash from ash pond of Ennore TPP and North Chennai TPP for leveling of the plant area.

It may be pointed out that as per the Expert Appraisal Committee (EAC) of MoEF⁴, coal ash contains “*about 48 elements including radioactive elements and toxic heavy metals (in mild dose)...*” One of the serious pollutants is mercury.⁵ Apart from the dangers of mercury and toxic metals, ash can also lead to respiratory diseases like asthma and TB⁶ and there are also increasing concerns about dangers of radioactivity. Both the EAC and National Green Tribunal have been asking for monitoring of radioactivity in ash as thermal power plants.

Thus, with ash from ash pond of of Ennore TPP and North Chennai TPP being used for leveling of the plant area of NTPC-TNEL power plant, large quantities of ash would have been used to fill and

⁴ Minutes of the 12th Meeting, held on 6 Dec 2010. Also noted by (IL and FS Escomart Limited Hyderabad 2010, 3-26).

⁵ (IL and FS Escomart Limited Hyderabad 2010, 3-17)

⁶ (IL and FS Escomart Limited Hyderabad 2010, 3-18)

level the wetlands, creating risks of leaching of toxic pollutants from the ash into the surrounding water system. It may be noted that the Expert Appraisal Committee of MoEF has now started recommending that ash should not be used for land leveling⁷.

In fact, since ash has these toxic elements, environmental clearances for coal power plants require proper protection including lining the bed of ash ponds to make sure that ash doesn't enter local water bodies and water systems⁸. However, we saw copious amounts of water pouring out of the ash water recirculating system of **the 630 MW North Chennai TPP**. This was the ash slurry decant (the water left after ash partly settles down; the decant can also carry fair amounts of ash and pollutants).



Figure 3: Google Earth image showing ash water leakage from ash water recirculation system of North Chennai Thermal Power Station into the local water body.

This leaked water is entering the local water system through a stream and ultimately contaminates the Kortaliyar river.

⁷ In its 32nd Meeting held on 12 September 2011, the Expert Appraisal Committee of Ministry of Environment and Forest noted that: *“It was pointed out that over a period of time due to weathering action heavy metals or radioactivity content increases manifold when fly ash is left open in fields. It was, therefore, of paramount importance that a detailed study...be carried out before advocating promotion of fly ash for utilisation in agriculture, reclamation of low lying areas [or] as mine void filling”*.

⁸ Burning of coal in power plants leaves behind massive quantities of ash. The most common form disposing this ash is to mix it with water to form slurry that is pumped to a nearby ‘ash pond’, which is a pond that holds this slurry. Sometimes, the water used for this is re-circulated. Coal plants also need huge quantities of water for ash disposal.

Apart from this, ash seems to be leaching out and contaminating the surroundings in other ways too. A new power plant, the **2x800 MW Ennore SEZ Supercritical Imported Coal based Thermal Power Plant by M/s TANGEDCO** is proposed to be built on some reclaimed area of this ash pond of North Chennai TPS. During the public hearing of this new TPP, local people complained of how the ash is clogging up their drains stopping the free flow of water, ash is depositing in and on their fields, and lands near drainage canals of ash dyke are also being affected by salinity⁹.

In fact, the **North Chennai TPS** seems to have been most reckless in disposal of ash. It has dumped huge quantities of ash into the Buckingham Canal that flows right in front of its gate, has deposited vast amounts in nearby marshlands, apart from disposing ash into its large ash ponds, which too, as we have seen above, are leaking ash to the surroundings.

⁹Environmental Impact Assessment Report (After Public Hearing as per MoEF Notification S.O.1533 dt. 14th Sep 2006) for Proposed (2x800 MW) Thermal Power Project at Vayalur Village, Ambathur Taluk, Thiruvallur District, Tamil Nadu, Page 229. (Ramky Enviro Engineers Ltd, 2011)



Figure 4: Photograph showing ash from the North Chennai TPS dumped in Buckingham canal next to the gate of plant. Smaller picture shows another view of the Buckingham canal in front of the NC TPS, clogged with ash. Note the fisherman fishing for mussels.



Figure 5: Photograph showing ash from North Chennai thermal power station dumped in marshy lands around river Kortaliyar

The **1440 MW Mettur TPS** (it is not a coastal plant, but was covered in our visit) allows the decant of its ash pond to flow directly into the local water bodies. This decant carries lots of ash, which is contaminating the fields, and ultimately the Cauvery river into which the local water system drains.



Figure 6: Photograph showing fields on the bank of river Cauvery affected due to ash settlement from ash of Mettur thermal power station ash pond leaked into local water channel.

In **Neyveli**, (again, not a coastal location), we saw lignite mines and thermal power station. The mine drainage is being pumped into channels and being delivered to fields for irrigation purposes. This mine drainage has left strong discolouration in the channels, indicating presence of contaminants. Local people also reported that when the channels supplied coloured water (yellow coloured, or black, with coal dust), they got much lesser yields.



Figure 7: Photograph showing discoloration of local drain after receiving mine drain water from Neyveli Lignite mines.

Neyveli has also been the site of that not so rare occurrence, rather, one that takes place with an alarming frequency in case of Indian thermal power plants – the ash pond breach which pours thousands of tons of ash into the surroundings, damaging houses, fields and contaminating water systems.

These examples demonstrate clearly that all thermal power plants are deliberately or ‘accidentally’ discharging large amounts of waste water and effluents into the surroundings, contaminating them with saline water and other pollutants. Note that most of the water used in coastal thermal power plants, including for cooling, ash disposal, and dust suppression is saline water. Thus, when this ‘leaks’ to the surroundings, saline water is intruding into inland freshwater or brackish water systems, impacting them badly. Thus, it’s a myth that care is being taken that coastal TPPs will not pollute local water systems. In fact, what we saw emphasises quite the contrary – that all coastal plant are creating huge risks for the inland freshwater and brackish water systems by bringing in large quantities of sea water, and generating other wastes whose safe disposal is shown to be highly unlikely.

The immediate impacts of such contamination can be felt on the ecology and environment, and particularly on fisheries, which also in turn impacts the livelihoods of the local communities. (See later for some details of this). At the same time, such pollution can have serious impact on the health of the people, some of which are manifested in immediate term but many of which are more insidious and long term.

Disrupting Local Water Systems – Case of Cheyyur TPP

The proposed 4000 MW Cheyyur thermal power plant to the south of Chennai is a perfect example of this threat. The Cheyyur plant is located about 5 kms from the coast, in the middle of very good agricultural land, grazing land and abundant freshwater sources in the form of cascade systems of tanks.



Figure 8: Photograph showing agricultural and grazing land at the site of upcoming Cheyyur UMPP project.

The plant proposes to draw in 733,800 cubic meters per day of sea water into the plant premises¹⁰. Part of this huge quantity will be send back to the sea, part evaporated, and part will go into the ash pond for disposing the ash. As we have seen, leakage of sea water and waste water is a rule rather than an exception.

A path-breaking study by Community Environmental Monitoring, with inputs from S. Janakarajan, Siddharth Hande & Nityanand Jayaraman, titled *Hydrological Implications of the 4000 MW coal-fired Ultra Mega Power Project in Cheyyur* (S Janakarajan, Sidharth Hande, Nityanand Jayaraman 2014) presents the multiple ways in which the Cheyyur project will impact and disrupt the hydrology of the area. It shows, with the use of detailed maps of the drainage and water bodies, how these water systems are put directly to risk¹¹.

In particular, it shows that the ash pond is at a height above the plant and surroundings, and any overflows, breaches and 'accidental' leaks threaten directly many of the freshwater tanks including the massive Vedal *peria eri* (big tank)¹². Most of these tanks are not just water storage structures

¹⁰EIA Report of Cheyyur Page 2-14 (WAPCOS Limited 2012, 2-14)

¹¹ Report available at <https://cheyyur.files.wordpress.com/2014/07/report-cheyyur-hydrology.pdf>

¹²Cheyyur hrdrological report page 10 (S Janakarajan, Sidharth Hande, Nityanand Jayaraman 2014, 10)

supporting rich agriculture and fisheries, but are of historical, social and cultural importance, with some of them thought to be going back to the 10th Century¹³.



Figure 9: Photograph showing Vedal Peria Eri, just at the beginning of the monsoon. A careful look at the middle of the photo on the right hand side will show a few bullock carts using the pre-monsoon dry eri as a path, giving an idea of the size of the eri.

¹³Cheyyur Hydrological report, page 7 (S Janakarajan, Sidharth Hande, Nityanand Jayaraman 2014, 7)



Figure 10: Photograph showing temple dating back to 10th Century, on the bank of Vedal Eri,.

The report also highlights how the proposed storm water drain cuts through local drainage channels, and will disrupt the freshwater flow into several water bodies, in particular the Odiyur lagoon. This decrease in freshwater flow into the lagoon will change its balance towards increased salinity, and have serious implications for its biological productivity that also supports a large migratory bird population and rich local fisheries.

Impacts on Fisheries and Livelihoods

Whether the waste water and effluents are released “accidentally” or deliberately, they can have a significant impact on the aquatic and marine ecosystems. Coastal thermal power plants will typically discharge several kinds of waste water.

In case the plant is using once through cooling system, then almost all the sea water that is pumped in for cooling purposes will be released back to the sea (or to a creek), but with an elevated temperature. Normally, this elevation is to be restricted to between 5 to 7 degrees or a maximum of 45 °C¹⁴. In case the plant uses recirculating cooling, then the blow down water – which still is a significant proportion of the sea water taken in – will be released back to the sea (or to a creek). This blow down will have higher concentrations of salts than the original sea water.

¹⁴ Pages 174, 180 and 181 (pdf page numbers). (IL and FS Escomart Limited Hyderabad 2010)

Apart from this, there would be waste water from other facilities, much of which is expected to be treated and used in the plant for purposes like coal dust suppression etc. However, even some of this waste water is discharged from the plant. If the plant has a RO system, then the RO waste is also discharged, mostly to the sea or creek.

The water used for ash disposal is sometimes re-circulated but lot of it also remains in the ash pond. Ash slurry represents the largest quantity of waste water from the plant that remains inland, and as we have seen, contaminates and threatens the surroundings in multiple ways like direct discharge into surroundings, leakage from ash ponds or recirculating systems, overflow and even ash pond breaches.

All these discharges have significant impact on the ecology, and particularly on fish and fisheries and the livelihoods of people.

For example, the Environmental Clearance of the 1000 MW NTPC-Tamil Nadu Energy plant at Vallur, just north of Chennai,¹⁵ and for its 500 MW expansion¹⁶, requires the plant to draw water from the sea, but allows for the discharge into the Ennore creek. In fact, currently, both, the 1000 MW NTPC TNEL plant and the 630 MW North Chennai TPP are discharging water into the Ennore creek¹⁷.

This discharge has adversely affected the lives and livelihoods of the fisherfolk dependent on the creek. The people of village Mugadwarkuppam (literally, village at the mouth of the river), told us that they were finding it increasingly difficult to fish in the creek, that catch was declining, and whatever they caught, it deteriorated and rotted far more rapidly than earlier.

¹⁵ EC letter dated 18 April 2007

¹⁶ EC of NTPC-TNEL dated 3 June 2009

¹⁷ The EC for the 1200 MW expansion of North Chennai power plant, EC letter dated 31 Aug 2009 requires effluent discharge to the sea. But we could not verify if this was being done.



Figure 11: Google Earth image showing discharge of water from compound wall of North Chennai thermal power station into Ennore Creek.



Figure 12: Photograph of the actual site marked in Google Earth image above, showing water discharge from boundary wall of North Chennai thermal power station into Ennore creek opposite Mukhdwarkuppam village.

Similar is the case with village Gummaldibba (and others), near the Krishnapattanam port in Nellore district in AP. Gummaldibba (in Chillakuru block of Nellore district in Andhra Pradesh) is a village where all the families are dependent on fishing, particularly in the Kandeleru creek. Yet, their

livelihoods have been virtually totally destroyed due to the combined effect of two thermal power plants and the Krishnapattanam port. The **540 MW Meenakshi TPP** and **540 MW Simhapuri TPP** both draw their water and discharge their waste waters into the Kandeleru creek¹⁸. It also calls for the cooling water blow down discharge to be at the same temperature as the ambient water temperature.

However, villagers report that the water discharged into the creek is hot water, that they have felt the temperature to be hot when fishing in the creek, that now when they go into the creek they get itching sensations on their body.

This discharge has impacted the fishing badly. Because of the fall in the fish catch, and because the water gives them itching and other problems, they have cut down going into the creek.

This impact of waste water has been compounded by the dredging operations in the port, which is at the mouth of the creek. The dredging operations create turbidity, which also affects the fish. (See also next section, Impacts of Associated Infrastructure, sub-section on Coastal Erosion for more on impacts of dredging). Local people told us that the hot water kills the fry (young fish, young shrimp), and also dredging at the port creates turbidity and pollution, this kills the fish, so fish does not get stocked. There is daily tidal movement, so that effect is pushed inside and outside on all sides. They are not even getting enough fish for their domestic needs.

Last but not the least, their fishing operations in the sea also have been affected as the movements of their fishing boats is restricted due to the movements of shipping vessels at the port.

The population of these affected villages (Gummaldibba 1, Gummaldibba 2 and Thaminipattnam) is around 4000.

While they have lost their most important source of livelihood, they have not received any compensation (except a one-time amount of Rs. 16,000 per family, after several protests and *dharnas*) and the only jobs that they have got from the port or the TPPs are that of labour or of coolies.

¹⁸ We were told by local people that the TPPs discharge their waters into the creek and we also saw the waste water pipes. However, we could not officially confirm to which TPP of the two the waste water pipe belongs and that the TPPs are actually discharging waste water into the creek. Note also that while the EC letters of Meenakshi and Simhapuri TPPs (dated 2 July 2008 and 3 July 2008 respectively) allow them to draw water from the creek, they are silent about the place where the waste water and blow down are to be discharged. They do require that "The cooling tower blow down shall be discharged from the cold end side and it shall be ensured that the temperature of discharged water shall be at the ambient temperature of the receiving waters." However, the EC Letter for expansion of Meenakshi TPP by 300 MW (dated 19th Oct 2009), allows the plant to draw water from the creek but requires it to discharge to the sea.



Figure 13: Photograph showing waste water pipeline of thermal power stations discharging effluents into Kandeleru creek.

The same problem was reported by people of the village Krishnapattanam, where there are 700 fishing families, but their fishing has been badly affected due to their access to sea being severely restricted, and the dredging that has affected their catch in the Kandeleru creek. They also reported, as did people from Gummaldibba, about the number of palmolin factories and the leakage and pollution from these factories into the creek, which too was affecting the fishing as per the villagers.

In Salem, we were also told that the fishing has declined in the Cauvery river downstream of the Mettur reservoir. Local people said that the ash flowing into the river was certainly one of the causes. They said that often, there would be lot of dead fish in the river, or else, the fish would decay very fast after it was caught.

Impacts of Associated Infrastructure

Coastal thermal power plants cannot work by themselves. They require the development of large scale supporting infrastructure. This includes the port (for getting the coal, often the very rationale for location of the plant on the coast); the transport system for getting the coal from the port to plant – which can be truck transport needing developments of roads, or conveyor belt systems miles long; the water intake structures including channels, pipes and pumping stations; the waste water discharge structures, the ash disposal areas and desalinisation facilities.

Together, just the construction of all these can cause serious disruptions of drainage patterns, and of ground and surface water systems. Our visit showed the serious impacts of these associated infrastructures.

Coastal Erosion

One of the serious impacts of construction on the coast – including port facilities, piers, jetties etc. is the disruption of the movement of sand, leading to erosion of the coast on one side. Due this, the coastal land erodes and the sea moves inside. This can have many serious impacts on the local people. They lose access to the beach – the areas where their boats are parked, where the catch is landed, sorted and dried. Sometimes, even their houses are affected and they are physically displaced.

According to a recent paper *“Impact of Port Development on the Coastline and the Need for Protection”* (Kudale 2010)

“Commonly, construction of such structures has adverse effect on the adjacent beaches and may even affect beaches some distance away...”

“These effects include accumulation of sediments on the updrift side with progressive advancement of the shoreline and erosion of the coastline on the down drift region.”

The paper also notes that dredging can lead to changes in the seabed that can significantly modify “currents, waves and water quality”. In particular, it lists changes like

“Low mixing and poor water quality near the bottom of dredged basins and channels, resulting in low levels of dissolved oxygen” and “potential for increased salinity intrusion in estuaries.”

This co-relates with the effects people described to use at Krishnapattanam.

The paper also notes such impacts at the Ennore Port, which is the port from where coal is supplied to the North Chennai TPP and the NTPC –TNEL TPP.

Another paper (Ministry of Earth Sciences and Indian National Center for Ocean Information Services 2009, 27) notes that:

“...the shore, south of the Ennore port has accreted at a rate of 45m per annum, extended offshore 300m to 400m (during 2000-2006) The zone of accretion extended south upto 2.6 km alongshore where 90 m wide beach has developed that eventually lead to rapid silting of Ennore Creek used to draw cooling water by power plants mentioned earlier”.

Apart from the power plants, the silting of the Ennore creek will severely impact the fisher people dependent on the creek. We have already detailed above how people of Mugadwar kuppam at the Creek mouth have been affected due to declining fish catch. The siltation of the creek is likely to be one of the reasons. (Diagram in Figure 14 below, from the same report shows the year wise accretion of the shore and into the Ennore Creek)

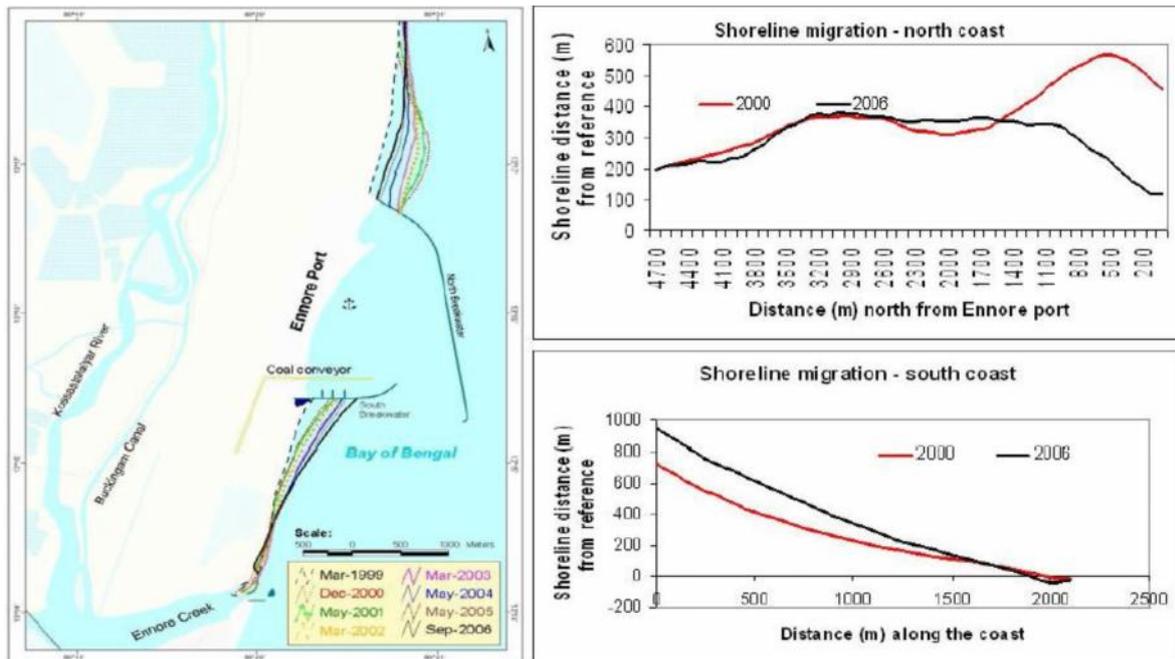


Fig.15. Observed shoreline at Ennore Port (1999 to 2006)

Figure 14: Source: (Ministry of Earth Sciences and Indian National Center for Ocean Information Services 2009, 26)

We also noted the coastal erosion at several villages we visited; for example in village Petode of Koylapat Panchayat in Kurunjyadi the children's play garden developed during Tsunami relief works has been destroyed, and continuing erosion has led to abandonment of the PDS shop built there. To the south side of village is the under construction site of Nagarjuna Jetty and intake well with port of the **4000 MW IL& FS thermal power station**.



Figure 15: Photograph showing damaged PDS shop due to sea Erosion at Petode village in Tamilnadu

Drains, Conveyor Belts, Pipes

Long pipes or channels to convey water from sea to the plant and from the plant to the sea result in disrupting the natural drainage channels. This can have serious impacts on the local water bodies. We have seen that is what is likely to happen in the case of the Cheyyur plant.

Many of the coastal plants use conveyor belts to carry the coal from the port to the plant. These conveyor belt systems can also disrupt local ecosystems. For e.g., in the case of the Cheyyur TPP, the 5 km long conveyor belt is likely to cut through many old sand dunes. These sand dunes are a veritable ecosystem by themselves. They support a rich diversity of crops including commercially important ones like cashew. The sand dunes act like sponges, storing fresh water during rain and providing it to the different crops and trees rest of the time. In this way, apart from the trees, these sand dunes also support rich paddy crops. They also provide these paddy fields protection in the coastal areas. This rich dune ecosystem is found even very close to the coast.



Figure 16: Photograph showing sand dunes protecting fields near the site of upcoming Cheyyur thermal power project.



Figure 17: Photograph showing well forested sand dunes near the coast where the conveyer belt of upcoming 4000 Cheyyur UMPP will cross through this area.

Coal Handling

One of the biggest impacts of coal handling – including loading and unloading of coal, transport through trucks and conveyor belts – is the release of coal dust into the atmosphere. This coal dust released in the atmosphere creates respiratory diseases, it settles on exposed surfaces in residential areas creating problems of contamination and cleaning, it settles on water in various water bodies leading to impacts on aquatic life including fish, and harms crops when it falls on fields.

People in Krishnapattanam village and in Gummaldibba complained that the coal dust from the loading unloading operations in the (Krishnapattanam) port is affecting them badly, and they are unable to live properly because of that. The dust settles everywhere, on the trees, on crops, on their houses. Krishnapattanam village people took out a rally in February 2014 and took a village delegation to port authorities demanding a stop to coal dust pollution in region. However the security guards at gate of authority stopped them and did not allow them to enter into office. This resulted in direct clashes with security guards.



Figure 18: Photograph showing Krishnapattanam port, coal dumps and transporting lorries. Smaller picture shows dust spreading due to coal handling.

It is interesting that the Environmental Clearance for the Krishnapattanam Port Phase 2 dated 13 Nov 2009 (we were not able to get the EC letter for Phase 1), has a condition that “The greenbelt of 100 m. width shall be developed around the coal stack yard as per the request in the public hearing”. A Monitoring Report of the Port by the Regional Office, Southern Zone of the MoEF was carried out on 5 Nov 2013, which noted almost full compliance with all conditions, including that the green belt of 211.5 ha was developed when at end of Phase 2 only 191.5 ha. However, as the photograph in Figure 18 above shows, there does not seem to be any green belt around the coal yard.

What people have not reported, but is also a major problem is the run-off from coal stock yards, whether in the ports or at the thermal power plants. This can contaminate the local water bodies unless it is properly treated.

In the residential area of Green Park in Mettur town, which is situated close to the coal yards of MALCO¹⁹ (Madras Aluminium Company) and Chemplast industries, coal dust has become a menace and a nuisance. Both the industrial units are having coal based captive thermal power plants. Roofs of houses in surrounding areas have turned black. Coal dust is everywhere, inform local people. Coal

¹⁹ Madras Aluminium Company was a public sector unit but now has been taken over by Vedanta group of industries. At present there is no production from plant. However there is generation of thermal power from the 100 MW capacity coal based thermal power plant.

dust accumulates on floors, vehicles, windows, clothes, kitchen utensils, water tanks etc. The women told us that they are tired of cleaning every now and then since the dust comes back in no time. Local people also complained of itching skin, burning eyes and problems in breathing due to dust pollution.

The problems persist in spite of the measures taken to restraint the spread of coal dust pollution – a so called green cover, some cloth that is torn in several places and a high boundary wall of metal sheets.



Figure 19: Photograph showing 'green cover' and protective cloth at coal yard of MALCO and Chemplast at Mettur in Tamilnadu.



Figure 20: Photograph showing finger blackened with coal dust, after swiping on window sill, at Green Park Residential area in Mettur, Tamil Nadu.

In fact, coal dust can be a serious contaminant in marine and aquatic environments too. A paper reviewing in detail large number of scientific studies on effects of unburnt coal on marine environment (Morrisey 2005) notes that:

“Coal storage and loading facilities at ports are also potential sites of contamination, often on a very large scale.” [Page 72]

It also finds that:

“When present in marine environments in sufficient quantities, coal will have physical effects on organisms similar to those of other suspended or deposited sediments. These include abrasion, smothering, alteration of sediment texture and stability, reduced availability of light, and clogging of respiratory and feeding organs.” [Page 69]

The paper details the many physical and chemical paths by which unburnt coal causes serious impacts on marine environment and ecology, and also states that:

“There are surprisingly few studies in the marine environment focusing on toxic effects of contaminants of coal at the organism, population or assemblage levels, but the limited evidence indicating bioavailability under certain circumstances suggests that more detailed studies would be justified.” [Page 69]

The paper also notes that:

“Indeed, most studies on the effects of unburnt coal on aquatic biota have been done in freshwater...several field studies in freshwater have observed reductions in abundance, diversity, growth and reproduction of fishes and macro-invertebrates, which were attributed to physical stress to organisms by suspended coal particles ... In the absence of a direct and definable causal mechanism, chemical toxicity cannot be ruled out.”

The experiences of fisher people we visited, where coal dust was a big issue tends to support the findings of the paper that coal dust (unburnt coal) can cause serious impacts on marine ecology and hence on the livelihoods of the communities.

Salinity Ingress

Gummaldibba village had good potable drinking water resources before construction of Krishnapattanam port and thermal power plants²⁰ in surrounding areas. According to the head of caste panchayat of village, their groundwater has turned saline. Earlier, the groundwater was very good and they were using it. Now they cannot use it for drinking as it has turned salty. The colour of bore well water has been changed to red.

At present, the Port Authority is supplying them with some piped water, but the quality is not good enough for drinking. For this, they are using mineral (bottled) water. They have been promised an RO plant, but their own water source has been lost. They blame two causes for this salinization. One, the dredging that has taken place and is taking place at the port. This, they say is allowing sea water to ingress by increasing the depths. Second, they say that the power plants pumped out a lot of groundwater during the construction phase, allowing saline ingress.

The same experience was seen in Krishnapattanam village, from which the port gets its name. This village had potable ground water despite being very close near to the sea. According the people of the village there was no need of any outside supply of drinking water to village before construction of Krishnapattanam Port.

Soon after the construction of the port began, their groundwater started turning saline, and now it is completely useless for drinking. Krishnapattanam village now depends on tanker water supply from the Port Authority. Every household has plastic drums kept at roadside for the water tanker to come and fill. Villagers complain that even the tanker water is not suitable for drinking purposes. They are using mineral water supply for drinking purposes. Each can of 20 liters water costs 20 rupees.

The people blame the dredging activities for salinization of water.

As we have already noted above, a paper by a scientist at the Central Water and Power Research Institute notes that that “dredging can lead to changes in the seabed that can significantly modify currents, waves and water quality”, leading to, among others, “potential for increased salinity intrusion in estuaries.” (Kudale 2010)

²⁰ Simhapuri and Meenaxi Thermal power stations are situated next to Gummaldibba village. Both the plants are under expansion.



Figure 21: Photograph showing plastic barrels outside houses for storing water from tanker supply in Krishnapattanam village.

It should also be noted that normally, projects such as ports and thermal power plants are not allowed to use groundwater for their construction and operation purposes. However, villagers as noted above told us how groundwater was used for these activities and that this is also one of the reasons for the salinization of groundwater. Given the close proximity of saline and fresh waters in the coastal area, use of fresh water, particularly ground water has to be done with utmost caution, but clearly this does not seem to be the case.

Even during our visit, we saw a large number of tankers pumping out ground water at a point close to the mandal HQ, Muthukur, to deliver to the port. We were informed that about 150 tankers make ten trips per day to take water to the port for cleaning, dust suppression, and other uses. This massive withdrawal of water just 5-6 kms from the coast is likely to result in not just fall in the ground water levels, but also further salinity ingress.



Figure 22: Photograph showing water supply tankers being filled by bore well pumps at Muthukur near Krishnapattanam port.

Cumulative Impacts

Serious as the impacts of individual plants are, the cumulative impacts of several plants coming up in clusters are much higher. In many places, including places we visited like Nellore district, North Chennai, Cuddalore, there are such clusters coming up. Unfortunately, there is no cumulative impact assessment being undertaken of such development²¹.



Figure 23: Signboards near Nellore showing a number of thermal power plants coming up in close vicinity. Seen in the distance are cooling towers of another plant.

²¹ A Cumulative Impact assessment (CIA) was ordered in the case of the IL&FS plant coming up in Cuddalore after local people moved the National Green Tribunal. However, this CIA was completed in just a matter of few weeks and falls far short of what a truly comprehensive CIA should be.

Preliminary Conclusions

Our visit has revealed that rather than being benign as far as water is concerned, coastal thermal power plants have massive and serious impacts on the local water systems, local communities and livelihoods. They were found to have salinized groundwater, contaminated local water bodies, disrupted water drainage patterns, dumped pollution irresponsibly, impacted yields of fish and affected people's livelihoods.

The EIAs and EMPs for most of the projects we visited are not available and so we are not able to see if these issues were dealt with in the EIA / EMP. However, one thing is clear, that even if the EIA/EMP dealt with these issues, there has been a clear and gross failure in terms of anticipating, preventing and mitigating these impacts. These calls for a serious re-look at the process of assessing and addressing impacts.

We have applied for the EIA and EMPs to be made available under the RTI Act. After obtaining these, we intend to do some more analysis to bring out some recommendations. This is why we have titled this section as preliminary conclusions.

This field visit is a part of the larger ongoing study and hence this report should be treated only as a preliminary report.

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October 28, 2014

Acknowledgements

Many people helped us in making this visit possible and it is not possible to name all of them. However, we would like to particularly mention G. Malyadri, G. Srinivaslu and C. H. Anjireddy of Jan Vigyan Vedika, E Venkateshwarlo and B. G. V. Raju of Andhra Pradesh Civil Liberties Committee, D. K. Balayu of Kula Nirmulana Porata Samiti and K Bhaskar of Mission for Evergreen Environment in Nellore; G Madheshwaram, A. Mani and T. M. Ganeshan of West Konur Farmers Association of Mettur; Arul Selvam in Cuddalore; the farmers, fisherpeople and communities of all the places we visited, and last but not the least, Nityanand Jayaraman, Karen Coelho, K. Saravanan, Divya Narayanan and Shweta Narayan of Community Environment Monitoring in Chennai for hosting us, in planning and arranging our visit, accompanying us and sharing with us their knowledge, information and insights.

All photos by Shripad Dharmadhikary / Jinda Sandbhor, Manthan Adhyayan Kendra

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Annexure 1

List of Thermal Power Plants Visited

Sr.No.	Name of Plant in brief	Location	Capacity (MW)	Status
1	Ennore TPP SEZ	Vayalur Village, Ambathur Taluk, Thiruvallur District, Tamil Nadu.	1600	In Pipeline
2	Ennore TPP	Ennore, Chennai, Tamil Nadu	450	Operational
3	North Chennai TPP (Main and Expansion)	Athipattu, Thiruvallur (District), Tamil Nadu	1830	Operational
4	NTPC TNEL, Vallur	Thiruvallur District, Tamil Nadu	1000	Operational
5	Meenakshi TPP	Village Thamminapatnam, District Nellore, AP	540	Operational
6	Simhapuri TPP	Village Thamminapatnam, District Nellore, AP	540	Operational
7	SBQ Steel Plant Captive TPP	District Nellore, AP	300	Operational
8	APGENCO Sri Damodaran Sanjeevaiah TPP	District Nellore, AP	1600	Operational
9	Gayatri TPP	Villages Painampuram & Sivampuram, District Nellore, AP	1980	Under construction
10	Nelcast TPP	Villages Painampuram & Sivampuram, District Nellore, AP	1320	Under construction
11	Cheyur UMPP	Cheyur village, Cheyur block of Kancheepuram district, Tamil Nadu	4000	In Pipeline
12	Mettur TPP	Mettur, Tamil Nadu	1086	Operational
13	IL&FS TPP	Parangipettai block of Cuddalore district, Tamil Nadu	4000	Under construction
14	CPCL	Thiyagavalli and Kudikadu villages of Cuddalore District, Tamil Nadu	1320	In Pipeline
15	Neyvelli TPS 1 and 2	Neyvelli, Tamil Nadu	2070	Operational
16	Reliance UMPP	Krishnapattanam, District Nellore, A.P.	4000	In Pipeline

Annexure 2

Locations of Places Visited

