



# GOVERNMENT OF PUDUCHERRY

## *Puducherry Pollution Control Committee*

**State of Environment & its Related Issues in Puducherry**

### **ENVIS HUB NEWSLETTER**



**WATER QUALITY INDEX IN THE  
U.T OF PUDUCHERRY FOR THE YEAR 2016**

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## **Introduction:**

Puducherry was formed in 1962 out of the four former colonies of French India: Pondicherry (now Puducherry) and Karaikal along India's south-eastern Coromandel Coast, surrounded by Tamil Nadu state; Yanam, farther north along the eastern coast in the delta region of the Godavari River, surrounded by Andhra Pradesh state; and Mahe, lying on the western Malabar Coast, surrounded by Kerala state. The territory's capital is the city of Puducherry in the Puducherry sector, just north of Cuddalore. The Union Territory of Puducherry is extending over an area of 492 Sq.Kms. Puducherry is the 29th most populous and the third most densely populated state/UT in India.

## **Geography**

The union territory of Puducherry consists of four small unconnected districts: Puducherry district (293 km<sup>2</sup> (113 sq m)), Karaikal district (160 km<sup>2</sup> (62 sq m)) and Yanam district (30 km<sup>2</sup> (12 sq m)) on the Bay of Bengal and Mahe district (9 km<sup>2</sup> (3.5 sq m)) on the Arabian Sea, covering a total area of 492 km<sup>2</sup> (190 sq m).

- The Pondicherry region is intersected by the deltaic channels of River Gingee and Ponnaiyar. It is also interspersed with lakes and tanks. The thick alluvium near Pondicherry is indicative of the place having been part of an extensive lagoon.
- Karaikal is part of the fertile Cauvery delta.
- Yanam region is skirted on the east and south by the Godavari River. The region is divided into two parts by the separation of the Godavari and Coringa Rivers.
- The Mahe Region is divided into two parts by the west flowing Mahe River. It is bounded in the south west by the Arabian sea and in the north by the Ponniyam River.

## **Rainfall**

### **Puducherry**

In Puducherry, northeast monsoon sets during the middle of October, and Puducherry gets the bulk of its annual rainfall during the period from October to December. The annual average rainfall is 1,240 mm (49 in). Winters are warm, with high of 30 °C (86 °F) and low often dipping to around 18–20 °C (64–68 °F).

### **Karaikal**

Karaikal has an annual average rainfall of about 126 cm. 68 percent of which occurs during October to December. The amount of rainfall during the south-west monsoon period is small, being less than 20 per cent of the annual. November is the rainiest month, accounting for about a third of the annual total. The range of variation of annual rainfall is wide. Variability of annual rain fall is fairly large, so that significant variations in rain fall from year to year may be expected. Drought conditions with the annual rainfall of less than 75 per cent of the normal may be expected once in three years on an average. In a year there are on an average about 55 rainy days, ie. days with rainfall of 2.5 mm or more.

## **Yanam**

In Yanam, high humidity over 70% in the mornings and over 60% in the evenings throughout the year. It experiences an oppressive summer season and a good rainfall. It enjoys the benefit of North-East monsoon. The average rainfall in a year is about 1226 mm.

## **Mahe**

Mahe has significant rainfall most months, with a short dry season. This location is classified as Am (short dry season) by Koppen and Geiger. The average annual rainfall is 3557 mm. There is a difference of 1080 mm of precipitation between the driest and wettest months.

## **Temperature**

In Puducherry, the average maximum temperature is 36 °C (97 °F). Minimum temperatures are in the order of 28–32 °C (82–90 °F). This is followed by a period of high humidity and occasional thundershowers from June till September.

In Karaikal, the level of temperatures is about the same as in Puducherry. December and January are the coolest months with the maximum at about 28°C and the minimum at about 23°C. Minimum temperature as low as 16°C may sometimes be recorded. The level of humidity and the pattern of cloudiness and surface winds are the same as in Puducherry. Although slight variations in the month wise occurrence of depressions and storms are noticeable, thunder-storms generally occur during April to November, particularly in April, September and October.

In Yanam, temperature starts rising rapidly till May which is the hottest month with the mean maximum around 37°C and mean minimum around 28°C. Humidity being high, the heat is very trying. The maximum temperature on some days in May or early June before the onset of the South-West monsoon touches about 47°C. Pre-monsoon thundershowers may at times bring welcome relief. With the onset of the monsoon in June, the mercury falls down bringing some sort of relief. The moderate temperature continues upto September. The months of December & January, falling in the winter season (Cold Weather Season) are the pleasant months.

In Mahe, the average annual temperature is 3.9 °C. About 562 mm of precipitation falls annually.

### **Water Quality Monitoring station in U.T. of Puducherry region:**

<b>Station Code</b>	<b>Location</b>	<b>Type</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Date of inception</b>
<b>Puducherry</b>					
1396	Ousteri	Lake	11° 57'01.9" N	79° 44' 47.7" E	11-01-90
1397	Krishna Nagar	Borewell	11° 57'10.88" N	79° 49' 12.68" E	11-01-90
1398	Thengaithittu	Borewell	11° 54'37.24" N	79° 49' 03.10" E	11-01-90

1453	Muthirappalayam	Borewell	11° 56'17.26" N	79° 46' 47.73" E	01-01-92
1454	Pondicherry University, Kalapet	Borewell	12°01'01.43" N	79° 51'02.74" E	01-01-92
1688	Katterikuppam	Borewell	12° 00'17.03" N	79° 42' 02.92" E	15-05-02
1686	Bahour	Lake	11° 49'47.8" N	79° 44' 35.3" E	15-05-02
1687	Chetty Koil, Mission Street	Openwell	11° 56'12.9" N	79° 49' 51.7" E	15-05-02
1689	Chunnambar	River	11° 52'59.9" N	79° 47' 57.0" E	15-05-02
2009	Kurumbapet	Borewell	11° 55'49.81" N	79° 45' 41.50" E	16-05-06
2010	Mettupalayam	Borewell	11° 56'35.64" N	79° 47' 07.64" E	15-05-06
2011	Uruvaiyar	Borewell	11°53'29.45" N	79° 45'06.95" E	15-05-06
2012	Maruthi school, Karuvadikuppam	Borewell	11° 58'04.79" N	79° 49'02.03" E	15-05-06
<b>Karaikal</b>					
1685	Arasalar	River	10° 54' 562" N	79 ° 49' 066" E	15-05-02
2013	T.R.Pattinam	Borewell	10° 50' 485" N	79 ° 49' 918" E	16-05-06
2014	Vadamattam	Borewell	11° 56' 773" N	79 ° 49' 771" E	16-05-06
<b>Yanam</b>					
2442	Gowtami –Godavari river near balayogi Bridge	River	16° 72' 597" N	82 ° 20' 216" E	07.01.2009
2443	Gowtami – Godavari Near Adavipolam	River	16° 71' 519" N	82 ° 26' 158" E	07.01.2009
2444	Gowtami – Godavari Coringa River ( Tidal Lock)	River	16° 73' 000" N	82 ° 21' 747" E	07.01.2009
<b>Mahe</b>					
2445	Mahe river	River	11° 42' 275" N	75 ° 32' 594" E	07.01.2009
2446	Pallur	Openwell	11° 43' 960" N	75 ° 32' 460" E	07.01.2009
2447	Panthakkal	Openwell	11° 45' 123" N	75 ° 32' 284" E	07.01.2009

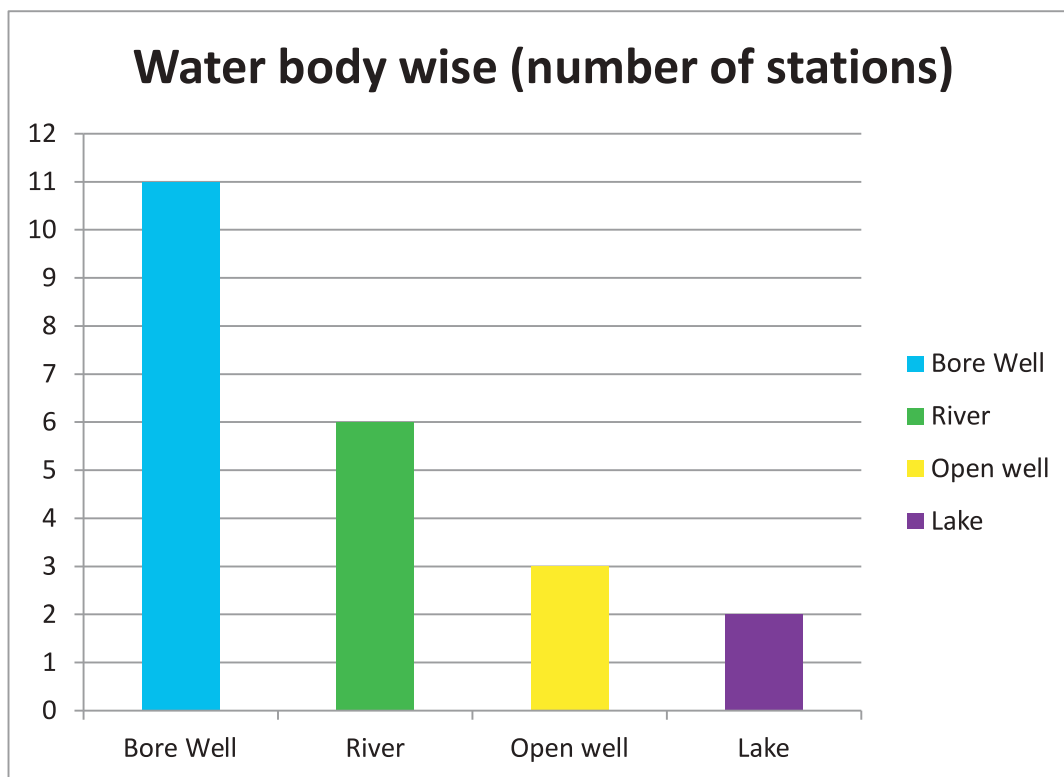
Water quality monitoring is carried out by Puducherry Pollution Control Committee periodically at various locations with financial assistance from Central Pollution Control Board under National Water Quality Monitoring Programme (NWMP). Monitoring is done on quarterly basis in surface water bodies in Puducherry and Karaikal regions, Annually in Mahe and Yanam regions and during pre and post monsoon in the case of ground water.

## Objectives of Water Quality Monitoring

The water quality monitoring is performed with following main objectives:

- To Understand the nature and extent of pollution control and measures required.
- To Evaluate the extend 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 body wise (number of stations)



Field observation	Core parameters	General parameters	Bio-Monitoring	Trace Metals
Weather	pH	Turbidity NTU	P/R ratio	Hexavalent Chromium mg/l
Depth of Stream/ Water table	Temperature °C	Phenolphthalein Alkalinity as CaCO <sub>3</sub> mg/l		Arsenic (as AS) mg/l
Colour and Intensity	Conductivity μmhos/cm	Total Alkalinity as CaCO <sub>3</sub> mg/l		(as Cd) mg/l
		COD mg/l		
		Chloride mg/l		
		Ammonia N mg/l		

Odour	Dissolved Oxygen mg/l	Calcium as CaCO <sub>3</sub> mg/l	Cadmium
		Magnesium as Co <sub>3</sub> mg/l	Copper (as Cu mg/l)
Visible effluent	BOD mg/l	Sulphate mg/l	
Discharge	Nitrate-N mg/l	Sodium mg/l	Chromium as (Cr) mg/l
	Nitrite-N mg/l	Total Dissolved Salt mg/l	
Human activities around station		Fixed Dissolved Solids mg/l	Iron (as Fe) mg/l
Station detail		Total Suspend Solids mg/l	Lead (as Pb) mg/l
		Orthophosphate mg/l	Nickel (as Ni) mg/l
		Potassium mg/l	
		Fluoride mg/l	
		% sodium SAR	Zinc (as Zn) mg/l

## WATER QUALITY INDEX

Water quality index (WQI) provides information about water quality in a single value. WQI is commonly used for the detection and evaluation of water pollution and may be defined as a reflection of composite influence of different quality parameters on the overall quality of water (Horton, 1965). WQI indices are broadly classified into two types, they are physico-chemical and biological indices. The physico-chemical indices are based on the values of various physico-chemical parameters in a water sample, while biological indices are derived from the biological information. There are numerous WQI published in various journals and research publications.

### Standard values of water quality parameters and their corresponding ideal values and unit weights

Sl. No	Parameters	Standard (Sn)	Ideal Value (V id)	K Value	Unit weight
1	pH	6.5 - 8.5	7	0.16069	0.02143
2	Turbidity	1.0 NTU	0	0.16069	0.16069
3	TDS	500 mg/l	0	0.16069	0.00032
4	Calcium	75 mg/l	0	0.16069	0.00214
5	Magnesium	30 mg/l	0	0.16069	0.00536
6	Chloride	250 mg/l	0	0.16069	0.00064
7	Sulphate	200 mg/l	0	0.16069	0.00080
8	Fluoride	1.0 mg/l	0	0.16069	0.16069
9	Nitrate as NO <sub>3</sub>	45 mg/l	0	0.16069	0.00357
10	Alkalinity	200 mg/l	0	0.16069	0.00080
11	Hardness	200 mg/l	0	0.16069	0.00080



## WQI Calculation

The WQI is calculated by using the expression given in Equation.

$$WQI = \sum q_n W_n / \sum W_n$$

Where,

$q_n$  = Quality rating of  $n^{\text{th}}$  water quality parameter.

$W_n$  = Unit weight of  $n^{\text{th}}$  water quality parameter.

Quality rating ( $q_n$ )

The Quality rating ( $q_n$ ) is calculated using the expression given in Equation

$$q_n = [ (V_n - V_{id}) / (S_n - V_{id}) ] \times 100$$

Where,

$V_n$  = Estimated value of  $n^{\text{th}}$  water quality parameter at a given sample location.

$V_{id}$  = Ideal value for  $n^{\text{th}}$  parameter in pure water.

( $V_{id}$  for pH = 7 and 0 for all other parameters)

$S_n$  = Standard permissible value of  $n^{\text{th}}$  water quality parameter.

## Unit Weight

The unit weight ( $W_n$ ) is calculated using the expression given in Equation.

$$W_n = K / S_n$$

Where

$S_n$  = Standard permissible Value of  $n^{\text{th}}$  water quality parameter.

$K$  = Constant of proportionality and it is calculated by using the expression given in Equation.

$$K = [1 / (\sum 1/S_n = 1, 2, \dots, n)]$$

(Source: [http://shodhganga.inflibnet.ac.in/bitstream/10603/10079/12/12\\_chapter%207.pdf](http://shodhganga.inflibnet.ac.in/bitstream/10603/10079/12/12_chapter%207.pdf))

WQI and corresponding water quality status (Chatterji and Raziuddin 2002)		
WQI	Status	Possible Uses
0-25	Excellent	Drinking, Irrigation and Industrial
26-50	Good	Domestic, Irrigation and Industrial
51-75	Poor	Irrigation and Industrial
76-100	Very poor	Irrigation
>100	Unsuitable for drinking	Restricted use for Irrigation
Above 150	Unfit for drinking	Proper treatment required before use

## NWMP Ground Water Quality and Surface Water Quality Data, 2016

NWMP Ground Water Quality Data During Post Monsoon January, 2016															
Sl.No.	Parameters	Kurumbapet	Krishna Nagar B.No.14	Maruthi School	University	Uruvaiyar	Thengaiyithu VN.15	Chetty Kovil	T.R.Patinam	Vadamattam	Katterikuppam	Muthirapalaya m B .No.9	Mettupalayam B.No.8	Acceptable Limit	Permissible Limit
1.	Temperature	31	30	30	30	30	30	26	28	28	30	30	30	-	-
2.	pH	7.12	7.8	7.3	7.37	7.35	7.57	7.36	7.4	7.46	7.38	7.34	7.54	6.5 - 8.5	NR
3.	Conductivity $\mu\text{mho/cm}$	439	370	1624	165	4210	1225	1351	1451	1295	554	501	690	-	-
4.	BOD (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	-	-
5.	Nitrate - N (mg/l)	5.606	6.143	0.365	1.166	0.036	0.02	0.226	0.014	0.348	1.935	4.692	5.049	-	-
6.	Nitrate (mg/l)	24.8242	27.19	1.6153	5.1643	0.1603	0.0863	1.0	0.0615	1.5396	8.5695	20.7771	22.3569	45	NR
7.	Nitrite - N (mg/l)	0.001	0.0021	0.0146	0.0014	0.0021	0.0014	0.0038	0.0035	0.1831	0.0347	0.101	0.0014	-	-
8.	Turbidity NTU	NIL	NIL	NIL	NIL	NIL	NIL	NL	NIL	NIL	NIL	NIL	NIL	1	5
9.	Bi- Carbonate as $\text{CaCO}_3$ mg/l	153.3	86.1	262.5	71.4	268.8	216.3	300	367.5	346.5	354.9	165.9	86.1	200	600
10.	Chloride (mg/l)	100	100	470	34	1266	330	290	390	290	40	90	106	250	1000
11.	COD (mg/l)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	-	-
12.	Hardness as $\text{CaCO}_3$ mg/l/mg/l	160	120	330	70	790	278	358	50	46	320	170	254	200	600
13.	Calcium as $\text{CaCO}_3$ mg/l	140	90	310	60	512	238	326	40	34	308	136	204	-	-
14.	Calcium as $\text{Ca}^{++}$	56	36	124	24	204.8	95.2	130.4	16	13.6	123.2	54.4	81.6	75	200
15.	Magnesium as $\text{CaCO}_3$ mg/l	20	30	20	10	278	40	32	10	12	12	34	50	-	-
16.	Magnesium as $\text{Mg}^{++}$	4.86	7.29	4.86	2.43	67.6	9.72	7.78	2.43	2.92	2.92	8.26	12.2	30	100
17.	Sulphate mg/l	23.2	14.2	502	3.4	172.4	29.8	66.1	8.4	1.7	8.4	7.2	56.1	200	400
18.	Sodium mg/l	53.2	41.4	218	9.5	559	145	150	332	266	13.4	48	68	-	-
19.	TDS mg/l	348	302	1066	112	2786	810	976	996	880	368	352	480	500	2000
20.	TSS mg/l	1	1	1	1	1	1	1	1	1	1	1	1	-	-
21.	Orthophosphate mg/l	0.082	BDL	BDL	BDL	0.060	0.048	BDL	0.070	0.044	BDL	BDL	BDL	-	-
22.	Potassium mg/l	7.6	11.1	21.6	0.5	9.2	5.1	33.7	2.7	2.8	3.0	2.3	1.3	-	-
23.	Fluoride mg/l	0.20	0.17	0.25	0.073	0.53	0.26	0.093	0.56	0.49	0.29	0.18	0.27	1	1.5
24.	% Sodium	40.5	40.1	57.0	22.6	60.1	52.5	44.8	93.1	92.1	8.3	37.6	36.6	-	-
25.	SAR	1.8	1.6	5.2	0.5	8.6	3.8	3.4	20.4	17.0	0.3	1.6	1.9	-	-
26.	Arsenic (as AS) mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	0.05
27.	Cadmium (as Cd) mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.003	NR
28.	Copper (as Cu) mg/l	ND	0.052	ND	0.013	0.213	ND	ND	ND	ND	ND	ND	ND	0.05	1.5
29.	Chromium as (Cr) mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	NR
30.	Iron (as Fe) mg/l	0.004	0.644	0.857	0.040	0.256	1.130	0.710	0.030	0.121	0.028	0.109	0.168	0.3	NR
31.	Lead (as Pb) mg/l	ND	0.006	0.019	ND	0.119	0.016	0.002	ND	ND	0.035	ND	0.005	0.01	NR
32.	Nickel (as Ni) mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02	NR
33.	Zinc (as Zn) mg/l	ND	0.058	0.144	0.006	0.010	ND	ND	ND	0.091	0.547	0.023	0.366	5	15



January 2016- Quarter					
Surface water quality In Puducherry					
Sl.No.	Parameters	Bahour	Chunnambar	Ousteri	Arasalar
1.	Temperature	28	28	27	27
2.	DO mg/l	6.7	7.2	6.8	-
3.	pH	7.28	7.21	7.14	7.56
4.	Conductivity $\mu\text{mho/cm}$	326	400	234	441
5.	BOD mg/l	BDL	BDL	1.5	BDL
6.	Nitrate - N - mg/l	0.0115	0.006	0.010	0.012
7.	Nitrate- N mg/l	0.0507	0.0248	0.0461	0.0523
8.	Nitrite mg/l	0.0042	0.0031	0.0035	0.0090
9.	P/R ratio	5.0	3.7	3.0	-
10.	Turbidity NTU	2	3	2	3
11.	Bi- Carbonate as $\text{CaCO}_3$ mg/l	147	231	123.9	262.5
12.	Chloride mg/l	80	130	30	90
13.	COD mg/l	26.4	22.8	29.6	NIL
14.	Ammonia N mg/l	BDL	BDL	BDL	BDL
15.	Hardness as $\text{CaCO}_3$ mg/l	120	210	90	160
16.	Calcium as $\text{CaCO}_3$ mg/l	80	176	84	150
17.	Magnesium as $\text{CaCO}_3$ mg/l	40	34	6	10
18.	Sulphate mg/l	10.2	17.2	9.9	12.9
19.	Sodium mg/l	47	76	14.5	69
20.	TDS mg/l	216	284	170	304
21.	TSS mg/l	2	2	1	2
22.	Orthophosphate mg/l	0.017	0.022	BDL	0.761
23.	Potassium mg/l	3.9	4.9	2.8	2.4
24.	Fluoride mg/l	0.059	0.83	0.40	0.48
25.	% Sodium	44.9	43.3	25.2	47.9
26.	SAR	1.9	2.3	0.7	2.4
27.	Arsenic (as AS) mg/l	ND	ND	ND	ND
28.	Cadmium (as Cd) mg/l	ND	ND	ND	ND
29.	Copper (as Cu) mg/l	ND	ND	ND	ND
30.	Chromium as (Cr) mg/l	ND	ND	ND	ND
31.	Iron (as Fe) mg/l	0.209	0.301	0.224	0.256
32.	Lead (as Pb) mg/l	0.007	0.012	ND	0.003
33.	Nickel (as Ni) mg/l	ND	ND	ND	ND
34.	Zinc (as Zn) mg/l	0.117	ND	0.057	ND

Surface water quality - January 2016 Quarter								
Station Code	Location Name	Name of Monitoring Agency	State Name	BOD	DO	FC	TC	WATER QUALITY STATUS
Quarterly Monitoring				January- March 2016				
Water quality criteria				<3.0 mg/l	> 4.0 mg/l	<2500 MPN/ 100 ml	< 5000 MPN/ 100 ml	
1689	Chunnambar, Puducherry	PPCC, Pdy	Puducherry	BDL	7.2	-	-	Satisfactory
1685	Arasalar, Karaikal	PPCC, Pdy	Puducherry	BDL	-	-	-	Satisfactory

Surface Water Quality Data April 2016 Quarter					
Sl.No.	Parameters	Bahour	Chunnambar	Ousteri	Arasalar
1	Dt.of Sampling	05.04.2016	05.04.2016	05.04.2016	05.04.2016
2	Time	12.05.PM	12.50 PM	2.00 PM	5.00 PM
3	Temperature	33	32	32	26
4	DO mg/l	6.5	9.2	7.3	9.8
5	pH	7.36	7.44	7.47	7.72
6	Conductivity $\mu$ mho/cm	446	966	228	580
7	BOD mg/l	1.0	8	4.8	5
8	Nitrate - N - mg/l	0.040	0.056	0.129	0.035
9	Nitrate mg/l	0.154	0.234	0.550	0.137
10	Nitrite - N - mg/l	0.0052	0.028	0.0045	0.0038
11	Fecal Coliform MPN/100 ml	170	130	220	-
12	Total Coliform MPN/100 ml	350	350	500	-
13	P/R ratio	4.5	5	3.0	-
14	Chromium as (Cr) <sup>6+</sup> mg/l	BDL	BDL	BDL	BDL
15	Turbidity NTU	2.0	2.0	3.0	22.0
16	Bi- Carbonate as CaCO <sub>3</sub> mg/l	176	242	154	260
17	Chloride mg/l	90	219.2	41.4	80.2
18	COD mg/l	27.9	44.4	27.5	27.9
19	Ammonia N mg/l	BDL	BDL	BDL	BDL
20	Hardness as CaCO <sub>3</sub> mg/l	56	98	52	42
21	Calcium as CaCO <sub>3</sub> mg/l	44	78	40	28

22	Magnesium as CaCO <sub>3</sub> mg/l	12	20	12	14
23	Sulphate mg/l	441	55.6	5.49	16.26
24	Sodium mg/l	63.9	177	21.4	76
25	TDS mg/l	296	644	172	396
26	FDS mg/l	54	170	68	180
27	TSS mg/l	2.0	5.0	3.0	4.0
28	Orthophosphate mg/l	BDL	BDL	BDL	BDL
29	Potassium mg/l	7.3	8.1	7	6.7
30	Fluoride mg/l	0.7	0.87	0.53	0.88
31	% Sodium	68	78	43.3	76.6
32	SAR	3.71	7.77	1.29	5.1

Water Quality status of river in Puducherry & Karaikal-April 2016 Quarter								
Station Code	Location Name	Name of Monitoring Agency	State Name	BOD	DO	FC	TC	Water Quality Status
Quarterly Monitoring				April - June 2016				
Water quality criteria				<3.0 mg/l	> 4.0 mg/l	<2500 MPN/ 100 ml	< 5000 MPN/ 100 ml	
1689	Chunnambar, Puducherry	PPCC,Pdy	Puducherry	8.0	9.2	130	350	Not Satisfactory
1685	Arasalar, Karaikal	PPCC,Pdy	Puducherry	5	9.8	*	*	Not Satisfactory

NWMP Ground Water Quality Data During Pre- Monsoon 2016 (September)															
Sl.No.	Parameters	Krishna Nagar B.No.14	Maruthi School	Chetty Kovil	Thengaithittu VN.15	Kurumbapet	Katterikuppam	Uruvaiyar	Muthirapalayam B.No.9	Metupalayam B.No.8	University	T.R. Pattinam	Vadamattam	Acceptable Limit	Permissible Limit
1.	Temperature	31	31	30	32	32	30	31	32	31	32	27	26.5	-	-
2.	pH	6.96	6.59	6.98	6.98	7.14	7.06	6.90	7.26	6.96	7.32	7.67	7.77	6.5-8.5	NR
3.	Conductivity $\mu\text{mho/cm}$	212	2110	1295	1250	525	466	3800	435	635	175	1546	1330	-	-
4.	COD (mg/l)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	-	-
5.	Nitrate - N (mg/l)	7.48	2.21	2.28	0.008	5.06	0.26	0.01	3	3.87	1.01	1.93	0.127	-	-
6.	Nitrate (mg/l)	33.12	9.78	10.1	0.037	22.4	1.15	0.044	13.28	17.14	4.47	8.55	0.56	45	NR
7.	Nitrite- N (mg/l)	0.00072	0.061	0.248	0.0057	0.0043	0.0043	0.0039	0.0143	0.0064	0.0032	0.319	0.1002	-	-
8.	Turbidity NTU	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	5
9.	BOD (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	-	-
10.	Bi- Carbonate as CaCO <sub>3</sub> mg/l	81.6	292.8	321.6	283.2	172.8	388.8	304.8	175.2	86.4	98.4	398.4	386.4	200	600
11.	Chloride (mg/l)	57.2	448.2	219.3	268.9	78.2	30.5	1071.9	72.5	68.7	32.4	343.3	249.8	250	1000
12.	Hardness as CaCO <sub>3</sub> (mg/l)	112.2	368.4	291.7	323.5	179.5	289.9	736.8	170.2	190.7	104.7	52.4	37.4	200	600
13.	Calcium as CaCO <sub>3</sub> (mg/l)	63.6	243.1	228.1	188.9	102.9	134.6	246.8	87.9	121.6	64.5	37.4	26.2	-	-
14.	Calcium (as Ca) mg/l	25.4	97.2	91.2	75.6	41.2	53.8	98.7	35.2	48.6	25.8	14.9	10.5	75	200
15.	Magnesium as CaCO <sub>3</sub> (mg/l)	48.6	125.3	63.6	134.6	76.6	155.3	490	82.3	69.1	40.2	15	11.2	-	-

16.	Magnesium (as Mg) mg/l	11.8	30.4	15.5	32.7	18.6	37.7	119	19.9	16.8	9.8	3.6	2.7	30	100
17.	Sulphate (mg/l)	7.99	62.1	76.05	26.32	29.73	3.7	166.33	20.67	142.83	2.43	3.41	2.92	200	400
18.	TDS (mg/l)	142	1210	782	764	346	292	2480	288	418	104	906	750	500	2000
19.	FDS (mg/l)	74	664	498	434	216	120	1746	170	334	66	570	288	-	-
20.	TSS (mg/l)	1	13	12	1	1	1	1	1	1	1	2	3	-	-
21.	Sodium (mg/l)	35.5	233	150	151	57.4	17.4	630	55	79	10.2	363	317	-	-
22.	Potassium (mg/l)	5.9	21.2	42	6	7.7	4.9	9.2	4.1	3.4	1.9	4.2	4.2	-	-
23.	Chromium as (Cr <sup>6+</sup> ) (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.05	NR
24.	% Sodium	39.09	59.1	48.59	49.66	39.63	11.26	64.48	40.41	46.73	17.07	93.17	94.15	-	-
25.	SAR	1.453	5.267	3.813	3.640	1.858	1.292	10.049	1.827	2.482	0.432	21.76	22.49	-	-
26.	Total Coliform (MPN/ 100 ml)	<2	<13	17	<2	<2	<2	<2	<2	<2	<2	-	-	f	*
27.	Fecal Coliform (MPN/ 100 ml)	<2	<2	4	<2	<2	<2	<2	<2	<2	<2	-	-		
NR - No Relaxation, *Shall not be detectable in any 100 ml samples															

September 2016 - Quarter				
Surface water quality in Puducherry				
Sl.No.	Parameters	Ousteri	Chunna mbar	Arasalar
1.	Temperature	32	32	26
2.	DO (mg/l)	7.8	10.8	9.8
3.	pH	7.41	7.85	7.76
4.	Conductivity $\mu$ mho/cm	200	1200	1050
5.	COD (mg/l)	28	31	53
6.	Nitrate - N (mg/l)	0.44	0.051	0.03
7.	Nitrate (mg/l)	1.95	0.226	0.133
8.	Nitrite - N (mg/l)	0.0097	0.0072	0.0161
9.	Turbidity NTU	20	24	10
10.	BOD (mg/l)	1.5	3	BDL
11.	Bi- Carbonate as CaCO <sub>3</sub> mg/l	148.8	220.8	343.2
12.	Chloride (mg/l)	26.7	236.5	154.5
13.	Hardness as CaCO <sub>3</sub> (mg/l)	93.5	188.9	185.1
14.	Calcium as CaCO <sub>3</sub> (mg/l)	58	63.6	29.9
15.	Magnesium as CaCO <sub>3</sub> (mg/l)	35.5	125.3	155.2
16.	Sulphate (mg/l)	6.82	81.9	9.94
17.	TDS (mg/l)	134	748	580
18.	FDS (mg/l)	96	592	224
19.	TSS (mg/l)	29	17	12
20.	NH <sub>3</sub> - N (mg/l)	BDL	BDL	BDL
21.	Sodium (mg/l)	28.8	201	152
22.	Potassium (mg/l)	4.8	7.6	7.1
23.	Chromium as (Cr) <sup>6</sup> (mg/l)	BDL	BDL	BDL

24.	P/R ratio	2.25	2.79	—
25.	% Sodium	38.51	68.6	62.78
26.	SAR	1.295	6.332	4.833
27.	Total Coliform(MPN/ 100 ml)	17	11	—
28.	Fecal Coliform(MPN/ 100 ml)	<2	<2	—

### Status of River Water Quality in Puducherry & Karaikal

September 2016

Station Code	Location Name	Name of Monitoring Agency	State Name	BOD	DO	FC	TC	WATER QUALITY STATUS
Pre - Monsoon				September				
Water quality criteria				<3.0 mg/l	> 4.0 mg/l	<2500 MPN/ 100 ml	< 5000 MPN/ 100 ml	
1689	Chunnambar River	PPCC, Pdy	Puducherry	3.0	10.8	<2	11	Satisfactory
1685	Arasalar River	PPCC, Pdy	Puducherry	BDL	9.8	—	—	Satisfactory

### December 2016-Quarter

#### Surface water quality in Puducherry

Sl.No.	Parameters	Bahour	Chunnambar	Ousteri	Arasalar
1.	Temperature°C	27	25	27	24
2.	DO (mg/l)	5.4	8.8	7.2	—
3.	pH	7.68	7.55	7.42	8.65
4.	Conductivity µmho/cm	712	1210	270	9240
5.	COD (mg/l)	29.2	33.3	62.5	50.9
6.	Nitrate - N (mg/l)	0.002	BDL	0.014	0.0322
7.	Nitrate (mg/l)	0.0089	BDL	0.062	0.143
8.	Nitrite - N (mg/l)	0.026	0.0036	0.0122	0.006
9.	Turbidity NTU	168.2	32	50.8	8.9
10.	BOD (mg/l)	3	6	12	7
11.	Bi- Carbonate as CaCO <sub>3</sub> mg/l	340.8	276	127.2	255.2
12.	Chloride (mg/l)	88.6	260	49	2,525
13.	Hardness as CaCO <sub>3</sub> (mg/l)	347.2	194.5	85.4	1350
14.	Calcium as CaCO <sub>3</sub> (mg/l)	218.2	141.8	63.6	1030
15.	Magnesium as CaCO <sub>3</sub> (mg/l)	129	52.7	21.8	320
16.	TDS (mg/l)	504	782	170	5556
17.	FDS (mg/l)	128	304	40	2574
18.	TSS(mg/l)	53	14	28	39
19.	Orthophospate mg/l	0.126	0.026	0.041	0.017
20.	NH <sub>3</sub> - N (mg/l)	BDL	BDL	0.586	BDL
21.	Chromium as (Cr) <sup>6</sup> (mg/l)	BDL	BDL	BDL	BDL

### Status of river water quality in Puducherry & Karaikal region - 2016

Station Code	Location Name	Name of Monitoring Agency	State Name	BOD	DO	FC	TC	Water Quality Status
Quarterly Monitoring				December - 2016				
Water quality criteria				<3.0 mg/l	> 4.0 mg/l	<2500 MPN/ 100 ml	< 5000 MPN/ 100 ml	
1689	Chunnambar, Puducherry	PPCC,Pdy	Puducherry	6.0	8.8	-	-	Not Satisfactory
1685	Arasalar, Karaikal	PPCC,Pdy	Puducherry	7	-	-	-	Not Satisfactory

### Water Quality Index for Ground Water Data in the UT. of Puducherry during the year 2016

Sl.No.	Station Code	Station Name	Water Quality Index	
			Post Monsoon	Pre-Monsoon
Puducherry				
1	2009	Kurumbapet	4.4	1.4
2	1397	Krishna Nagar	6.7	0.5
3	2012	Maruthi school	6.2	3.4
4	1454	Pondicherry University	3	1.8
5	2011	Uruvaiyar	12.8	2.9
6	1398	Thengaithittu	7.4	1.1
7	1688	Katterikuppam	7.1	1.4
8	1453	Muthirapalayam	5.0	1.9
9	2010	Mettupalayam	7.5	1
10	1687	Chetty Kovil	4.0	4.3
Karaikal				
11	2013	T.R.Pattinam	11.1	3.4
12	2014	Vad amattam	10.2	3.7

### Water Quality Index for Mahe during the year 2016

Sl.No.	Station Code	Station Name	WQI
1	2447	Pandakal	3.27
2	2446	Pallur	1.35



**Note:**

WQI	Status	WQI	Status
0 -25	Excellent	26 - 50	Good
51 - 75	Poor	76 - 100	Very poor
>100	Unsuitable for drinking	Above 150	Unfit for drinking

**Status of Ground Water Quality in Puducherry & Karaikal**

During 2016 in Uruvaiyar location the parameters Hardness, Chloride and Total Dissolved Solids are slightly higher than the permissible limit. In other locations all the parameters are well within the limits.

**Status of Surface Water Quality in Puducherry & Karaikal**

Surface water bodies viz., Bahour lake, Ousteri Lake, Chunnambar River and Arasalar river falls under 'D' class of Use based classification of surface water (propagation of wild life and fisheries) . These water bodies meet primary water Quality Criteria specified by Central Pollution Control Board (CPCB) for class 'D' (the parameter pH, DO & Free Ammonia as N meet the criteria). BOD is slightly high in Chunnambar, Ousteri and Arasalar river during April and October 2016 quarters.

**Status of Surface Water Quality in Yanam & Mahe**

Surface water bodies in Yanam and Mahe regions meet the Primary Water Quality Criteria of CPCB for class 'D'.

**Status of open well in Mahe Region**

The concentration of all the parameters are well within the acceptable limit of drinking water standards in the two wells at Mahe region.

With respect to WQI, the status of water quality in the above two locations are excellent.

**Conclusion**

In general based on the WQI, the quality of water in all the locations are excellent. Hardness, Chloride and Total Dissolved Solids are slightly higher than the permissible limit in Uruvaiyar. The reason may be due to intrusion of saline water and geological condition of the area.

During April and October 2016, BOD is slightly high in Chunnambar, Ousteri and Arasalar river. This may be due to heavy accumulation of algal biomass .

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