



PUDUCHERRY ENVIS HUB

HOST CENTRE : PUDUCHERRY POLLUTION CONTROL COMMITTEE
FUNDED BY MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
GOVERNMENT OF INDIA, NEW DELHI

Volume XII-I

STATUS OF WATER QUALITY IN THE U.T. OF PUDUCHERRY FOR THE YEAR 2020

January to March 2021



envis.pon@nic.in



0413 - 2201256



<https://dste.py.gov.in/Envispyd/>

Introduction

Department of Science, Technology & Environment (DST&E) / Puducherry Pollution Control Committee (PPCC) is monitoring Water quality periodically at 31 locations with financial assistance from Central Pollution Control Board (CPCB) under National Water Quality Monitoring Programme (NWMP). Monitoring is done on quarterly basis in surface water bodies and during pre and post monsoon in case of ground water in Puducherry & Karaikal regions and annually in Mahe and Yanam regions.

Objectives of Water Quality Monitoring

The water quality monitoring is performed with the following main objectives:

- To understand the nature and extent of pollution control and measures required.
- To evaluate the extent of pollution control required and effectiveness of pollution control measures already in existence.
- To assess water quality trends over a period of time.
- To assess assimilative capacity of a water body thereby reducing cost on pollution control.
- To understand the environmental fate of different pollutants.
- To assess the fitness of water for different uses.

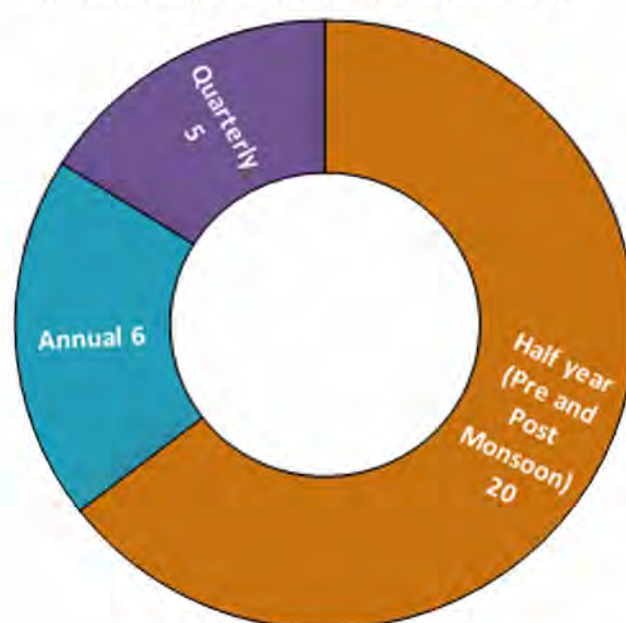
Water Quality Monitoring Stations in U.T. of Puducherry

U.T. of Puducherry has 31 Stations under NWMP. The details of waterbody wise No. of stations and frequency of water quality monitoring stations are shown in the figures below

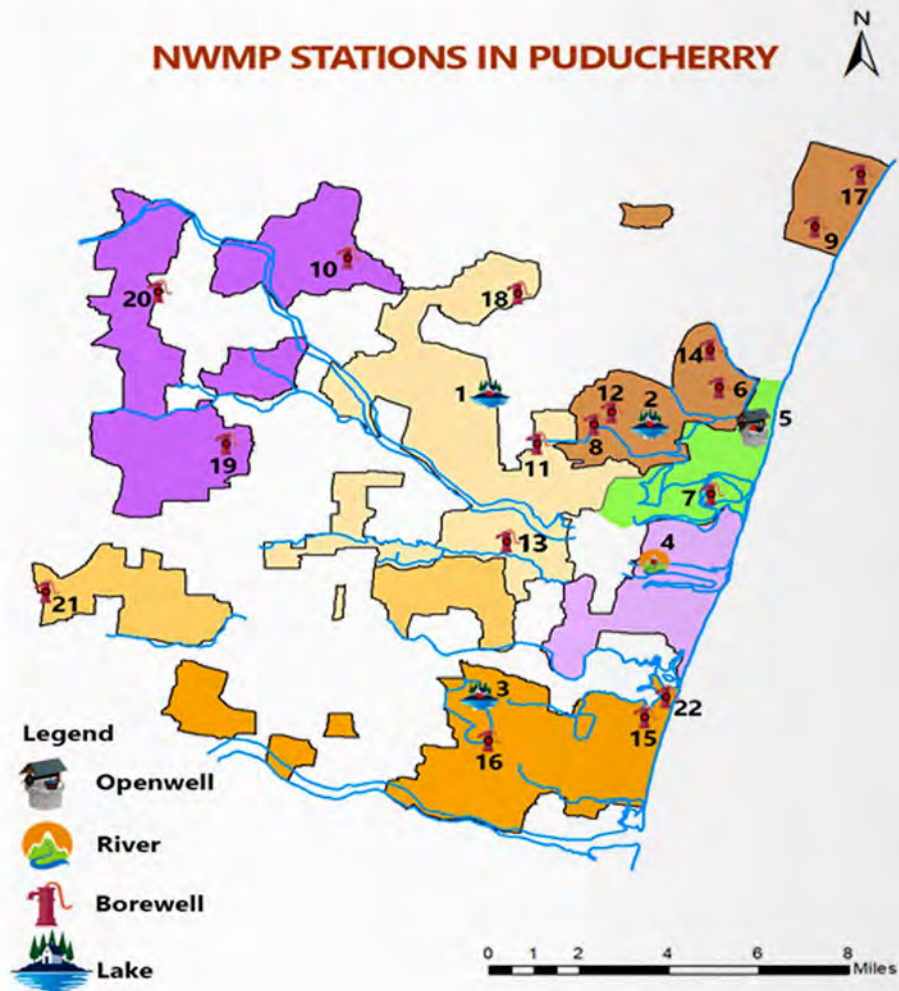
Waterbody wise Number of Stations



Frequency wise water quality Monitoring Station (in numbers)



LOCATION MAP OF WATER QUALITY MONITORING STATIONS



Sl.No	Location
1.	Ousteri Lake
2.	Kanagan Lake
3.	Bahour Lake
4.	Chunnambar River
5.	Chetty Koil, Mission Street
6.	Krishna Nagar
7.	Thengaithittu
8.	Muthirappalayam
9.	Pondicherry University
10.	Katterikuppam
11.	Kurumbapet

Sl.No	Location
12.	Mettupalayam
13.	Uruvaiyar
14.	Maruthi School
15.	Echankadu
16.	Near by Lake, Bahour
17.	Chevalier Sellane Government Higher secondary school, Kalapet
18.	Dhanderar Kulam, Sedarapet
19.	Kothapurinatham, Thiruvandarkoil
20.	Thirukkanur
21.	Madukarai
22.	Panithittu

NWMP STATIONS IN YANAM



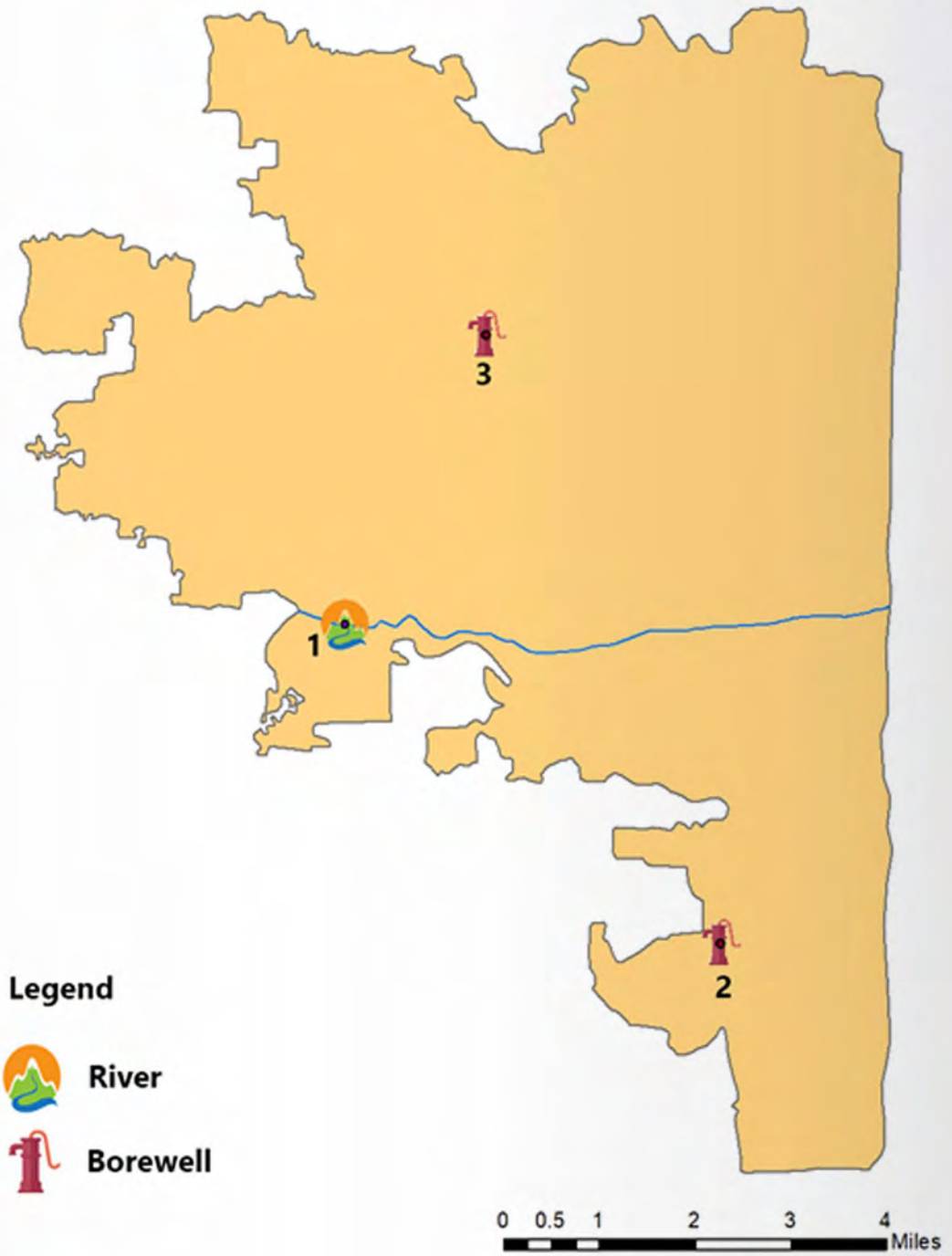
Sl.No	Location
1.	Gautami - Godavari River Near Balayogi Bridge
2.	Gautami - Godavari River Near Adavipolam
3.	Coringa River (Tidal Lock)

NWMP STATIONS IN MAHE



Sl.No	Location
1.	Mahe River
2.	Pallur
3.	Panthakkal

NWMP STATIONS IN KARAIKAL



Sl.No	Location
1.	Arasalar
2.	T.R Pattinam
3.	Vadamattam

Surface Water Quality (2020) Puducherry and Karaikal

BOD (mg/l) in Chunnambar River

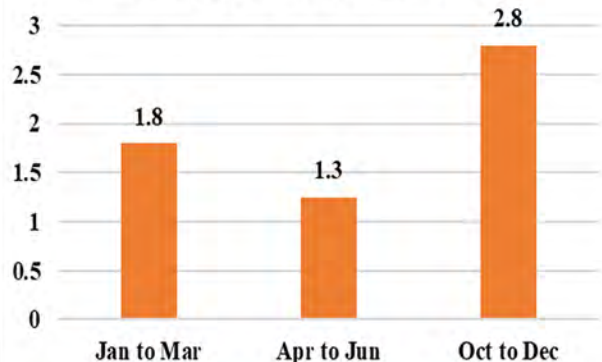


Fig 1.0 Chunnambar River

BOD (mg/l) in Bahour Lake

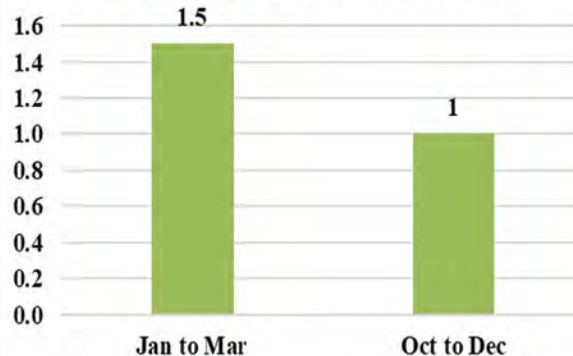


Fig 1.1 Bahour Lake

BOD (mg/l) in Ousteri Lake

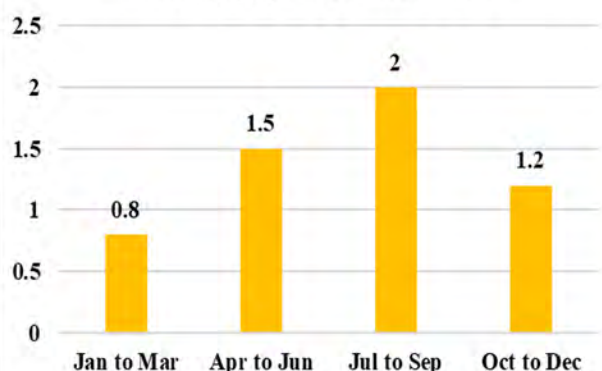


Fig 1.2 Ousteri Lake

BOD (mg/l) in Kanagan Lake

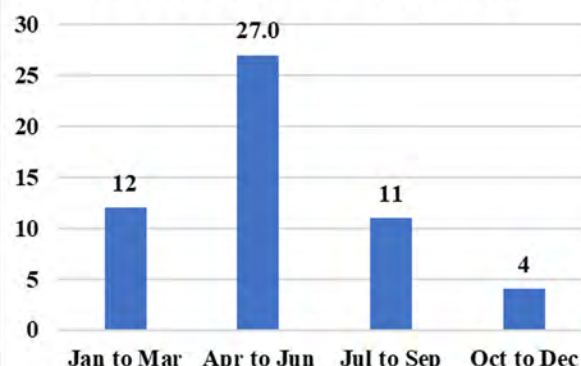


Fig 1.3 Kanagan Lake

BOD (mg/l) in Arasalar River

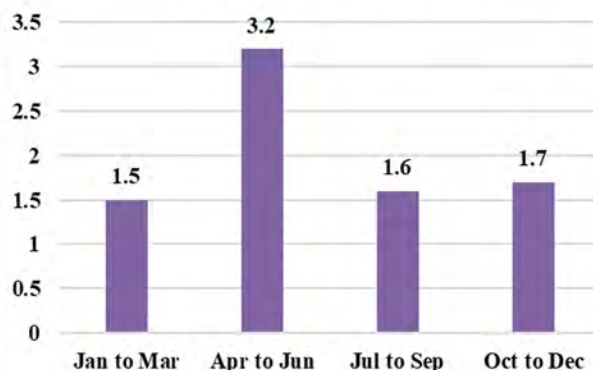


Fig 1.4 Arasalar River

Note:

- As per the primary water quality criteria for bathing water of class B, BOD should be 3 mg/l or less.
- Water quality standards – <https://cpcb.nic.in/wqstandards/>

Ground Water Quality Data Interpretation – Puducherry and Karaikal

Comparative Study of Post and Pre Monsoon of 2020

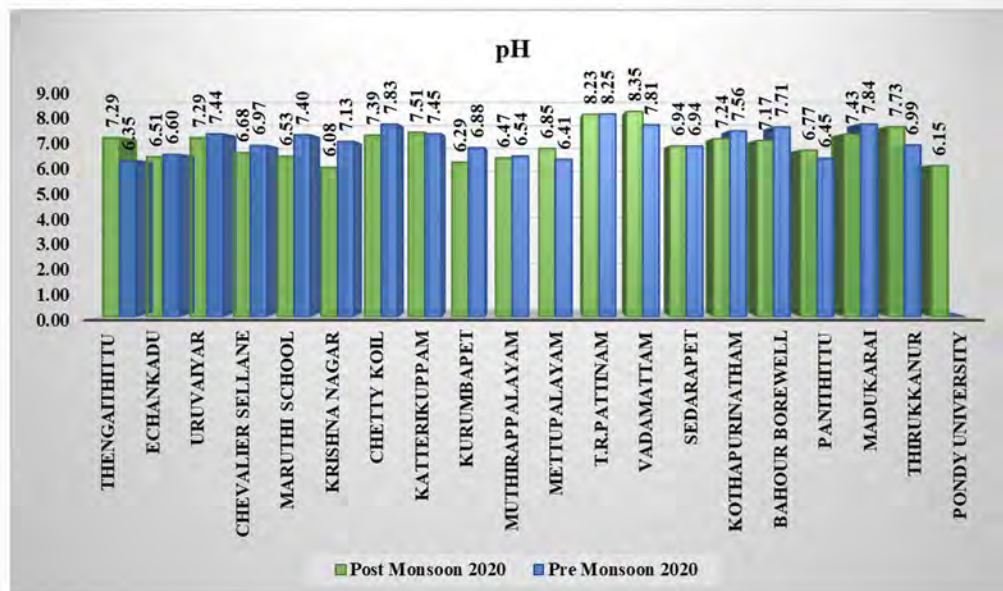


Fig 2.0 pH

Note: Standards as per IS (10500 : 2012)

Acceptable Limit - 6.5 to 8.5

Permissible Limit - No Relaxation

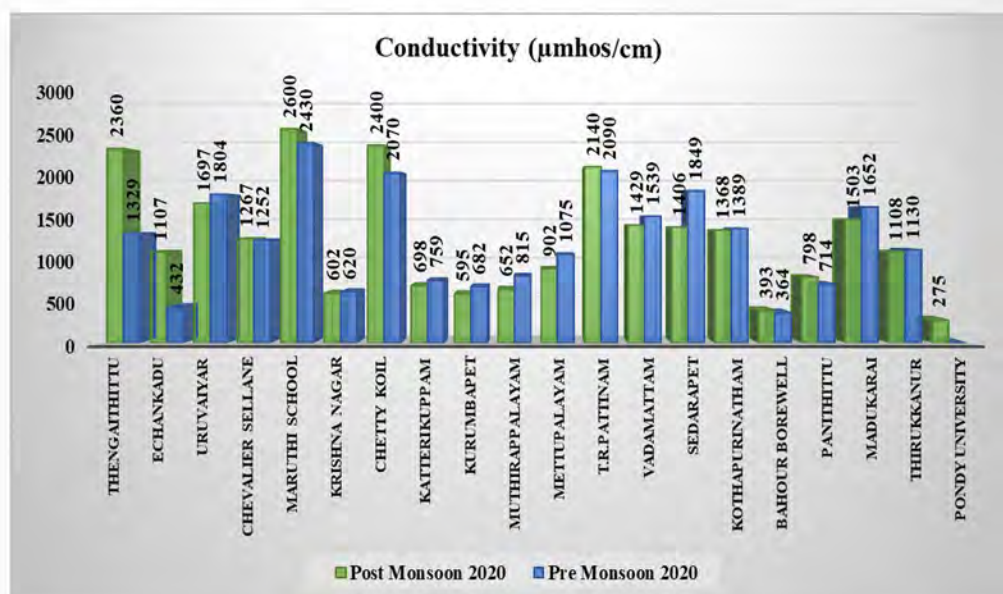


Fig 2.1 Conductivity (µmhos/cm)

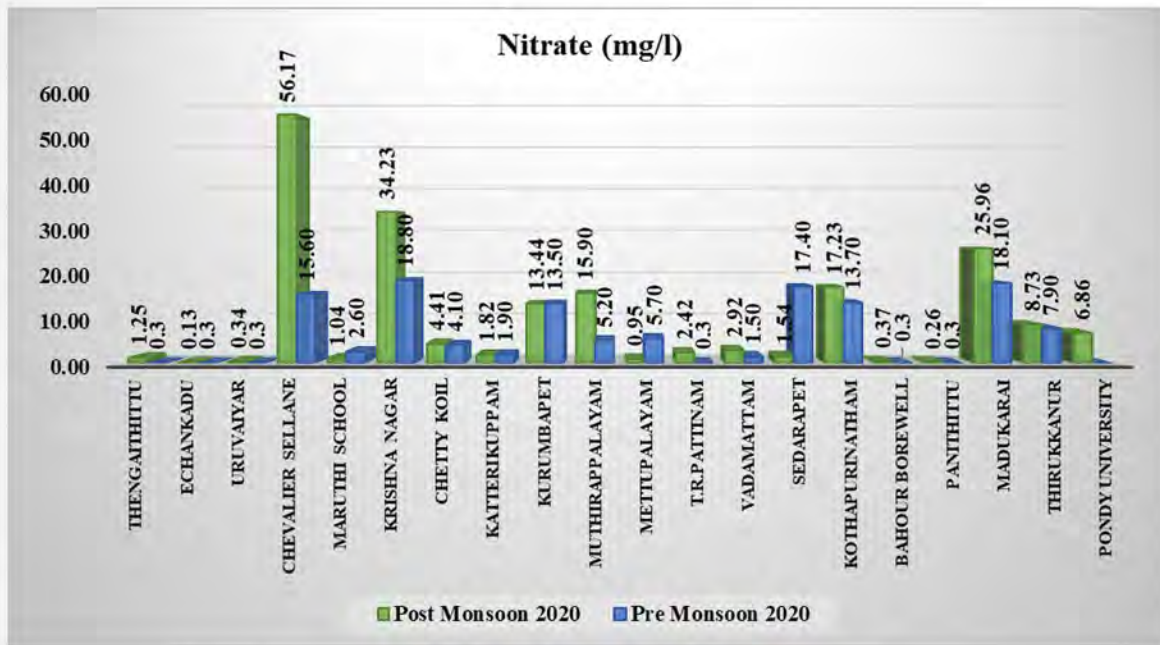


Fig 2.2 Nitrate (mg/l)

Note: Standards as per IS (10500 : 2012)

Acceptable Limit - 45 (mg/l)

Permissible Limit - No Relaxation

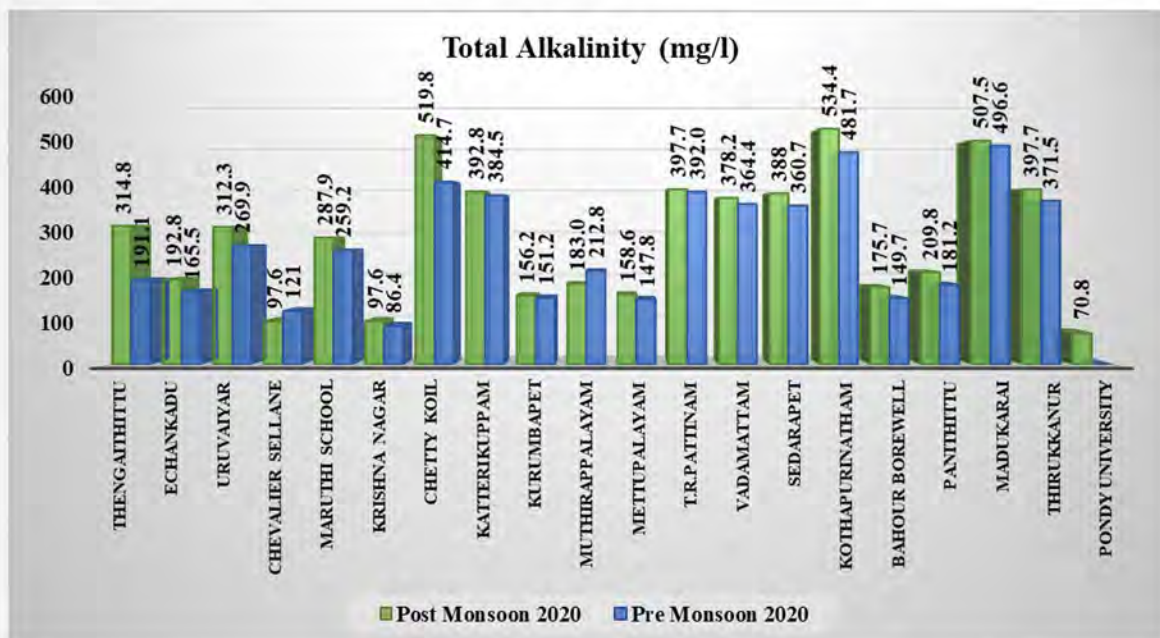


Fig 2.3 Alkalinity (mg/l)

Note: Standards as per IS (10500 : 2012)

Acceptable Limit - 200 (mg/l)

Permissible Limit - 600 (mg/l)

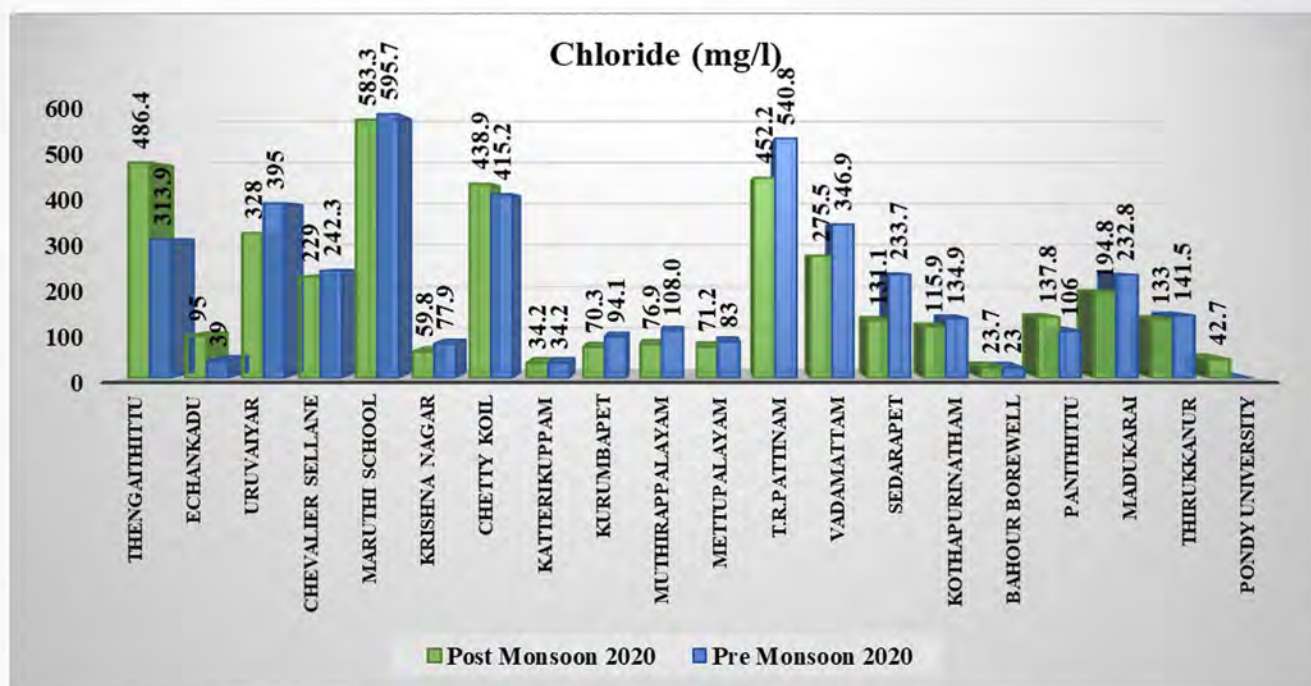


Fig 2.4 Chloride (mg/l)

Note: Standards as per IS (10500 : 2012)

Acceptable Limit - 250 (mg/l)

Permissible Limit - 1000 (mg/l)

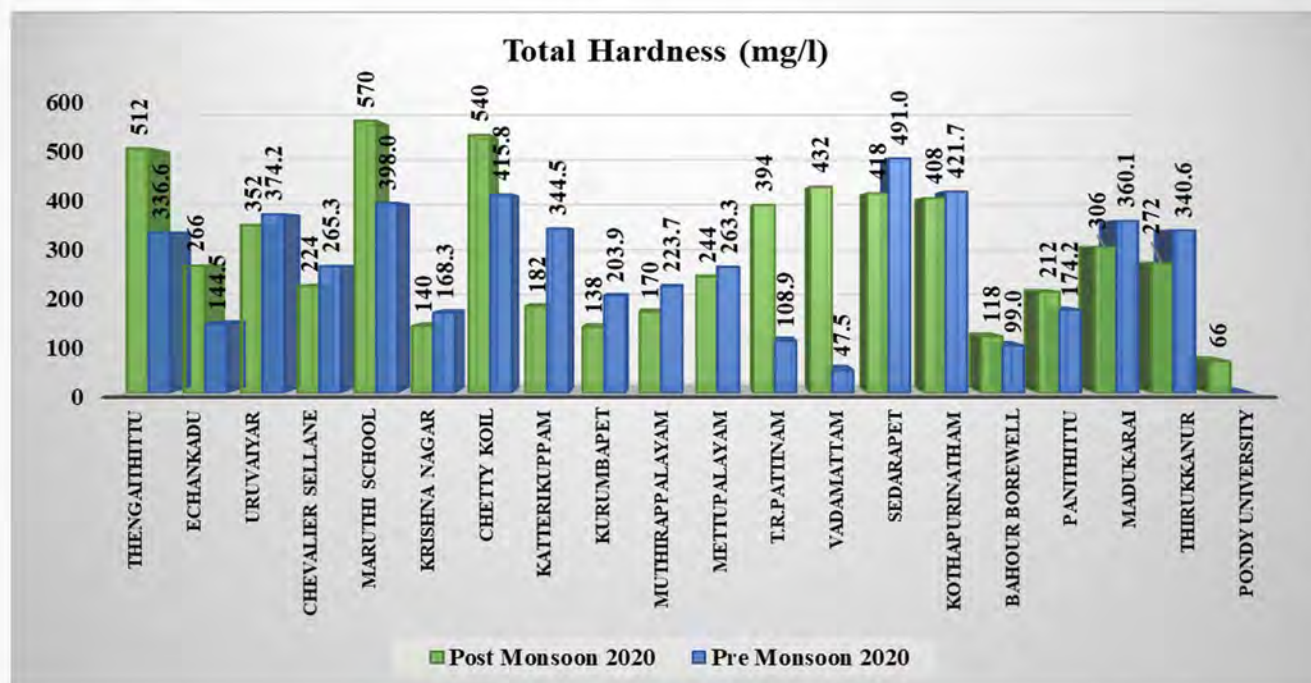


Fig 2.5 Total Hardness (mg/l)

Note: Standards as per IS (10500 : 2012)

Acceptable Limit - 200 (mg/l)

Permissible Limit - 600 (mg/l)

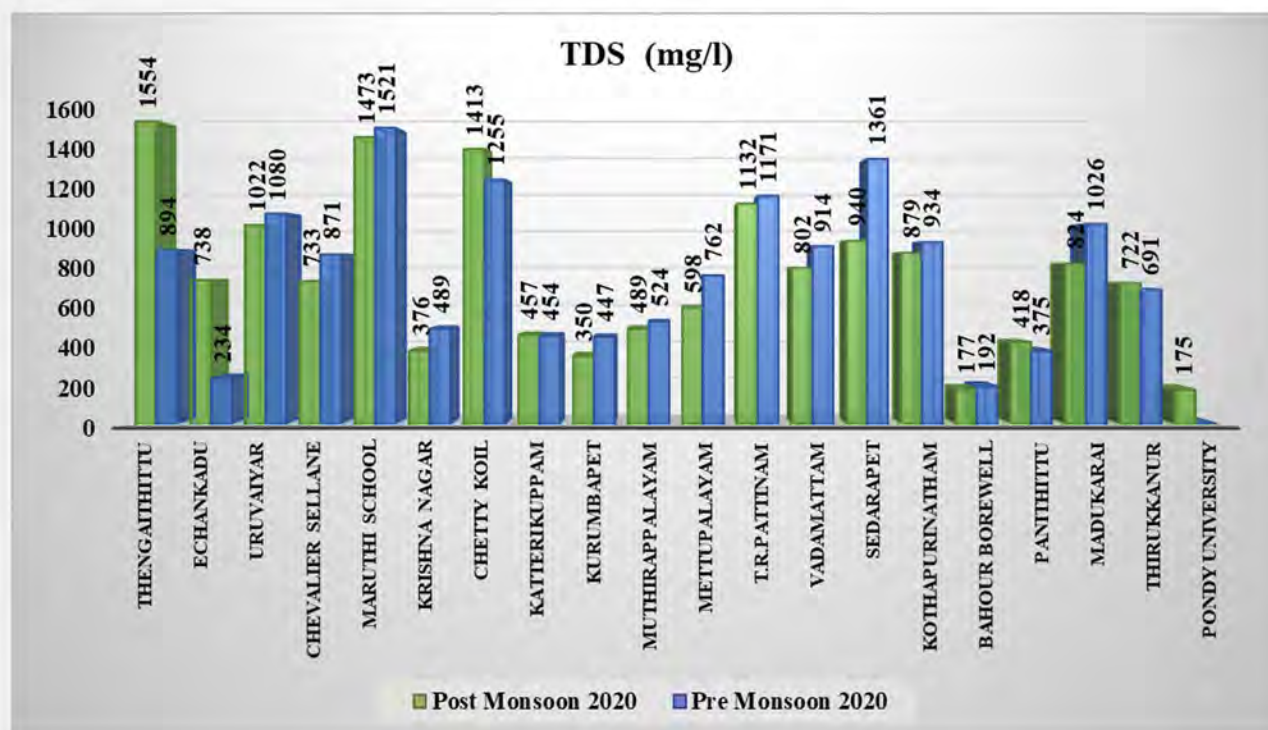


Fig 2.6 TDS (mg/l)

Note: Standards as per IS (10500 : 2012)

Acceptable Limit - 500 (mg/l)

Permissible Limit - 2000 (mg/l)

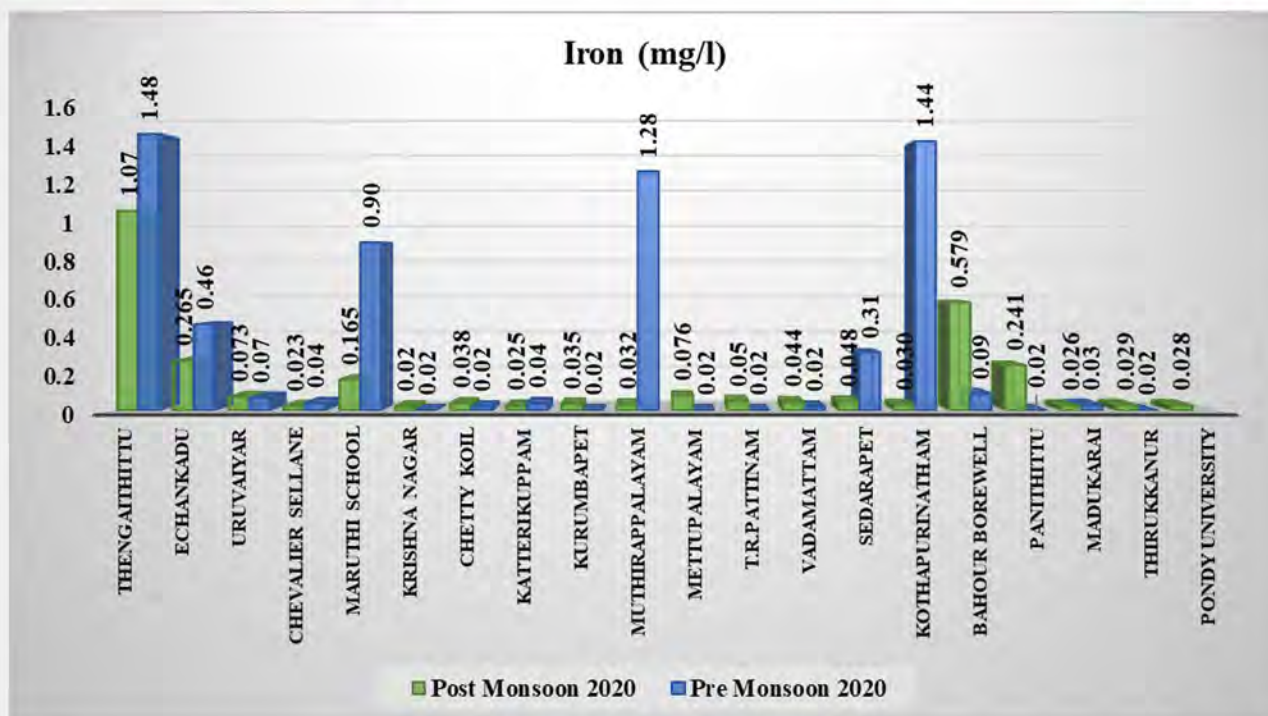


Fig 2.7 Iron (mg/l)

Note: Standards as per IS (10500 : 2012)

Acceptable Limit - 0.3 (mg/l)

Permissible Limit - No Relaxation

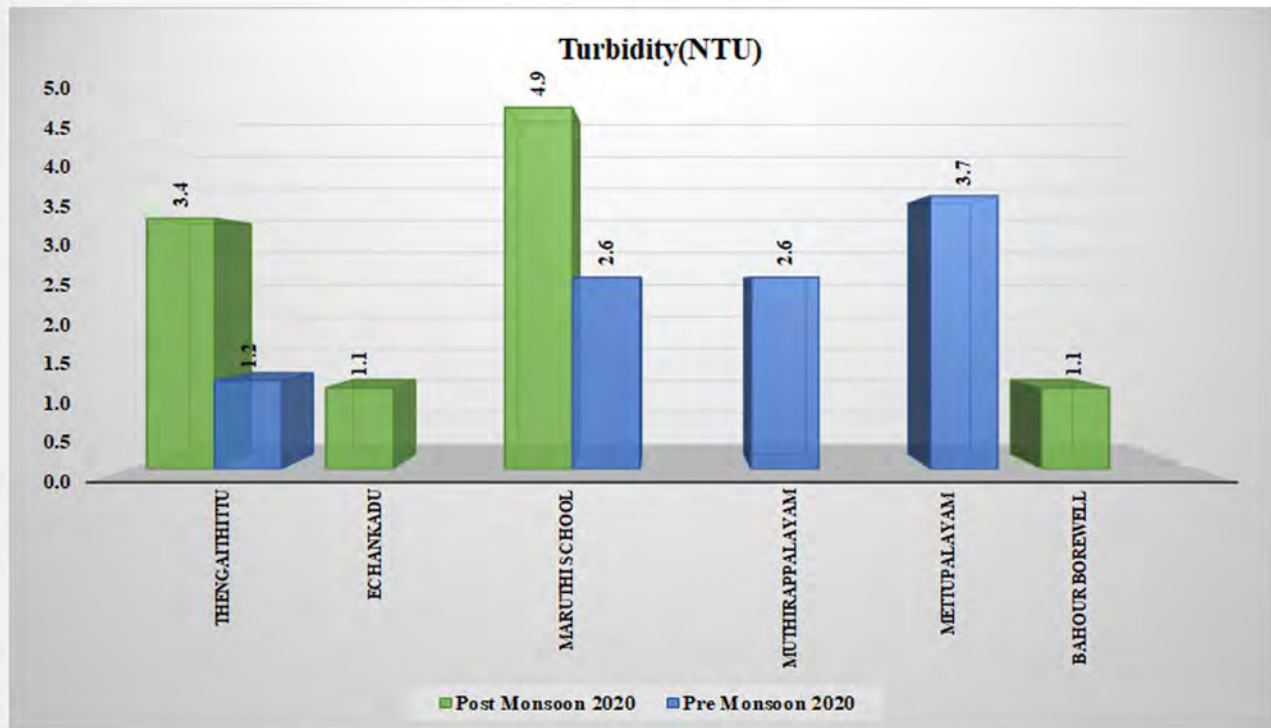


Fig 2.8 Turbidity (NTU)

Note: Standards as per IS (10500 : 2012) – The Turbidity is BDL in other Locations / season

Acceptable Limit – 1 (NTU)

Permissible Limit – 5 (NTU)

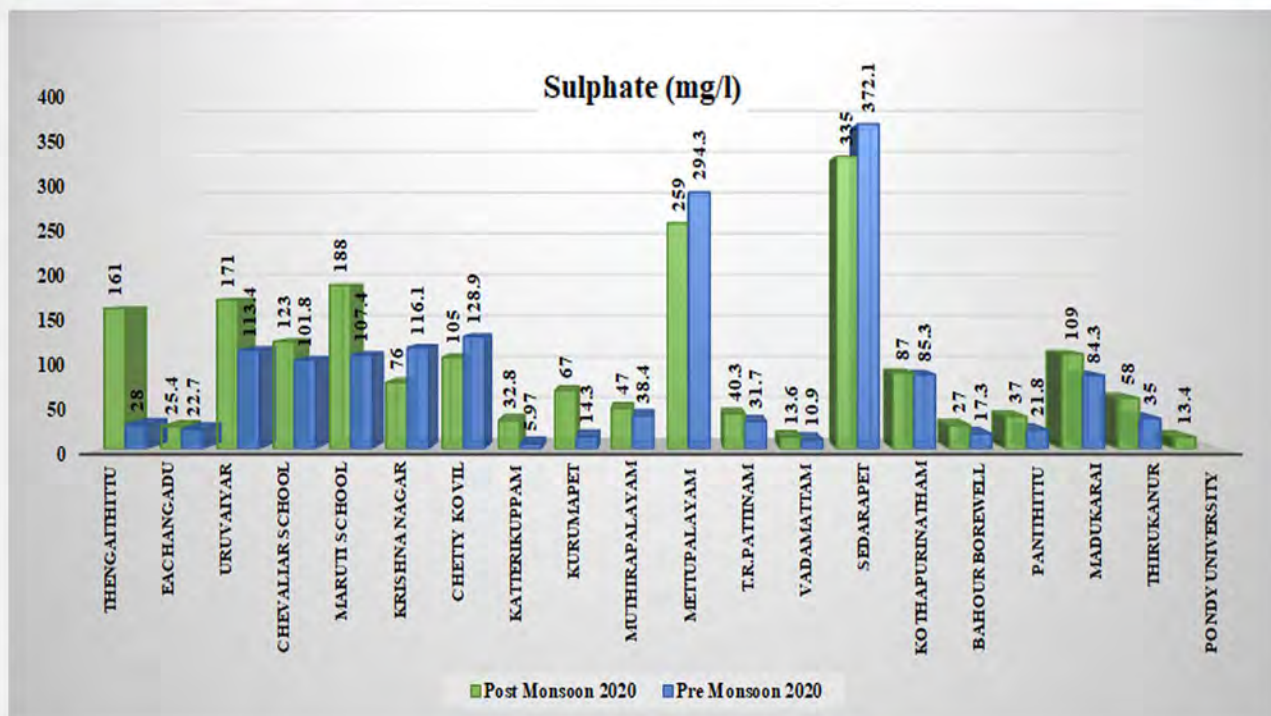


Fig 2.9 Sulphate (mg/l)

Note: Standards as per IS (10500 : 2012)

Acceptable Limit – 200 (mg/l)

Permissible Limit – 400 (mg/l)

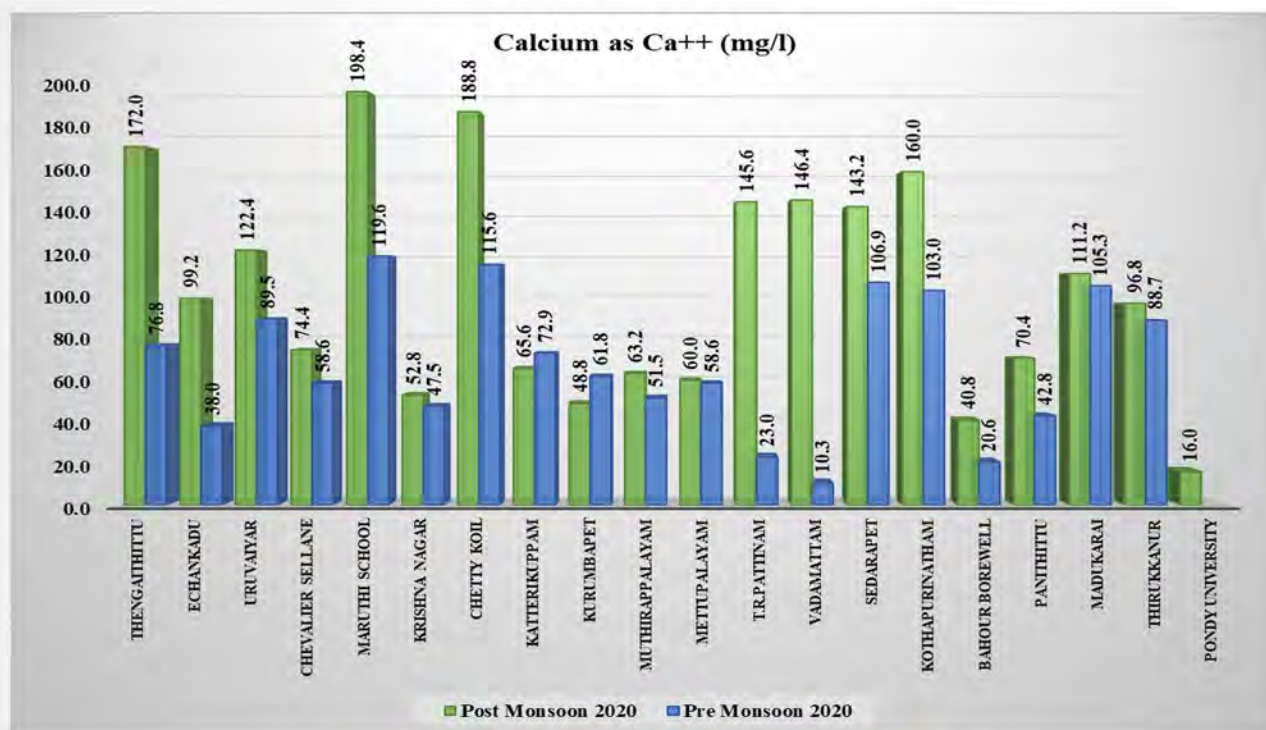


Fig 2.10 Calcium as Ca⁺⁺ (NTU)

Note: Standards as per IS (10500 : 2012)

Acceptable Limit - 75 (mg/l)

Permissible Limit - 200 (mg/l)

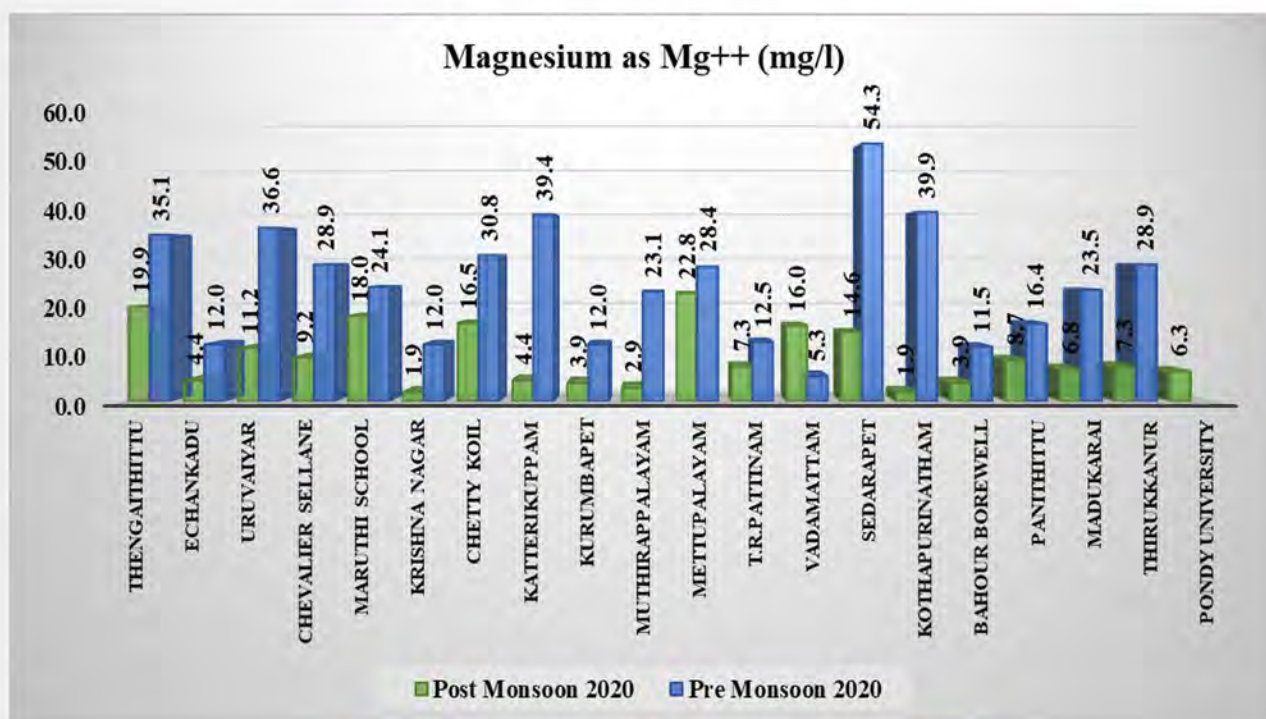


Fig 2.11 Magnesium as Mg⁺⁺ (mg/l)

Note: Standards as per IS (10500 : 2012)

Acceptable Limit - 30 (mg/l)

Permissible Limit - 100 (mg/l)

Note:

In Pondicherry University during Pre Monsoon water sampling could not be done since the borewell was under repair. Similarly in Chunnambar during July quarter and Bahour during April, July quarters water sampling was not done due to non-availability of water.

Pesticides viz., Alpha BHC $\mu\text{g/L}$, Beta BHC $\mu\text{g/L}$, Gamma BHC $\mu\text{g/L}$, OP DDT $\mu\text{g/L}$, PP DDT $\mu\text{g/L}$, PP DDE $\mu\text{g/L}$, PP DDD $\mu\text{g/L}$, Alpha Endosulphan $\mu\text{g/L}$, Beta Endosulphan $\mu\text{g/L}$, Dieldrin $\mu\text{g/L}$, Carbaryl (Carbamate) $\mu\text{g/L}$, 2,4-D $\mu\text{g/L}$, Aldrin $\mu\text{g/L}$, Malathion $\mu\text{g/L}$, Methyl Parathion $\mu\text{g/L}$, Chloropyriphos $\mu\text{g/L}$, Isoproturon $\mu\text{g/L}$, Alachlor $\mu\text{g/L}$, Atrazine $\mu\text{g/L}$, Monochrotophos $\mu\text{g/L}$, Ethion $\mu\text{g/L}$, Phorate $\mu\text{g/L}$ in all the 25 locations in Puducherry and Karaikal are Below Detectable Limit (BDL).

In all the Ground water sample trace metals viz., Copper mg/L, Cadmium mg/L, Lead mg/L, Total Chromium mg/L, Zinc mg/L, Arsenic mg/L, Mercury mg/L are within the permissible limit of IS (10500 : 2012).

WATER SAMPLING BY THE LABORATORY STAFF

Water Quality in Yanam Region 2020

Sl.No.	Parameters	Gautami - Godavari River Near Adavipolam	Coringa River (Tidal Lock)	Gautami - Godavari River Near Balayogi Bridge
1.	Latitude	16° 42' 52.54" N	16° 43' 48.6" N	16° 43' 30.25" N
2	Longitude	82 ° 15' 41.53" E	82 ° 13' 2.6" E	82 ° 12' 21.46" E
3.	Month of Sampling	December 2020	December 2020	December 2020
4.	Time	08.30 A.M	09.00 A.M	10.00 A.M
5.	Temperature °C	26.0	26.0	26.0
6.	DO mg/l	6.6	2.0	6.5
7.	pH	8.01	7.40	8.07
8.	Conductivity µmho/cm	29800	2080	20200
9.	BOD mg/l	BDL (DL - 1)		
10.	Nitrate - N mg/l	0.46	1.27	0.36
11.	Nitrate mg/l	2.04	5.60	1.60
12.	Nitrite - N mg/l	BDL (DL - 0.02)		
13.	Turbidity NTU	11.8	4.9	8.2
14.	Bi-Carbonate as CaCO ₃ mg/l	114.8	138.6	116.8
15.	Carbonate as CaCO ₃ mg/l	3.96	Nil	5.94
16.	Chloride mg/l	10496.7	849.7	6098.1
17.	COD mg/l	Nil	Nil	Nil
18.	Total Hardness mg/l	3000	320	2040
19.	Calcium Hardness mg/l	2220	210	1530
20.	Calcium as Ca++ mg/l	888	84	612.0
21.	Magnesium Hardness mg/l	780	110	510

Sl.No.	Parameters	Gautami - Godavari River Near Adavipolam	Coringa River (Tidal Lock)	Gautami - Godavari River Near Balayogi Bridge
22.	Magnesium as Mg++ mg/l	189.5	26.7	123.9
23.	Sulphate mg/l	1183.7	320.0	589.4
24.	Orthophosphate mg/l	0.16	0.47	0.19
25.	TDS mg/l	18565	1148	12881
26.	TSS mg/l	97.0	28.0	45.0
27.	FDS/TFS mg/l	15589	571	9441
28.	Ammonia - N mg/l	0.09	0.27	0.07
29.	Sodium mg/l	6801.0	237.2	5325.0
30.	Potassium mg/l	18.95	8.11	12.15
31.	Hexavalent Chromium mg/l	BDL		
32.	% Sodium	82.97	60.86	84.88
33.	SAR	53.9	5.8	51.2
34.	P/R Ratio	7.0	2.1	8.0
35.	Arsenic mg/l	BDL (DL - 0.005)		
36.	Cadmium mg/l	BDL (DL - 0.001)		
37.	Copper mg/l	0.268	0.034	0.087
38.	Lead mg/l	BDL (DL - 0.005)		
39.	Total Chromium mg/l	BDL (DL - 0.01)		
40.	Mercury mg/l	BDL (DL - 0.0005)		
41.	Nickel mg/l	BDL (DL - 0.01)		
42.	Zinc mg/l	BDL (DL - 0.1)		
43.	Manganese as Mn mg/l	0.089	0.37	BDL (DL - 0.05)
44.	Iron mg/l	0.39	0.81	0.25

Water Quality in Mahe Region 2020

Sl.No.	Parameters	Pallur (Open Well)	Pandakkal (Open Well)	Mahe river
1.	Latitude	11°43'58.06"	11°45'40.24"	11°42'36.88"
2.	Longitude	75°32'16.95"	75°32'13.02"	75°32'11.22"
3.	Month of Sampling	October 2020	October 2020	October 2020
4.	Time	10.00 A.M	10.30 A.M	11.45 A.M
5.	Temperature °C	27	27	26
6.	pH	5.69	5.23	6.91
7.	DO mg/l	-	-	6.4
8.	Conductivity µmho/cm	335	81.6	186.3
9.	BOD mg/l	BDL (DL-1.0)		
10.	Turbidity NTU	Nil	Nil	2.5
11.	Bi- Carbonate as CaCO ₃ mg/l	52.5	26.3	46.5
12.	Carbonate as CaCO ₃ mg/l	Nil	Nil	Nil
13.	Chloride mg/l	41.7	16.9	24.8
14.	COD mg/l	Nil	16.2	20.2
15.	Hardness as CaCO ₃ mg/l	78	36	34
16.	Calcium as CaCO ₃ mg/l	66	22	26
17.	Calcium as Ca++ mg/l	26.4	8.8	10.4
18.	Magnesium as CaCO ₃ mg/l	12	14	8
19.	Magnesium as Mg++ mg/l	2.9	3.4	1.9
20.	Sulphate mg/l	10.9	3	6.6
21.	Orthophosphate mg/l	0.21	0.26	1.2
22.	TDS mg/l	246	59	133
23.	TSS mg/l	BDL (DL-10.0)		
24.	FDS mg/l	153	34	117
25.	Ammonia - N mg/l	BDL (DL-0.4)		
26.	Hexavalent Chromium mg/l	BDL		
27.	Arsenic mg/l	BDL (DL-0.005)		
28.	Cadmium mg/l	BDL (DL-0.001)		
29.	Copper mg/l	0.056	0.047	0.071
30.	Lead mg/l	BDL (DL-0.005)		
31.	Total Chromium mg/l	0.03	0.04	0.04
32.	Mercury mg/l	BDL (DL-0.0005)		
33.	Nickel mg/l	BDL (DL-0.01)		
34.	Zinc mg/l	0.041	0.036	0.2
35.	Iron mg/l	BDL (DL-0.02)	0.12	0.43

Surface Water

The Level of pH in Kanagan Lake is slightly higher than the range of 6.5 – 8.5 as per primary water quality criteria for bathing water of Class B during January and July quarters. The pH of other surface water bodies meet this criteria. DO does not meet the Primary Water Quality Criteria (≥ 5 mg/l) in Bahour lake (4.0 mg/l) during October quarter and in Arasalar River during April (4.2 mg/l) and October (3.9 mg/l) quarter. Similarly, in Arasalar river during April quarter BOD (3.2 mg/l) is slightly higher than the primary water quality criteria (≤ 3 mg/l) for bathing water of Class B. BOD does also not meet the criteria in Kanagan lake during January quarter (12 mg/l), April quarter (27 mg/l) and in July quarter (11 mg/l). In Mahe Region pH, DO and BOD meets the primary water quality criteria for bathing water of Class B. In the Surface Water Bodies of Yanam region, pH and BOD meets the Water Quality Criteria whereas, in Coringa river DO (2.0 mg/l) is less than the primary water criteria (≥ 5 mg/l).

The primary cause of oxygen depletion in the water body is because of excessive growth of algae and phytoplankton driven by high levels of phosphorus and nitrogen.

The increase in BOD levels indicate excessive concentration of biodegradable organic matter in water which may be due to sewage disposal and high oxygen consumption by heterotrophic organisms.

Ground Water

In some of the borewells in Thengaithittu, Krishna Nagar, Kurumbapet, Muthirapalayam, Mettupalayam, Pannithittu, Pondicherry University the pH varies between 6.08 and 6.47 which is close to neutral for those locations.

In the Chevalier School, nitrate level in postmonsoon season is 56.17 mg/l which is higher than the acceptable limit of 45 mg/l. Similarly, in Krishna Nagar (34.23 mg/l) and Madukarai (25.96 mg/l) during postmonsoon though the nitrate level is within the acceptable limit, the concentration is found to be slightly higher compared to other monitoring stations. Sources of nitrate may be attributed to municipal wastewater, septic tanks, sewage disposal systems and improper disposal of municipal solid waste.

The concentration of iron in some of the ground water samples viz., Maruthi School (0.9 mg/l), Kothapurinatham (1.44 mg/l), Sedarapet (0.31 mg/l), Eachangadu (0.46 mg/l), Thengaithittu (1.48 mg/l), Muthirapalayam (1.28 mg/l) during premonsoon and in Thengaithittu (1.07 mg/l) and Bahour borewell (0.579 mg/l) during post monsoon does not meet the acceptable limit (0.3 mg/l). The source of iron in the ground water of Puducherry region is due to the natural occurrence of iron oxide in geological condition.

Nickel in Thengaithittu (0.029 mg/l), Muthirapalayam (0.031 mg/l), Mettupalayam (0.04 mg/l), and Uruvaiyar (0.029 mg/l), is slightly higher than the acceptable limit (0.02 mg/l). This may be due to leaching of metal such as pipes and fittings in contact with water.

Release of Value Added Knowledge Products

Smt. Smitha. R, I.A.S., Chairperson, Puducherry Pollution Control Committee (PPCC) released Monthly and Yearly Science Calendar, 2021 in the presence of Dr. S. Dinesh Kannan, IFS, Member Secretary, PPCC on 04.01.2021 prepared by Puducherry Envis Hub. This Environmental E- calendar will emphasis on the importance of highlighted days in the respective month for carrying out necessary environmental, Science related activates/celebration/events.



Celebration of Eco friendly bhogi festival

Puducherry Pollution Control Committee in collaboration with Puducherry Envis Hub organized webinar on the topic "Celebrating Eco-Friendly Bhogi" delivered by Dr. V. Gopal, Principal, College of Pharmacy, Mother Theresa Post Graduate & Research Institute of Health Sciences held on 12.01.2021.



Poster



Celebration of World Wetlands Day

Puducherry ENVIS Hub organized outdoor walk at Ariyankuppam River on the eve of World Wetlands Day held on 02.02.2021. Dr. M. Bubesh Guptha, Environmentalist, Founder Director, Universal Eco Foundation, Puducherry explained the “Importance of Wetlands and Water” to the participants.



Webinar Session

Conducted webinar on the eve of World Wetlands Day, wherein, Dr. M. Bubesh Guptha, Environmentalist, Founder Director, Universal Eco Foundation, Puducherry delivered expert lecture on “Importance of Wetlands & Wetland Birds in Puducherry Region” held on 02.02.2021.



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PUDUCHERRY ENVIS HUB
Puducherry Pollution Control Committee
3rd Floor, PHB Building,
Anna Nagar, Puducherry - 605 005.

E-Mail: envis.pon@nic.in

Website: <https://dste.py.gov.in/Envispdy/>

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