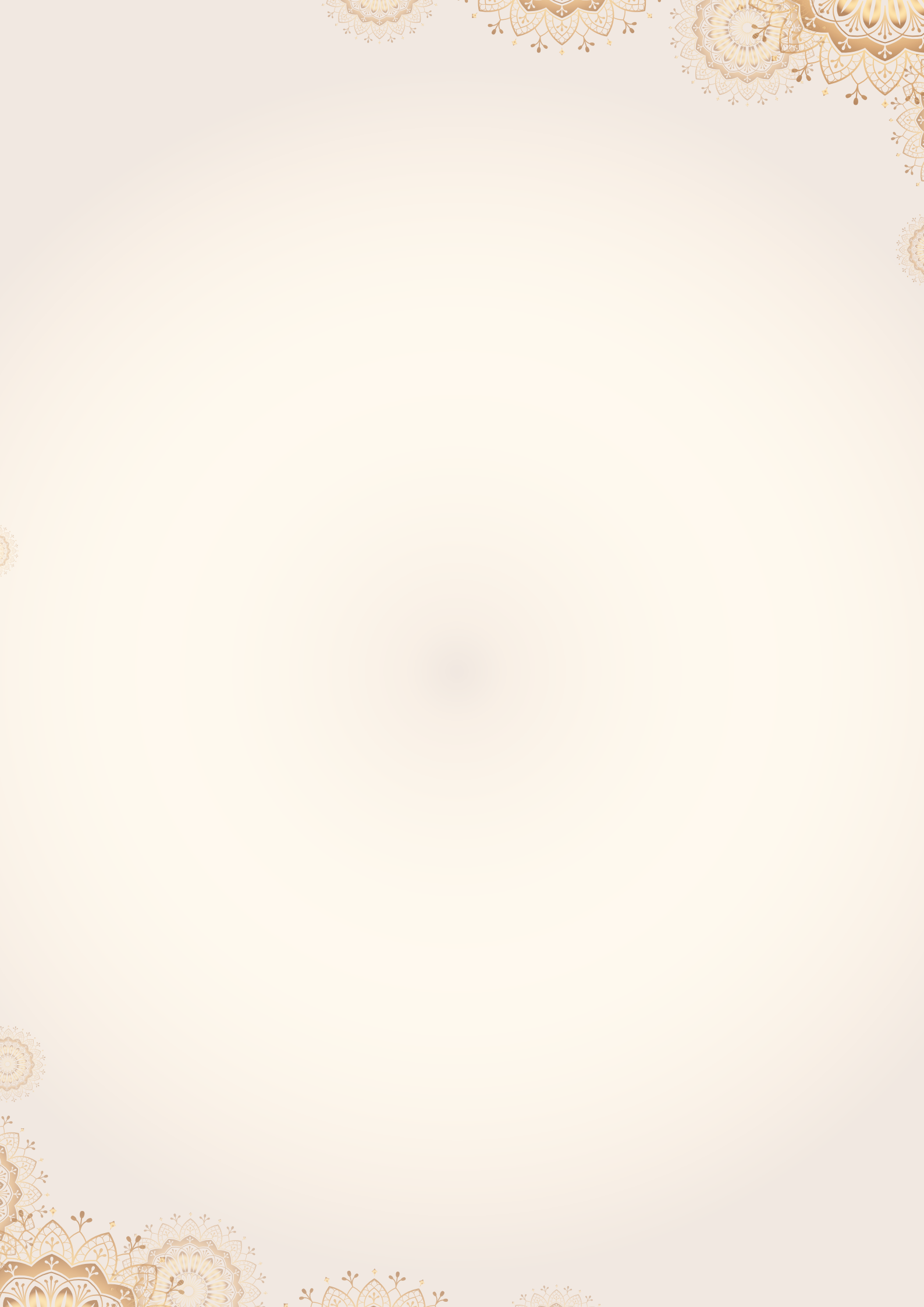




Report on Water Quality across Tamil Nadu pre - & post - Idol immersion on Vinayagar Chaturthi



2022 - 2023



VINAYAGAR CHATHURTHI

In India, as a part of widely celebrated Vinayagar Chaturthi festival, it has been a tradition to immerse Vinayagar idols which are worshipped by devotees in water bodies like lakes, ponds, rivers, estuaries, open coastal beaches, wells etc. The immersion of idols concerns in terms of environmental impact of water pollution as the ingredients of the idols made of Plaster of Paris does not completely dissolve in water and leads to environmental pollution. Also, toxic paints used in decorating the idols containing mercury, lead, cadmium, Iron seeps into the water as the idol dissolves. It increases the acid content, Total Dissolved solids (TDS) and heavy metals in water thereby altering the water quality, damaging ecosystem under water and also leading to bio-accumulation. The idols can also block natural flowing water causing its stagnation and further, the decorative materials resurfaces and floats atop the water body resulting in eutrophication. It is therefore very important to celebrate the festival being mindful of the need for environment protection and also prevention and control of pollution.

In pursuance to the directions of Hon'ble High Court, Central Pollution Control Board (CPCB) evolved the Guidelines for immersion of idols and other puja materials reaching in the water bodies during festival. These guidelines have been prepared with a view to ensure environmental friendly idol immersion without affecting the quality of water bodies while ensuring religious observance. These guidelines emphasize the need for restriction on single use plastic materials for making idols, use of naturally occurring colors for coloring idols, imposing restrictions on size of the idol, construction of temporary synthetic lined ponds of adequate capacity, etc.

In this regard, it is directed to the State Pollution Control Boards having statutory powers under the Water (Prevention of Pollution) Control Act, 1974 and the Environment (Protection) Act, 1986 to give directions to implement the guidelines issued by the Central Pollution Control Board. And to conduct water quality assessment of the water bodies pre-immersion, during immersion and post-immersion on the basis of prescribed parameters.

Accordingly, in the State of Tamil Nadu, Tamil Nadu Pollution Control Board collected water samples from various water bodies across the State to oversee and monitor water quality and assess the impact of idol immersion activity during Vinayagar Chaturthi- 2022. Inorganic, metals and biological parameters were analyzed to evaluate the water quality. The reports received from Advanced Environmental Labs (AELs), Chennai, Cuddalore, Madurai, Salem and Tirunelveli, District Environmental Labs (DELs), Dindigul, Maraimalai Nagar and Tiruppur were compiled and the inferences and conclusion were drawn.

Results of the Analysis (Physio-Chemical and Bacteriological Parameter) of the water bodies in Chennai, Tamil Nadu
monitored during pre- and post-idol immersion activity during
Vinayagar Chaturthi (30.08.2022 & 10.09.2022)

S.No	Sampling Location in Chennai	Date of sampling	Type of water body	Pre/Post immersion sampling	pH Number	DO (mg/L)	BOD (mg/L)	Faecal Coliform (MPN/100 ml)	Heavy metals in mg/L								
									Arsenic	Cadmium	Chromium	Copper	Iron	Manganese	Nickel	Lead	Zinc
1	Kasimedu	30.08.2022	Harbour near sea	Pre-	8.55	0.8	6	<2	<0.01	0.3845	<0.05	<0.0015	<0.05	0.0939	<0.02	<0.015	<0.0015
		10.09.2022		Post-	7.89	1.6	8	<2	<0.01	0.3934	<0.05	<0.0015	<0.05	0.1164	<0.02	<0.015	<0.0015
2	Pattinapakkam	30.08.2022	Sea	Pre-	8.39	1.5	5	<2	<0.01	0.376	<0.05	<0.0015	<0.05	<0.1	<0.02	<0.015	<0.0015
		10.09.2022		Post-	8.38	1.8	9	<2	<0.01	0.399	<0.05	<0.0015	<0.05	<0.1	<0.02	<0.015	<0.0015
3	Ennore	30.08.2022	Sea	Pre-	8.52	1	7	<2	<0.01	0.491	<0.05	<0.0015	<0.05	0.156	<0.02	<0.015	<0.0015
		10.09.2022		Post-	8.01	1.6	8	<2	<0.01	0.368	<0.05	<0.0015	<0.05	0.084	<0.02	<0.015	<0.0015
4	Kancheepuram	30.08.2022	Lake	Pre-	6.76	3.03	5	110	<0.01	<0.0008	<0.05	<0.0015	0.017	0.059	<0.006	<0.015	0.094
		10.09.2022		Post-	6.52	nil	11	140	<0.01	0.068	<0.05	0.015	0.019	0.043	0.662	<0.015	0.234
5	Sava Theethakulam	30.08.2022	Lake	Pre-	8.5	4.4	6	78	<0.01	<0.0008	<0.05	<0.0015	0.017	0.059	<0.006	<0.015	0.089
		10.09.2022		Post-	8.49	nil	15	68	<0.01	0.04	<0.05	0.025	0.015	0.151	0.751	<0.015	0.246
6	Kusanthair River	30.08.2022	River	Pre-	7.51	6.8	4	45	<0.01	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	2.94	2.221
		10.09.2022		Post-	7.58	6	5	93	<0.01	<0.0008	0.452	1.461	<0.5	<0.006	3.694	2.321	
7	Buckingham Canal	30.08.2022	River	Pre-	7.85	6.2	4	20	<0.01	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	2.099	2.324
		10.09.2022		Post-	7.92	5.8	4	45	<0.01	<0.0008	0.1691	1.499	<0.5	<0.006	2.54	2.542	
8	Pazhaverkadam	30.08.2022	Sea	Pre-	8.27	6.2	5	91	<0.01	<0.0008	<0.05	6.496	<0.5	<0.01	<0.006	3.224	5.766
		10.09.2022		Post-	7.93	6.2	3	78	<0.01	<0.0008	2.672	3.74	<0.5	<0.01	<0.006	3.668	6.018
9	Ezhuikan Palam	30.08.2022	River	Pre-	7.56	6	5	61	<0.01	<0.0008	<0.05	0.293	<0.5	<0.01	<0.006	2.224	0.426
		10.09.2022		Post-	8.29	5.6	3	92	<0.01	<0.0008	0.361	0.498	<0.5	<0.006	2.961	0.982	
Primary Water Quality Criteria for Outdoor Bathing									Acceptable limit (mg/l): As-0.01, Cd-0.003, Cr-0.05, Cu-0.05, Fe-0.3, Mn-0.1, Ni-0.02, Pb-0.01 & Zn-5								
						>5 mg/L	<3 mg/L	<500 MPN/100									
						6.5- 8.5											

Parameters	Primary Water Quality Criteria for Outdoor Bathing as per CPCB	Water Quality Standards for Coastal Waters Marine Outfalls as per CPCB				
		SW - I	SW - II	SW - III	SW - IV	SW - V
pH	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 9	6.0- 9
DO	>5 mg/L	min 5 mg/L	min 4 mg/L	min 3 mg/L	min 3 mg/L	min 3 mg/L
BOD	<3 mg/L		3 mg/L	3 mg/L	5 mg/L	
Faecal coliforms Most Probable Number (MPN)	<500 MPN/100 ml		100/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)
Heavy metals (mg/L) (acceptable limit)	As-0.01 mg/L, Cd-0.003 mg/L, Cr-0.05 mg/L, Cu-0.05 mg/L, Fe-0.3 mg/L, Mn-0.1 mg/L, Ni-0.02 mg/L, Pb-0.01 mg/L & Zn-5 mg/L	Hg- 0.01 mg/L, Pb - 0.01 mg/L, Cd - 0.01 mg/L		Fe -0.5 mg/L, Mn - 0.5 mg/L		
Oil & grease		0.1 mg/L				None except for such small amount
Turbidity Nephelometric Turbidity Unit (NTU)			30 NTU	30 NTU		
Designated Best Use		Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone.	Bathing, Contact Water Sports and Commercial fishing.	Industrial cooling, Recreation (non-contact) and Aesthetics.	Harbour.	Navigation and Controlled Waste Disposal.

Chennai

- No exceedance observed in pH value at all monitored stations.
- Dissolved Oxygen (DO) does not meet the Primary Water Quality Criteria for Outdoor Bathing (>5 mg/L) at all monitored stations (pre- & post-idol immersion) except at Kusanthair River, Buckingham Canal, Pazhaverkadu and Ezhukan Palam.
- Biochemical Oxygen Demand (BOD) does not meet the criteria (<3 mg/L) at any of the monitored locations (pre- & post-idol immersion). Further, surge in BOD value post-immersion was observed in Kancheepuram (increase by 9 mg/L), Ponneri (increase by 6 mg/L), Kasimedu (increase by 6 mg/L), Ennore (increase by 5 mg/L) and Pattinapakkam (increase by 2 mg/L).
- Faecal coliform met the criteria (<500 MPN/100 ml) at all the monitored locations.
- Arsenic (As) and Chromium (Cr), Lead (Pb) and Iron (Fe) are within the Acceptable Limit at all the monitored locations.
- Cadmium (Cd) level does not meet the standard limit (0.003 mg/l) at Kasimedu, Pattinapakkam and Ennore (pre- & post-). Also, a distinctive increase in concentration post-immersion was highly notable at Kancheepuram and Ponneri exceeding the standard limit.
- Copper (Cu) concentration was well within the standards prior to idol-immersion. However, post-idol immersion, concentration of the element had soared at Ennore, Kacheepuram, Ponneri Lake, Kusanthair River, Buckingham Canal, Pazhaverkadu and Ezhukan Palam.
- Copper level at Kusanthair River, Buckingham Canal, Pazhaverkadu and Ezhukan Palam exceed the standards (pre- & post-) with a post value of 1.461 mg/L, 1.499 mg/L, 3.74 mg/L and 0.498 mg/L respectively
- Likewise, Manganese concentration at Kasimedu exceeds the standard (post-) with a higher value of 0.1164 mg/L.
- At Kancheepuram and Ponneri Lake, Nickel concentrations detected prior to idol immersions were within acceptable limit (0.02 mg/l). But, Post-idol immersion values of Nickel at Kancheepuram - 0.662mg/L and Ponneri Lake - 0.751 mg/L exceed the limit significantly.

Results of the Analysis (Physio-Chemical and Bacteriological Parameter) of the water bodies in Chengalpattu, Tamil Nadu

monitored during pre- and post-idol immersion activity during

Vinayagar Chaturthi (30.08.2022 & 10.09.2022)

S.No	Sampling Location in Chengalpattu	Date of sampling	Type of water body	Pre/Post immersion sampling	pH Number	DO (mg/L)	BOD (mg/L)	Faecal Coliform (MPN/100 ml)	Heavy metals in mg/L							
									Arsenic	Cadmium	Chromium	Copper	Iron	Manganese	Nickel	Lead
1	Alamparaikuppam village sea	30.08.2022	Sea	Pre-	8.2	6	5	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.2598
		10.09.2022		Post-	8.24	6.8	3	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.1
2	Mamallapuram sea	30.08.2022	Sea	Pre-	8.24	6.8	5	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.3107
		10.09.2022		Post-	8.32	6.3	2	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.01
3	Maduranthagam Lake	30.08.2022	Lake	Pre-	7.94	7.1	2	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.2471
		10.09.2022		Post-	7.92	7.1	2	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.12
4	Sadurangapattinam Village sea	30.08.2022	Sea	Pre-	8.26	7.3	3	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.2042
		10.09.2022		Post-	8.34	6.6	3	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.38
5	Vadapatinam village sea	30.08.2022	Sea	Pre-	8.23	7.3	2	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.2508
		10.09.2022		Post-	8.26	6.7	4	<2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	0.38

Parameters	Primary Water Quality Criteria for Outdoor Bathing as per CPCB	Water Quality Standards for Coastal Waters Marine Outfalls as per CPCB				
		SW - I	SW - II	SW - III	SW - IV	SW - V
pH	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 9	6.0- 9
DO	>5 mg/L	min 5 mg/L	min 4 mg/L	min 3 mg/L	min 3 mg/L	min 3 mg/L
BOD	<3 mg/L		3 mg/L	3 mg/L	5 mg/L	
Faecal coliforms Most Probable Number (MPN)	<500 MPN/100 ml		100/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)
Heavy metals (mg/L) (acceptable limit)	As-0.01 mg/L, Cd-0.003 mg/L, Cr-0.05 mg/L, Cu-0.05 mg/L, Fe-0.3 mg/L, Mn-0.1 mg/L, Ni-0.02 mg/L, Pb-0.01 mg/L & Zn-5 mg/L	Hg- 0.01 mg/L, Pb - 0.01 mg/L, Cd - 0.01 mg/L		Fe -0.5 mg/L, Mn - 0.5 mg/L		
Oil & grease		0.1 mg/L				None except for such small amount
Turbidity Nephelometric Turbidity Unit (NTU)			30 NTU	30 NTU		
Designated Best Use		Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone.	Bathing, Contact Water Sports and Commercial fishing.	Industrial cooling, Recreation (non-contact) and Aesthetics.	Harbour.	Navigation and Controlled Waste Disposal.

Chengalpattu

- No exceedance of standard observed in pH value at all monitored stations.
- Dissolved Oxygen (DO) values are well within the acceptable range.
- Biochemical Oxygen Demand (BOD) met the criteria (<3 mg/L) at Maduranthagam Lake and Sadurangapattinam village sea (-pre & -post). At Alamparaikuppam Village Sea and Mamallapuram sea, exceeded BOD values (pre-) have declined.
- Faecal coliform was found well within the desirable level at all the monitored locations.
- Heavy metals Arsenic, Cadmium, Chromium, Copper, Iron, Manganese, Nickel, Lead and Zinc were all well within acceptable limit at all the locations.
- Change in post-idol immersion values were observed in all sampled locations.

Results of the Analysis (Physio-Chemical and Bacteriological Parameter) of the water bodies in *Cuddalore*, Tamil Nadu
monitored during pre- and post-idol immersion activity during
Vinayagar Chaturthi (30.08.2022 & 10.09.2022)

S.No	Sampling Location in Cuddalore	Date of sampling	Type of water body	Pre/Post immersion sampling	pH Number	DO (mg/L)	BOD (mg/L)	Faecal Coliform (MPN/100 ml)	Heavy metals								
									Arsenic	Cadmium	Chromium	Copper	Iron	Manganese	Nickel	Lead	Zinc
1	Ulundurpet Eri	30.08.2022	Lake	Pre-	7.3	6	16	<2	<0.01	<0.0008	<0.05	<0.0015	<0.05	<0.01	<0.02	<0.015	0.008
		10.09.2022		Post-	7.52	6	26	<2	<0.01	<0.0008	<0.05	0.019	<0.05	<0.01	<0.02	<0.015	0.009
2	Bommalyar Palayam Sea-shore	30.08.2022	Sea	Pre-	8.02	5.6	16	<2	<0.01	<0.0008	<0.05	<0.0015	<0.05	<0.01	<0.02	<0.015	0.024
		10.09.2022		Post-	8.19	5.6	16	<2	<0.01	<0.0008	<0.05	0.021	<0.05	<0.01	<0.02	0.001	0.028
3	Ekkiyarkuppam seashore	30.08.2022	Sea	Pre-	8.13	5.8	20	<2	<0.01	<0.0008	<0.05	<0.0015	<0.05	<0.01	<0.02	<0.015	0.02
		10.09.2022		Post-	8.13	5.6	22	<2	<0.01	<0.0008	<0.05	0.009	<0.05	<0.01	<0.02	0.002	0.022
4	Kaipanikuppam seashore	30.08.2022	sea	Pre-	8.14	5.4	18	<2	<0.01	<0.0008	<0.05	<0.0015	<0.05	<0.01	<0.02	<0.015	0.031
		10.09.2022		Post-	8.12	5.2	18	<2	<0.01	<0.0008	<0.05	0.008	<0.05	<0.01	<0.02	0.002	0.039
5	Devanampattinam	30.08.2022	Sea	Pre-	8.21	5.4	12	<2	<0.01	<0.0008	<0.05	0.002	<0.05	<0.01	<0.02	<0.015	<0.0015
		10.09.2022		Post-	8.34	5.4	14	<2	<0.01	<0.0008	<0.05	0.002	<0.05	<0.01	<0.02	0.002	0.019

Parameters	Primary Water Quality Criteria for Outdoor Bathing as per CPCB	Water Quality Standards for Coastal Waters Marine Outfalls as per CPCB				
		SW - I	SW - II	SW - III	SW - IV	SW - V
pH	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 9	6.0- 9
DO	>5 mg/L	min 5 mg/L	min 4 mg/L	min 3 mg/L	min 3 mg/L	min 3 mg/L
BOD	<3 mg/L		3 mg/L	3 mg/L	5 mg/L	
Faecal coliforms						
Most Probable Number (MPN)	<500 MPN/100 ml		100/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)
Heavy metals (mg/L) (acceptable limit)	As-0.01 mg/L, Cd-0.003 mg/L, Cr-0.05 mg/L, Cu-0.05 mg/L, Fe-0.3 mg/L, Mn-0.1 mg/L, Ni-0.02 mg/L, Pb-0.01 mg/L & Zn-5 mg/L	Hg- 0.01 mg/L, Pb - 0.01 mg/L, Cd - 0.01 mg/L		Fe -0.5 mg/L, Mn - 0.5 mg/L		
Oil & grease		0.1 mg/L				None except for such small amount
Turbidity Nephelometric Turbidity Unit (NTU)			30 NTU	30 NTU		
Designated Best Use		Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone.	Bathing, Contact Water Sports and Commercial fishing.	Industrial cooling, Recreation (non-contact) and Aesthetics.	Harbour.	Navigation and Controlled Waste Disposal.

Cuddalore

- No exceedance observed in pH value at all monitored locations.
- Dissolved Oxygen (DO) values fall well within the acceptable range.
- The Biochemical Oxygen Demand (BOD) values doesn't meet the standard at all sampled locations and further highlights the increase in number post-immersion at Ulundurpet Eri (increase by 10mg/L) , Ekkiyarkuppam seashore (increase by 2 mg/L) and Devanampattinam (increase by 2 mg/L).
- Faecal coliform met the criteria (<500 MPN/100 ml) at all the monitored locations.
- Heavy metals Arsenic, Cadmium, Chromium, Iron, Manganese, Nickel, Lead and Zinc were all well within acceptable limit at all the sampled locations.
- Post immersion, rise in Copper concentration is noted in all locations except Devanampattinam.

Results of the Analysis (Physio-Chemical and Bacteriological Parameter) of the water bodies in *Dindigul*, Tamil Nadu
monitored during pre- and post-idol immersion activity during
Vinayagar Chaturthi (30.08.2022 & 10.09.2022)

S.No	Sampling Location in Dindigul	Date of sampling	Type of water body	Pre/Post immersion sampling	pH Number	DO (mg/L)	BOD (mg/L)	Faecal Coliform (MPN/100 ml)	Heavy metals in mg/L								
									Arsenic	Cadmium	Chromium	Copper	Iron	Manganese	Nickel	Lead	Zinc
1	Anaipatti River Nilakkottai	30.08.2022	River	Pre-	7.66	5.7	4	<2	<0.01	<0.0008	<0.05	0.036	<0.5	<0.01	<0.006	<0.015	0.023
		10.09.2022		Post-	8.07 ↑	3.9 ↓	9 ↑	<2	<0.01	<0.0008	<0.05	0.049 ↑	<0.5	<0.01	<0.006	<0.015	0.038
2	Kottakudi River Bodinayakanur pudur	30.08.2022	River	Pre-	7.99	5.7	4	<2	<0.01	<0.0008	<0.05	0.042	<0.5	<0.01	<0.006	<0.015	0.034
		10.09.2022		Post-	7.65 ↓	5.5 ↓	7 ↑	<2	<0.01	<0.0008	<0.05	0.056 ↑	<0.5	<0.01	<0.006	<0.015	0.043
3	River cauvery at Varangal	30.08.2022	River	Pre-	7.76	5.8	4	<2	<0.01	<0.0008	<0.05	<0.0015	<0.5	0.012	<0.006	<0.015	0.028
		10.09.2022		Post-	8.16 ↑	4.2 ↓	12 ↑	<2	<0.01	0.019 ↑	0.023	0.048 ↑	<0.5	<0.01	<0.006	<0.015	0.051
4	River cauvery at Kulithalai	30.08.2022	River	Pre-	7.98	5.6	5	<2	<0.01	<0.0008	<0.05	0.046	<0.5	<0.01	<0.006	<0.015	0.035
		10.09.2022		Post-	8.02	4.6 ↓	11 ↑	<2	<0.01	0.021 ↑	0.019	0.054 ↑	<0.5	0.011	<0.006	<0.015	0.047
5	Vaigal Dam DS	30.08.2022	Dam	Pre-	7.96	5.4	4	<2	<0.01	<0.0008	<0.05	0.048	<0.5	<0.01	<0.006	<0.015	0.035
		10.09.2022		Post-	7.99	5.2 ↓	7 ↑	<2	<0.01	<0.0008	<0.05	0.052 ↑	<0.5	<0.01	<0.006	<0.015	0.043
Primary Water Quality Criteria for Outdoor Bathing									Acceptable limit (mg/l): As-0.01, Cd-0.003, Cr-0.05, Cu-0.05, Fe-0.3, Mn-0.1, Ni-0.02, Pb-0.01 & Zn-5								
					6.5- 8.5	>5 mg/L	<3 mg/L	<500 MPN/100 ml									

Parameters	Primary Water Quality Criteria for Outdoor Bathing as per CPCB	Water Quality Standards for Coastal Waters Marine Outfalls as per CPCB				
		SW - I	SW - II	SW - III	SW - IV	SW - V
pH	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 9	6.0- 9
DO	>5 mg/L	min 5 mg/L	min 4 mg/L	min 3 mg/L	min 3 mg/L	min 3 mg/L
BOD	<3 mg/L		3 mg/L	3 mg/L	5 mg/L	
Faecal coliforms Most Probable Number (MPN)	<500 MPN/100 ml		100/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)
Heavy metals (mg/L) (acceptable limit)	As-0.01 mg/L, Cd-0.003 mg/L, Cr-0.05 mg/L, Cu-0.05 mg/L, Fe-0.3 mg/L, Mn-0.1 mg/L, Ni-0.02 mg/L, Pb-0.01 mg/L & Zn-5 mg/L	Hg- 0.01 mg/L, Pb - 0.01 mg/L, Cd - 0.01 mg/L		Fe -0.5 mg/L, Mn - 0.5 mg/L		
Oil & grease		0.1 mg/L				None except for such small amount
Turbidity Nephelometric Turbidity Unit (NTU)			30 NTU	30 NTU		
Designated Best Use		Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone.	Bathing, Contact Water Sports and Commercial fishing.	Industrial cooling, Recreation (non-contact) and Aesthetics.	Harbour.	Navigation and Controlled Waste Disposal.

Dindigul

- No exceedance of pH value was observed at all monitored stations.
- Dissolved Oxygen (DO) at all the sampled locations have lowered values compared to pre-immersion values.
- Biochemical Oxygen Demand (BOD) does not meet the criteria (<3 mg/L) at any of the monitored locations (-pre & -post). Additionally, an increase in values of BOD was observed at all the locations.
- Faecal coliform was found well within the desirable level at all the monitored locations.
- Heavy metals Arsenic, Chromium, Iron, Manganese, Nickel, Lead and Zinc were all well within acceptable limit at all the locations.
- At Varangal and Kulithalai, exceedance of Cadmium values was noted (0.003 mg/l) post-idol immersion.
- Similarly, Copper too has shown an increase in values exceeding the standard (0.05 mg/l) post-idol immersion at Bodinayakanur pudur, Kulithalai and Vaigai Dam DS.

Results of the Analysis (Physio-Chemical and Bacteriological Parameter) of the water bodies in *Madurai*, Tamil Nadu

monitored during pre- and post-idol immersion activity during

Vinayagar Chaturthi (30.08.2022 & 10.09.2022)

S.No	Sampling Location in Madurai	Date of sampling	Type of water body	Pre/Post immersion sampling	pH Number	DO (mg/L)	BOD (mg/L)	Faecal Coliform (MPN/100 ml)	Heavy metals									
									Arsenic	Cadmium	Chromium	Copper	Iron	Manganese	Nickel	Lead	Zinc	
1	Agni Theertham Seashore Rameswaram	30.08.2022	Sea	Pre-	6.95	7.3	<2	<1.8	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
		10.09.2022		Post-	7.35	5	<2	<2	0.005	0.02	0.682	<0.01	<0.006	<0.015	<0.0015			
2	Indira Nagar Seashore Mandapam	30.08.2022	Sea	Pre-	7.65	7.8	<2	<1.8	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
		10.09.2022		Post-	7.83	3.2	<2	<2	0.006	0.019	0.712	<0.01	<0.006	<0.015	0.002			
3	Navapasanam Seashore Devipattinam	30.08.2022	Sea	Pre-	7.52	7.1	<2	<1.8	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
		10.09.2022		Post-	7.88	4.2	<2	<2	0.007	0.022	0.732	<0.01	<0.006	<0.015	0.023			
4	Naripaiyur Seashore Naripaiyur	30.08.2022	Sea	Pre-	7.9	7	<2	<1.8	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
		10.09.2022		Post-	7.84	4.7	<2	<1.8	<0.0008	0.019	0.647	<0.01	<0.006	<0.015	0.014			
5	Vaigai, Thaikkal Palam	30.08.2022	River	Pre-	7.46	6	3	63	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
		10.09.2022		Post-	7.65	3.2	5	47	<0.0008	<0.0015	0.647	<0.01	<0.006	<0.015	<0.0015			

Parameters	Primary Water Quality Criteria for Outdoor Bathing as per CPCB	Water Quality Standards for Coastal Waters Marine Outfalls as per CPCB				
		SW - I	SW - II	SW - III	SW - IV	SW - V
pH	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 9	6.0- 9
DO	>5 mg/L	min 5 mg/L	min 4 mg/L	min 3 mg/L	min 3 mg/L	min 3 mg/L
BOD	<3 mg/L		3 mg/L	3 mg/L	5 mg/L	
Faecal coliforms Most Probable Number (MPN)	<500 MPN/100 ml		100/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)
Heavy metals (mg/L) (acceptable limit)	As-0.01 mg/L, Cd-0.003 mg/L, Cr-0.05 mg/L, Cu-0.05 mg/L, Fe-0.3 mg/L, Mn-0.1 mg/L, Ni-0.02 mg/L, Pb-0.01 mg/L & Zn-5 mg/L	Hg- 0.01 mg/L, Pb - 0.01 mg/L, Cd - 0.01 mg/L		Fe -0.5 mg/L, Mn - 0.5 mg/L		
Oil & grease		0.1 mg/L				None except for such small amount
Turbidity Nephelometric Turbidity Unit (NTU)			30 NTU	30 NTU		
Designated Best Use		Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone.	Bathing, Contact Water Sports and Commercial fishing.	Industrial cooling, Recreation (non-contact) and Aesthetics.	Harbour.	Navigation and Controlled Waste Disposal.

Madurai

- No exceedance of standard observed in pH value at all monitored stations.
- Post-idol immersion, a drastic decrease in Dissolved Oxygen (DO) level is observed at all monitored locations, affecting the values to exceed the bathing criteria (>5 mg/L).
- Biochemical Oxygen Demand (BOD) values except at Vaigai Thaikkal Palam (post-idol immersion) were detected within an acceptable limit.
- Faecal coliform was found well within the desirable level at all locations tested.
- Heavy metals Arsenic, Chromium, Copper, Manganese, Nickel, Lead and Zinc were all well within standard limit at all the locations.
- Cadmium values, post-idol immersion exceed the standard (0.003 mg/l) at Agni Theertham Seashore Rameswaram (0.005 mg/L) and Indra Nagar Seashore Mandapam (0.006 mg/L), Navapasanam Seashore Devipattinam (0.007 mg/L).
- Iron concentration observed pre-idol immersion are all well within the standards. However, post immersion data signifies its increase exceeding the standard at all the five monitored stations.

Results of the Analysis (Physio-Chemical and Bacteriological Parameter) of the water bodies in Salem, Tamil Nadu

monitored during pre- and post-idol immersion activity during

Vinayagar Chaturthi (30.08.2022 & 10.09.2022)

S.No.	Sampling Location in Salem	Date of sampling	Type of water body	Pre/Post immersion sampling	pH Number	DO (mg/L)	BOD (mg/L)	Faecal Coliform (MPN/100 ml)	Heavy metals						
									Arsenic	Cadmium	Chromium	Copper	Iron	Manganese	Nickel
1	Cauvery (Hogenakkal)	30.08.2022	Dam	Pre-	7.51	6.9	<2	7.8	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.92	6.6	<2	12	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
2	Thenpennai	30.08.2022	River	Pre-	7.65	5.8	<2	12	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.25	5.4	<2	17	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
3	Mookaneri Lake	30.08.2022	Lake	Pre-	7.71	5.8	<2	11	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.46	5.6	<2	22	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
4	Kumaragiri Lake	30.08.2022	Lake	Pre-	7.69	4.7	<2	21	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.96	4.4	<2	33	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
5	Annaimaduvu Dam	30.08.2022	Dam	Pre-	7.77	6	<2	12	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.8	4.6	<2	25	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
6	Maniakundam Lake	30.08.2022	Lake	Pre-	8.19	6.7	<2	17	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.84	5.5	<2	46	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
7	Muttal Lake	30.08.2022	Lake	Pre-	6.88	6.2	<2	26	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.54	5.9	<2	46	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
8	Ottamparai Lake	30.08.2022	Lake	Pre-	7.02	5.6	<2	31	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	6.98	<0.5	<2	58	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
9	Sentharpatty Lake	30.08.2022	Lake	Pre-	7.93	5.7	<2	17	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.75	5.2	<2	31	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
10	Jangamasamuthiram	30.08.2022	Lake	Pre-	8.34	5.2	<2	17	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	8.42	5	<2	25	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
11	Seelanikkaenpatty	30.08.2022	Lake	Pre-	7.09	3.4	<2	27	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.74	5.9	<2	49	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
12	Bhavani @ Nanjai Pullay	30.08.2022	River	Pre-	7.08	7	<2	6.1	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.81	6.8	<2	11	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
13	River Bhavani @ Alhani	30.08.2022	River	Pre-	7.06	7.2	<2	6.8	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.61	6.9	<2	17	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
14	River Bhavani @ Padaguthurai	30.08.2022	River	Pre-	7.33	7.1	<2	6.8	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.35	7	<2	12	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
15	River Bhavani @ Perunthalayur	30.08.2022	River	Pre-	7.35	7.2	<2	6.8	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.3	6.9	<2	14	<0.0008	<0.05	<0.0015	<0.01	<0.006	<0.015	<0.0015

Parameters	Primary Water Quality Criteria for Outdoor Bathing as per CPCB	Water Quality Standards for Coastal Waters Marine Outfalls as per CPCB				
		SW - I	SW - II	SW - III	SW - IV	SW - V
pH	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 9	6.0- 9
DO	>5 mg/L	min 5 mg/L	min 4 mg/L	min 3 mg/L	min 3 mg/L	min 3 mg/L
BOD	<3 mg/L		3 mg/L	3 mg/L	5 mg/L	
Faecal coliforms Most Probable Number (MPN)	<500 MPN/100 ml		100/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)
Heavy metals (mg/L) (acceptable limit)	As-0.01 mg/L, Cd-0.003 mg/L, Cr-0.05 mg/L, Cu-0.05 mg/L, Fe-0.3 mg/L, Mn-0.1 mg/L, Ni-0.02 mg/L, Pb-0.01 mg/L & Zn-5 mg/L	Hg- 0.01 mg/L, Pb - 0.01 mg/L, Cd - 0.01 mg/L		Fe -0.5 mg/L, Mn - 0.5 mg/L		
Oil & grease		0.1 mg/L				None except for such small amount
Turbidity Nephelometric Turbidity Unit (NTU)			30 NTU	30 NTU		
Designated Best Use		Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone.	Bathing, Contact Water Sports and Commercial fishing.	Industrial cooling, Recreation (non-contact) and Aesthetics.	Harbour.	Navigation and Controlled Waste Disposal.

Salem

- No exceedance of pH value observed at all monitored stations.
- Drastic decrease in Dissolved Oxygen (DO) value post-idol immersion was observed at Ottamparai Lake (decrease by 5.1 mg/L), Seelanaickenpatti (decrease by 2.5 mg/L), Annaimaduvu Dam (decrease by 1.4 mg/L), and Maniyarkundam Lake (decrease by 1.2 mg/L). Otherwise, a general decrease in DO values was detected in other stations.
- Biochemical Oxygen Demand (BOD) met the criteria (<3 mg/L) at all of the monitored locations (-pre & -post).
- A general increase in faecal coliform was noted in all the sampled locations post-idol immersion although, the values do not exceed the standard criteria(<500 MPN/100 ml).
- Heavy metals Arsenic, Cadmium, Chromium, Copper, Iron, Manganese, Nickel, Lead and Zinc were all well within acceptable limit at all the locations.

Results of the Analysis (Physio-Chemical and Bacteriological Parameter) of the water bodies in Tirunelveli, Tamil Nadu
monitored during pre- and post-idol immersion activity during
Vinayagar Chaturthi (30.08.2022 & 10.09.2022)

S.No	Sampling Location in Tirunelveli	Date of sampling	Type of water body	Pre/Post immersion sampling	pH Number	DO (mg/L)	BOD (mg/L)	Faecal Coliform (MPN/100 ml)	Heavy metals in mg/L							
									Arsenic	Cadmium	Chromium	Copper	Iron	Manganese	Nickel	Lead
1	Kadayam	30.08.2022	Dam	Pre-	7.3	9	<2	1.8	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.25	7.3	<2	1.8	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
2	Alwarkurichi	30.08.2022	River	Pre-	7.19	8.3	<2	5.5	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.06	7.4	<2	6.1	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
3	Gundaru	30.08.2022	Dam	Pre-	7.2	7	2.8	6.1	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	6.96	7.2	<2	10	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
4	Karuppanathi	30.08.2022	Dam	Pre-	7.2	8.1	4.1	15	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.85	7.4	<2	15	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
5	Kudankulam	30.08.2022	Sea	Pre-	6.88	5.7	4.5	8.2	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.3	6.5	4.4	5.5	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
6	Tirupudai Maruthur	30.08.2022	River	Pre-	7.25	8.5	<2	17	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015
		10.09.2022		Post-	7.12	7.2	2.5	14	<0.0008	<0.05	<0.0015	<0.5	<0.01	<0.006	<0.015	<0.0015

Parameters	Primary Water Quality Criteria for Outdoor Bathing as per CPCB	Water Quality Standards for Coastal Waters Marine Outfalls as per CPCB				
		SW - I	SW - II	SW - III	SW - IV	SW - V
pH	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 9	6.0- 9
DO	>5 mg/L	min 5 mg/L	min 4 mg/L	min 3 mg/L	min 3 mg/L	min 3 mg/L
BOD	<3 mg/L		3 mg/L	3 mg/L	5 mg/L	
Faecal coliforms Most Probable Number (MPN)	<500 MPN/100 ml		100/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)
Heavy metals (mg/L) (acceptable limit)	As-0.01 mg/L, Cd-0.003 mg/L, Cr-0.05 mg/L, Cu-0.05 mg/L, Fe-0.3 mg/L, Mn-0.1 mg/L, Ni-0.02 mg/L, Pb-0.01 mg/L & Zn-5 mg/L	Hg- 0.01 mg/L, Pb - 0.01 mg/L, Cd - 0.01 mg/L		Fe -0.5 mg/L, Mn - 0.5 mg/L		
Oil & grease		0.1 mg/L				None except for such small amount
Turbidity Nephelometric Turbidity Unit (NTU)			30 NTU	30 NTU		
Designated Best Use		Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone.	Bathing, Contact Water Sports and Commercial fishing.	Industrial cooling, Recreation (non-contact) and Aesthetics.	Harbour.	Navigation and Controlled Waste Disposal.

Tirunelveli

- No exceedance of standard observed in pH value at all monitored stations.
- Dissolved Oxygen (DO) values fall well within the acceptable range.
- Biochemical Oxygen Demand (BOD) values at all the stations monitored are recorded within the criteria except Karuppanathi (-pre) and Kudankulam (-pre & -post).
- Faecal coliform was found well within the desirable level at all the monitored locations.
- Heavy metals Arsenic, Chromium, Manganese and Zinc were all well within acceptable limit at all the locations.
- Post-idol immersion, increase in concentration of Cadmium, Copper, Nickel and Lead at Kudankulam was observed, thereby exceeding the standard.
- Also, increase in the iron value post immersion was noted exceeding the standard.

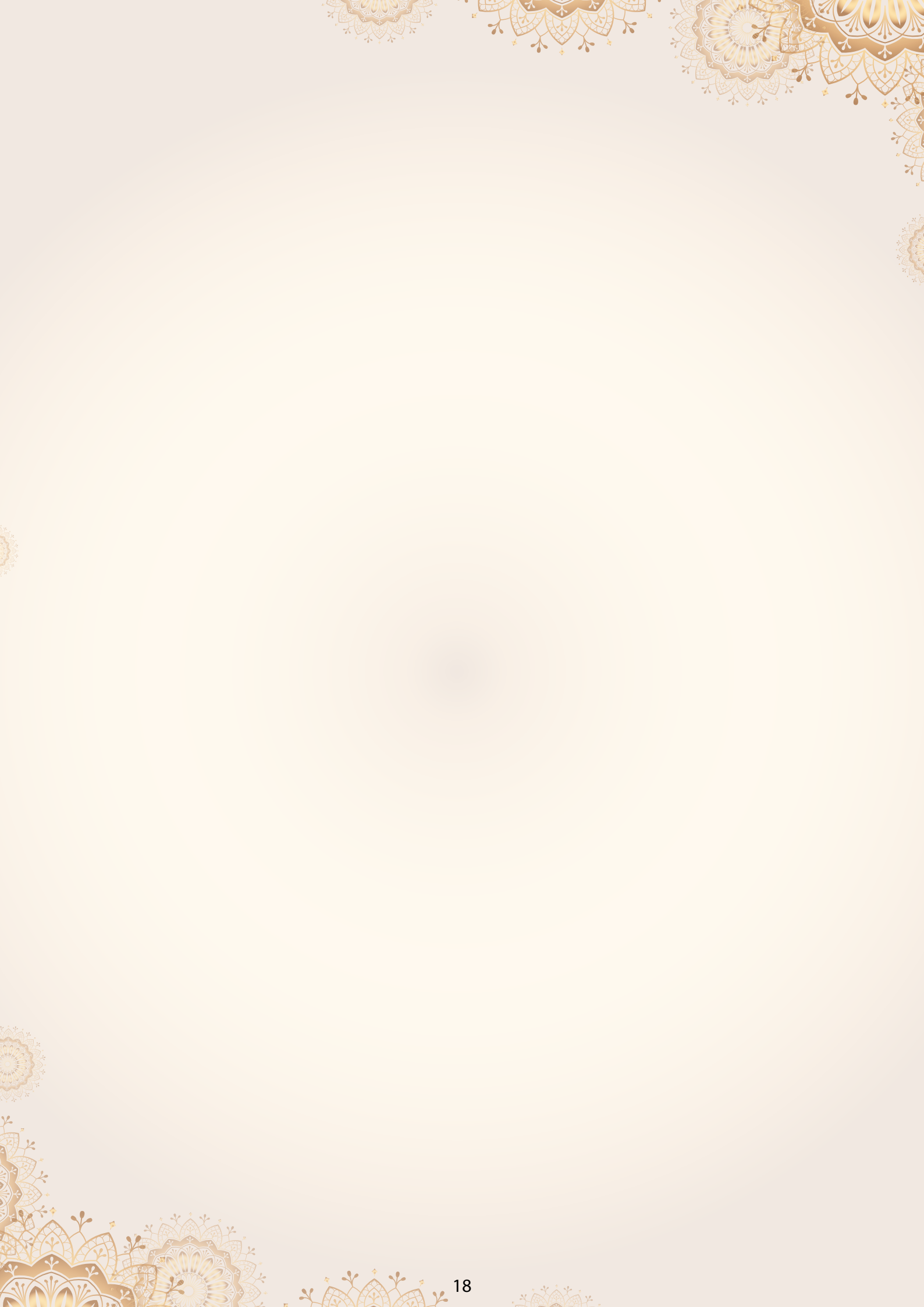
Results of the Analysis (Physio-Chemical and Bacteriological Parameter) of the water bodies in Tiruppur, Tamil Nadu
monitored during pre- and post-idol immersion activity during
Vinayagar Chaturthi (30.08.2022 & 10.09.2022)

S.No	Sampling Location in Tiruppur	Date of sampling	Type of water body	Pre/Post immersion sampling	pH Number	DO (mg/L)	BOD (mg/L)	Faecal Coliform (MPN/ 100 ml)	Heavy metals							
									Arsenic	Cadmium	Chromium	Copper	Iron	Manganese	Nickel	Lead
1	Samalapuram Lake	30.08.2022	Lake	Pre-	8.62	7.8	3	<2	<0.0008	<0.05	<0.0015	<0.05	<0.01	<0.0015	<0.015	<0.0015
		10.09.2022		Post-	8.44 ↑	6.9 ↓	12 ↓	<2	<0.0008	<0.05	<0.0015	<0.05	0.804	<0.015	0.1	
2	Amarawathy River at Kaniyur	30.08.2022	Lake	Pre-	6.83	8	<2	<2	<0.0008	<0.05	<0.0015	<0.05	<0.01	<0.0015	<0.015	0.106
		10.09.2022		Post-	7.53 ↑	8.1	<2	<2	<0.0008	<0.05	<0.0015	<0.05	<0.006	1.248	0.106	

Parameters	Primary Water Quality Criteria for Outdoor Bathing as per CPCB	Water Quality Standards for Coastal Waters Marine Outfalls as per CPCB				
		SW - I	SW - II	SW - III	SW - IV	SW - V
pH	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 9	6.0- 9
DO	>5 mg/L	min 5 mg/L	min 4 mg/L	min 3 mg/L	min 3 mg/L	min 3 mg/L
BOD	<3 mg/L		3 mg/L	3 mg/L	5 mg/L	
Faecal coliforms						
Most Probable Number (MPN)	<500 MPN/100 ml		100/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)	500/100 ml (MPN)
Heavy metals (mg/L) (acceptable limit)	As-0.01 mg/L, Cd-0.003 mg/L, Cr-0.05 mg/L, Cu-0.05 mg/L, Fe-0.3 mg/L, Mn-0.1 mg/L, Ni-0.02 mg/L, Pb-0.01 mg/L & Zn-5 mg/L	Hg- 0.01 mg/L, Pb - 0.01 mg/L, Cd - 0.01 mg/L		Fe -0.5 mg/L, Mn - 0.5 mg/L		
Oil & grease		0.1 mg/L				None except for such small amount
Turbidity Nephelometric Turbidity Unit (NTU)			30 NTU	30 NTU		
Designated Best Use		Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone.	Bathing, Contact Water Sports and Commercial fishing.	Industrial cooling, Recreation (non-contact) and Aesthetics.	Harbour.	Navigation and Controlled Waste Disposal.

Tiruppur

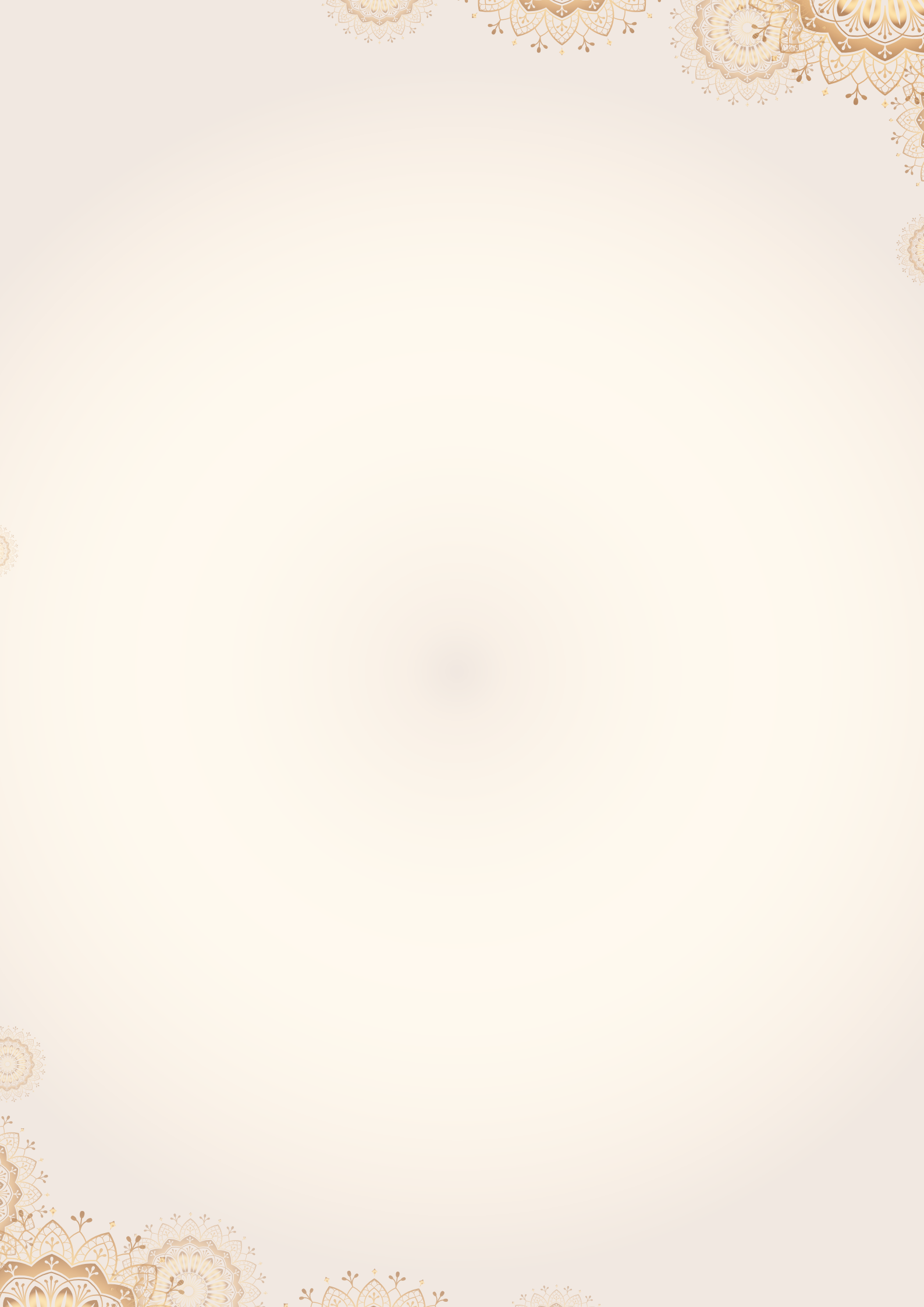
- Exceedance in pH value prior to idol-immersion was observed at Samalapuram Lake. Otherwise, no exceedance of standard observed in pH value.
- Dissolved Oxygen (DO) values meet the Primary Water Quality Criteria for Outdoor Bathing (>5 mg/L) at both the monitored stations.
- Post idol-immersion, drastic increase in Biochemical Oxygen Demand (BOD) value (increase by 9 mg/L) exceeding the standard was observed at Samalapuram Lake.
- Faecal coliform was found well within the desirable level at all locations tested.
- Heavy metals Arsenic, Cadmium, Chromium, Copper, Iron and Manganese were all well within acceptable limit at all the locations.
- Nickel concentrations at Samalapuram Lake samples (-pre & -post) exceed the standards (0.02 mg/L). Further, a rise in Nickel level (0.804 mg/L) post-idol immersion was detected.
- Post idol-immersion, dramatic increase in concentration of Lead (1.248 mg/L) is noted causing to exceed the standard (0.01 mg/L).
- Increase in Zinc concentration was observed post-idol immersion at Samalapuram Lake.



CONCLUSION

The following conclusions are drawn from the inferences:

- pH, quantitative measure of how acidic/basic water is, irrespective of Idol- immersion remained within the Water Quality Standards of Lakes, Rivers and Coastal Waters.
- Largely, a general decrease and at places depletion of Dissolved Oxygen (DO) is observed probably due to organic loading during the festivities leading to increase in Biochemical Oxygen Demand (BOD).
- Faecal coliform was found well within the desirable level at all the monitored locations probably due to lack of manmade discharge during the festivities.
- Conspicuous changes in metal concentration observed during post-immersion may be attributed to idol immersion activities.



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