



Citizen consumer and civic Action Group

Chennai, India

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Chennai Water Crisis – Myths & Realities



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“Chennai’s Water Crisis: Myths and Realities”

Citizen Consumer and Civic Action Group

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Chennai

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Introduction:

Countries in the Asia Pacific region including India are facing scarcity of water. Studies reveal that certain regions are facing a particularly acute situation and the state of Tamil Nadu in South India is one of them. The root cause is not just the paucity of resources but primarily their mismanagement. The mismanagement has three main dimensions;

1. The overexploitation of water resources through excessive extraction;
2. Unplanned growth and expansion in infrastructure and construction;
3. Surface and groundwater pollution.

Aquifers have been left bone dry, due to excessive extraction not only for domestic purposes but also for industrial purposes. In coastal areas, the problem gets compounded because of saline water intrusion. Water intensive industries operating in water-rich areas have largely been responsible for not only depletion but also the contamination of water sources. Pollution by leather tanneries in Vellore region, dyeing units in Tirupur region and the SIPCOT industrial estate in Cuddalore are just a few of the many examples in the state.

Several water bodies – lakes, ponds, tanks, backwaters, wetlands and other waterways – are all being subject to unplanned urban development and have now disappeared (or are disappearing) under construction and infrastructure projects. The few that are left often become sites for garbage disposal, particularly in urban areas.

As a result, not only is the quantity of water available for human consumption rapidly dwindling but its quality also is being compromised.

The Millennium Development Goals adopted by all the members of the United Nations makes a call to *'halve the proportion of people without sustainable access to safe drinking water and sanitation by 2015.'*

The World Summit on Sustainable Development (WSSD) held in Johannesburg, states that *'managing the natural resources base in a sustainable and integrated manner is essential for sustainable development.'* It necessitates *'water and sanitation infrastructure and services development, ensuring that such infrastructure and services meet the needs of the poor and are gender-sensitive.'*

It requires governments and agencies to *'Facilitate access to public information and participation, including by women, at all levels in support of policy and decision-making related to water resources management and project implementation'* and also to *'Adopt prevention and protection measures to promote sustainable water use and to address water shortages.'*

These international declarations are the ideology behind this Study.

Defining the Problem:

There has been, in recent years, a transformation in the way water has been viewed. From a natural resource that was collectively owned, water is increasingly viewed as an economic commodity. This shift has nonetheless not resulted in ownership lines being clearly drawn, despite changes in the demand side where it is now 'a commodity'.

What has been lost in this change is that most questions regarding quantity and quality of the water are unilaterally laid down by the State with little scope for participation by the 'conservers' of the resource. The 'conserver', usually the peri-urban or rural resident, is relegated to being a powerless spectator in decisions that vitally concerns her life and livelihood.

There is no doubt that active and participatory interventions are absolutely necessary to provide water resources for this generation and preserve it for the next. It has been observed that the state has largely been focussing on short-term supply side solutions (ranging from selling water through water tankers to investing in large schemes to draw water from various parts of Southern India). The study seeks to look at whether these 'solutions' are indeed sustainable, given that there are arguments afloat suggesting that these 'solutions' may have even precipitated the problem further.

This study primarily analyses the degree of consultation with the water conservers and examines the decisions that affect the entire community.

Methodology:

A) Research and Documentation

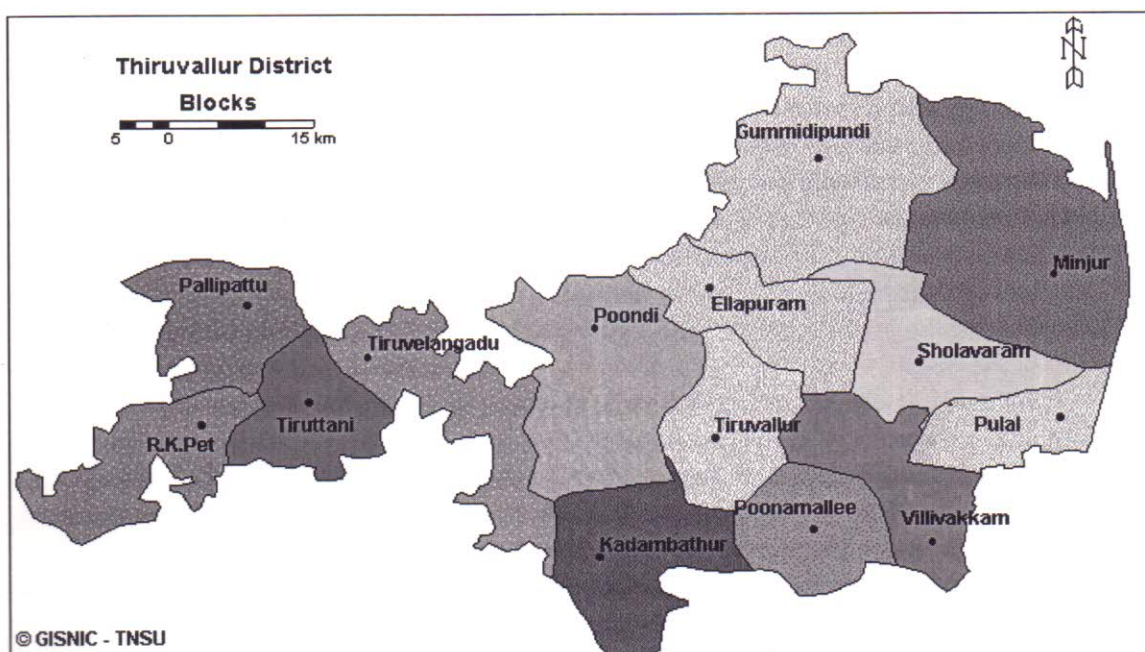
In order to study the diversity of issues and understand better the ground realities, a thorough preliminary literature search was felt paramount. A dedicated research team comprising social scientists / researchers also visited the various agencies involved – including the Chennai CMWSSB Supply and Sewerage Board (CMWSSB) and the Central Ground Water Board (CGWB), interviewed key office-bearers and collected information and documents made available. The documents so collected have been scrutinised for the purpose of this report.

The study team also accessed other surveys, proposals and suggestions made by non-government agencies and academic institutions as well as available statistics and other.

B) Water Commission Public Hearings

The other method utilised by this study was to conduct public hearings using a People's Water Commission. This method has been honed in India by the Indian Peoples Tribunal¹ and finds an important place in the WSSD Declaration. The Water Commission comprised an eminent panel of experts including persons with knowledge on issues relating to water management, environmental protection, public policy and community participation. Local community-based organisations and their affiliates along with the members of the community were invited to present their case to the Commission. The representations both vocal and written have been systematically documented and filed.

During the course of the literature study, the study team found that the issue of water extraction had its tentacles spread over a radius of more than 50 km around Chennai. This was not a new finding by any stretch of imagination, since it is common knowledge that most of Chennai's water comes from outside the City Corporation limits. For the purpose of the study, the project team decided to focus on specific areas where Chennai draws its water from and where the impact has been significant. And it was found that the Thiruvallur District (north / north east of Chennai) was and is bearing the brunt of having their water extracted for feeding Chennai.



Source: <http://www.tiruvallur.tn.nic.in/images/mapBlocks.gif>

¹ The Indian People's Tribunal (IPT) on Environment and Human Rights was set up to highlight environmental and human rights violations by State and private parties and give voice to the struggles of the grass root organisations and affected communities. The IPT methodology has developed into a credible instrument for immediate redressal of grievances of the affected persons as well as effecting long-term changes in policy and programmes to make them more people friendly and ecologically sensitive.

Equipped with evidences from the research and documentation, the Hearings were organised in three areas. Every study has its limitations and therefore these 3 areas were picked within the Thiruvallur district – at Karanodai village in the Sholavaram Block, at Thiruvallur town in Thiruvallur Block and Minjur town in Minjur Block to cover maximum area possible and get a fair representation.

Armed with the literature survey and the findings of the Water Commission, the study team has sought to put together this Report. The purpose of this report is to

- (a) Place the study findings and an entire range of related information in the public domain;
- (b) To underscore the importance of applying the basic concept of equity and social justice in water management and;
- (c) To debunk popular myths and expose some realities of Chennai's water "crisis".

Background to the Study

Chennai city is today part of what is referred to as the Chennai Metropolitan Area covering the Municipal Corporation of Chennai and several other municipalities and panchayats.² The total population is estimated to be around 6 million. (*Refer Annexure I*)

Over the past three decades, Chennai's population has grown phenomenally. Being the State capital, Chennai has always attracted a floating population. With increased industrial and construction activities this migration into the city has increased. However the infrastructure to cope with this has been far from satisfactory. There is no City Master Plan or City Development Plan to guide development within the city and everything has been ad hoc, often whimsical and wholly unsustainable since growth has been without a vision, much less with adequate infrastructure facilities such as water and sanitation. Nearly one third of Chennai live in slums that do not have access to services like piped water supply and basic sanitation.³

Not just the slums, a large portion of Chennai city and its rapidly growing suburbs have been facing acute shortages of water year after year. What is amazing is that the city has suffered silently and has accepted that the shortage is due to deficient rains. While this may have some elements of truth in it, the reality is that most citizens are not aware of any specific details - where does Chennai's water really come from? How come CMWSSB and other private water tankers (whose numbers have been steadily increasing) always have water, if there is none in the municipal taps? For a city reeling under an acute water crisis, how are we providing for (and going to provide for) the large infrastructure expansion led by the IT sector or automobile sector in the State? While these thoughts may have come up in general conversation, it has rarely moved beyond these forums.

There are several explanations for this – that Chennai city is largely apathetic to such issues, that there is a general perception that the onus of worrying about this water crisis is the job of the State and so on. But Chennai city has survived the “water scarcity” year after year – and this is a truth.

What is little known is that Chennai owes its extended life and much of its water resources to its surrounding regions. These peri-urban areas – north, west and south of Chennai have for several years, been feeding Chennai water needs. The east was spared till date because it is an ocean, but some recent plans are afoot to tap the ocean as well.

What is even less known is that several of these peri-urban areas – once rich and bountiful in water are today reeling under water scarcity due to the pressure of providing water to the city. The unfairness of this is wretched.

² G. Dattatri, “Water supply and Sanitation in Peri-Urban Chennai – Case study Findings”, Paper presented at an International Workshop on Water Management, Chennai, February 10-11, 2005.

³ Paul Appaswamy, “Water Allocation and Management in the Madras Metropolitan Area” Draft report

Myth 1: Chennai's Water comes from faraway rivers connected to the city by a series of high-cost pipelines

Reality: Chennai has always looked elsewhere to augment its water supplies and has spent huge sums of money on connecting or trying to connect faraway rivers to the city. The reality is that Chennai has been moving in concentric circles around itself – searching for and digging out water from neighbouring districts and areas – severely crippling their water sources.

Originally the three storage sources - Poondi, Cholavaram and Red Hills were the only sources providing water to the city of Chennai. However from the 1980's, it appears that there was a shortage between demand and supply. The government began to look elsewhere to augment its sources for supply and began to explore the surrounding areas nearest Chennai. This also marked a shift from looking at surface water to underground water.

In 1971, the Tamil Nadu government in consultation with international agencies decided to set up the TWAD Board (Tamil Nadu Water Supply and Drainage Board) as a specialised agency to deal with water supply and sanitation for the entire State. For Chennai alone, a Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) was set up in 1978.

Several of the studies carried out by government and non-government agencies⁴ from then on suggested that a large ground water aquifer exists in the Araniar-Kortaliyar river basin (AK Basin) located in the Thiruvallur district, north-west of Chennai, until today, the primary agency entrusted with the task of supplying water in Chennai city, the CMWSSB has been tapping into this basin.

CMWSSB has employed various strategies to tap groundwater from this basin. Initially a handful of well fields were commissioned and this grew into a larger number as the years went by. When CMWSSB was unable to get enough water from these wells to meet the needs of Chennai city (that was growing rapidly) they hired private agricultural wells under a tripartite agreement with CMWSSB, the Tamil Nadu Electricity Board (TNEB) and farmers forming parties to it. The CMWSSB pays the TNEB for electricity used for pumping this water since it is for non-agricultural purposes. According to the annual reports of the CMWSSB every year the list of new wells hired has been steadily doubling.⁵

scale industry and

⁴ 1) Hydrogeological and Artificial Recharge Studies, Chennai, UNDP/CMWSSB Studies (1965-69, 1975-78, 1982-91). 2) Groundwater Resources and Development Potential of Chennai MGR District, Central Ground Water Board (1991). 3) Hydrogeological and sea water Intrusion studies between Thiruvanniyur and Muttukadu by RITES-CMWSSB. 4) A profile of Thiruvallur district, Tamil Nadu Water Resources Organisation (Public works department), 2000. 5) Second Chennai Water Supply Project, Scott Wilson Piesold (UK), for CMWSSB (2002)

⁵ Chennai Metropolitan Water Supply and Sewerage Board. Annual Report 1999-2000, 2000-2001, 2001-2002, 2002-2003, 2003-2004, 2004-2005.

With a single-minded objective of getting water, the thirst of CMWSSB kept increasing. Existing wells were not yielding as much as was required and in some cases wells had **gone dry**. CMWSSB began pumping water for 24 hours a day as opposed to the agreement where they had promised to extract water for a maximum of 18 hours. The Public Hearings conducted as part of this study brought out this information. Details of this over-extraction by CMWSSB have also been documented in an earlier study carried out in the Magaral Panchayat.⁶

This is not to say that **all** Chennai's water was being sourced from the AK Basin, since CMWSSB had gone up to a distance of 130-150 km from Chennai to find water. In June 2003, they were transporting 4 MLD⁷ which was stepped up to 100 MLD in May 2004. The recent acceleration of tapping water from distance sources is primarily due to the fall in the yield of bore wells in Well Fields in the AK basin.⁸

Where is the water going?

It is often argued that in the order of preference, drinking water is ahead of industrial uses for water. The public hearings organised as part of this Study suggests otherwise. While CMWSSB had promised the farmers in the villages concerned that the water extracted from their fields were for drinking purposes only, the water was in reality also supplied to industries. **This fact is accepted by the CMWSSB.** In their Annual Report for the 2001-2002, they state that groundwater from villages around Panjetty, Minjur, Tamaraipakkam Flood Plains, Kannigaiper and Poondi Well Field sources were drawn to the tune of about 75 MLD extracted from sixty of the Board's bore wells. 40 MLD of this water was supplied to industries in the Manali area and only the remaining 35 MLD reached the city.⁹

CMWSSB was not the only one destroying the water basin. Water extraction by private parties in Chennai and its surrounding areas too is growing at an alarming rate. This double impact of water extraction by CMWSSB and private parties have placed an enormous amount of pressure on groundwater sources. A classic example of such an area is village Athur in Sholavaram Block of Thiruvallur district from where the CMWSSB had initially hired agricultural wells close to Kortaliyar River. This village is also the location of a massive packaged water unit that is extracting enormous amount of ground water.

As brought to centre stage by the residents of Mathur and Manjambakkam villages near Manali during the Public Hearings, water extraction has literally become a small-scale industry and even a court order and further appeals to prevent extraction did not deter the 200 odd tankers that swindle their water resource. (See Annexure 1)

⁶ M. Gambiez, E. Lacour and Joel Ruet, "Rural impact of farmers selling water to Chennai Metropolitan Water Board: a case study of Magaral Panchayat", Centre de Sciences Humaines, New Delhi, year?

⁷ Million Litres per Day

⁸ <http://www.chennai-metrowater.com/cmwdrw04.html>

⁹ Chennai Metro Water, 2001-02 Annual report, Pg 59

The private packaged water industry, a multi-crore industry today, with their extensive focus on “water quality” have been accessing nearly 3.7 billion litres of potable water each month. Even conservative figures indicate that water packaging units waste anywhere between 15- 35 percent of the water they draw from the ground.¹⁰ For the water-starved villagers of Thiruvallur district, there is nothing more enraging than to hear about their water being wasted in this manner.

If this wasn't bad enough, a survey conducted by ‘Economic Perspectives’¹¹ covering 4500 users found that 85% of domestic users in Chennai depend on their own sources for water. This primarily meant that they purchased water for their drinking and cooking needs. Only 2% of the households were using water supplied by the CMWSSB. With the urban resident dependant on packaged drinking water and with the unbelievable growth in that segment of the market, it is time to put claims by the CMWSSB that extraction is mainly for drinking water purposes under the scanner. **After all, where is all the water really going?**

Impacts of CMWSSB's over extraction

If drying up the aquifers wasn't bad enough, in several other parts of the Thiruvallur district, CMWSSB's over-extraction has also affected the quality of the ground water in various areas. The coastal aquifer of Minjur area is one of the worst affected parts of the district, due to the intrusion of salt water from the sea as a result of excess extraction. According to the local villagers of Minjur, seawater intrusion has been so severe that water is salty and undrinkable even in areas 10-15 km inland. The pathetic state of this once water rich and water supplying belt of Minjur has now reached a point where villagers cannot use this water for washing and cooking purposes. The Central Ground Water Board's District ground Water Management Studies Report of Thiruvallur, 2004-05 substantiates the claims of the local people of Minjur with respect to the extent of seawater intrusion and deterioration in quality. The report says that seawater intrusion has advanced in villages of Neidhavoyal, Kalpakkam, Velambakkam and electrical conductivity ranges from 2000–8000 micro Siemens – signifying acute salinity.

According to a news report as recent as 2004 “all 150 hand-pumps in the *panchayat* union have failed... **people in Minjur town do not have their own drinking water;** they get their supply from Nallur.”¹²

The recent Public Hearing in Minjur organized as part of this Study unraveled painful stories of villages in Nallur that were supplying water to neighbouring villages that

¹⁰ Anjali Kamat. “Water Profiteers”. May 2002

“<http://www.indiaresource.org/issues/water/2003/waterprofiteers.html>”

¹¹ CSH Occasional paper N°6 / 2002, The Water & Sanitation Scenario in Indian Metropolitan cities : resources and management in Delhi, Calcutta, Chennai, Mumbai, Joël Ruet, V.S.Saravanan, Marie-Hélène Zérah

¹² <http://www.hindu.com/thehindu/mag/2004/09/12/stories/2004091200590700.htm>

had fallen prey to over extraction. Though the seawater intrusion is more prominent in coastal areas it is not endemic to those areas. The plight of some of the villages like Sholavaram and Iyyapanthangal that are considerably inland are showing signs of excess salinity due to unregulated ground water extraction was presented before the quorum at the public hearing. With agriculture being the main occupation of Thiruvallur district and the salt-intolerant paddy being the most dominant of the crops being cultivated, seawater intrusion has resulted in fertile lands becoming fallow especially in the coastal areas.

Other impacts: The unregulated water extraction by industries in Ambattur and Manali has not only resulted in deterioration in quantity but the pollution due to the effluents has also had an impact on the quality. (Annexure 2)

Apart from the highly visible impact due to the depletion in water resources in terms of quantity and quality, some of the lesser known impacts and ripple effects were also brought to the forefront through the public hearing process. For example, the remaining villagers who continue to try their luck with agriculture have shifted from cultivating paddy to crops needing less water like pulses and Bajra, which is not their staple crop. They sell these crops in order to purchase rice – an action that forces food insecurity.

Even within a village, the capacity of a big farmer (for example in village Velliyur) to withstand the impacts caused by his decision to shift from using his land for agriculture to selling water is much more than the subsistence and small farmers who cannot withstand any such impact. Resultantly, these small farmers (who once owned their own agricultural lands) have become daily wage earning labourers today – completely overturning the growth model.

The water extraction process over the years had resulted in the ‘water supplying’ villages looking towards their neighbours for water. Six bore wells dug recently dug in Kizhanoor and Velliyur did not fetch even a drop of water. Today these villages survive due to the mercy of a neighbouring village Siruvanur. But this may not be for long, since conflicts between villages about how much water can be accessed has been increasing. And, with the ground water depletion so rapid, several banks have black listed villages which prevents villagers from availing loans for agriculture-related purposes.

Sand Quarrying:

Still worse is the issue of sand quarrying. When there is no water left in the once flowing rivers, an entire new profession of sand quarrying in the river beds has emerged. Several speakers at the Public Hearings pointed out that sand extraction was one of the major causes for the continuing problems in the area. It causes quick run off of water, resulting in lack of percolation for ground water recharge, causing river banks to collapse. Also any check dams built to store water also collapse when sand is extracted. There are innumerable cases of law and order problems and even traffic

accidents, with villagers alleging a strong nexus between the bigger contractors and local politicians.

Can the CMWSSB and other agencies pretend that they are not responsible for these impacts as well?

Future Plans of CMWSSB in the AK Basin

The Chennai Metropolitan Area Groundwater (Regulation) Act 1987 was legislated to regulate and control the extraction, use or transport of groundwater and to conserve groundwater in certain areas including Chennai city and extended to 243 revenue villages in Thiruvallur and Kancheepuram districts. The law conferred powers on the CMWSSB to make regulations for regularly assessing the quantity of water that can be drawn from the AK Basin and fixing limits of extracting ground water. The law mandates that permission is required to sink wells or extract groundwater. Irrespective of what the intention of the law was, the CMWSSB and private water extraction continues unabated.

According to the CMWSSB's Policy Note for 2003-2004, they are seeking further World Bank assistance (about Rs.600 crores) to provide infrastructure facilities to draw additional ground water from the AK Basin. The CMWSSB has recently entered into a consultancy to reassess the groundwater potential of the area and introduce the concept of "transferable water rights" in the AK basin. Experts suggest that the Board is moving away from purchasing irrigation rights to purchasing long-term groundwater rights – possibly creating tradable assets for future plans.

Myth 2: Chennai's efforts at Rain Water Harvesting have been hugely successful and can be considered a laudable achievement

Reality: Partially true, but having systematically destroyed its existing lakes, tanks, wetlands, low-lying areas and other natural rain water harvesting areas, the State has created a water crisis

Every Chennai resident knows that Chennai receives more than 50% of its rainfall from the northeast monsoon during the months of October, November and December. During this period there are occasionally one or two cyclonic storms, which brings heavy rainfall. The southwest monsoons on the other hand are highly erratic and summer rains are negligible for Chennai.

Chennai's topography is fairly flat with many low-lying areas that get inundated during periods of heavy rainfall. The city had many ponds, lakes, and temple tanks. The exact number of lakes and ponds are not available; but experts estimate that there were at least 1000 lakes and tanks apart from 38 temple tanks in and around Chennai. Along the coastal belt of Chennai many estuaries, creeks, lagoons, mangrove swamps and salt marshes exist including the Pulicat Lake, a large salt-water lake at the northern boundary of Chennai, the Adyar Creek towards the south of the city and the large Pallikaranai Wetland further south.

Unfortunately in the rush to grab water from rivers and water bodies far and away, these existing water sources and recharge areas were forgotten, neglected and subsequently destroyed.

In 1993, CAG filed a case against the Tamil Nadu Housing Board seeking to stop their proposed plans of constructing housing colonies in the lake beds and low lying areas of Velachery, Kakkalur, Chittalapakkam, Ambattur and Nolambur. Unfortunately, the Madras High Court did not stop the destruction at that time, and before you knew it, the lake beds were filled up. With the Tamil Nadu Housing Board leading the way, several private builders and contractors built on the remaining portions of the low lying areas.

Today, large portions of the Velachery, Ambattur and Chittalapakkam lakes stand destroyed, the Adyar estuary and creek has been built on, and the Pallikarani wetland is one of the two municipal garbage dumpsites of the city.

Is the State really serious about protecting its water bodies?

While all this destruction was happening, the State came out with a scheme to promote individual harvesting of rainwater. This micro initiative taken on by the government in 2002 by an amendment to the Chennai Metropolitan Area Ground Water Regulation Act of 1987, sought to mandate rainwater harvesting in all government and private buildings including new buildings. This law was rather progressive on many counts, but was repeatedly ignored.

The State subsequently decided to get serious about this mission – but limited their next step to rainwater harvesting alone. By an ordinance promulgated in July 2003 they mandated that all buildings both government and private should have rainwater harvesting structures in place by 31 August 2003 failing which water supply connections would be disconnected.

A number of households, commercial establishments and institutions adopted rainwater-harvesting structures in response. However, the short time given to comply with the rules led to the adoption of structures, which experts consider insufficient and not optimally useful. The CMWSSB states that there was 100% adoption of rainwater harvesting structures by all households, commercial establishments and institutions by August 2004. However it does not give information on the status of government buildings.

Rainwater harvesting is not new to Chennai. A number of initiatives had been taken earlier by both individuals and organisations in harvesting rainwater. From the year 1993 the builders Alacrity Foundation alone had installed rainwater-harvesting structures in almost 150 apartment complexes covering 4,500 apartments.

There are other criticisms to the rainwater harvesting efforts carried out till date. “The concept of rainwater harvesting has however been understood by many as collecting rainwater flow from terraces only” says noted expert on rainwater harvesting, Mr. Sekar Raghavan. The surface run-off in other areas of the premises has been totally ignored. A household survey conducted by Mr. Raghavan and his team on the effectiveness of rainwater harvesting in the Gandhinagar locality of south Chennai during June and October 2003 revealed that only 50% of the 309 houses covered had implemented structures scientifically to optimise recovery of rainwater.

There are other issues as well. The government is said to have promised loans to panchayats to install rainwater-harvesting structures but this has never materialised. The enormous potential of public spaces including (paved areas in) parks, roads and storm water drains that carry the excess floodwaters remain unexploited by the Government and result in the loss of precious water.

Unfortunately, even in Minjur, where the Central Ground Water Board had recommended artificial recharge through rainwater harvesting as a cost-effective method for arresting the decline of ground water levels and water quality deterioration, the State took no action. In a perverse turn of events, there were efforts by government authorities to landfill water bodies even in Minjur (See Annexure 3).

At the Kortaliyar and Araniyar rivers, villagers have been asking the government to support the construction of check dams to recharge the groundwater. Even organising peaceful protests and calling the attention of the political leaders and concerned agencies did not yield results. (See Annexure 4)

Similarly, there have been repeated requests from villagers of Kesavaram to construct a check dam across Cooum river. Panchayats have passed resolutions to increase the height of check dams in Seemavaram and Kammavarapalayam of Minjur block to help in percolation.

Interestingly the government refuses to respond to these requests. At the same time, the government went ahead and constructed a check dams which did not even last one monsoon as in the case of Nerkundram near Minjur.

There is no doubt that **rainwater harvesting was a positive step** taken by the government. But given the enormity of the water problem in Chennai – the State should not have and should not be destroying its existing water recharge zones – the lakes, wetlands, marshes, low lying areas and river beds.

Sewage water pollution

Despite being disallowed, sewage water has always found its way to the Cooum and Adyar rivers and in Chennai and serve as a

Myth 3: Given Chennai's water scarcity, it has explored all possible efforts of treating, recycling and reusing waste water

Reality: Not really. Till recently, the government did not even accept the benefits of waste water or sewage treatment. This is however changing and more emphasis is being placed on treatment and reuse.

The Johannesburg plan of implementation of the WSSD requires countries to '*Introduce measures to improve the efficiency of water infrastructure to reduce losses and increase recycling of water.*'

The government has only recently begun looking at the option of enhancing the recycling of water – brought on by the realisation that in times of acute water scarcity, ensuring continuous supply is an impossible task.

The 2002 amendment to the Chennai Metropolitan Area Ground Water Regulation Act of 1987, brought in progressive suggestions on grey water recycling and dual-water systems, among others. However, this law has remained on paper and has been repeatedly ignored.

The economics 'against' recycling

For many years, the CMWSSB appeared convinced that recycling waste water was a **bad** option. This logic was prompted by the need of the CMWSSB to seek revenue from industries – in order to cross subsidise domestic consumers. Industrial users were charged much higher rates and this allowed CMWSSB to cross subsidise. As has been mentioned above, ground water from the AK Basin was being supplied to industries situated in and around Manali from the early 1960's. This supply was kept up for many years even when Chennai had started slowly exhibiting water stress symptoms. In fact, even when industries evinced interest in setting up their own treatment plants to reuse water, permission was denied as the CMWSSB wanted to continue selling groundwater at high rates to industries.

Since they were not allowed to look at recycling as an option and in order to reduce their high-cost dependence on CMWSSB, industries are known to have begun unchecked extraction of groundwater from wells and bore wells for their use, though there is no reliable data or estimates available with regard to this. Today, experts suggest that several manufacturers of packaged drinking water and beverages resort to this practise unchecked.

Sewage water treatment

Despite being discussed for several years, sewage treatment has never really been accorded the importance that it deserves in Chennai city. Chennai's sewage has always found its way to the waterways and canals that flow through its territory. The Cooum and Adyar rivers along with the Buckingham Canal are the major waterways in Chennai and serve as conduits for carrying excess waters from storm water drains

in the city. Presently the condition of these waters is highly polluted due to discharge of sewage and effluents.

As early as in 1993 CAG and other environmental organisations filed a public interest litigation in the Madras High Court seeking directions to the government agencies responsible to stop polluting these waterways. The Court directed the Pollution Control Board to take action and stop the discharge. Years later there is little improvement.

Recently though, the government has adopted the Chennai River Conservation Project that has been formulated with the objective of preventing sewage entering into waterways and also keeping them clean.¹³ But we are still discussing what condition the sewage should be while being discharged into the rivers under this Scheme, not how this water can be reused in the water supply system.

Sewage outfalls into Chennai Rivers (As on 04-08-2005)¹⁴

Agency	No of outfalls	Outfalls arrested	Outfalls to be plugged
CMWSSB	115	62	53
Chennai Corporation	38	2	36
Public works department	34	4	30
Others	29	8	21
Total	216	76	140

The table above clearly states the conditions prevalent now – where masses of garbage and sewage flow into the rivers.

Recently under the greening process of Chennai city a number of small gardens and parks have mushroomed all over the city. For the first time since its inception, CMWSSB is talking about using about 1.5 lakh litres of treated water to maintain these parks. Recent news reports also indicate that CMWSSB is planning to expand their sewage treatment coverage

Private initiatives in the recycling of grey water have been prevalent for some time now. This is a marked departure from the earlier situation where the concept of waste water recycling for reuse was not popular. Many citizens who were reluctant have now accepted that this would help to conserve water in their apartment blocks. Some apartment complexes today have systems where water is treated and physically reclaimed for uses such as flushing or watering gardens while in the others it is used for recharging the groundwater.

¹³ "A Status check on city river project" The Hindu, 22nd August 2005

¹⁴ Ibid

Recently, some of the larger industrial water users, have set up tertiary treatment facilities and are recycling their water.¹⁵ Given their technology, the CMWSSB has begun supplying these industries secondary sewage effluent for their industrial use.

¹⁵ <http://www.thehindubusinessline.com/2004/02/11/stories/2004021101671700.htm>

Myth 4: Water supplied anywhere in the city is of the same quality – irrespective of the locality or profile of the consumer

Reality: Sadly NO. Samples we collected from water supplied to Chennai slums was high in coliform, which was missing in water samples collected from some other residential areas.

Quantity is but one aspect of a resource. But the fixation with quantity at bet will ensure that all residents get “adequate” water supply. This is a mandate of the CMWSSB, without doubt. However, can we really disregard the smell of chlorine or the turbid colour in the water? Is it not our right to ask for “safe drinking water”?

In 1993, CAG filed a public interest litigation before the High Court of Madras seeking the supply of potable drinking water to the citizens of Madras. This was in connection with a severe epidemic of diarrhoeal diseases that broke out in the city in November 1992 due to contaminated water supply. Several reports in the newspapers had appeared bringing to notice that an alarming number of cases were being admitted into the Communicable Diseases Hospital. The CMWSSB stated that its water is not contaminated and this case was disposed in 2001.

The study team decided to examine the quality of water being supplied in Chennai city. First, a pilot level testing of water supplied through the network of community water tanks, community pumps and water tankers (trucks) was carried out to ascertain whether they are indeed safe for human consumption.

According to officials of the CMWSSB, water is sourced to the city of Chennai from new Veeranam, and Redhills. While south Chennai is supplied by the water from Veeranam, North and West Chennai areas are supplied by the Redhills tank.

It is common knowledge that south Chennai is better planned and offers facilities and a quality of life better than its northern and western counterparts and overall the development in west and north Chennai has not matched the development in the south. Keeping this assumption in mind and also factoring criteria such as ease of collection, transportation and distance from the testing laboratory, the sites for testing the water quality were chosen.

Kilpauk treatment plant, which supplies north Chennai areas and being one of the main supply points, the zones being supplied by it were chosen for sample collection. Thus, **Kilpauk** (water treatment plant and nearby areas), **Perambur** and **Vyasarpadi** (Zone 3) were thus chosen.

Preliminary enquiries and surveys revealed that tanker water supply had been discontinued in several areas. The sites chosen also had limited or almost no direct tanker supply. Water tankers would fill the community tank (black plastic tanks) provided on the street. Piped water supplied to hand pumps is also now predominant. Therefore street water tanks and hand pumps were the sources of sample collection.

Samples were collected from areas with high-income dwellings and low-income dwellings (including slums)

Sample size

A total number of 12 samples, 4 in each area were collected. However one sample had to be discarded, as it was stored beyond 24 hours.

Water Quality Standards

The Indian Standards for Drinking Water Quality laid down by the **Bureau of Indian Standards (BIS), IS: 10500-1991** were used to ascertain the quality of water.

Sampling Protocol¹⁶

A lighted candle is held at the mouth of the collection point for 3-5 minutes (for taps or hand pumps). Water was allowed to flow for one minute and then the sample was collected. 1 litre of the sample was collected. The vessel (1 litre plastic can) used for sample collection was allowed to overflow and then closed, in order to prevent air bubbles in the sample. A separate vessel (1 litre sterilised plastic container) was used to collect the sample for the purpose of bacteriological testing. The sample was collected and sent to the laboratory within 24 hours.

Results and Discussion

Chemical Analysis:

The results of chemical analysis of all the samples collected showed that they were within the prescribed standards (For detailed results please check the annexure). However, some observations have been discussed below.

A **strong odour of Chlorine** in samples K1-K4 (collected in Kilpauk area) was present. One sample (P1) collected in a high-income area in Perambur showed pH value as high as **9.55** indicating excess alkalinity. Sample P2 collected in a slum area in Perambur was slightly yellow in colour. **Magnesium and Calcium** were detected close to the desirable limit for samples collected in **Vyasarpadi area**, indicating the level of hardness in water.

Bacteriological analysis:

Samples collected in Perambur (P2) and Vyasarpadi (V3) in slum areas showed the **presence of coliform**. In P2, a level of 7 was detected in 100ml of sample and in V3, a level of 3 in 100ml of sample.

Coliform:

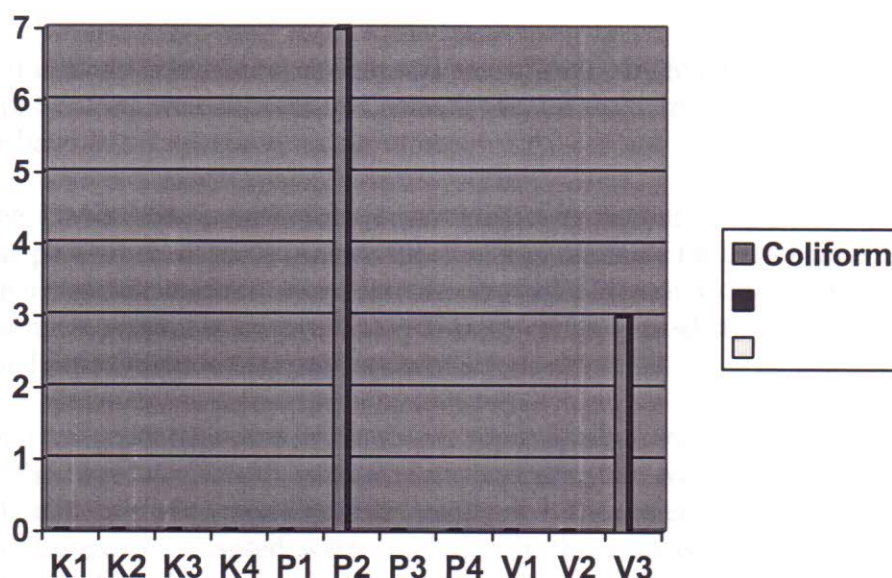
With respect to coliform, according to CMWSSB¹⁷, coliform organisms should not be present in 100 ml of any two consecutive samples or more than 5% of the samples

¹⁶ Methodology developed in consultation with Dr.R.Swaminathan, Ex-Scientist, NEERI

¹⁷ <http://chennaietrowater.tn.nic.in/qualitymainpage.htm>

collected for the year. However, in this pilot testing coliform presence has been detected in 2 out of the 11 samples (approx. 18%). **This renders the water unfit for consumption.**

Graph 1: Presence of Coliform in water samples



Based on the results some of the broad conclusions that can be arrived at are:

1. Water quality in Perambur and Vyasarpadi is not of the same quality as in Kilpauk area.
2. It can be inferred that the quality is potentially deteriorating along the supply as we proceed from the treatment plant to the supply areas.
3. **Noticeably quality of water in low-income areas particularly slums seem poor..**
4. The level of coliform indicates that the water maybe **unsuitable for consumption.**

It is important to note that this is a pilot level study of water quality and results indicate the possible extent of contamination. Further, some parameters such as residual chlorine, total Nitrogen and heavy metals have not been tested. While the facilities for testing the two parameters were non-existent in the testing lab, heavy metals were not analysed due to limitation in resources available for this study.

A more detailed analysis would reveal better the quality of water being supplied to the city of Chennai.

Conclusion

The provision of clean and safe water leads to spill over benefits to the community and to future generations and these benefits spread over to the rest of society, for example by the reduction in the spread of infectious diseases. The pressing issue today is how to achieve the right balance between managing water as a social good and a precious finite resource commodity. This issue is also part of the debate over globalization and privatization of water worldwide.

The purpose of this study is to review current and past efforts – by State and non-State players to ensure drinking water access to Chennai; viewed from an ‘equity lens’ it is obvious that we have failed miserably in our efforts.

The role of the CMWSSB is quite obviously biased in favour of the city and prejudicial to the peri-urban areas. It appears that the only rationale for drawing up the “Greater Chennai Agglomeration” to extend far beyond Chennai Corporation and other urban panchayat areas was to give CMWSSB power and jurisdiction over these areas – power and jurisdiction to take and extract.

And yet, Chennai residents take care of their own water needs – buying from private sellers, or from the ‘free’ CMWSSB tankers. So where does the water extracted – at the cost of the livelihoods of so many families, really go? The water withdrawal from peri-urban areas has not just caused water depletion in these areas and made them seek water from elsewhere, but is also setting up a conflict situation not only between urban and peri-urban areas but also amongst the peri-urban areas themselves. So we must ask the question – who does the CMWSSB work for?

Water bodies and lakes in the areas have been neglected, misused and appropriated over the years. Desilting of our reservoirs and lakes has not been done as also sides and embankments not protected. In several areas powers for traditional maintenance of water bodies has been taken away from the people and rests currently with government bodies in the city. This has led to neglect of the water bodies and local people are not able to get agencies to respond to their complaints. Encroachments by the powerful and land promoters has resulted in illegal buildings in several of these water bodies.

And while individual water harvesting measures have been made mandatory in the “larger public interest”, no such onus seems to rest with the government for maintaining water bodies and lakes.

Experts argue that among the options to augment water resources, rainwater harvesting is the cheapest at Rs.4 a cubic metre. Check dams cost Rs.11 a cubic metre, recycling wastewater for industrial use costs Rs.36 a cubic metre, and desalination costs about Rs.45 a cubic meter.¹⁸

¹⁸ <http://www.thehindubusinessline.com/2004/11/23/stories/2004112301561700.htm>

And yet, after years of promising to bring water from far and away rivers, the governments' next plan is to look at the expensive option of desalination. Recently the government has awarded the work of setting up such a plant to a Hyderabad based company at the same destroyed Minjur area, north of the city. This project is expected to cost 500 crores.

There is clearly no holistic approach to planning and development with each agency operating in its own bubble with a set of pre-determined set of 'one-off' projects – often at cross purposes with the other.

For a democracy to function effectively and to be truly representative of peoples aspirations there should be a seamless flow of power from the grass roots to the state and centre. Excessive concentrations along the line only serve to create imbalances and conflicts of interest where the weak are overwhelmed by the bureaucracy and vested interests which, often in the name of greater good exploit local resources ignoring local priorities. Local communities should be made trustees of their land and environment to ensure accountability and prevent despoliation. It may be argued that the same vested interests that operate at the macro levels will continue to influence local governments as well, but in the political scheme of things there is bound to be much more transparency and commitment to local issues rather than in the state secretariat or the legislative assembly. State agencies such as the CMWSSB, should be made inspecting agencies to ensure compliance to policies while planning and implementation should pass down to the local government. Currently the state government is as guilty of doing to the local governments what it is accusing the centre of doing to the state. In a diverse society such as ours, decision making should not be far removed from the problem, as issues then, get clouded over by administrative complexities and indifference to the plight of others.

The purpose of this study is to provide a platform where the community in and around Chennai can voice their concerns. It is aimed to bring to fore an accurate picture about the prevailing situation on water use and management in the urban and peri-urban areas of Chennai. Through this platform, CAG hopes to be able to jointly address these issues, scams and injustices.

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Annexure

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ANNEXURES

Annexure - 1 Response from the Chief Minister's special cell to the petition-
Prevention of groundwater tapping.



K. RAJARAMAN, I.A.S.,
DEPUTY SECRETARY TO CHIEF MINISTER

SECRETARIAT
MADRAS.

CHIEF MINISTER'S SPECIAL CELL

D.O. Letter No. F/16224/CN/95-1. DATED: 4-8-95

Dear Thiru Rama Mohana Rao,

Sub: Chief Minister's Special Cell petitions-
Prevention of ground water tapping- Reg.
report called for.

.....

Enclosed are eleven petitions in original received from Thiru M.P. Palani and others of Mathur Manali, Madhavaram, Chinnasekkadu, Manali of Saidapet Taluk, by effective implementation of Madras Metropolitan Area Ground Water (Regulation) Act, recently amended and included these areas.

I request you to kindly take immediate and effective action against the unlawful ground water sales in these areas and arrange to send your report.

Yours sincerely,

- sd -

To
Thiru P. Rama Mohana Rao, I.A.S.,
District Collector,
Chennai MGR District,
Kancheepuram.

Copy to:
The Sub-Collector, Saidapet, Madras.

Thiru M.P. Palani,
Mathur Manali post, Madras.68
/true copy/

S. J. S. S. S. S.
Section Officer

Annexure - 2 : Water quality report from the Tamil Nadu Water Supply & Drainage Board dated 19th February 2002.



TAMIL NADU WATER SUPPLY & DRAINAGE BOARD

DISTRICT WATER TESTING LABORATORY, THIRUVALLUR - 602 001.

From,

JUNIOR WATER ANALYST,
TWAD Board, District Water Testing Laboratory,
Thiruvallur - 602 001.

To,

The Executive Officer
Manali Town Panchayat

Lt. No. 2482 - 2496/2001/JWA/TN Dated: 19/2/2001

Sir,

SUB: Examination of Water Sample Report
furnished Reg.

REF: your Ltr. 396/2000/A1/9.2.2001

The results of analysis for the sample sent under reference is enclosed.

- 1) Sample no. 2482 (H.P.) :- The water is chemically not potable as its Total Hardness and Iron values is exceed the maximum acceptable limit.
- 2) Sample no. 2483 (H.P.) :- The water is chemically not potable as its Total Hardness and Nitrate values is exceed the maximum acceptable limit.
- 3) Sample no. 2484, 2485 (H.P.) :- The water is chemically not potable as its Nitrate values is exceed the maximum acceptable limit.
- 4) Sample no. 2486 (H.P.) :- The water is chemically potable.

19/2/2001
JUNIOR WATER ANALYST/TWAD
District Water Testing Laboratory,
Thiruvallur - 602 001.

Invoice No 1

0190

dated

12/2/2001 for Rs. 4250/-

IN THE HIGH COURT OF JUDICATURE AT MADRAS

Date: 23.10.2003

Coram!

The Honourable Mr. B. SUBHASHAN REDDY, Chief Justice

and

The Honourable Mr. Justice A. KULASEKARAN

W.P. No. 45150 of 2002 and W.M.P. No. 66097 of 2002

D. Duraivelupandian

25-B, Sakthavatchalan Street,

Minjur - 601203

... Petitioner

1. The Collector,
Tiruvallur District,
Tiruvallur.

2. The Revenue Divisional Officer,
Ponneri Taluk,
PONNERI.

3. The Executive Officer,
Minjur Town Panchayat,
MINJUR - 601203.

4. The President,
Minjur Town Panchayat,
MINJUR - 601203.

... Respondents

Petition under Article 226 of Constitution of India
for the issuance of writ of Mandamus for the reasons stated
therein.

For Petitioner : Mr. M.V. Muralidaran

For Respondents 1 and 2 : Mr. V. Raghupathy,
Govt. Pleader

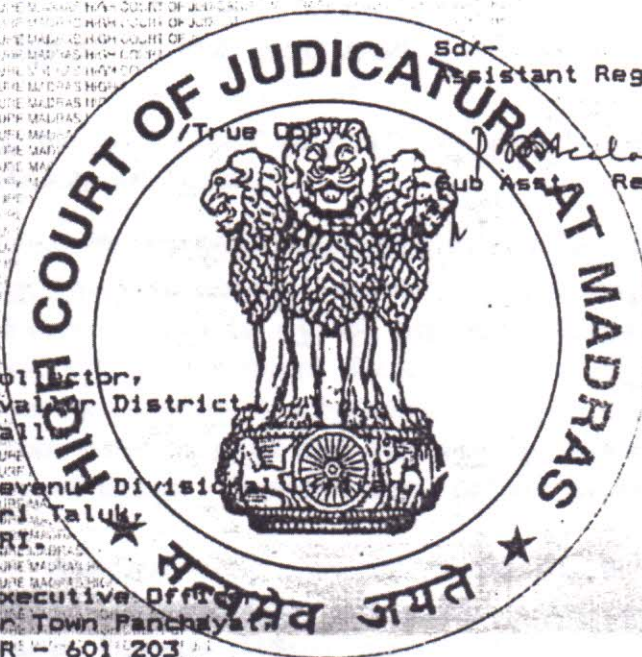
For Respondents 3 and 4 : Mr. V. Subbarayan
Spl. Govt. Pleader

ORDER

(The Order of the Court was made by A. Kulasekaran, J)

This Public Interest Litigation has been filed praying for injunction restraining the respondents 3 and 4 from closing the Varasakthi Vinayakar Tank (Kulan) situated in the survey No. 237/1, Minjur Village, Ponneri Taluk, Tiruvallur District with further direction to all the respondents to clean the Varasakthi Vinayagar Kulan in a proper manner for the use of the people of Minjur Village.

2. Learned counsel for the petitioner submitted that a representation dated 6.11.2002 has been made which has not been disposed of. But the learned Special Government Pleader submitted that they have already commenced the work of desisting the tank. Considering the circumstances of the case, we direct the respondents to dispose of the said representation of the petitioner within a period of four weeks from the date of receipt of a copy of this order. Accordingly, this writ petition is disposed of. Consequently, W.M.P.No.66007 of 2002 is closed.



Sd/-
Assistant Registrar

Sub Ass't Registrar

13/1/03

- bh/
- To
1. The Collector,
Thiruvallur District,
Tiruvallur
 2. The Revenue Divisional Officer,
Ponneri Taluk,
PONNERI.
 3. The Executive Officer,
Minjur Town Panchayat,
MINJUR - 601 203

4. The President,
Minjur Town Panchayat,
MINJUR - 601 203.

+ 1 CC to Mr.M.V.Muralidharan, Advocate SR.No.62026.

W.P.NO.45150 OF 2002

jk (cd)
spn.

**நீர் ஆதாரங்கள் புறமைக்கவும்,
குசஸ்தலை ஆற்றில் அணை கட்டவும்
வேண்டி மனித சங்கில் போராட்டம்.**

இடம் : காரனோடை பாலம் அருகில்.

நாள் : 25-9-04 சனிக்கிழமை

நேரம் : காலை 9.00 மணி முதல்

பொன்னேரி வட்டம், சோழவரம் ஊராட்சி ஒன்றியம் சேர்த்து விவசாய பெருமக்களே,
பொது மக்களே சித்திரபேரி, செயல்படுவீர்.

கிது நான் வரை நமது விவசாயத்திற்கும், குடிநீருக்கும் தீவிரத் தீவிரப் பெற்று வந்தோம்.
அரசின் தவறான அணுகுமுறையால் பல்வகையான அனாதைகள் அடைந்தும்,
வாடகைக்கு பெற்றும் செலவை குடிநீருக்கு எந்த வித உடன்பாடுமின்றி பெருமளவு தீர் கொண்டு
செல்லப்பட்டு, முழுமையாக தீவிரத் தீர் வறண்டு விட்டது. குசஸ்தலை ஆற்றில் உடன்பாடற்ற
முறையில் மனல் சுறாண்டப்பட்டு வருவதால் ஆற்றுப்படுகை பாழடைந்து கடல் தீர் உட்புகுந்து
கித்த ஒன்றிய பகுதிகளில் பெருமளவு குடிநீர் உப்பு தீராக மாறி குடி குடிநீருக்கே போராத
வேண்டிய நிலை உருவாகி விட்டது. விவசாயமும் பெரும் பாதிப்பு அடைந்துள்ளது.

கித்த அவல நிலையினால் மாற்ற குசஸ்தலை ஆற்றின் கிடைபய பண்டுகளவனார்
கித்தில் அணைக்கட்டியும், அணையிலிருந்து ஏரிக்கரு வரவு கால்வாய்கள் ஏற்படுத்தியும்,
ஏரி மற்றும் குளங்களை சீரமைத்து தீர்ப்பு ஏற்படுத்த வேண்டி அரசின் கவனத்தை
கிப்பகுதியின்பால் ஈர்க்கும்படி விவசாயிகளின் சங்கத்தின் சேர்ப்பாகவும், எக்ஸ்ப்ளோரே
தொண்டு திறுவனத்தின் வாயிலாகவும் நடைபெற உள்ள மனித சங்கில் போராட்டத்தில்
பொது தோக்கத்தை மனதில் கொண்டு உட்பு பாதுகாடுகள் கின்று பொது மக்கள் அனைவரும்
கலந்து கொண்டு மனித சங்கில் போராட்டம் வெற்றி அடைய அனைவரைய திரண்டு வருமாறு
அன்புடன் அழைக்கின்றோம்.

M.B.நீர்மல்,

நிறுவனம் மற்றும் தலைவர்,
எக்ஸ்ப்ளோரே இண்டஸ்ட்ரிஸ்

G.வாசுதேவ் நாயுடு

தலைவர் -
தமிழ்நாடு விவசாயிகள் சங்கம்
(கட்சிசார்பற்றது)
சீமையூர்

**அன்பளிப்பு
பாண்டிசைஸ் (ரீ) கிம்மெட் . பஞ்செட்டி**

From suppliers of water to borrowers

Village falls victim to indiscriminate extraction

Staff Reporter

CHENNAI: "From the days when we were providing water to our neighbours — Chennai residents — we have been reduced to the level of pleading for water from other villages to meet our drinking needs," laments Dhana-lakshmi of a village near Karanodai on the city's northern outskirts.

Her words reflect the anguish of the villagers whose lives have been affected by indiscriminate groundwater extraction to cater to Chennai's water demand, and sand mining.

Farmers highlighted the spill-over effects of the present water management system and official apathy to over-extraction of water, especially in the villages along the Koratalaiyar river belt, at a public hearing organised by Citizens Consumer and Civic Action Group (CAG) on Saturday at Karanodai.

The villagers said agriculture has been abandoned for almost two years due to lack of water. "We don't have enough water for our drinking needs, leave alone for agriculture," they said.

Pointing out that lack of water affected the education, Ms. Dhana-lakshmi said, "My children go to school once in two days as there is not enough water to wash their uniforms and give them a bath daily."

The villagers said a few farmers of villages such as Athur sold water from their wells either lured by money or 'pressured' by the government and others had no option except to follow suit.

Kalyani of Kannigaipair said the farmers were forced to sell their lands for industrialisation as ground water resources had



WATER WOES: Kothandapani, a farmer of Sembulivaram speaks on the problems faced by villagers near Chennai due to over extraction of sub-soil water, at a public hearing organised by the Citizen Consumer and Civic Action on Saturday. (From left) Tara Murali, CAG trustee, Bharat Jairaj, CAG legal coordinator, P.H.C.M. Gandhi, former TWAD Board official and Shobha Iyer, CAG study coordinator look on. — PHOTO: S. THANTHONI

been exhausted and water bodies abandoned. "We have been reduced to a state of borrowing water from other villages at Rs. 2 a pot."

S. Natesan of Karanodai spoke about illegal sand mining in the Koratalaiyar river basin, which has affected the groundwater recharge. He appealed to the government to stop sand mining to ensure recharging of groundwater.

Kothandapani of Sembulivaram village suggested check-dams be built across the Koratalaiyar river at every 2 km distance to store water for irrigation. Janakiraman of Siruvapuri questioned the suggestion for a change in crop pattern and said it would not suit the marginal farmers and casual labour-

ers. M. Bhaskaran, Azhichivakkam village panchayat president, suggested desilting of water bodies and planting saplings.

He emphasised the need for the farmers' participation in the grievance day conducted at the district collectorate.

The public hearing was part of the CAG's study on 'Chennai's water crisis: myths and realities,' which would focus on the impact of the extraction of natural resources on the surrounding villages of the city.

It would seek a solution to make the city self-sufficient in its water needs.

The findings of the study would be revealed by September-end and presented to the government.

City draws farmers' water

By PREETI KANNAN

Chennai, Aug. 30: Fifty-five-year-old Jagannath, from Kizhanur village in Tiruvallur district, used to produce about 200 bags of rice from his fields every year.

But now he stands outside a ration shop every month to buy a few bags of rice to feed his family.

This has been the plight of about 20 villages in and around the district for which Jagannath squarely blames the Metrowater and private water suppliers for over-exploiting the groundwater to feed the thirsty Chennai.

While a few villagers in Kizhanur have been cultivating *Kambu*, also known as *bhajra*, sesame and *ragi* for the last ten years to sustain themselves, many have been forced to leave their homes in search of *coolie* jobs in cities.

Says Jagannath, "We have depended on the Araniyar and Kortaliyar rivers for



Sorry state: Jagannath looks at the sesame crop he cultivated in his field this year, which has dried because of lack of adequate water. From being a rice cultivator, he has been forced to grow crops like sesame, cumba and raagi, which consume less water. Photograph by Martin Louis.

decades.

But, since mid-eighties water has been drawn from the basin and many landlords have also sold their water to private parties, hoping to make huge profits."

Excess water from the Satyamoorthy dam in Poondi reservoir, in Tiruvallur district, was let into this basin and used by

the villagers. Usually, a good monsoon and surplus water used to recharge the ground water table.

Now, the villagers have not seen a drop of water in the basin, for more than a decade.

Adding to their woes of ground water depletion, sand quarrying is a common phenomenon in the river stretches. Says Mr

Muthu, a farmer from Periyalayam, "The government has leased the land and takes a few lorries of sand from the basin, but private parties also vie for their share and often take more than 1,500 lorry-loads of sand."

"Even some villagers take sand from the river beds, as they have no other source of income and when they take it in their bullock carts, they are apprehended and fined. If you steal sand in a lorry, you are let off scot free," he adds bitterly.

The Metrowater officials, though, chose not to comment on the issue and the Board's Managing Director was not available for comment.

Says Mr K.S. Sudhakar of Citizens Consumer and Civic Action Group (CAG), which has been organising public hearings for villagers, "Chennai should start looking for alternatives to solve its water problems, instead of exploiting other villages."

Annexure – 8:

Water Sample Collection Data Sheet

Protocol of sample collection and testing

1 litre white plastic cans are to be used for collection. Samples have to be collected from CMWSSB tankers alone. The sample is to be collected directly from the outlet of the water tanker. Before collection the plastic can must be rinsed thoroughly with the same water and one litre of sample is to be collected. The can must be tightly sealed. The collected sample must be immediately refrigerated to prevent contamination. The sample must be handed over to the testing laboratory within 24 hours.

Date of collection:

Time of collection:

Place of collection:

Quantity of sample collected:

Number of water tanker / tank:

Description of surrounding area:

Sample collected by:

Signature:

C.P.R. ENVIRONMENTAL EDUCATION CENTRE
1, ELDAMS ROAD, CHENNAI-600 018

WATER ANALYSIS REPORT

Sample Number	W-111/2005-06		Date of Collection	19-09-2005	
Nature of sample	Tap water		Time of Collection	3.00 p.m.	
Location	Chennai (K1)		Date of analysis	19-09-2005 to 21-09-2005	
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result
1	Colour	Hazen	5.00	25.00	Nil
2	Odour		Unobjectionable	Unobjectionable	Chlorine smell
3	Turbidity	NTU	5.00	10.00	1.60
4	pH		6.50 to 8.50	6.50 to 8.50	7.06
5	Conductivity	µS/cm	N.S.	N.S.	430.00
6	Total dissolved solids	mg/l	500.00	2000.00	275.00
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	80.00
8	Chloride as Cl	mg/l	250.00	1000.00	78.00
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	76.00
10	Calcium as Ca	mg/l	75.00	200.00	12.00
11	Magnesium as Mg	mg/l	30.00	100.00	11.20
12	Sulphate as SO ₄	mg/l	200.00	400.00	28.00
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	0.90
14	Nitrate as NO ₃	mg/l	45.00	100.00	0.90
15	Fluoride as F	mg/l	1.00	1.50	0.40
16	Iron as Fe	mg/l	0.30	1.00	<0.10
17	Manganese as Mn	mg/l	0.10	0.30	<0.10
18	Coliform	Cfu/100 ml	Nil	Nil	Nil
Remarks	All the above parameters analysed are within the maximum permissible limit.				
Note	1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.				

C.P.R. ENVIRONMENTAL EDUCATION CENTRE
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WATER ANALYSIS REPORT

Sample Number		W-112/2005-06		Date of Collection		19-09-2005
Nature of sample		Tap water		Time of Collection		3.00 p.m.
Location		Chennai (K2)		Date of analysis		19-09-2005 to 21-09-2005
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result	
1	Colour	Hazen	5.00	25.00	Nil	
2	Odour		Unobjectionable	Unobjectionable	Chlorine smell	
3	Turbidity	NTU	5.00	10.00	1.80	
4	pH		6.50 to 8.50	6.50 to 8.50	7.15	
5	Conductivity	μS/cm	N.S.	N.S.	440.00	
6	Total dissolved solids	mg/l	500.00	2000.00	282.00	
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	80.00	
8	Chloride as Cl	mg/l	250.00	1000.00	78.00	
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	74.00	
10	Calcium as Ca	mg/l	75.00	200.00	12.80	
11	Magnesium as Mg	mg/l	30.00	100.00	10.20	
12	Sulphate as SO ₄	mg/l	200.00	400.00	26.00	
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	0.90	
14	Nitrate as NO ₃	mg/l	45.00	100.00	1.00	
15	Fluoride as F	mg/l	1.00	1.50	0.40	
16	Iron as Fe	mg/l	0.30	1.00	<0.10	
17	Manganese as Mn	mg/l	0.10	0.30	<0.10	
18	Coliform	Cfu/100 ml	Nil	Nil	Nil	
Remarks		All the above parameters analysed are within the maximum permissible limit.				
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.				

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WATER ANALYSIS REPORT

Sample Number		W-113/2005-06		Date of Collection		19-09-2005
Nature of sample		Tap water		Time of Collection		3.00 p.m.
Location		Chennai (K3)		Date of analysis		19-09-2005 to 21-09-2005
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result	
1	Colour	Hazen	5.00	25.00	Nil	
2	Odour		Unobjectionable	Unobjectionable	Chlorine smell	
3	Turbidity	NTU	5.00	10.00	2.10	
4	pH		6.50 to 8.50	6.50 to 8.50	7.40	
5	Conductivity	µS/cm	N.S.	N.S.	440.00	
6	Total dissolved solids	mg/l	500.00	2000.00	282.00	
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	80.00	
8	Chloride as Cl	mg/l	250.00	1000.00	78.00	
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	76.00	
10	Calcium as Ca	mg/l	75.00	200.00	13.60	
11	Magnesium as Mg	mg/l	30.00	100.00	10.20	
12	Sulphate as SO ₄	mg/l	200.00	400.00	27.00	
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	0.90	
14	Nitrate as NO ₃	mg/l	45.00	100.00	1.20	
15	Fluoride as F	mg/l	1.00	1.50	0.40	
16	Iron as Fe	mg/l	0.30	1.00	<0.10	
17	Manganese as Mn	mg/l	0.10	0.30	<0.10	
18	Coliform	Cfu/100 ml	Nil	Nil	Nil	
Remarks		All the above parameters analysed are within the maximum permissible limit.				
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.				

C.P.R. ENVIRONMENTAL EDUCATION CENTRE
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WATER ANALYSIS REPORT

Sample Number		W-114/2005-06		Date of Collection		19-09-2005	
Nature of sample		Tap water		Time of Collection		3.00 p.m.	
Location		Chennai (K4)		Date of analysis		19-09-2005 to 21-09-2005	
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source		Result	
1	Colour	Hazen	5.00	25.00		Nil	
2	Odour		Unobjectionable	Unobjectionable		Chlorine smell	
3	Turbidity	NTU	5.00	10.00		2.10	
4	pH		6.50 to 8.50	6.50 to 8.50		7.22	
5	Conductivity	µS/cm	N.S.	N.S.		440.00	
6	Total dissolved solids	mg/l	500.00	2000.00		282.00	
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00		80.00	
8	Chloride as Cl	mg/l	250.00	1000.00		78.00	
9	Total hardness as CaCO ₃	mg/l	300.00	600.00		76.00	
10	Calcium as Ca	mg/l	75.00	200.00		12.80	
11	Magnesium as Mg	mg/l	30.00	100.00		10.70	
12	Sulphate as SO ₄	mg/l	200.00	400.00		28.00	
13	Phosphate as PO ₄	mg/l	N.S.	N.S.		0.90	
14	Nitrate as NO ₃	mg/l	45.00	100.00		1.00	
15	Fluoride as F	mg/l	1.00	1.50		0.40	
16	Iron as Fe	mg/l	0.30	1.00		<0.10	
17	Manganese as Mn	mg/l	0.10	0.30		<0.10	
18	Coliform	Cfu/100 ml	Nil	Nil		Nil	
Remarks		All the above parameters analysed are within the maximum permissible limit.					
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.					

C.P.R. ENVIRONMENTAL EDUCATION CENTRE
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WATER ANALYSIS REPORT

Sample Number		W-115/2005-06		Date of Collection		24-09-2005
Nature of sample		Tap water		Time of Collection		02.00 p.m.
Location		Chennai (P1)		Date of analysis		24-09-2005 to 28-09-2005
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result	
1	Colour	Hazen	5.00	25.00	Nil	
2	Odour		Unobjectionable	Unobjectionable	Nil	
3	Turbidity	NTU	5.00	10.00	1.00	
4	pH		6.50 to 8.50	6.50 to 8.50	9.55	
5	Conductivity	μS/cm	N.S.	N.S.	370.00	
6	Total dissolved solids	mg/l	500.00	2000.00	240.00	
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	44.00	
8	Chloride as Cl	mg/l	250.00	1000.00	80.00	
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	44.00	
10	Calcium as Ca	mg/l	75.00	200.00	8.00	
11	Magnesium as Mg	mg/l	30.00	100.00	6.00	
12	Sulphate as SO ₄	mg/l	200.00	400.00	38.00	
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	<0.10	
14	Nitrate as NO ₃	mg/l	45.00	100.00	0.20	
15	Fluoride as F	mg/l	1.00	1.50	0.29	
16	Iron as Fe	mg/l	0.30	1.00	0.12	
17	Manganese as Mn	mg/l	0.10	0.30	<0.10	
18	Coliform	Cfu/100 ml	Nil	Nil	Nil	
Remarks		All the above parameters analysed are within the maximum permissible limit except,pH.				
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.				

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WATER ANALYSIS REPORT

Sample Number		W-116/2005-06		Date of Collection		24-09-2005
Nature of sample		Tap water (Hand Pump)		Time of Collection		02.00 p.m.
Location		Chennai (P2)		Date of analysis		24-09-2005 to 28-09-2005
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result	
1	Colour	Hazen	5.00	25.00	Slightly yellow	
2	Odour		Unobjectionable	Unobjectionable	Nil	
3	Turbidity	NTU	5.00	10.00	2.00	
4	pH		6.50 to 8.50	6.50 to 8.50	7.15	
5	Conductivity	µS/cm	N.S.	N.S.	430.00	
6	Total dissolved solids	mg/l	500.00	2000.00	275.00	
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	84.00	
8	Chloride as Cl	mg/l	250.00	1000.00	84.00	
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	92.00	
10	Calcium as Ca	mg/l	75.00	200.00	13.00	
11	Magnesium as Mg	mg/l	30.00	100.00	15.00	
12	Sulphate as SO ₄	mg/l	200.00	400.00	31.00	
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	<0.10	
14	Nitrate as NO ₃	mg/l	45.00	100.00	0.21	
15	Fluoride as F	mg/l	1.00	1.50	0.35	
16	Iron as Fe	mg/l	0.30	1.00	0.72	
17	Manganese as Mn	mg/l	0.10	0.30	<0.10	
18	Coliform	Cfu/100 ml	Nil	Nil	7.00	
Remarks		All the above parameters analysed are within the maximum permissible limit except, coliform.				
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.				

C.P.R. ENVIRONMENTAL EDUCATION CENTRE
1, ELDAMS ROAD, CHENNAI-600 018

WATER ANALYSIS REPORT

Sample Number		W-117/2005-06		Date of Collection		24-09-2005
Nature of sample		Tap water		Time of Collection		02.00 p.m.
Location		Chennai (P3)		Date of analysis		24-09-2005 to 28-09-2005
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result	
1	Colour	Hazen	5.00	25.00	Nil	
2	Odour		Unobjectionable	Unobjectionable	Chlorine smell	
3	Turbidity	NTU	5.00	10.00	1.00	
4	pH		6.50 to 8.50	6.50 to 8.50	7.80	
5	Conductivity	µS/cm	N.S.	N.S.	680.00	
6	Total dissolved solids	mg/l	500.00	2000.00	435.00	
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	152.00	
8	Chloride as Cl	mg/l	250.00	1000.00	120.00	
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	184.00	
10	Calcium as Ca	mg/l	75.00	200.00	42.00	
11	Magnesium as Mg	mg/l	30.00	100.00	19.00	
12	Sulphate as SO ₄	mg/l	200.00	400.00	45.00	
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	<0.10	
14	Nitrate as NO ₃	mg/l	45.00	100.00	0.21	
15	Fluoride as F	mg/l	1.00	1.50	0.32	
16	Iron as Fe	mg/l	0.30	1.00	0.24	
17	Manganese as Mn	mg/l	0.10	0.30	<0.10	
18	Coliform	Cfu/100 ml	Nil	Nil	Nil	
Remarks		All the above parameters analysed are within the maximum permissible limit.				
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.				

C.P.R. ENVIRONMENTAL EDUCATION CENTRE
1, ELDAMS ROAD, CHENNAI-600 018

WATER ANALYSIS REPORT

Sample Number		W-118/2005-06	Date of Collection		24-09-2005
Nature of sample		Tap water	Time of Collection		02.00 p.m.
Location		Chennai (P4)	Date of analysis		24-09-2005 to 28-09-2005
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result
1	Colour	Hazen	5.00	25.00	Nil
2	Odour		Unobjectionable	Unobjectionable	Chlorine smell
3	Turbidity	NTU	5.00	10.00	0.80
4	pH		6.50 to 8.50	6.50 to 8.50	7.35
5	Conductivity	μS/cm	N.S.	N.S.	430.00
6	Total dissolved solids	mg/l	500.00	2000.00	275.00
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	76.00
8	Chloride as Cl	mg/l	250.00	1000.00	88.00
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	84.00
10	Calcium as Ca	mg/l	75.00	200.00	14.00
11	Magnesium as Mg	mg/l	30.00	100.00	12.00
12	Sulphate as SO ₄	mg/l	200.00	400.00	35.00
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	<0.10
14	Nitrate as NO ₃	mg/l	45.00	100.00	0.20
15	Fluoride as F	mg/l	1.00	1.50	0.34
16	Iron as Fe	mg/l	0.30	1.00	0.52
17	Manganese as Mn	mg/l	0.10	0.30	<0.10
18	Coliform	Cfu/100 ml	Nil	Nil	Nil
Remarks		All the above parameters analysed are within the maximum permissible limit.			
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.			

C.P.R. ENVIRONMENTAL EDUCATION CENTRE
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WATER ANALYSIS REPORT

Sample Number		W-119/2005-06		Date of Collection		24-09-2005
Nature of sample		Tap water		Time of Collection		02.00 p.m.
Location		Chennai (V1)		Date of analysis		24-09-2005 to 28-09-2005
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result	
1	Colour	Hazen	5.00	25.00	Nil	
2	Odour		Unobjectionable	Unobjectionable	Slightly chlorine smell	
3	Turbidity	NTU	5.00	10.00	1.50	
4	pH		6.50 to 8.50	6.50 to 8.50	7.60	
5	Conductivity	μS/cm	N.S.	N.S.	680.00	
6	Total dissolved solids	mg/l	500.00	2000.00	435.00	
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	148.00	
8	Chloride as Cl	mg/l	250.00	1000.00	116.00	
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	172.00	
10	Calcium as Ca	mg/l	75.00	200.00	40.00	
11	Magnesium as Mg	mg/l	30.00	100.00	17.00	
12	Sulphate as SO ₄	mg/l	200.00	400.00	44.00	
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	<0.10	
14	Nitrate as NO ₃	mg/l	45.00	100.00	0.20	
15	Fluoride as F	mg/l	1.00	1.50	0.26	
16	Iron as Fe	mg/l	0.30	1.00	0.08	
17	Manganese as Mn	mg/l	0.10	0.30	<0.10	
18	Coliform	Cfu/100 ml	Nil	Nil	Nil	
Remarks		All the above parameters analysed are within the maximum permissible limit.				
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.				

C.P.R. ENVIRONMENTAL EDUCATION CENTRE
1, ELDAMS ROAD, CHENNAI-600 018

WATER ANALYSIS REPORT

Sample Number		W-120/2005-06	Date of Collection		24-09-2005
Nature of sample		Tap water	Time of Collection		02.00 p.m.
Location		Chennai (V2)	Date of analysis		24-09-2005 to 28-09-2005
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result
1	Colour	Hazen	5.00	25.00	Nil
2	Odour		Unobjectionable	Unobjectionable	Nil
3	Turbidity	NTU	5.00	10.00	1.00
4	pH		6.50 to 8.50	6.50 to 8.50	7.57
5	Conductivity	µS/cm	N.S.	N.S.	790.00
6	Total dissolved solids	mg/l	500.00	2000.00	505.00
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	196.00
8	Chloride as Cl	mg/l	250.00	1000.00	128.00
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	220.00
10	Calcium as Ca	mg/l	75.00	200.00	50.00
11	Magnesium as Mg	mg/l	30.00	100.00	23.00
12	Sulphate as SO ₄	mg/l	200.00	400.00	49.00
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	<0.10
14	Nitrate as NO ₃	mg/l	45.00	100.00	0.21
15	Fluoride as F	mg/l	1.00	1.50	0.28
16	Iron as Fe	mg/l	0.30	1.00	0.12
17	Manganese as Mn	mg/l	0.10	0.30	<0.10
18	Coliform	Cfu/100 ml	Nil	Nil	Nil
Remarks		All the above parameters analysed are within the maximum permissible limit.			
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.			

C.P.R. ENVIRONMENTAL EDUCATION CENTRE
1, ELDAMS ROAD, CHENNAI-600 018

WATER ANALYSIS REPORT

Sample Number		W-121/2005-06	Date of Collection		24-09-2005
Nature of sample		Tap water	Time of Collection		02.00 p.m.
Location		Chennai (V3)	Date of analysis		24-09-2005 to 28-09-2005
Sl.No	Parameter	Unit	Desirable Limit	Maximum permissible limit in the absence of alternate source	Result
1	Colour	Hazen	5.00	25.00	Nil
2	Odour		Unobjectionable	Unobjectionable	Nil
3	Turbidity	NTU	5.00	10.00	0.50
4	pH		6.50 to 8.50	6.50 to 8.50	7.45
5	Conductivity	μS/cm	N.S.	N.S.	690.00
6	Total dissolved solids	mg/l	500.00	2000.00	440.00
7	Total Alkalinity as CaCO ₃	mg/l	200.00	600.00	168.00
8	Chloride as Cl	mg/l	250.00	1000.00	116.00
9	Total hardness as CaCO ₃	mg/l	300.00	600.00	168.00
10	Calcium as Ca	mg/l	75.00	200.00	40.00
11	Magnesium as Mg	mg/l	30.00	100.00	21.00
12	Sulphate as SO ₄	mg/l	200.00	400.00	47.00
13	Phosphate as PO ₄	mg/l	N.S.	N.S.	<0.10
14	Nitrate as NO ₃	mg/l	45.00	100.00	0.21
15	Fluoride as F	mg/l	1.00	1.50	0.27
16	Iron as Fe	mg/l	0.30	1.00	0.12
17	Manganese as Mn	mg/l	0.10	0.30	<0.10
18	Coliform	Cfu/100 ml	Nil	Nil	3.00
Remarks		All the above parameters analysed are within the maximum permissible limit except, coliform.			
Note		1. Quoted limits are as per Drinking water – Specification, IS 10500: 1991. 2. N.S.- Not Specified. 3. Sample was not collected by us.			