

# Critical Analysis of Water Quality for Different Uses in Rural and Urban Fringe Area around Nagpur

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**Abstract** –Concept of water quality index need to be propagated in India under the present circumstances leading to spread out colonies / residential areas .in the present paper Canadian standard has been used. water quality indices where worked out for urban fringe area and rural area around Nagpur. Canadian concept of water quality index was adopted. Uses of water for drinking, Agriculture, recreation etc. where considered because of the prevailing water uses in the surveyed area.

**Keywords**-contaminated, El Nino, adsorbents, Fringe, urbanization

## I- INTRODUCTION

**B**oth urban and rural drinking water supplies in India relay on heavily on rainfall pattern. Spatial distribution of rainfall has been disturbed due to global warming and other global phenomena like Elnino etc. Government of India has assured drinking water at the rate 50 to 150 LPCD in rural and urban area respectively. LPCD about 80% of these quantity emergent as waste water, sewage water, grey water. It is known that sewage is still to be provided to urban and rural area Recently it has been realized that depletion rate of ground water has become a matter of Concern. The reason for this is withdrawal of

ground water both for drinking water supply and individual purpose. It is also fact that government has been insisting on rural sanitation program. This program has promoted both individuals and local cell bodies like gram panchayat, Zillah parishad etc. to provide pit latrines / pore flush latrines etc. organic matter get digested in the pit prefabricated rectangular septic tank followed by sock pit is also another alternative

CPHEEO, Government of India has recommended narrow /small bore sewerage for transmission of grey water /sewage followed by its treatment by low cost method like stabilization pond /artificial wet land system etc. visit to any rural or urban fringe area will indicate absence of sewerage, flowing grey water drains it has been mention above that rainfall pattern has changed and sudden precipitation, heavily rainfall within short period has become a regular phenomenon under such condition rise in ground water table can be substantial and probably reach the depth of pit latrine, low cost sanitation disposal system

Concept of water quality index summarized the technical finding of water quality surveys into numbers to make it easily comprehensible to decision makers because WQI is based on caused and effect of a water quality parameters which is generally descriptive

**II- METHOLOGY**

It was decided to find out drinking water quality index For the sources which are being used by consumers in rural urban fringe or urban area then grab sample where collected and analyzed for routine water quality criteria parameter as per IS 10500

Analysis was carried out as per standard method for examination of water, waste water etc. published by American Water Work Association (AWW) or Bureau of Indian Standard (BIS) .Analysis was carried out in the laboratory of Enviro-techno consultant Significance of this parameter are calcium and magnesium can cause hardness to water if chloride Concentration of dissolved species depend on Geology of the Area, Environmental location And the depth from which water is extracted or aquifer from which water is drawn

Inquiry was made for existence of pipe water supply on to the location Drinking water quality criteria Index was calculated by two methods namely Average Weighted arithmetic mean method, Hourtels method

Table 1- Well Water of Rural Area

Parameter	Jinda l steel powe r (R)	MahalgaonDighor o (R)	Umrea d road (R)	Hingn a (R)
PH	7.2	7.1	7	6.8
Conductiv ity	1430	1051	400	10140
Turbidity	<2	<2	<2	<2
Total Dissolve Solid	942	740	283	3540
Total Alkalinity	356	294	108	258
Total Hardness	340	330	176	2250
Calcium Hardness	174	150	102	870
Magnesium Hardness	166	180	74	1380
Calcium	70	60	41	348

ions				
Magnesium ions	40	43	18	331
Chloride		74	24	2338
Sulphate	35	22	22	42

Table 2- Well Water of Rural Area and Urban Area

Parameter	Balaji kalmeshwar yerlagaon (R)	Arneja rice mill katol road (R)	ST. Vincent Paloti (U)	Ramdaspath (U)
PH	7.1	7.1	7.1	7
Conductiv ity	1228	700	3063	586
Turbidity	Null	<2	<2	<5
Total Dissolve Solid	663	664	2067	588
Total Alkalinity	340	258	508	250
Total Hardness	78	224	500	225
Calcium Hardness	24	166	304	165
Magnesium Hardness	54	58	196	60
Calcium ions	10	66	122	66
Magnesium ions	13	14	47	14
Chloride	30	54		40
Sulphate	52	29	237	13

Table 3- Well Water of Urban Area

Parameter	Ganeshpeth (U)	Raghuji Nagar (U)	Jaripatka (U)	Cotton Market (U)
PH	7	7	7.5	7.6
Conductivity	717	874	1158	1224
Turbidity	<2	<2	<2	<2
Total Dissolve Solid	570	805	926	1171
Total Alkalinity	218	306	136	410
Total Hardness	240	260	156	288
Calcium Hardness	170	150	94	188
Magnesium Hardness	70	110	62	100
Calcium ions	68	60	38	75
Magnesium ions	17	26	15	24
Chloride	46	66	160	97
Sulphate	34	47	89	109

Table 4 –Surface Water of Rural Area

Parameter	Beltarodi (R)	Mahalgaon Dighoro (R)	Wardha Road (R)
PH	7.5	7.6	6.4
Conductivity	280	1016	162
Turbidity	<2	<2	<5
Total Dissolve Solid	273	726	21
Total Alkalinity	285	285	68
Total Hardness	118	270	68

Calcium Hardness	46	140	Nil
Magnesium Hardness	34	130	Nil
Calcium ions	18	56	Nil
Magnesium ions	8	31	Nil
Chloride	14		17
Sulphate	4	71	7

Table 5- Surface Water of Urban Area

Parameter	Panchpouli (U)	Shakardhara Shree Hospital RO Outlet (U)	Pardi Raw water (U)	Dhantoli (U)
PH	7.4	6.5	7	7.6
Conductivity	267	37	699	328
Turbidity	<2	<2	<2	<2
Total Dissolve Solid	213	10	561	174
Total Alkalinity	86	14	274	112
Total Hardness	80	Nil	250	140
Calcium Hardness	65	Nil	188	72
Magnesium Hardness	15	Nil	62	68
Calcium ions	26	Nil	75	-
Magnesium ions	4	Nil	15	-
Chloride	10	8	34	18
Sulphate	13	0.8	28	9

Table 6- Surface Water of Urban Area

Parameter	Jaripatka Ring Road (U)	Dhantoli (U)	Shakkardhara (U)	CA Road(U)
PH	7.1	7	5.5	7.9
Conductivity	326	288	57	540
Turbidity	<2	<2	Nil	<2
Total Dissolve Solid	289	144	<15	270
Total Alkalinity	106	142	22	202
Total Hardness	116	92	12	188
Calcium Hardness	72	66	0	118
Magnesium Hardness	44	29	12	70
Calcium ions	29	26	0	47
Magnesium ions	11	6	3	17
Chloride	35	28	14	65
Sulphate	12	13	Nil	36

Table 7- Bore Well Water of Urban Area

Parameter	Manish nagar (U)	Suraynagar (U)	Jafar nagar (U)	Civil lines (U)
PH	7.4	7.3	7.5	7.1
Conductivity	906	1440	330	841
Turbidity	<2	<2	Nil	<2

Total Dissolve Solid	773	1221	250	663
Total Alkalinity	322	448	90	286
Total Hardness	248	226	132	312
Calcium Hardness	128	150	60	198
Magnesium Hardness	125	76	72	114
Calcium ions	51	60	24	79
Magnesium ions	30	18	17	27
Chloride	-	117	27	17
Sulphate	20	59	90	40

Table 8- Bore Well of Water Urban and Rural Area

Parameter	Gandhi Nagar hill road (U)	Ramdaspeth (U)	Jolibar chowk (U)	Bhilgoan(R)
PH	7.5	7.1	7.5	7
Conductivity	828	1584	1011	1454
Turbidity	<2	<2	<2	41
Total Dissolve Solid	779	1267	931	1254
Total Alkalinity	236	176	316	434
Total Hardness	76	430	296	245
Calcium Hardness	36	248	174	140
Magnesium	40	182	122	105

**III- RESULT**

Hardness				
Calcium ions	14	99	70	56
Magnesium ions	10	45	29	25
Chloride	146	171	85	87
Sulphate	30	39	66	131

Table 9- Bore Well Water of Rural Area

Parameter	Vihar ,Kamptee (R)	Mahalgaon Dighori (R)	Bharath wada (R)	Saraswati Nagar (R)
PH	7	7.6	7	7
Conductivity	3625	953	1904	610
Turbidity	<2	<2	<2	<2
Total Dissolve Solid	1875	601	911	588
Total Alkalinity	216	282	454	238
Total Hardness	800	280	340	284
Calcium Hardness	560	110	240	168
Magnesium Hardness	240	170	100	116
Calcium ions	244	44	96	67
Magnesium ions	60	41	24	28
Chloride	640	-	180	32
Sulphate	402	25	150	40

The WQI Canadian Standard 1993 tool is used for calculating WQI where the data is put up into Excel sheet

Table 10 - Well Water of Rural Area

Data	Overall	Drinking	Aquatic	Recreation	Irrigation
WQI	83	79	100	100	100
Quality	Good	Fair	Excellent	Excellent	Excellent

Table 11 - Well Water of Urban Area

Data	Overall	Drinking	Aquatic	Recreation	Irrigation
WQI	70	75	100	100	41
Quality	Fair	Fair	Excellent	Excellent	Poor

Table 12 - Surface Water of Urban Area

Data	Overall	Drinking	Aquatic	Recreation	Irrigation
WQI	72	66	41	100	100
Quality	Fair	Fair	Poor	Excellent	Excellent

Table 13- Well Water of Urban Area

Data	Overall	Drinking	Aquatic	Recreation	Irrigation
WQI	71	78	100	100	35
Quality	Fair	Fair	Excellent	Excellent	Poor

Table 14 - BoreWell Water of Rural Area

Data	Overall	Drinking	Aquatic	Recreation	Irrigation
WQI	71	78	100	100	35
Quality	Fair	Fair	Excellent	Excellent	Poor

Table 15 - Bore Well Water of Rural Area

Data	Overall	Drinking	Aquatic	Recreation	Irrigation
WQI	66	62	100	100	27
Quality	Fair	Marginal	Excellent	Excellent	Poor

#### IV-CONCLUSION

Present study has confirmed the utility of water quality index before selecting any source for intended use of a source. This will help in prioritization of sources for execution water supply schemes. Further utility is to specify water quality in numbers which can be taken by the executives so that it will be advisable to find out water quality indices of proposed drinking water supply sources before finalizing any water supply source in urban areas. Examination in three season of the year is advisable. This is also applicable to rural areas

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