

Status of Groundwater in Villages Around SIPCOT Chemical Estate, Cuddalore

Presented to the Cuddalore Local Area Environment Committee

SIPCOT Area Community Environmental Monitors
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Since they were set up in the early 1980s, industries in SIPCOT Cuddalore have operated without adequate or appropriate infrastructure for environmental protection. Given the high water table in Cuddalore, the abundance of sweet groundwater, and the proximity to the coast, the siting of chemical industries in the region was a senseless move. On the one hand, industrial extraction of groundwater from the vulnerable coastal aquifer has led to salinity intrusion. On the other, indiscriminate discharge of solid and liquid effluents from the industries has contaminated subsurface water.

Even today, SIPCOT companies routinely dump their solid wastes and discharge their toxic effluents onto land within or outside their premises. Over the years, the groundwater quality in villages around SIPCOT has deteriorated, and people have been put to great hardship.

Right to Water is a fundamental right. Indian law also recognises intergenerational equity as a governing principle for decision-making, particularly regarding natural resources. Although the problems of contamination and salinity intrusion surfaced more than a decade ago, and have been acknowledged by expert agencies like the Asian Development Bank and NEERI, no steps have been taken to curtail pollution, arrest salinisation or provide alternative sources of water for the affected communities.

SIPCOT Area Community Environmental Monitors wish to place on record with the newly constituted Local Area Environment Committee (LAEC) the facts about groundwater pollution in SIPCOT.

SACEM urges the LAEC to order the industries to set up the infrastructure (including a fund) for permanent provision of clean piped water to the households within SIPCOT. Besides reducing hardships, provision of clean water will vastly improve health and hygiene conditions in the SIPCOT villages. Simultaneously, steps should be taken on a priority basis to remediate the aquifers by decontamination and arresting salinity intrusion. For this, an assessment of the sources and extent of the problem followed by the development and implementation of a remediation plan is required.

SACEM requests the LAEC to pass orders on the following matters:

1. Immediate provision of clean piped water as per WHO guidelines to SIPCOT residents;
2. Ban on discharge of industrial effluents (treated or untreated) on land within or outside the industrial premises
3. Moratorium on industrial groundwater extraction and closure of factories illegally extracting groundwater;
4. Ban on the setting up of polluting or water-intensive industries in SIPCOT;
5. Mandatory recycling of industrial wastewater, and replacement of existing water needs through recycled water;
6. Assessment of damage, and sources thereof, to groundwater through pollution and salinity intrusion;
7. Remediation and rehabilitation of groundwater at polluters' expense

Ground water situation:

Good water that was earlier available at 30 feet or less is now difficult to find even at 800 feet, according to SIPCOT residents. Salinity intrusion and industrial pollution of groundwater are the two key reasons for deterioration of water quality.

Currently, 19 industries operate within SIPCOT and less than 4 units operate in the same geographical region, but outside SIPCOT. The entire water requirement of these industries is met by groundwater. SIPCOT operates several mega-borewells at depths in excess of 200 metres. The SIPCOT industries reportedly consume more than 20 million litres per day. Industries outside SIPCOT have their own borewells.¹ An accurate estimate of the total water extracted in SIPCOT is not available. However, it is likely to be in excess of 20 million given that a number of illegal borewells exist, and the demands placed by new companies like Pondicherry Alum etc have not been accounted for.

The groundwater stress is a commonly acknowledged phenomenon. Indeed, in 1999, Semmankuppam Panchayat issued a resolution prohibiting polluting and water-intensive industries from setting up within their jurisdiction, given the importance of agriculture to the local economy. Farmers and residents of SIPCOT also report that NABARD issued a circular advising banks to stop giving loans for agricultural pumpsets. This rule, ironically, didn't apply to groundwater extraction for industrial use.

Salinity intrusion:

As early as in 1994, the Asian Development Bank had warned of salinity intrusion in the region. "The supply of water to the industries is dependent on groundwater. Since the aquifer in the Cuddalore region is close to the coast, there is a danger of seawater intrusion to the aquifer if there is a severe depletion of its quantity without adequate recharge from other sources. This will result in deterioration of the groundwater quality. Present data show that saline intrusion has already occurred in the Cuddalore coastal area."²

All investments in handpumps and borewells in the area have gone to waste. Just in Sangolikuppam village, about 300 hand pumps are not in use due to saline water ingress.

Chemical pollution:

Another common complaint regarding water quality relates to the colour, odour and taste of water. Residents report coloured water (yellow or dark red), water that changes colour with time and exposure to sunlight, odours (sewer, metal or aromatic substances), oily film. All these indicate the presence of chemicals in the water.

According to the Indian People's Tribunal Report, "All villages within or in the immediate vicinity of SIPCOT, without exception, suffer from serious groundwater pollution. Handpumps in the stretch between Thaikalthonithurai and Semmankuppam

have either been disabled or are abandoned. A handpump visited by the IPT panel at Thaikalthonithurai behind JK Pharma factory pumped out black water that smelled of sewage.”

IPT member and ecotoxicologist Dr. Amit Nair notes that "The groundwater, which was extracted through hand-pumps, had a strong stench of chemicals and the possibility of volatile organic compounds (VOC) aromatic hydrocarbons in the water cannot be ruled out."³

Water sources that yield water that is noticeably polluted have been abandoned as drinking water sources by villagers. However, many such sources continue to be used for bathing, washing or other household needs, increasing the threat of exposure to users.

Indeed, villagers – particularly children – complain of skin problems and constant itching. Given that there isn't even sufficient water for maintaining basic hygiene, the health status of these pollution-impacted communities is abysmal.

The flip side of this fact is that the availability of clean water for drinking, bathing and other purposes will vastly improve the health indicators in this area.

An overview of water contamination in a few villages of SIPCOT Cuddalore

Name of the village → Details ↓	Pachaiyankuppam	Kudikadu Colony	Kudikadu village	Eachangadu	Sangolikuppam	Semmankuppam	Sonnanchavadi
Location of the village	North of the SIPCOT industrial complex, behind Tagros Chemicals	Located on the eastern side of Vanavil Dyes and Shasun Chemicals towards Uppanar	Located on the western bank of Uppanar, behind Asian Paints	Located on the western banks of Uppanar between SPIC Pharma to the south and Tantech Agro Chemicals in the north	Located on the western banks of River Uppanar North of Pioneer Chemicals	Located immediate south west of Pioneer Miyagi Chemicals	Located on the southern end of SIPCOT, south of Arokema Peroxides and Bayer
Number of borewells (complete data not available)	1	None	1 (depth – more than 100 feet)	1 (depth – 750 feet) water from this source is used for drinking	2 (depth – 800 feet). One bore usable. Other has saline water.	There are 11 borewells out of which 5 belong to Pioneer Miyagi Chemicals. Out of the remaining 6 borewells, one is about 800 feet deep and the rest about 120 – 150 feet deep. The water from all the borewells is yellow in colour and saline and not used for drinking.	1 (depth – 850 feet, the water from this source is yellow in colour and has a slight metal smell to it. The village uses this water for drinking purposes) Two borewells sunk earlier were abandoned because of poor water quality.

Number of hand pumps	Data not available	None	About 5	1	300 (not in use as the water has turned saline)	15 (The average depth is about 20 feet. None of the sources are in use as the water level have gone down)	2 (The hand pumps are 20 to 25 feet deep. The water is dark yellow in colour, it is only used for washing and toilet)
Number of Household borewells	Data not available	None	Data not available	None	25 (borewells 20 feet deep, water is not used for drinking purposes as it has turned saline but it is mostly used for washing clothes and for toilets)	15 (The average depth is about 20 feet. Barring a few, most of the sources are not in use as the water level have gone down)	4 (The water is not used for drinking as it has turned saline)
Number of Cylinder borewells for agriculture	Data not available	None	Data not available	None	None	8 (The average depth of the borewells is 60 feet. Three of them are currently not in use as the water has turned saline.	1 (The depth of this source is 240 feet, it is not in use since the water table has dropped)
Number of Overhead tanks	Data not available	None	1	1	3 (currently only 2 in use)	6	1
Comments about the	<ul style="list-style-type: none"> ▪ Water is yellow in colour 	--	<ul style="list-style-type: none"> ▪ Groundwater is dark 	<ul style="list-style-type: none"> ▪ Water is yellow in 	Salinity intrusion	<ul style="list-style-type: none"> ▪ Water is yellow in colour 	<ul style="list-style-type: none"> ▪ Water is yellow in

water quality in the area	<ul style="list-style-type: none"> ▪ Water has metal and sewer odour ▪ Water gets an oily film on the top if kept for long. ▪ The water has corroded the pipes through which it is supplied to the households. ▪ Skin itching upon contact with water. 		<p>reddish in colour</p> <ul style="list-style-type: none"> ▪ Water has aromatic and acid odour, sometimes the odour of the water cannot be identified ▪ Skin infections upon contact with water. 	<p>colour</p> <ul style="list-style-type: none"> ▪ Water has a strong metal odour ▪ Skin itching upon contact with the water 	<p>Water is light yellow in colour</p> <p>Good water is not available at less than 800 feet</p>	<ul style="list-style-type: none"> ▪ Water has sewer and metallic odour to it ▪ Saline water. ▪ Most of the water sources in the village have been abandoned ▪ Hair loss; skin rashes and itching; increase in the body heat reported upon contact with water 	<p>colour</p> <ul style="list-style-type: none"> ▪ Water has a slight metallic odour to it ▪ Skin itching upon contact with water.
Water source visited	<p>Hand pump, located on the north of the village balwadi</p>	<p>Water tap, on the road from Kudikadu colony to Morgan Industries</p>	<p>Hand pump on the north of the school in the village</p>	<p>Hand pump, located in the premises of Shanmugam, south of Tantech Agro Chemicals</p>	<p>None</p>	<p>--</p>	<p>--</p>
Description of water (taste, colour,	<p>The water is yellow in colour, has a strong metal smell to it.</p>	<p>Water is colourless and odourless</p>	<p>Could not determine since the hand pump was not</p>	<p>Water is yellow in colour and had a very</p>	<p>None</p>	<p>--</p>	<p>--</p>

odour)			working	strong metal odour to it.			
Any health effects of the water	Itching and burning sensation	None reported	--	Itching sensation	People complain of skin itches from using the ground water	Hair loss; skin rashes and itching; increase in the body heat	--
Comments	The water from this source is used for bathing and washing purpose only.	The water is used for all purposes	The water from this source is not used for drinking but is used for other purposes.	The hand pump is abandoned.	--	--	--
Current source of water for the village	1 Borewell-cum-overhead tank: 850 feet deep located within the village.	Village gets tanker water from Shasun Chemicals; and piped water from a borewell near Kannia Koil on the western side of the highway.	1 Borewell-cum-overhead tank: More than 100 feet deep located within the village.	1 Borewell-cum-overhead tank: 750 feet deep located within the village.	1 Borewell-cum-overhead tank: 800 feet deep located within the village. 1 overhead tank getting water from a distant borewell	From a neighbouring village Madukarai; From Pioneer Miyagi's borewell-tap	1 Borewell: 850 feet

Annexure 1

Main findings of National Environmental Engineering Research Institute's analysis of ground water in and around Eachangadu and Kudikadu villages of SIPCOT Cuddalore (November 1999):⁴

- 33% of the total samples from Kudikadu village and Eachangadu village had objectionable odour;
- 75% of the total samples were pale yellow to brown in colour;
- 75% of the water samples had a disagreeable taste
- 38% of the water samples from Kudikadu, and 66 percent of Eachangadu samples had turbidity exceeding prescribed limits;
- 74% of the water samples had TDS exceeding drinking water quality limits; High TDS lends a brackish taste to the water, and can exert a laxative effect if consumed;
- 49 percent of samples collected from Kudikadu and Eachangadu had total hardness concentration exceeding drinking water limits;
- 50 percent of the samples from Kudikadu and 60 percent from Eachangadu had chloride levels in excess of the CPHEEO limits;
- 1 water sample from Eachangadu contained fluorides exceeding the tolerance limit;
- 66% of the samples from Kudikadu and 73 percent from Eachangadu had iron concentrations above prescribed limits;
- 29 percent of the water samples from Kudikadu and 53 percent of the samples from Eachangadu contained manganese over prescribed limits. Excess manganese can cause damage to brain, liver, kidneys and developing fetuses.
- 33 percent samples from Kudikadu and 33 percent from Eachangadu had zinc levels in excess of prescribed limits;
- The Dissolved Oxygen (DO) and Chemical Oxygen Demand (COD) for water samples collected at both villages showed that the water is contaminated and deteriorating rapidly.

Similar problems were found with the water quality in borewells inside and outside the SIPCOT complex with colour, dissolved solids, iron, manganese and zinc concentrations exceeding the prescribed limits.

¹ IPT report, July 2003. Indian People's Tribunal on Environment and Human Rights Report On Human Rights Violations, Industrial Pollution and the Implications of the Proposed Chemplast Sanmar PVC factory in SIPCOT, Cuddalore, T.N. Pg 11

² ADB, June 1994. "Tamil Nadu Environmental Monitoring and Pollution Control," T.A. No. 1366-Ind, Final Report - Vol. II, Pg 4.26

³ IPT report, July 2003. Indian People's Tribunal on Environment and Human Rights Report On Human Rights Violations, Industrial Pollution and the Implications of the Proposed Chemplast Sanmar PVC factory in SIPCOT, Cuddalore, T.N. Pg 14

⁴ NEERI, Nagpur, November 1999. "Subsoil Water Quality Assessment in and around the SIPCOT Industrial Complex, Kudikadu Village, Cuddalore," Pg 48 - 53