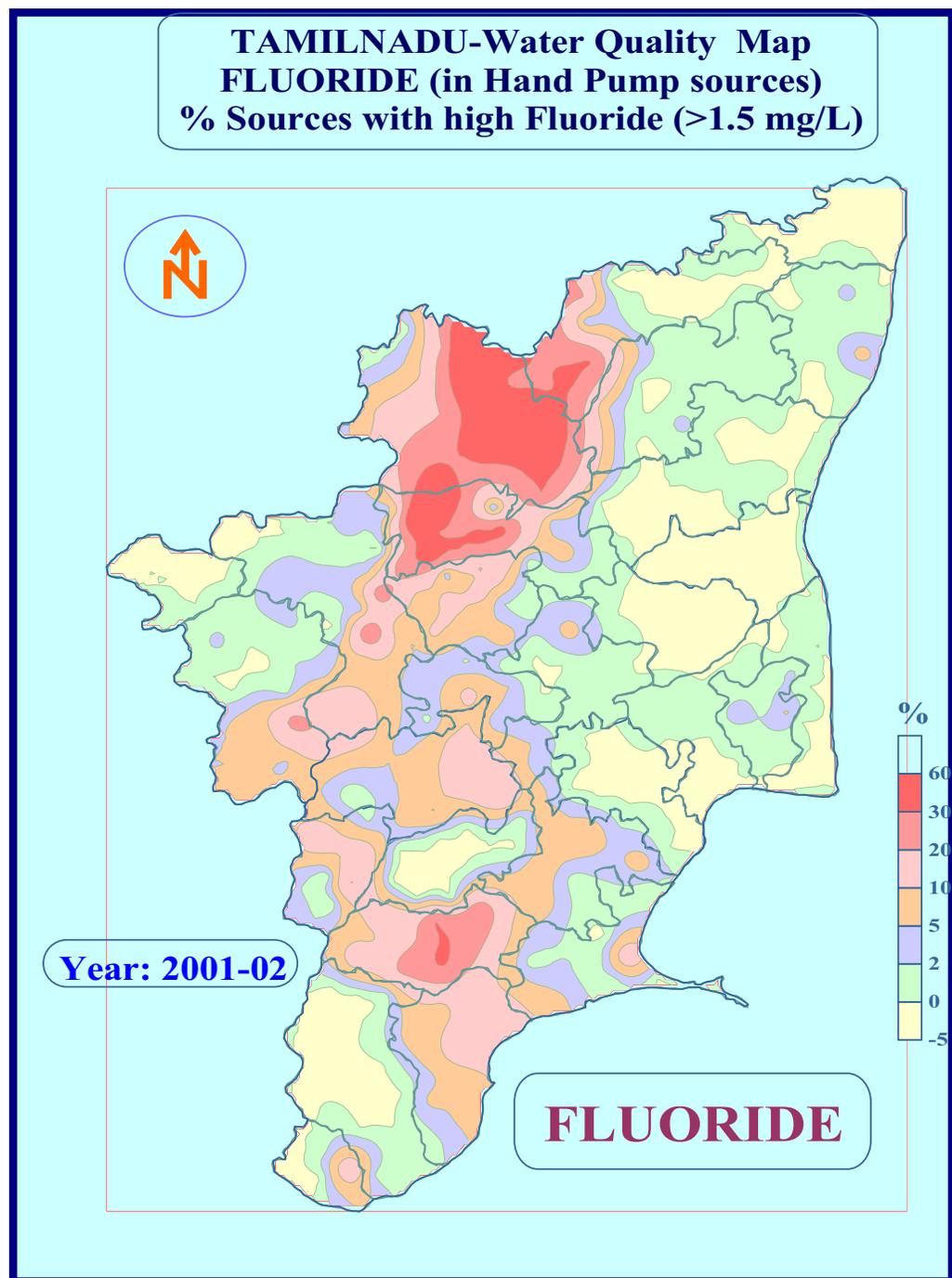




# TAMILNADU WATER SUPPLY AND DRAINAGE BOARD

## HOGENAKKAL WATER SUPPLY AND FLUOROSIS MITIGATION PROJECT

# Tamil Nadu - Fluoride in Ground water



- A large number of excess fluoride water sources present in Dharmapuri, Krishnagiri, Salem, Erode, Namakkal, Dindigul and Virudhunagar districts.
- A high fluoride content of 12.4 mg/l recorded in Dharmapuri district.
- Dharmapuri and Krishnagiri districts are affected due to excess fluoride leading to Dental, Skeletal and Non-skeletal fluorosis.



# Availability of Water Supply before the project

- **up to 10 lpcd** - rural habitations
- **12-50 lpcd** - urban areas

## Water Quality

- 57% of total habitations suffer due to excessive fluoride content in ground water.
- The ground water is moderately hard and fluoride ranging from 1.5 mg / litre - 12.4 mg / litre.

## Prevalence of Disease

- **Skeletal Fluorosis**
- **Dental Fluorosis,**
- **Non-Skeletal manifestations**
- **Related ailments**

# Hogenakkal Water Falls



# **Hogenakkal Water Supply & Fluorosis Mitigation Project**

## **Objectives of the HWS & FM Project**

- ❖ To provide sustainable and protected drinking water to the entire population of Dharmapuri and Krishnagiri districts.**
- ❖ To under take Fluorosis Mitigation measures for all the afflicted population through medical interventions.**
- ❖ To develop the Capacity of Local Bodies in efficient Operations & Maintenance and better cost recovery on user charges.**

# Hogenakkal Water Supply & Fluorosis Mitigation Project

**Administrative Sanction:** G.O. Ms no:19,MAWS(WS4) Dept, dated: 29-01-2010

Installation- Rs 1928.80 Crore & Annual Maintenance- Rs 63.67 Crore.

**Funding :**

JICA Loan	State Share	ULB Share
Rs. 1585.60 Crore	Rs.307.48 Crore	Rs. 35.72 Crore

**Expenditure as on 31-10-2017 : Rs 1779.73 crore**

**Loan period ends on 28.07.2017 : JICA Lon Amount Claimed : R 1442.28 Crore**

**Population Benefitted: 33.87Lakh (Census : 2011)**

**Beneficiaries:**

Local Body	Dharmapuri District	Krishnagiri District	Total
<b>Municipalities</b>	1	2	3
<b>Town Panchayats</b>	10	7	17
<b>Rural Habitations</b>	3245	4394	7639

**Scheme Inaugurated on: 29 . 05 . 2013**

**Water Supply :**

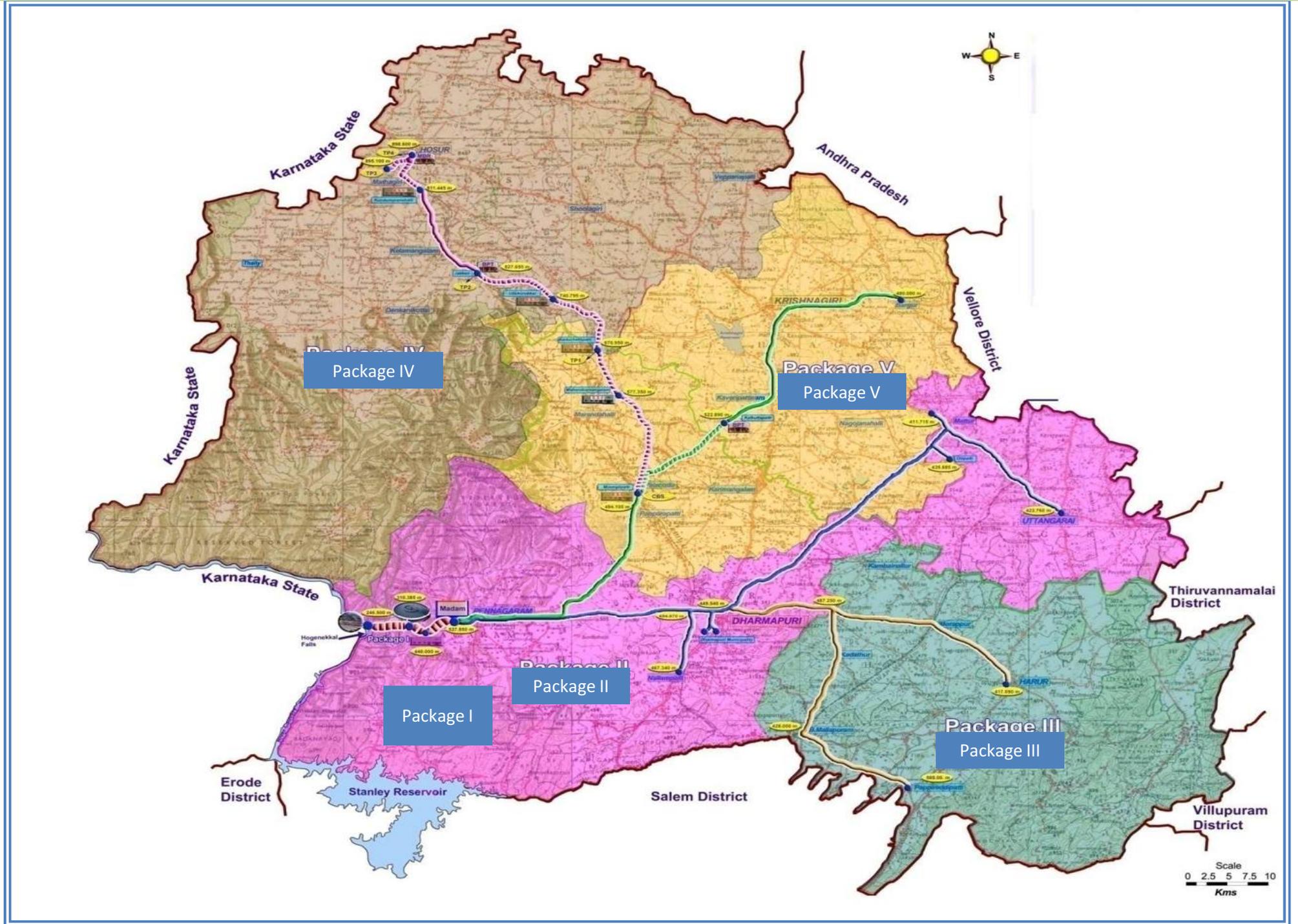
**Designed Requirement in Million Litres per Day (MLD)**

**Intermediate -Year 2021 - 127 MLD**

**Ultimate - Year 2036 - 160 MLD**

**Supplied Quantity - 120 MLD**

# HWS & FM PROJECT – AT A GLANCE





— Gravity Main  
— Pumping Main



**Master Balancing Reservoir at Madam - Capacity - 240 Lakh Litres  
Size 60 m x 40 m x 5.75 m - 2 compartments**

## Unique Features of the HWS & FM project

- The Intake structures are designed & located in such a way that even during the lowest flow in the river in summer, the designed quantity of **160 MLD** water flows into intake well.
- **Full scale Water Treatment Plant** capable of treating 160 MLD in 12 acres of land at a location locally known as 'Yanai Pallam' within the forest.
- **Flat Bottom Sludge Blanket Clarifier** removes of all impurities of raw water.
- **Un-interrupted power supply** ensured through dedicated dual power supply to Intake Works, Water Treatment Plant and Booster Pumping Station.
- The treated water distributed from a **240 lakh litres capacity Master Balancing Reservoir** at a distance of 11.15km and 200m higher in elevation than treatment plant utilizing the elevation to supply water by gravity wherever feasible and making the project as 'energy efficient'.
- The optimum and efficient operation & maintenance is ensured through **installation of SCADA system** with telecommunication & satellite network .
- **All tribal habitations** at very higher elevations covered with water supply, ignoring the exorbitant installation cost by pumping to more than 1000m elevation and facing other local challenges (+ MSL 1245.186 M)
- Another remarkable feature - **water facilities made to Elephants etc..**

## Water Supply Component - Pipeline and Structures

Sl. No.	Description	Total Quantity
1	MS Pipe	204.82 km
2	DI Pipe	2158.52 km
3	HDPE Pipe	7805.38 km
	<b>Total Length of Pipeline laid</b>	<b>10168.72 km</b>
4	Union Master Balancing Reservoir	16 nos.
5	Panchayat Master Balancing Reservoir	544 nos.
6	Union Sump	25 nos.
7	Panchayat Sump	476 nos.
8	Break Pressure Tank / Sump	36 nos.
9	Over Head Tank	530 nos.
	<b>Total Civil Structures constructed</b>	<b>1627 nos.</b>



**Rapid Sand Filter Bed - 12 nos in Water Treatment Plant - 10 Working + 2 Standby  
Number of Filter Nozzles - 75,816**

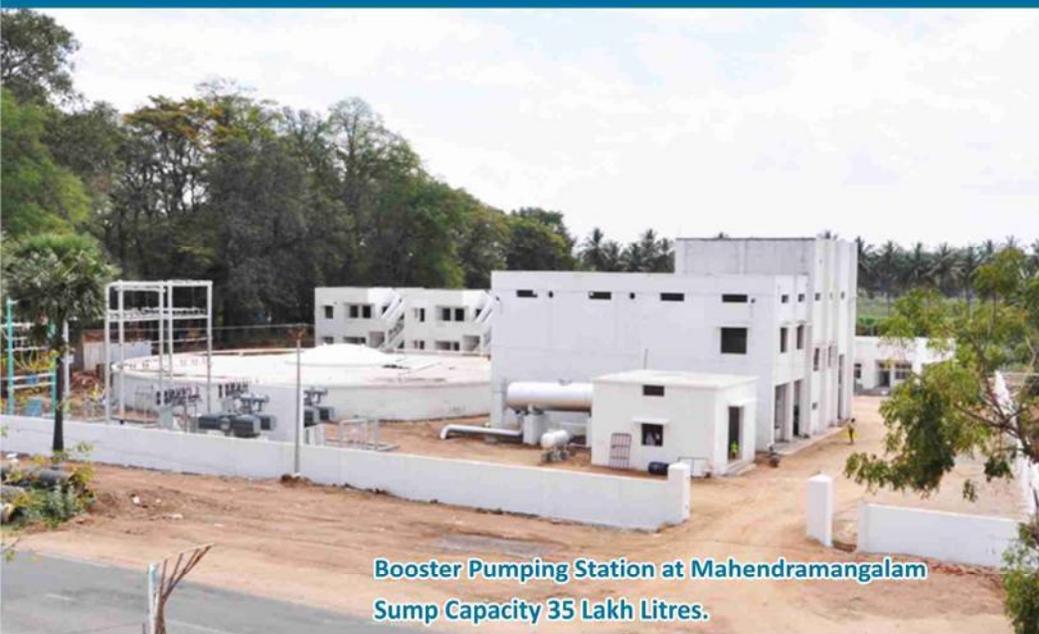
HWS & FM Project



**Common Booster Pumping Station at Moongilpatty**  
Sump Capacity 75.20 Lakh Litres.



**Moongilpatty Pump House size : 45 m x 7 m,**  
9 Pumpsets, 4 standby.



**Booster Pumping Station at Mahendramangalam**  
Sump Capacity 35 Lakh Litres.



**3 Turbine Pumpsets, 2 working in parallel & 1 standby.**

## BOOSTER PUMPING STATIONS





**Master Balancing Reservoirs - 560 nos for gravity feeding  
Capacity ranging from 10,000 Litres to 20 Lakh Litres**

HWS & FM Project



**Water troughs for Elephant and other animals  
provided at 24 locations.**



**Railway line crossing by Trenchless Technology near Palacode  
900 mm dia Pipeline**

HWS & FM Project

**Trenchless technology was adopted in more than 100 critical locations**

# Re-Chlorination arrangements at Karimangalam Sump



Re-Chlorination was done at  
26 locations





## Project House at Dharmapuri

# SCADA ARRANGEMENTS

- Signals of data at Intake, Booster Pumping Station and MBR at Madam was transferred to Central Control Room (CCR ) at WTP via Optical Fiber Cable.
- From CCR at WTP , data was transferred to CCR at Dharmapuri via BSNL net work.
- SCADA arrangements were installed in 74 Locations along the Transmission Main , Feeder main and Internal transmission mains.
- The details of signals data at all 74 locations has been transferred to Central Control Room at WTP via VSAT Antennas.
- In absence of VSAT Antennas, details of signals data has been transferred to Central Control Room at WTP via GSM mobile lines.
  
- Installation cost for SCADA arrangements - Rs. 24.37 Crore.
- Operation & Maintenance of SCADA arrangement- Rs.1.02 crore per annum
- (BSNL net work – Rs.52 Lakhs & Other maintenance – Rs.50 Lakhs)

## **ADVANTAGES:**

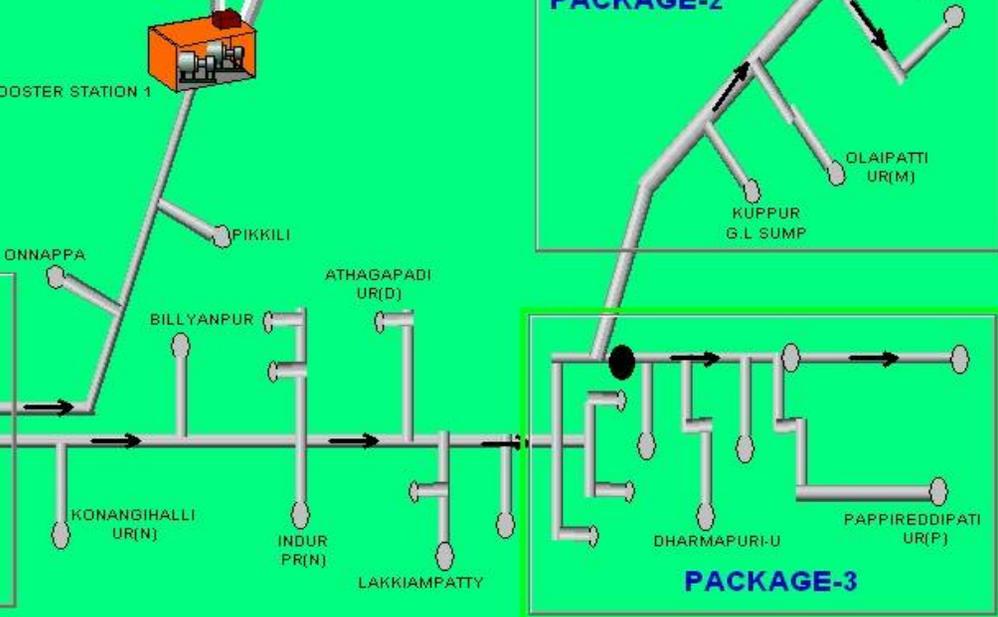
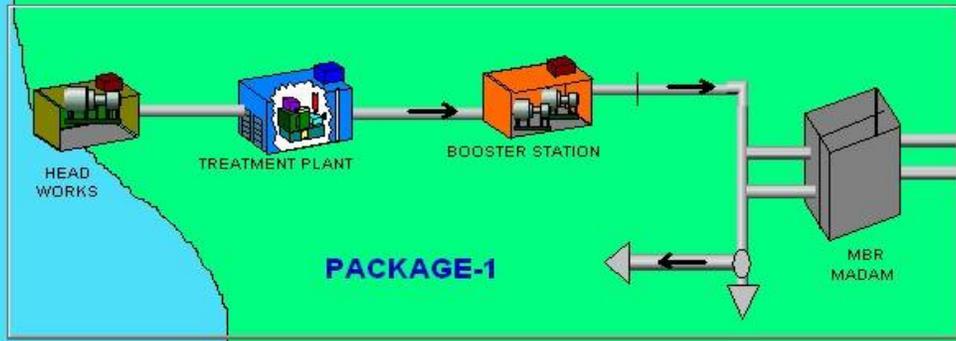
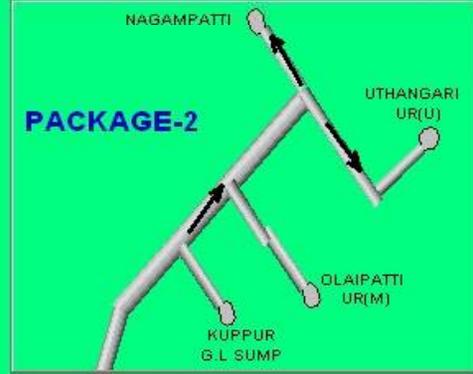
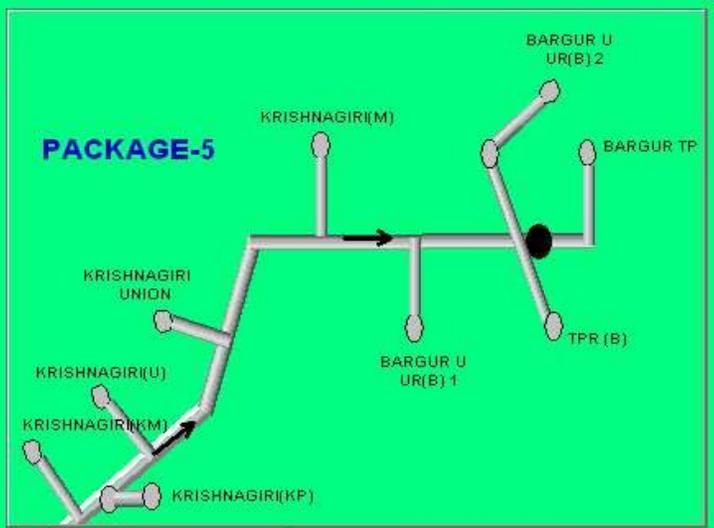
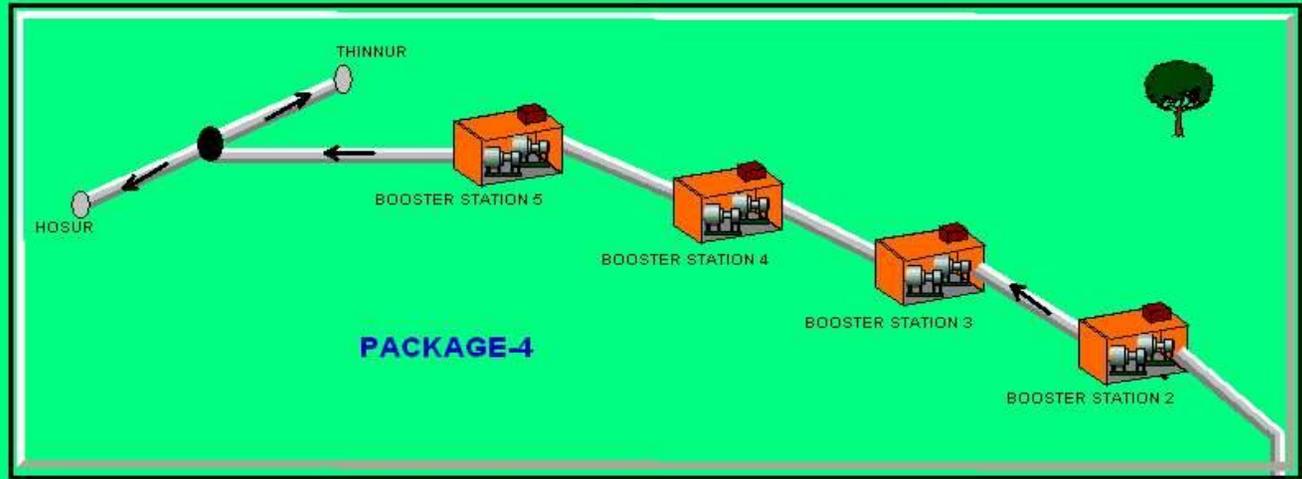
- ❖ About 50% of Manpower reduced. (Approximate 60 Nos)
- ❖ Auto control of all Valves and Pump sets in WTP.
- ❖ All data of flow details at all pumping and tapping points stored for reference at any time at CCR at WTP.
- ❖ Water quality monitoring through online analyser.



# TAMILNADU WATER SUPPLY & DRAINAGE BOARD DHARMAPURI

LOGIN

EXIT

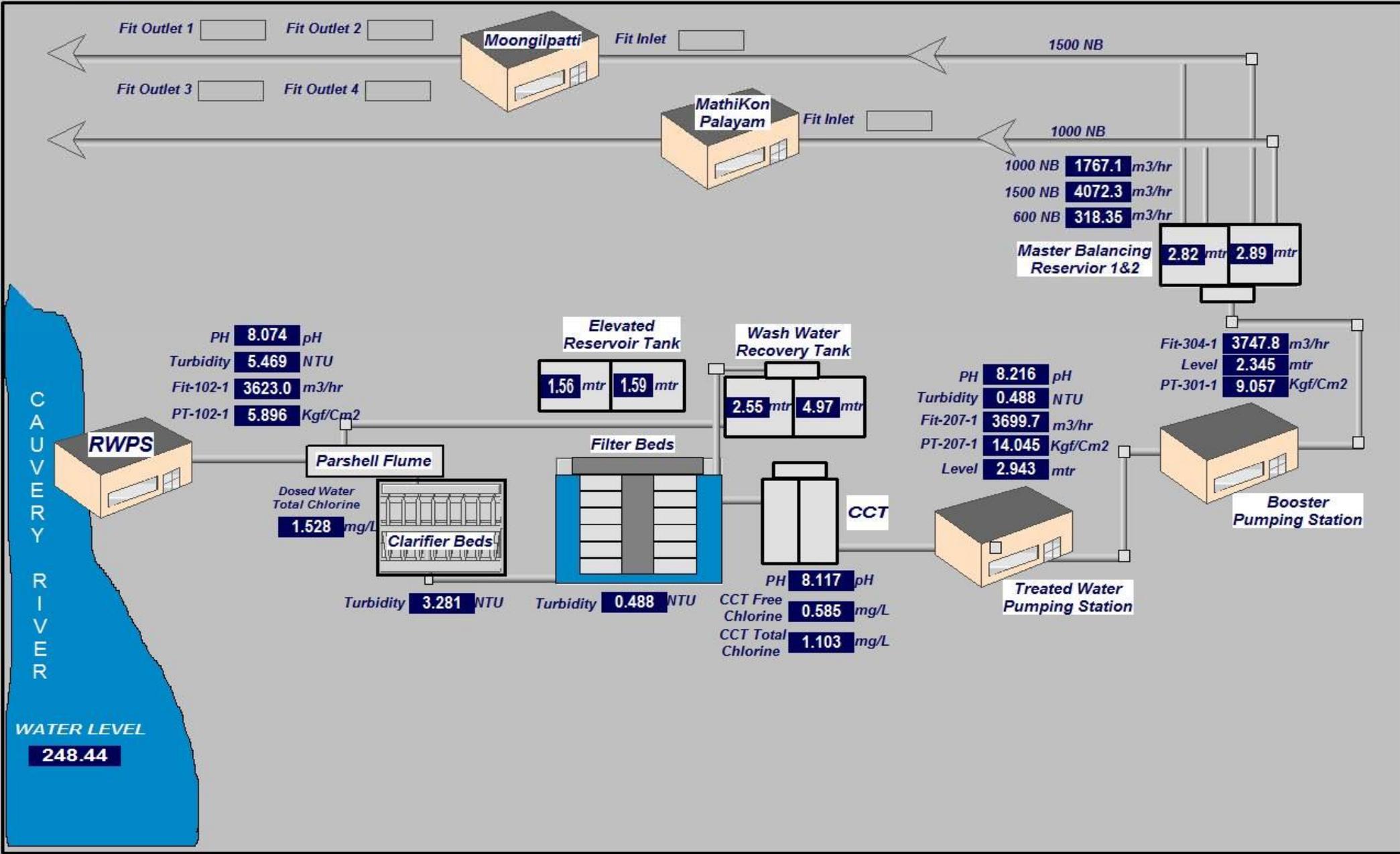




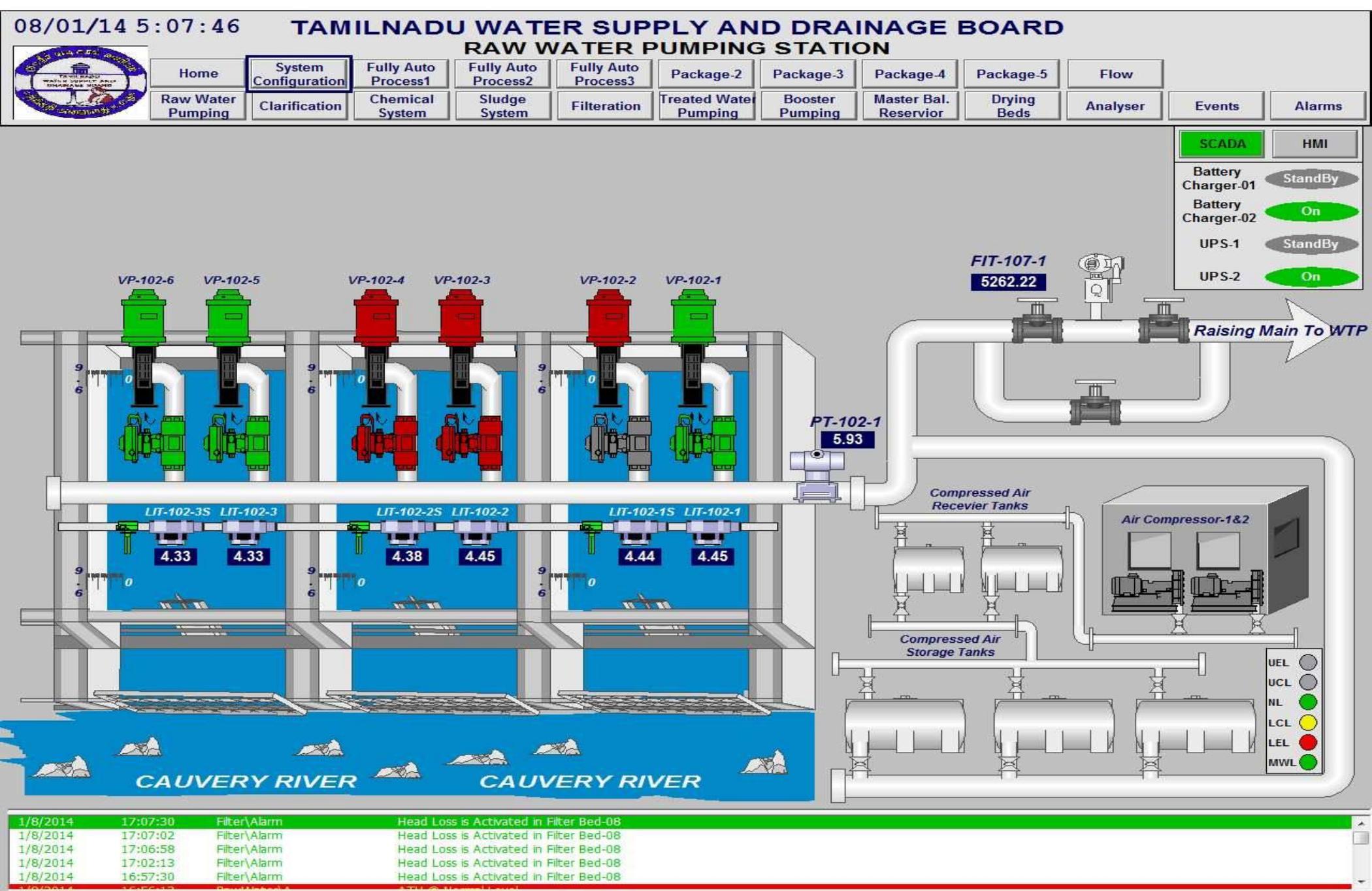
# TAMILNADU WATER SUPPLY AND DRAINAGE BOARD

## HOGENAKKAL WATER SUPPLY AND FLOURSIS MITIGATION PLANT

### CAPACITY : 160 MLD



# Analysis of the Application Developed For HWS&FMP.



# Fluorosis Mitigation Component



## **Hospital Approach:**

- Trained Doctors to diagnose, and to prescribe preventive, promotive, curative and rehabilitative measures.

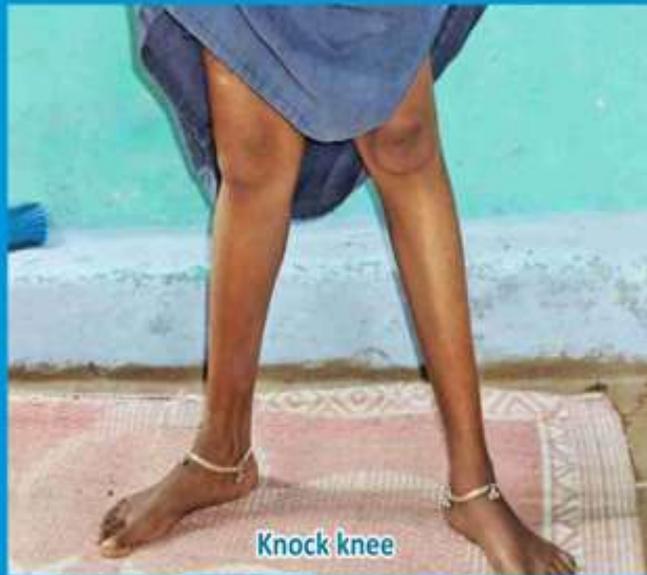
## **School Approach:**

- Assessment of prevalence of Dental Fluorosis among school students and diet counselling by trained teachers on prevention of fluorosis.
- Testing of drinking water sources in schools for Fluoride level

## **Community Approach:**

- Assessment of prevalence of Dental, Skeletal and Non Skeletal Fluorosis among the entire population by trained VHNs and NGO Volunteers,
- Testing all drinking water sources in villages for assessment of fluoride level.
- Counselling to the affected households trained VHNs and NGO Volunteers on preventive and control measures of fluorosis
- Impact assessment at intervals of 3rd week, 3rd month and 8th month after counselling.

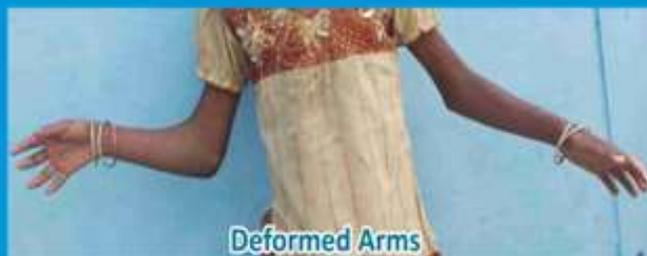
**Skeletal Fluorosis**



**Knock knee**



**Bow leg**



**Deformed Arms**

**Dental  
Fluorosis  
and  
Skeletal  
Fluorosis**

**In  
Dharmapuri  
and  
Krishnagiri  
Districts**

**Dental Fluorosis**



**Moderate DF**



**Severe DF**

# Hogenakkal Water Supply & Fluorosis Mitigation Project

## Fluorosis Mitigation Component

Training on identification and Diagnosis of Dental, Skeletal and Non Skeletal Fluorosis:

Doctors	School Teachers	Nurses	NGO volunteers
841	3785	418	1887

Specialised Training for Doctors:

Nutrition	Dental Cosmetic Surgery
10 Doctors	27 Dentist

Health Survey on Prevalence of Dental, Skeletal and Non Skeletal Fluorosis:

School Students	Community Households
4,24,047 nos	6,67,224 nos

Micro Nutrients, Medical Equipments supplied and Medical camps:

Micro Nutrient Supplements	Ion Meters to test Urine, Serum & Water	Dental Arm Chairs	Auto Analysers	Medical Camps
105.83 lakh tablets	10 nos	17 nos	3 nos	36 nos

# Hogenakkal Water Supply & Fluorosis Mitigation Project

## Fluorosis Mitigation Component

### Dental Fluorosis treatment provided to School Students on Pilot Basis

Shoolagiri Block in Krishnagiri District	Karimangalam Block in Dharmapuri District
34 Girl Students	31 Girl Students

### Impact Assessments on Non Skeletal Fluorosis category persons (Baseline)

Persons categorised - Non Skeletal fluorosis	1 <sup>st</sup> Round Urine analysis persons with F > 1 mg/litre
39392 Nos	25325 Nos

### Impact Assessments on 25325 persons with Fluoride more than 1 mg/ Litre

#### 2<sup>nd</sup> round Urine analysis with Group Counseling

Target persons	Urine analysis completed	Persons with F < 1 mg/lr	% Reduction
25325 Nos	25325 Nos	15834 Nos	63%

#### 3<sup>rd</sup> round and Final Urine analysis taken by November 2016

Target persons	Urine analysis completed	Persons with F < 1 mg/lr	% Reduction
25325 Nos	25325 Nos	20309 Nos	80%



## Fluorosis Mitigation Measures - Counseling to affected people



**Fluorosis Mitigation Measures  
Medical Check-up and Distribution of Micronutrients**



**Fluorosis Mitigation Measures  
Medical Check-up and Distribution of Micronutrients**



DENTAL TREATMENT FOR A SCHOOL STUDENT AT KARIMANGALAM PH CENTRE IN DHARMAPURI DISTRICT





# Saved Generations



*Thanks*