

Water Quality of Ponds with respect to Criteria parameters during 2021 (January- December)

Sl. No	Sampling Location	No. of Obs.	Annual average values (Range of values)					Frequency of violation (Percent of violation) from designated criteria value					Existing Class	Parameters responsible for downgrading the water quality	Possible Reason
			Parameters												
			pH	DO (mg/L)	BOD (mg/L)	TC (MPN/100 ml)	FC (MPN/100 ml)	pH	DO	BOD	TC	FC			
(a) Bindusagar Pond in Bhubaneswar City															
1.	Lingaraj Temple side	11	7.3 (6.5-8.0)	7.3 (4.1-9.1)	2.0 (1.1-2.8)	13363 (170-54000)	7596 (790-24000)	0	2 (18)	0	8 (73)	4 (37)	Does not conform to Class B	DO, TC, FC	Human activities
2.	Ananta Vasudev	11	7.7 (7.0-8.2)	7.9 (5.8-9.5)	2.1 (1.1-2.7)	18556 (1700-54000)	6390 (130-22000)	0	0	0	11 (100)	3 (27)		TC, FC	
3.	Gyananagar	11	7.6 (7.2-8.1)	7.0 (4.7-8.8)	1.9 (< 1.0-2.8)	18286 (170-54000)	7853 (20-35000)	0	1 (9)	0	8 (73)	3 (27)		DO, TC, FC	
4.	Near Kedarnath Research Centre	11	7.6 (7.0-8.2)	7.1 (5.6-8.8)	2.1 (1.1-2.8)	16233 (2800-54000)	5497 (330-17000)	0	0	0	11 (100)	4 (37)		TC, FC	
*Class 'B'			6.5-8.5	5 and above	3 or less	500 or less		Outdoor bathing							
Water quality criteria for bathing water (MOEF Notification G.S.R. No. 742(E) Dt. 25.09.2000)			6.5-8.5	5 and above	3 or less		2500 (Maximum Permissible)	Water use for organised outdoor bathing							

*** Tolerance limit for Inland Surface water bodies (IS-2296-1982)**

NB : The criteria of non-compliance with respect to TC has been calculated on the following basis:
 TC values with more than 5% of samples show more than 2000 MPN/100 ml and more than 20% of the samples show more than 500 MPN/ 100 ml.
 (Ref : IS 2296-1982 foot note)

Sl. No	Sampling Location	No. of Obs.	Annual average values (Range of values)					Frequency of violation (Percent of violation) from designated criteria value					Existing Class	Parameters responsible for downgrading the water quality	Possible Reason
			Parameters												
			pH	DO (mg/L)	BOD (mg/L)	TC (MPN/ 100 ml)	FC (MPN/ 100 ml)	pH	DO	BOD	TC	FC			
(b) Ponds (Puri)															
1.	Narendra	12	8.6 (7.7-9.5)	9.5 (4.2-15.7)	5.1 (3.6-8.2)	2518 (210-9200)	524 (68-1300)	5 (42)	3 (25)	12 (100)	7 (58)	0	Does not conform to Class B	pH, DO, BOD, TC,FC	Human activities
2.	Markanda	12	8.6 (7.4-9.4)	9.2 (3.2-12.5)	5.8 (3.4-8.3)	3764 (45-24000)	1745 (45-13000)	5 (42)	2 (17)	12 (100)	6 (50)	2 (17)		pH, DO, BOD, TC,FC	
3.	Indradyumna	12	8.5 (7.6-9.4)	7.7 (2.0-11.9)	4.4 (3.8-5.7)	6288 (45-54000)	3887 (20-35000)	5 (42)	3 (25)	12 (100)	7 (58)	1 (8)		pH, DO, BOD, TC,FC	
4.	Swetaganga	12	8.5 (7.5-9.3)	9.6 (3.3-15.6)	5 (3.6-8)	1456 (170-4300)	630 (45-2400)	5 (42)	2 (17)	12 (100)	6 (50)	0		pH, DO, BOD, TC	
5.	Parvati sagar	12	8.3 (6.9-9.3)	7.7 (2.1-11.1)	7.5 (3.3-12)	2231 (130-5400)	732 (45-2400)	5 (42)	2 (17)	12 (100)	6 (50)	0		pH, DO, BOD, TC	
*Class 'B'			6.5-8.5	5 and above	3 or less	500 or less	-	Outdoor bathing							
Water quality criteria for bathing water (MOEF Notification G.S.R. No. 742(E) Dt. 25.09.2000)			6.5-8.5	5 and above	3 or less		2500 (Maximum Permissible)	Water use for organised outdoor bathing							

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

NB :The criteria of non-compliance with respect to TC has been calculated on the following basis:

TC values with more than 5% of samples show more than 2000 MPN/100 ml and more than 20% of the samples show more than 500 MPN/ 100 ml.
(Ref : IS 2296-1982 foot note)

Sl. No	Sampling Location	No. of Obs.	Annual average values (Range of values)					Frequency of violation (Percent of violation) from designated criteria value					Existing Class	Parameters responsible for downgrading the water quality	Possible Reason
			Parameters												
			pH	DO (mg/L)	BOD (mg/L)	TC (MPN/100 ml)	FC (MPN/100 ml)	pH	DO	BOD	TC	FC			
(c) Pond in Jeypore town															
1.	Jagannaths agar	12	7.4 (7.1-7.6)	6.0 (5.7-6.4)	2.1 (1.4-2.7)	7088 (490-22000)	1995 (140-4900)	0	0	0	9 (75)	4 (33)	Does not conform to Class B	TC, FC	Human activities
(d) Pond in Angul Town															
1.	Raniguda Pond	12	7.8 (7.3-8.4)	6.0 (2.8-12.6)	5.2 (3.4-9.5)	1839 (490-2800)	663 (130-1300)	0	7 (52)	12 (100)	9 (75)	0	Does not conform to Class B	DO, BOD, TC	Human activities
*Class 'B'			6.5-8.5	5 and above	3 or less	500 or less	-	Outdoor bathing							
Water quality criteria for bathing water (MOEF Notification G.S.R. No. 742(E) Dt. 25.09.2000)			6.5-8.5	5 and above	3 or less		2500 (Maximum Permissible)	Water use for organised outdoor bathing							

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

NB :The criteria of non-compliance with respect to TC has been calculated on the following basis:

TC values with more than 5% of samples show more than 2000 MPN/100 ml and more than 20% of the samples show more than 500 MPN/ 100 ml.
(Ref : IS 2296-1982 foot note)

Water quality of Ponds with respect to other parameters during 2021 (January- December)

Sl. No.	Sampling Location	Physical parameters		Organic pollution Indicators					Mineral constituents							
		Annual average values (Range of values)														
		TSS	Total alkalinity	COD	NH ₄ -N	Free NH ₃ -N	TKN	EC	SAR	% Na	B	TDS	TH	Cl	SO ₄	F
		(mg/L)		(mg/L)					(μS/cm)	(mg/L)						
(a) Bindusagar Pond in Bhubaneswar City																
1.	Lingaraj Temple side	17 (<10-38)	121 (56-164)	12.9 (10.5-17)	0.7 (0.56-1.12)	0.018 (0-0.174)	3.86 (1.68-7.28)	363 (236-420)	1.31 (0.71-1.81)	35.13 (25.15-43.76)	<0.5 (<0.5-0.5)	228 (216-240)	103 (92-132)	48 (28-76)	15.1 (10.7-22.6)	0.352 (0.197-0.751)
2.	Ananta Vasudev	20 (<10-49)	127 (56-168)	14.7 (7.1-22.9)	0.7 (0.56-1.12)	0.026 (0-0.174)	3.42 (1.68-6.16)	372 (232-425)	1.37 (0.77-1.78)	36.19 (26.59-43.51)	<0.5 (<0.5-0.5)	236 (220-252)	100 (84-120)	47 (30-60)	16.4 (10.9-40)	0.329 (0.219-0.637)
3.	Gyananagar	16 (<10-42)	124 (64-152)	12.9 (7.1-18.9)	0.88 (0.56-1.68)	0.027 (0-0.174)	3.11 (<1.5-5.04)	371 (270-423)	1.35 (0.74-2)	35.85 (25.83-46.36)	<0.5 (<0.5-0.5)	238 (228-248)	99 (84-124)	47 (28-76)	15.9 (11.3-28.2)	0.299 (0.19-0.471)
4.	Near Kedarnath research Centre	22 (<10-49)	124 (64-176)	14.2 (10.5-22.9)	0.72 (0.56-1.12)	0.024 (0-0.174)	2.86 (<1.5-5.6)	368 (247-427)	1.44 (0.72-2.1)	37.39 (24.83-45.65)	<0.5 (<0.5-0.5)	224 (208-240)	95 (80-108)	46 (30-76)	17 (11.1-34.1)	0.282 (0.192-0.489)
*Class 'C'		-	-	-	-	-	-	-	-	-	-	1500	-	600	400	1.5

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

Class 'C' :Drinking water source with conventional treatment followed by disinfection

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Sl. No.	Sampling Location	Nutrients			Heavy metals						
					Annual average values (Range of values)						
		NO ₃ ⁻	PO ₄ ^{3--P}	Cr(VI) ##	Fe##	Ni##	Cu##	Zn##	Cd##	Hg##	Pb##
		(mg/L)			(mg/L)						
(a) Bindusagar Pond in Bhubaneswar City											
1.	Lingaraj Temple side	3.115 (1.712-6.827)	0.101 (<0.05-0.273)	NA	0.080	0.020	0.005	0.009	0.0017	0.00074	0.010
2.	Ananta Vasudev	1.805 (0.556-5.384)	0.062 (<0.05-0.279)	NA	0.195	0.016	0.003	0.007	0.0024	0.00074	0.015
3.	Gyananagar	1.845 (0.445-3.756)	0.078 (<0.05-0.283)	NA	0.138	0.014	0.003	0.006	0.0025	0.00074	0.011
4.	Near Kedarnath Research Centre	2.096 (0.537-3.786)	0.072 (<0.05-0.267)	NA	0.185	0.014	0.004	0.006	0.0024	0.00074	0.013
*Class 'C'		50	-	0.05	50	-	1.5	15.0	0.01	-	0.10

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

Data for the period April, 2021

Class 'C' :Drinking water source with conventional treatment followed by disinfection

DO : Dissolved Oxygen, BOD : Biochemical Oxygen Demand, TC : Total Coliform, TSS : Total Suspended Solids; COD : Chemical Oxygen Demand, NH₄-N : Ammonical nitrogen, TKN : Total Kjeldahl Nitrogen; FC : Fecal Coliform, EC : Electrical Conductivity, TDS : Total Dissolved Solids, B : Boron ; SAR : Sodium Absorption Ratio, TH : Total hardness; Cl : chloride, SO₄ : sulphate; F : Fluoride; PO₄³⁻ : phosphate, : Cr(VI) : Hexavalent Chromium; T.Cr : total Chromium, Fe : Iron, Ni : Nickel, Cu : Copper, Zn : Zinc; Cd : cadmium; Hg : Mercury; Pb : Lead

Sl. No.	Sampling Location	Physical parameters		Organic pollution Indicators					Mineral constituents							
		Annual average values (Range of values)														
		TSS	Total alkalinity	COD	NH ₄ -N	Free NH ₃ -N	TKN	EC	SAR	% Na	B	TDS	TH	Cl	SO ₄	F
		(mg/L)		(mg/L)					(µS/cm)	(mg/L)						
(b) Ponds in Puri town																
1.	Narendra	24 (10-59)	183 (96-240)	29.5 (18.3-43.6)	0.809 (0.56-2.24)	0.120 (0-0.504)	4.36 (<1.5-6.16)	636 (356-961)	1.8 (0.27-4.33)	30.56 (7.67-49.85)	<0.5 (<0.5-0.712)	516 (480-552)	182 (88-260)	84 (10-156)	37.2 (25.7-70.4)	0.188 (0.067-0.474)
2.	Markanda	22 (11-59)	173 (88-224)	35.9 (18.2-57.2)	0.98 (0.56-2.24)	0.192 (0-0.941)	4.36 (<1.5-7.28)	564 (380-688)	1.09 (0.28-2.02)	24.64 (8.72-39.01)	<0.5 (<0.5-0.716)	374 (364-384)	207 (140-260)	57 (16-86)	43.6 (30.7-50.4)	0.148 (0.067-0.452)
3.	Indradyumna	14 (<10-42)	117 (52-200)	26.2 (14.7-40)	1.12 (0.56-2.8)	0.119 (0-0.448)	4.42 (1.68-9.52)	429 (283-561)	1.73 (0.53-3.0)	38.56 (19.1-52.41)	<0.5 (<0.5-0.716)	264 (260-268)	116 (68-192)	66 (22-96)	24.9 (18.5-32.8)	0.169 (0.128-0.225)
4.	Swetaganga	14 (<10-26)	151 (48-288)	27.5 (19.1-40)	0.88 (0.56-1.12)	0.090 (0-0.381)	4.23 (1.68-6.72)	530 (298-745)	1.67 (0.66-3.07)	35.86 (18.33-56.05)	<0.5 (<0.5-0.639)	280 (172-388)	156 (76-260)	69 (38-96)	32.2 (13.7-46.1)	0.161 (0.02-0.438)
5.	Parvati sagar	25 (<10-63)	117 (80-220)	42.5 (18.2-57.2)	0.96 (0.56-2.8)	0.072 (0-0.286)	4.29 (<1.5-7.28)	406 (332-599)	1.31 (0.5-1.83)	34.18 (14.72-44.08)	<0.5 (<0.5-0.663)	236 (216-256)	121 (84-232)	52 (32-76)	21.7 (13.4-33.7)	0.297 (0.137-1.27)
*Class 'C'		-	-	-	-	-	-	-	-	-	-	1500	-	600	400	1.5

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

Class 'C' :Drinking water source with conventional treatment followed by disinfection

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Sl. No.	Sampling Location	Nutrients			Heavy metals						
					Annual average values (Range of values)						
		NO ₃ ⁻	PO ₄ ³⁻ -P	Cr(VI) ##	Fe##	Ni##	Cu##	Zn##	Cd##	Hg##	Pb##
		(mg/L)			(mg/L)						
(b) Ponds in Puri town											
1.	Narendra	6.379 (0.502-37.402)	0.72 (0.265-0.989)	NA	1.144	0.015	0.003	0.011	0.0027	0.00111	0.008
2.	Markanda	19.171 (0.572-37.88)	0.648 (0.152-1.008)	NA	0.801	0.019	0.001	0.004	0.0014	0.00111	0.005
3.	Indradyumna	3.448 (0.556-7.315)	0.165 (<0.05-0.625)	NA	0.051	0.013	0.002	0.003	0.0014	0.00074	0.002
4.	Swetaganga	10.388 (0.609-58.964)	0.531 (<0.05-1.117)	NA	0.238	0.015	0.001	0.014	0.0013	0.00074	0.009
5.	Parvati sagar	3.234 (0.477-13.878)	0.086 (<0.05-0.287)	NA	0.086	0.010	0.001	0.014	0.0006	0.00074	0.005
*Class 'C'		50	-	0.05	50	-	1.5	15.0	0.01	-	0.10

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

Data for the period April, 2021

Class 'C' :Drinking water source with conventional treatment followed by disinfection

Sl. No.	Sampling Location	Physical parameters		Organic pollution Indicators				Mineral constituents								
		Annual average values (Range of values)														
		TSS	Total alkalinity	COD	NH ₄ -N	Free NH ₃ -N	TKN	EC	SAR	% Na	B	TDS	TH	Cl	SO ₄	F
		(mg/L)		(mg/L)				(μS/cm)			(mg/L)					
Pond in Jeypore town																
1.	Jagannathsagar	18 (<10-29)	116 (64-156)	16.8 (11.2-27.5)	0.653 (0.56-1.12)	0.004 (0-0.017)	3.71 (<1.5-7.28)	301 (216-402)	0.85 (0.21-2.27)	25.28 (8.25-56.19)	0.612 (<0.5-1.195)	190 (176-204)	103 (44-136)	30 (6-66)	12.1 (<5-18.7)	0.186 (0.109-0.389)
Pond in Angul town																
1.	Raniguda	44 (15-96)	235 (140-328)	32.6 (17-42.3)	1.058 (0.56-1.68)	0.032 (0-0.140)	4.73 (3.36-7.28)	701 (392-1334)	1.4 (0.54-2.64)	28.14 (14.82-46.15)	<0.5 (<0.5-<0.5)	414 (380-448)	233 (100-520)	95 (22-396)	37.7 (28.8-43.8)	0.696 (0.455-0.895)
*Class 'C'		-	-	-	-	-	-	-	-	-	-	1500	-	600	400	1.5

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Sl. No.	Sampling Location	Nutrients			Heavy metals							
		Annual average values (Range of values)										
		NO ₃ ⁻	PO ₄ ³⁻ -P	Cr(VI)##	Fe##	Ni##	Cu##	Zn##	Cd##	Hg##	Pb##	
		(mg/L)			(mg/L)							
Pond in Jeypore town												
1.	Jagannathsagar	3.39 (1.449-5.618)	0.142 (<0.05-0.702)	NA	0.038	0.003	0.002	0.010	0.0016	0.00037	0.004	
Pond in Angul town												
1.	Raniguda	9.356 (1.275-50.858)	0.303 (<0.05-1.083)	NA	0.231	0.023	0.005	0.011	0.0016	0.00111	0.020	
*Class 'C'		50	-	0.05	50	-	1.5	15.0	0.01	-	0.10	

* Tolerance limit for Inland Surface water bodies (IS-2296-1982)

##Data for the period April, 2021

Class 'C' :Drinking water source with conventional treatment followed by disinfection