केवल सरकारी उपयोग हेतु
FOR OFFICIAL USE ONLY

जल गुणवत्ता वर्ष पुस्तिका

WATER QUALITY YEAR BOOK

जून 2017- मई 2018 June 2017 - May 2018

सोन बेसिन

SONE BASIN

जल विज्ञानीय प्रेक्षण परिमण्डल

HYDROLOGICAL OBSERVATION CIRCLE

केन्द्रीय जल आयोग

CENTRAL WATER COMMISSION

वाराणसी

VARANASI

PREFACE

Water is a prime natural resource and basic human need. The National Water Policy lays stress on planning and development of water resources on a national perspective. The prime requisite of water resources planning is indeed an efficient information system on the quantity and quality of this time and space variable precious natural asset. In present times due to fast pace of development and increasing population the quality of waters in our river systems is under tremendous pressure, thereby posing a challenge to preserve the quality of waters and at the same time to clean up the already polluted rivers.

The Central Water Commission in its capacity as an apex technical organisation in the field of water resources development endeavors the gigantic task of collection and compilation of Water Quality data incorporating the quality and quantity of available waters in various basins of the country. The Water Quality Books of various river basins of the country are being published by Central Water Commission.

The present volume contains information and trend on various water quality parameters for the year 2017-2018 measured in Sone river basin, a tributary of Ganga river.

The valuable guidance and inspiration of **Shri Y.K. Sharma**, Member, RM, CWC, New Delhi and **Shri Bhopal Singh**, Chief Engineer, Upper Ganga Basin Organisation, CWC, Lucknow is gratefully acknowledged.

I would like to place on record the special contribution made by officers and staff of Hydrological Observation Circle, Varanasi and Middle Ganga Division-III, Varanasi in compilation of information and publication of the report in present form.

It is hoped that this publication will be found useful for the planners, managers and users in the field of water resources.

(RAVINDRA SINGH)
SUPERINTENDING ENGINEER
HOC, CWC,VARANASI

September, 2018

CONTENTS

.

1. INTRODUCTION

1.1. Scope

Rapidly increasing population, rising standard of living, exponential growth of industrialized and urbanization have exposed the Water Resources in general and rivers in particular to various form of degradation. It is therefore necessary to keep vigilant watch of quality of available fresh waters whose major sources in our country are rivers.

1.2. Source of Information

Middle Ganga Division No. III, Varanasi under the Hydrological Observation Circle, Central Water Commission, Varanasi is conducting Water Quality observations at three sites in Sone sub-basin. The finalised data for the year 2017-2018 is presented in the book. The details of sites are given in Table 1 and same has been located in index map .

T A B L E 1

Sl.No	Name of site	Station Code
Middle Ganga Division No. III		
1.	Kuldah Bridge at Sone	GGTOOT3
2.	Chopan at Sone	GGTOOL5
3.	Duddhi at Kanhar	GGT3OE8

1.3. Observation Technique

Water samples from all the Water Quality stations are collected on 1st working day of the month and transported to divisional laboratory where systematic analysis is conducted for the determination of constituents like pH, Specific Conductance, Potassium (as K), Sodium (as Na), Calcium (as Ca), Magnesium (as Mg), Iron (as Fe), Nitrogen Ammoniacal (as NH4-N), Carbonate (as CO3), Bicarbonate (as HCO3), Chloride (as Cl), Fluoride (as F), Sulphate (as SO4), Nitrate (as NO3), Nitrite (as NO2), Phosphate (as PO4), Silica (as SiO2) and Boron (as B).

pH and Specific Conductance are determined by digital pH meter and conductivity meter. Cl-, CO3--, HCO3- , Ca++ and Mg++ are estimated by titration method. SO4-- is estimated by turbidimetric method with the help of Nephelometer. Na+ and K+ estimation is done by the method of flame emission with the help of Flame

photometer and rest by the method of colorimetric estimation with the help of U-V Spectrophotometer.

In addition to the above, Dissolved Oxygen is also estimated. Biochemical Oxygen Demand, Chemical Oxygen Demand and Microbiological Parameters such as Total Coliform & Fecal Coliform are determined at selected sites.

2. WATER QUALITY DATA

2.1 Explanatory Notes

The explanatory notes, described hereunder, are designed to assist in the interpretation of various parameters contained in the data presented subsequently.

i) The river water samples are collected at a regular frequency of once in a month usually on the 1st working day from the main flowing portion of the stream as per uniform protocol.

ii) Well Water analysis is also carried out twice in a year i.e. 1st working day of November & May.

iii) Dissolved Oxygen is measured at the site laboratory within an hour of collection of samples.

iv) The other water quality parameters are analysed at the divisional laboratory, Varanasi/National River Water Quality laboratory,New Delhi.

v) Chemical Indices, namely, Hardness Number, Sodium Percentage, Sodium Adsorption Ratio and Residual Sodium Carbonate are calculated as follows :

a. Hardness Number (HAR) is calculated by adding the total Ca^{++} and Mg^{++} in the sample expressed as equivalent parts of $CaCO_3$.

$$H.N.=(Ca^{++}+Mg^{++}x50$$

Where Ionic concentrations being in m.e./litre.

b. Sodium Percentage (S.P.) is given by

$$S.P.= (Na^{+} x100) / (Ca^{++} + Mg^{++} + Na^{+} + K^{+})$$

c. Sodium Adsorption Ratio (S.A.R.) is given by

$$S.A.R. = Na^{+} / \{(Ca^{++} + Mg^{++})/2\}^{½}$$

Where the ionic concentration being in m.e./litre.

d. Residual Sodium Carbonate (R.S.C.) is given by

$$R.S.C. = (CO_3^{--} +HCO_3^{-}) - (Ca^{++} + Mg^{++})$$

Where concentration of all the ions being in m.e./litre.

vi) Water year ranges from June 1st of one calendar year to May 31st of the next calendar year and covers one complete hydrological cycle.

vii) The gauging station code number is a unique seven column alpha-numeric reference number which facilitates storage and retrieval of water quality data in data banks. The first column is identifier of either an integral river basin or for convenience, a region having several contiguous river catchments. This is followed by a column which identifies an independent river system which either have one or more outlets to the sea or crosses international border to enter another country. The third, fourth and fifth column spaces denote first, second and third order tributaries respectively from the mouth upstream. The sixth and seventh column spaces indicate the location of the gauging station in one of the 225 slots earmarked on the river. The blank column spaces are filled by zero.

2.2 Method of Presentation

In the succeeding pages, stationwise water quality data and its trend is presented, comprising history sheet and water quality analysis tables.

History sheet gives concise description of the water quality observation station. The water quality analysis tables are given seasonwise (flood, winter, summer) for the river water and for well water during the month of November & May. The samples of water quality analysis are collected once a month as already mentioned in para 2.1 above.

3. WATER QUALITY TOLERANCE AND CLASSIFICATION

As per ISI-IS: 2296-1982, the tolerance limits of parameters are specified as per classified use of water (Table 1,2,3,4,5 Annexed) depending on various uses of water. The following classifications have been adopted in India.

Classification	Type of use
Class A	Drinking water source without conventional treatment but After disinfection.
Class B	Outdoor bathing.
Class C	Drinking water source with conventional treatment followed by disinfection.
Class D	Fish culture and wild life propagation .
Class E	Irrigation , Industrial cooling or controlled waste disposal.

TABLE-1

TOLERANCE LIMITS FOR INLAND SURFACE WATERS, CLASS – A

`

S. No.	Characteristic	Tolerance
(i)	pH value	6.5 to 8.5
(ii)	Dissolved Oxygen, mg/l, ((Min))	6.0
(iii)	Bio-chemical Oxygen Demand ((Max))	2.0
(iv)	Total Coliform Organisms, MPN/100 ml,((Max))	50
(v)	Colour, Hazen units, ((Max))	10
(vi)	Odour	unobjectionable
(Vii)	Taste	Agreeable taste
(viii)	Total Dissolved Solids, mg/l, (Max)	500
(ix)	Total Hardness (as CaCO3), mg/l ,(Max)	300
(x)	Calcium Hardness (as CaCO3), mg/l, (Max)	200
(xi)	Magnesium (as CaCO3), mg/l,(Max)	100
(xii)	Copper (as Cu), mg/l, (Max)	1.5
(xiii)	Iron (as Fe), mg/l,(Max)	0.3
(xiv)	Manganese (as Mn), mg/l,(Max)	0.5
(xv)	Chlorides (as Cl), mg/l,(Max)	250
(xvi)	Sulphate (as SO4), mg/l ,(Max)	400
(xvii)	Nitrates (as NO2), mg/l,(Max)	20
(xviii)	Fluorides (as F,) mg/l,(Max)	1.5
(xix)	Phenolic compounds(as C6H5OH), mg/l,(Max)	0.002
(xx)	Mercury (as Hg), mg/l ,(Max)	0.001
(xxi)	Cadmium (as Cd), mg/l,(Max)	0.01
(xxii)	Selenium (as Se), mg/l ,(Max)	0.01
(xxiii)	Arsenic (as As), mg/l,(Max)	0.05
(xxiv)	Cyanides (as CN), mg/l, (Max)	0.05
(xxv)	Lead (as Pb), mg/l, (Max)	0.1
(xxvi)	Zinc (as Zn), mg/l, (Max)	15
(xxvii)	Chromium (asCr6+), mg/l,(Max)	0.05
(xxviii)	Anionic detergents, (as MBAS), mg/l ,(Max) .	0.2
(xxix)	Poly-nuclear aromatic hydrocarbons (PAH),	0.2
(xxx)	(Min)eral oil, mg/l ,(Max)	0.01
(xxxi)	Barium (as Ba), mg/l ,(Max)	1.0
(xxxii)	Silver (as Ag), mg/l (Max)	0.05
(xxxiii)	Pesticides	Absent
(xxxiv)	Alpha emitters, µc/ml, (Max)	10^{-9}
(xxxv)	Beta emitters, µc/ml, (Max)	10^{-8}

TABLE- 2

TOLERANCE LIMITS FOR INLAND SURFACE WATERS, CLASS – B

S. No.	Characteristic	Tolerance
(i)	pH Value	6.5 to 8.5
(ii)	Dissolved Oxygen, mg/l,(Min)	5.0
(iii)	Biochemical Oxygen Demand (5 days at 20 °C), (Max)	3.0
(iv)	Total Coliform Organisms, MPN/100 ml, (Max)	500
(v)	Fluorides (as F)<mg/l, (Max)	1.5
(vi)	Colour, Hazen units, (Max)	300
(vii)	Cyanides (as CN), mg/l, (Max)	0.05
(viii)	Arsenic (as As), mg/l, (Max)	0.2
(ix)	Phenolic Compounds (as C6H5OH) mg/l, (Max)	0.005
(x)	Chromium (as Cr6+), mg/l, (Max)	1.0
(xi)	Anionic detergents (as MBAS), mg/l, (Max)	1.0
(xii)	Alpha emitters, µc/ml, (Max)	10^{-8}

TABLE- 3

TOLERANCE LIMITS FOR INLAND SURFACE WATERS, CLASS – C

S. No.	Characteristic	Tolerance
(i)	pH Value	6.5 to 8.5
(ii)	Dissolved Oxygen, mg/l (Min)imum	4.0
(iii)	Biochemical Oxygen Demand	3.0
(iv)	Total coliform organisms, MPN/100 ml, (Max)	5000
(v)	Colour, Hazen units, (Max)	300
(vi)	Fluorides (as F), mg/l ,(Max)	1.5
(vii)	Cadmium (as Cd), mg/l, (Max)	0.01
(viii)	Chlorides (as Cl), mg/l, (Max)	600
(ix)	Chromium (as Cr6+), mg/l, (Max)	0.05
(x)	Cyanides (as CN), mg/l, (Max)	0.05
(xi)	Total Dissolved Solids, mg/l, (Max)	1500
(xii)	Selenium (as Se), mg/l, (Max)	0.05
(xiii)	Sulphates (as SO4), mg/l, (Max)	400
(xiv)	Lead (as Pb), mg/l, (Max)	0.1
(xv)	Copper (as Cu),mg/l,(Max)	1.5
(xvi)	Arsenic (as As), mg/l, (Max)	0.2
(xvii)	Iron (as Fe), mg/l, (Max)	50
(xviii)	Phenolic compounds (as C6H5OH), mg/l, (Max)	0.005
(xix)	Zinc (as Zn), mg/l, (Max)	15
(xx)	Insecticides, mg/l, (Max)	Absent
(xxi)	Anionic detergents (as MBAS), mg/l, (Max)	1.0
(xxii)	Oils and grease, mg/l, (Max)	0.1
(xxiii)	Nitrates (as NO3), mg/l,(Max)	50
(xxiv)	Alpha emititers, µc/mg, (Max)	10-9
(xxv)	Beta emitters, µc/ml, (Max)	10-8

TABLE-4

TOLERANCE LIMITS FOR INLAND SURFACE WATERS, CLASS -D

S. No.	Characteristic	Tolerance
(i)	pH value	6.5 to 8.5
(ii)	Dissolved Oxygen, mg/l, (Min).	4.0
(iii)	Free Ammonia (as N), mg/l, (Max).	1.2
(iv)	Electrical Conductance at 25 °C, μ S, (Max)	1000
(v)	Free Carbon Dioxide (as C02),mg/l, (Max)	6.0
(vi)	Oils and Grease, mg/l, (Max)	0.1
(vii)	Alpha emitters, μ c/ml, (Max)	10^{-9}
(viii)	Beta emitters, μ c/ml, (Max)	10^{-8}

TABLE- 5

TOLERANCE LIMITS FOR INLAND SURFACE WATERS,CLASS -E

S. No.	Characteristic	Tolerance
(i)	pH value	6.0 to 8.5
(ii)	Electrical Conductance at 25°C, μ S, (Max)	2250
(iii)	Sodium Adsorption Ratio, (Max)	26
(iv)	Boron (as B), mg/l, (Max)	2.0
(v)	Total Dissolved Solids, (inorganic), mg/l, (Max)	2100
(vi)	Sulphates (as SO4), mg/l, (Max)	1000
(vii)	Chlorides (as Cl), Mg/l, (Max)	600
(viii)	Sodium Percentage, (Max)	60
(ix)	Alpha emitters, μ c/ml, (Max)	10^{-9}
(x)	Beta emitters, μ c/ml, (Max)	10^{-8}

4. WATER QUALITY SCENARIO/TREND

Surface water quality trends assists resource managers in identifying nature and extent of emerging water-quality concerns, planning remedial measures, evaluating their effectiveness and prioritization of pollution control effects. This section presents the scenario of different water quality parameters based on the results of data analysis of the **Chopan** and **Kuldahbridge** stations on river Sone and **Duddhi** station on river Kanhar which confluences with river Sone downstream of Chopan.

4.1 W.Q. Network :

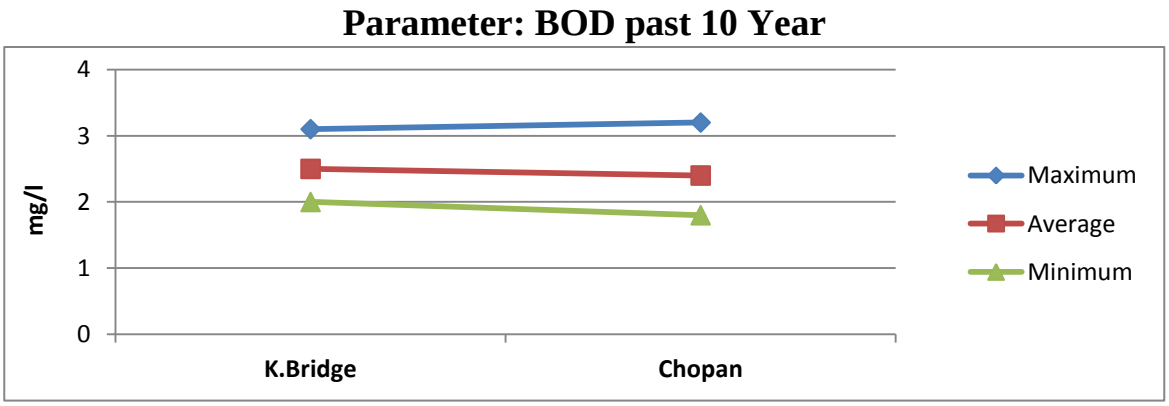
S.No.	Name of Site	River	Class
1	Kuldahbridge	Sone	Trend
2	Chopan	Sone	Trend
3	Duddhi	Kanhar	Trend

4.2. WATER QUALITY SCENARIO/TRENDS FOR RIVER SONE (MAIN STEM):

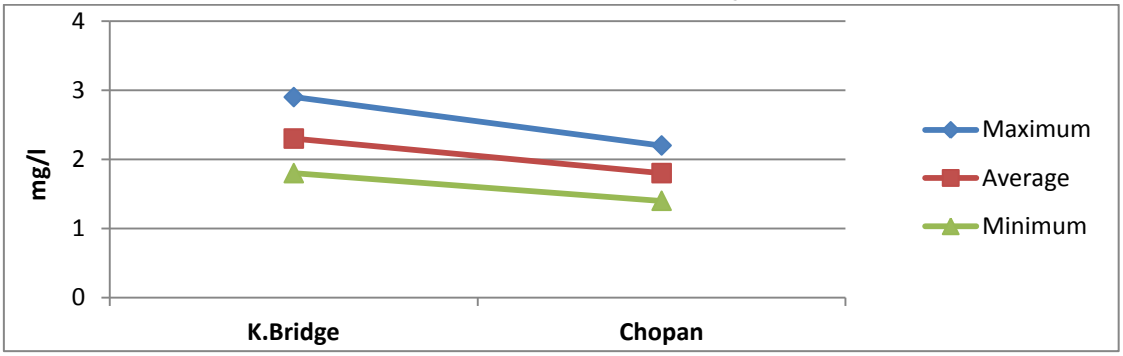
4.2.1 Biological Oxygen Demand (BOD) in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year*	Current year	Since inception	Past 10 year*	Current year	Since inception	Past 10 year*	Current year
Kuldahbridge	-	3.1	2.9	-	2.0	1.8	-	2.5	2.3
Chopan	-	3.2	2.2	-	1.8	1.4	-	2.4	1.8

*BOD started from June 2009.



Parameter: BOD current year

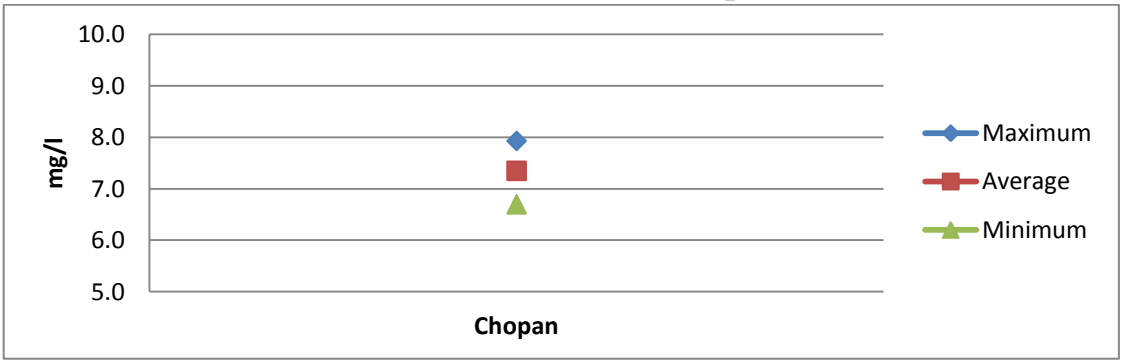


4.2.2 Dissolved Oxygen (DO) in mg/l

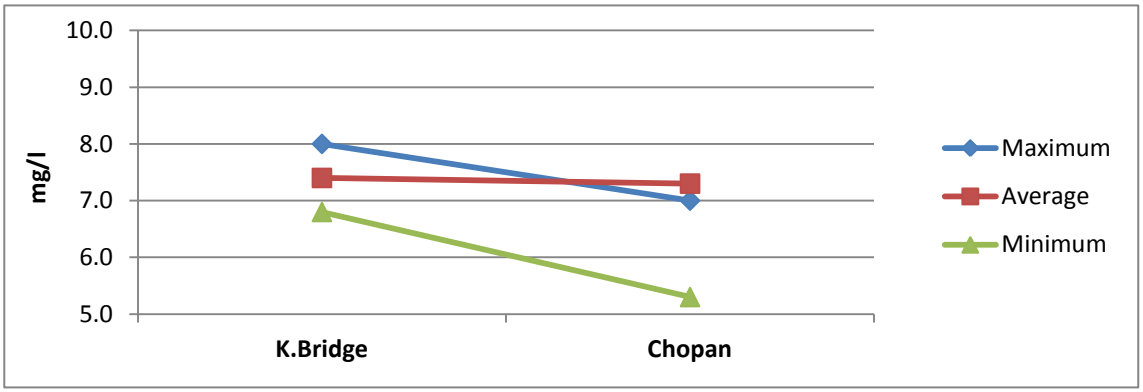
Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year
Kuldahbridge	-	8.0	8.6	-	6.7	6.3	-	7.4	7.3
Chopan	7.9	7.0	8.4	6.7	5.3	6.9	7.4	7.4	7.5

* DO started from June 1988 at Chopan & June 2009 at Kuldahbridge

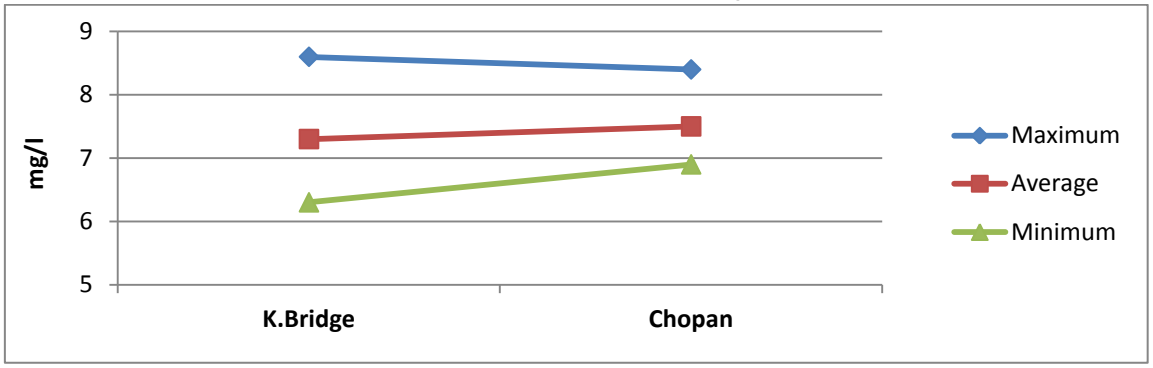
Parameter: DO since inception



Parameter: DO past 10 Year



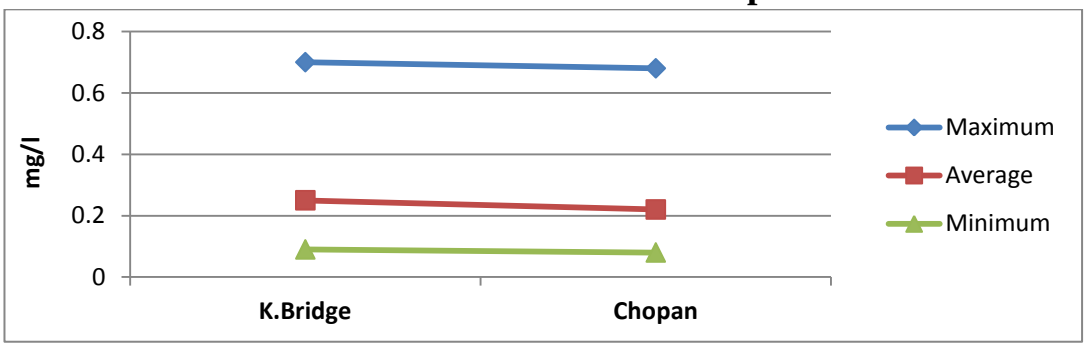
Parameter: DO current year



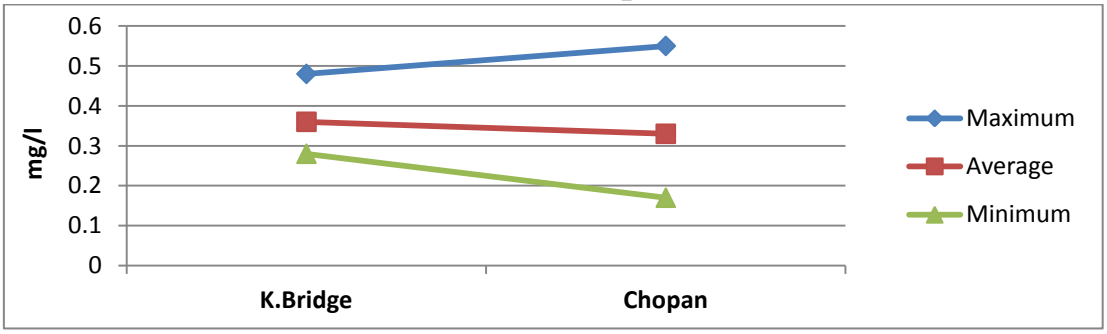
4.2.3 Fluoride in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year	Since inception from	10 year	One year
Kuldahbridge	0.70	0.48	0.44	0.09	0.28	0.24	0.25	0.36	0.30
Chopan	0.68	0.54	0.40	0.08	0.17	0.23	0.22	0.33	0.29

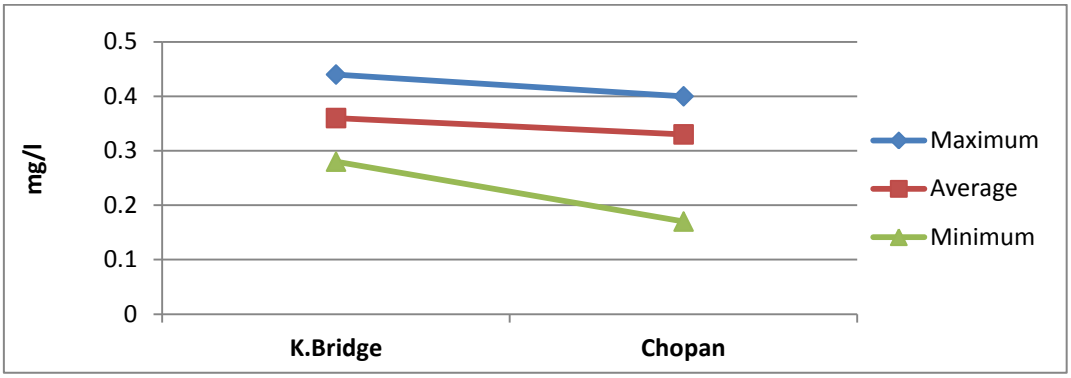
Parameter: Fluoride since inception



Parameter: Fluoride past 10 Year



Parameter: Fluoride current Year

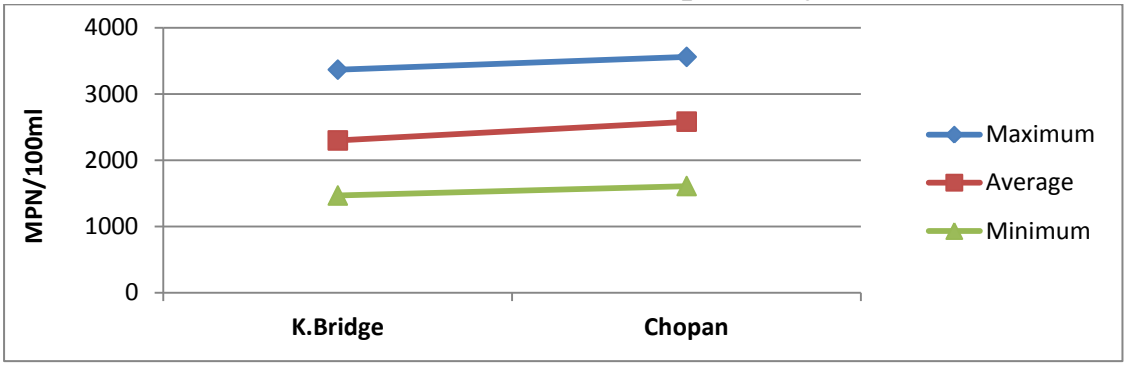


4.2.4 Total coliform in MPN/100ml

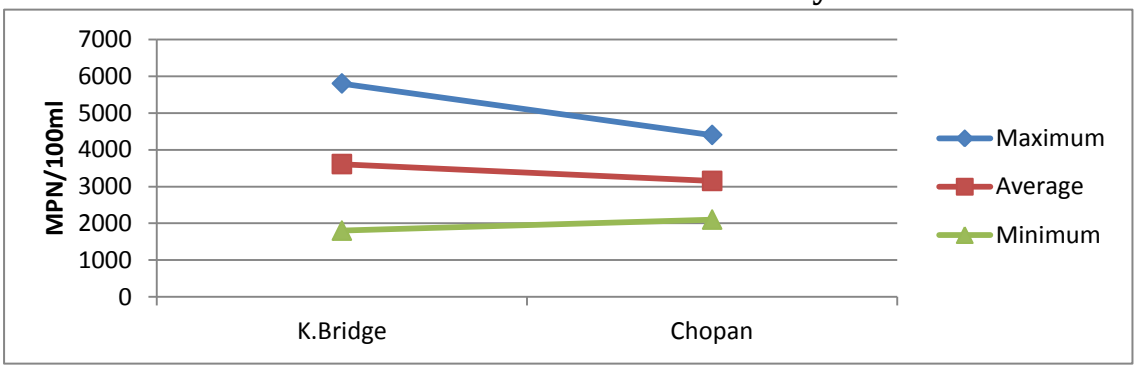
Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year
Kuldahbridge	-	3367	5800	-	1467	1800	-	2298	3608
Chopan	-	3560	4400	-	1610	2100	-	2582	3150

Note : *Total coliform started from January 2007 at Chopan & June 2009 at Kuldahbridge.

Parameter: Total coliform past 10 year



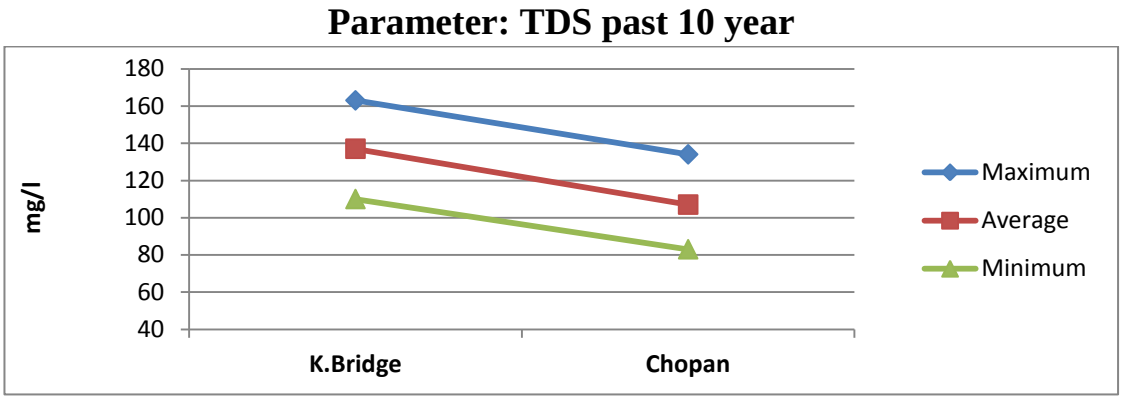
Parameter: Total coliform current year

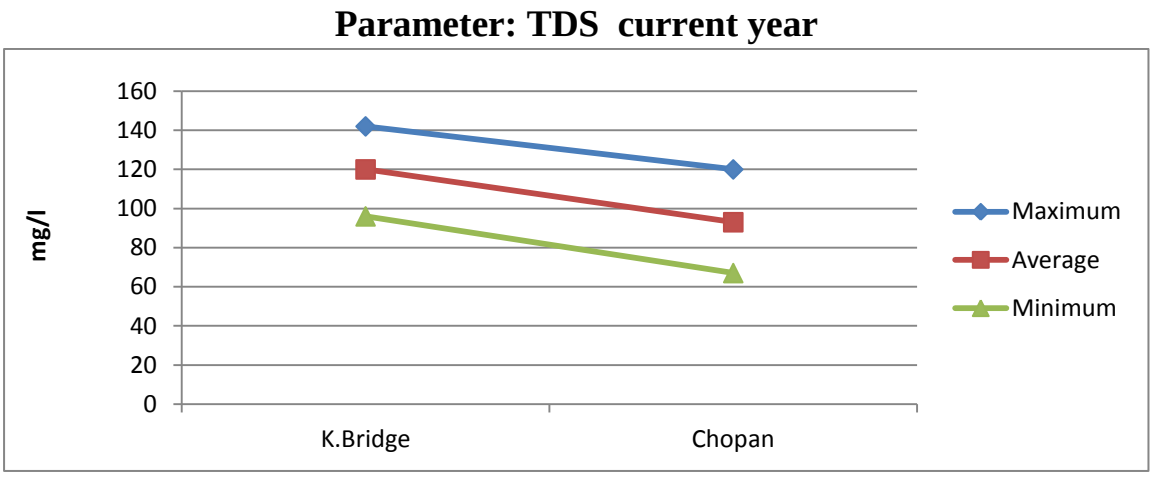


4.2.5 Total Dissolved Solids (TDS) in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year*	Current year	Since inception	Past 10 year*	Current year	Since inception	Past 10 year*	Current year
Kuldahbridge	-	163	142	-	110	96	-	137	120
Chopan	-	134	120	-	83	67	-	107	93

*TDS started from June 2009 at Kuldahbridge & Chopan.



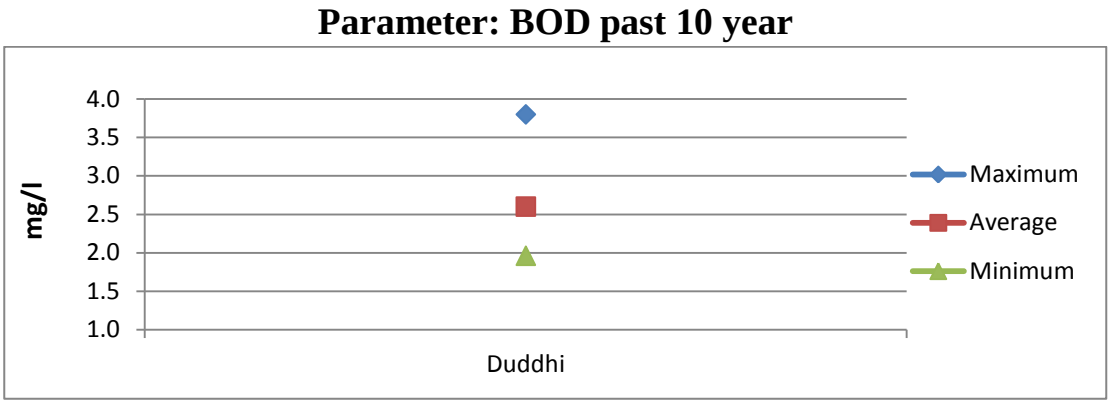


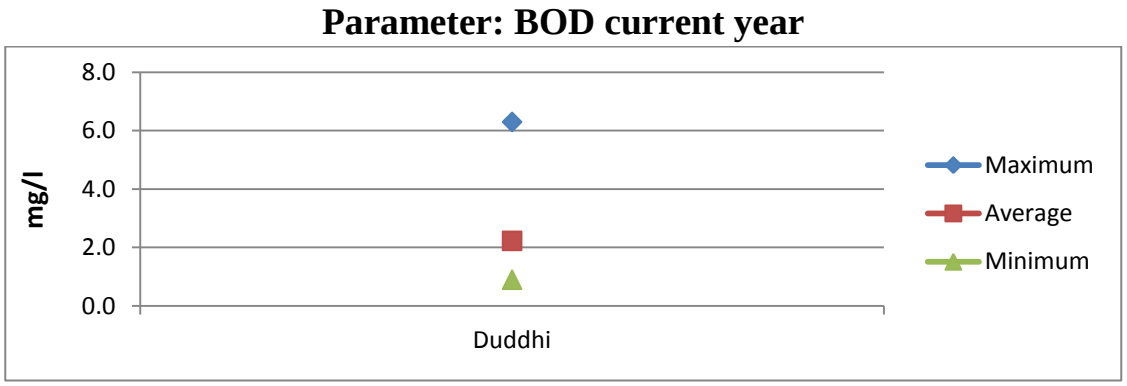
4.3. WATER QUALITY SCENARIO/TRENDS FOR RIVER KANHAR (SONE TRIBUTARY):

4.3.1 Biological Oxygen Demand (BOD) in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year*	Current year	Since inception	Past 10 year*	Current year	Since inception	Past 10 year*	Current year
Duddhi	-	3.8	6.3	-	2.0	0.9	-	2.6	2.2

*BOD started from June 2009.

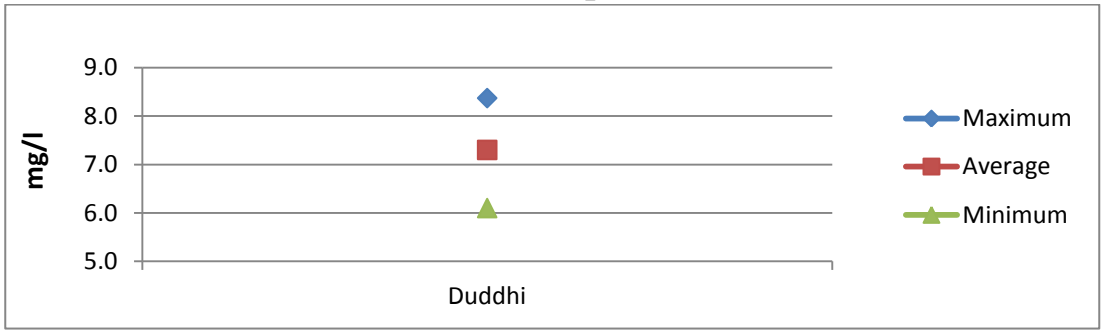




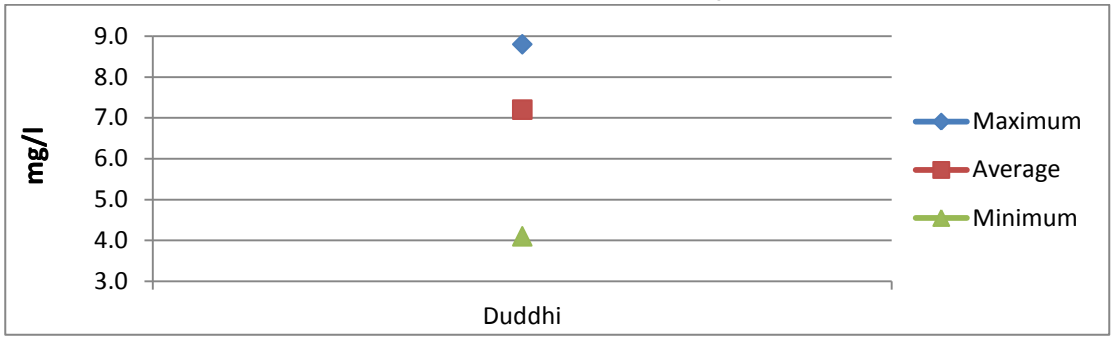
4.3.2 Dissolved Oxygen (DO) in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year
Duddhi	-	8.4	8.8	-	6.1	4.1	-	7.3	7.2

*DO started from 2009 at Dudhhi.



Parameter: DO current year

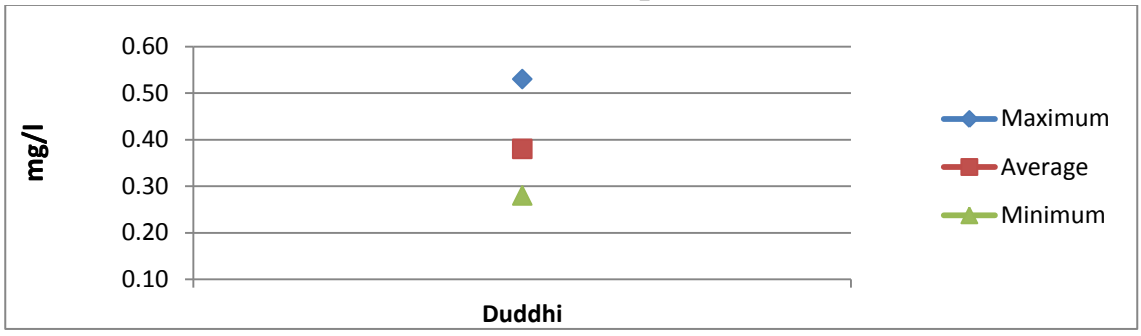


4.3.3 Fluoride in mg/l

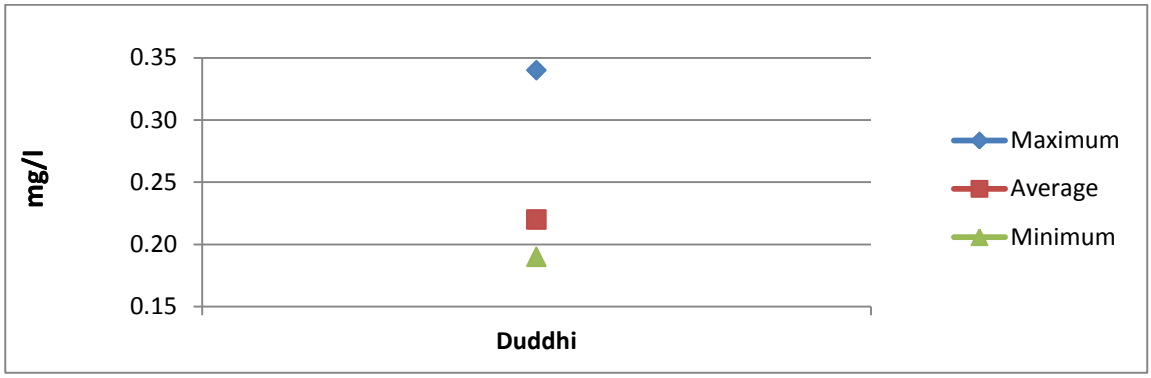
Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year	Since inception from	10 year	One year
Duddhi	0.47	0.53	0.34	0.20	0.28	0.19	0.29	0.38	0.29

Parameter: Fluoride since inception

Parameter: Fluoride past 10 Year



Parameter: Fluoride current Year

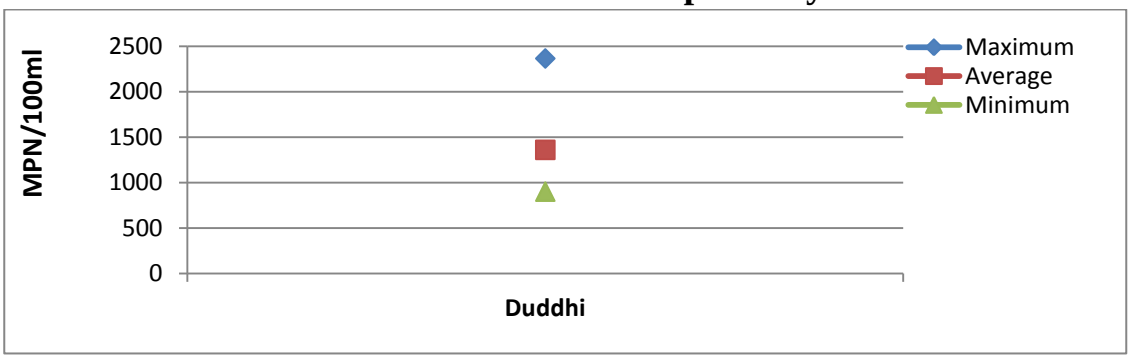


4.3.4 Total coliform in MPN/100ml

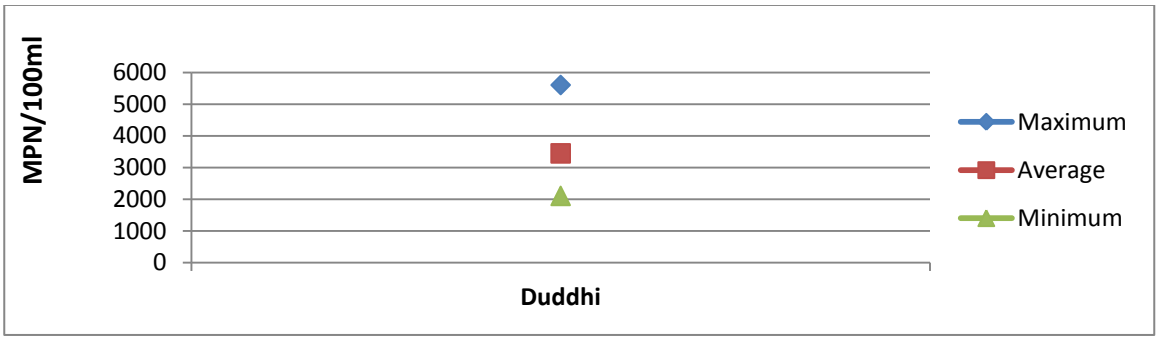
Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year	Since inception	Past 10 year	Current year
Duddhi		2367	5600		900	2100		1360	3442

Note : Total coliform started from May 2007 at Duddhi.

Parameter: Total coliform past 10 year



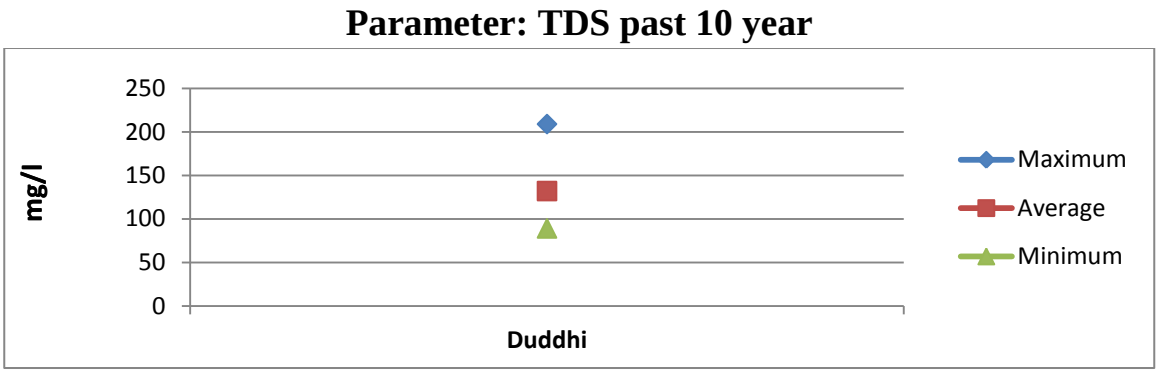
Parameter: Total coliform current year

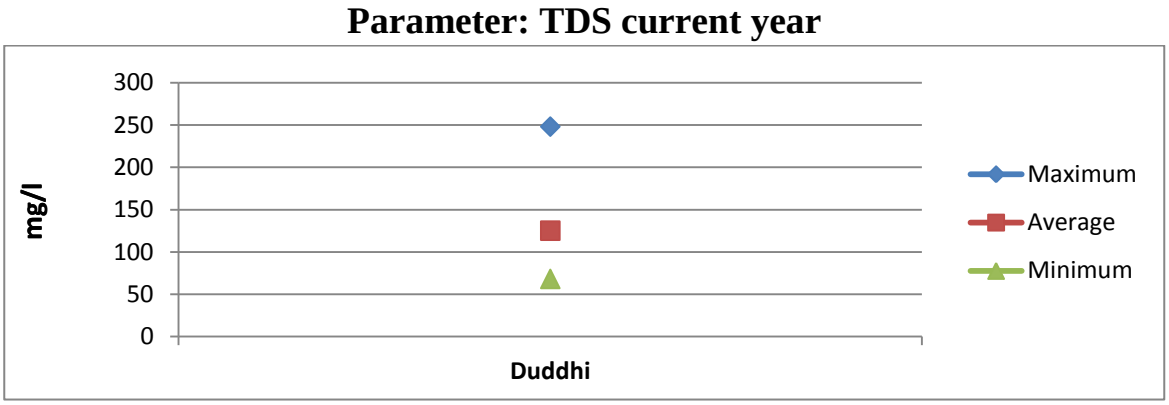


4.3.5 Total Dissolved Solids (TDS) in mg/l

Site Name (From U/S to D/S)	Avg. of Yearly Maximum			Avg. of Yearly Minimum			Annual Average		
	Since inception	Past 10 year*	Current year	Since inception	Past 10 year*	Current year	Since inception	Past 10 year*	Current year
Duddhi	-	209	248	-	89	68	-	132	125

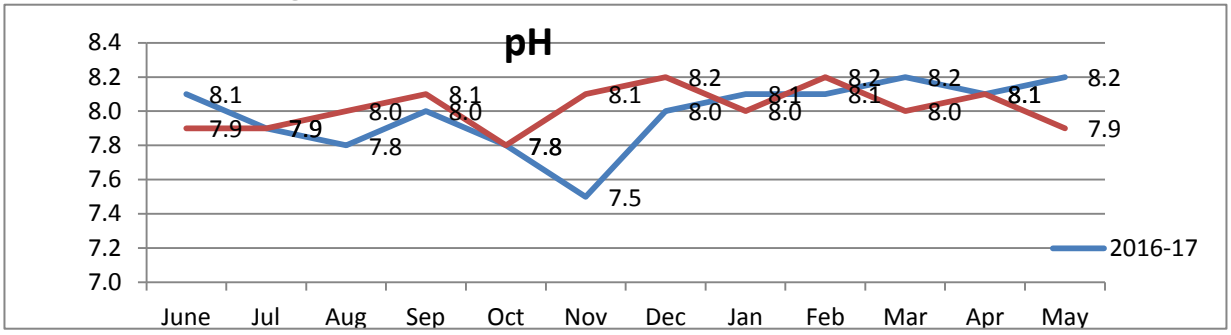
*TDS started from June 2009 at Duddhi.

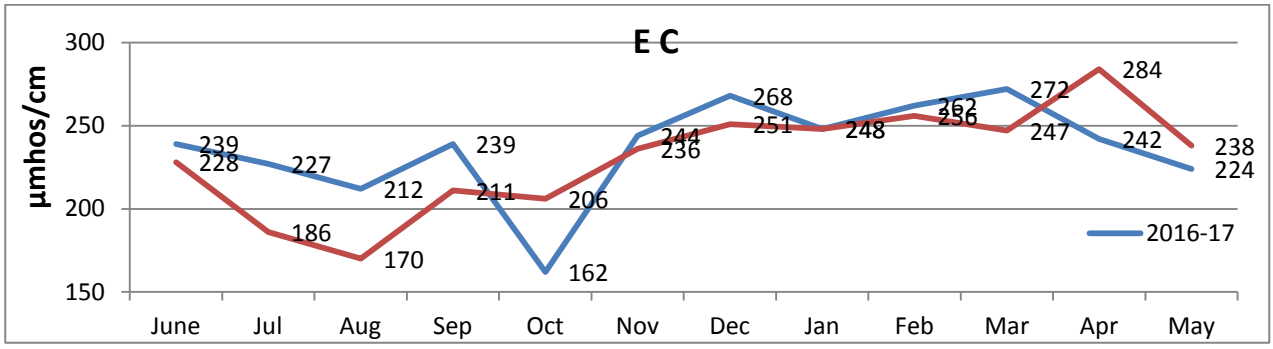


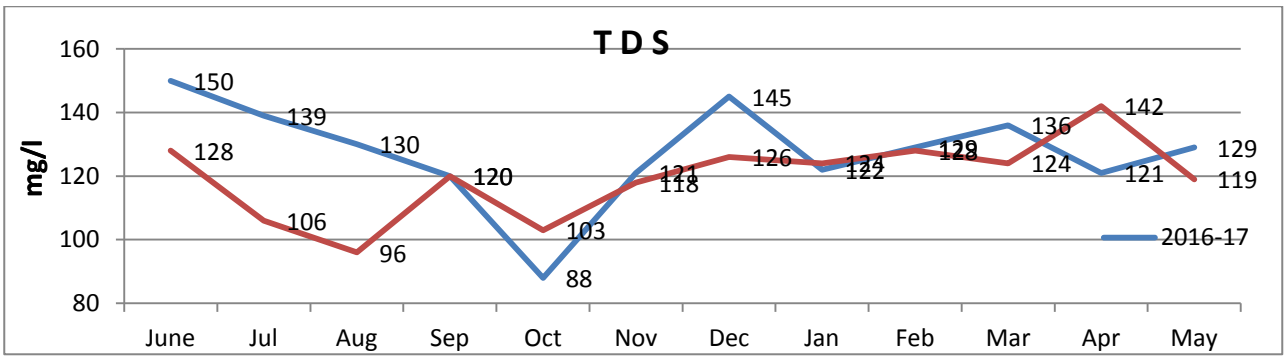


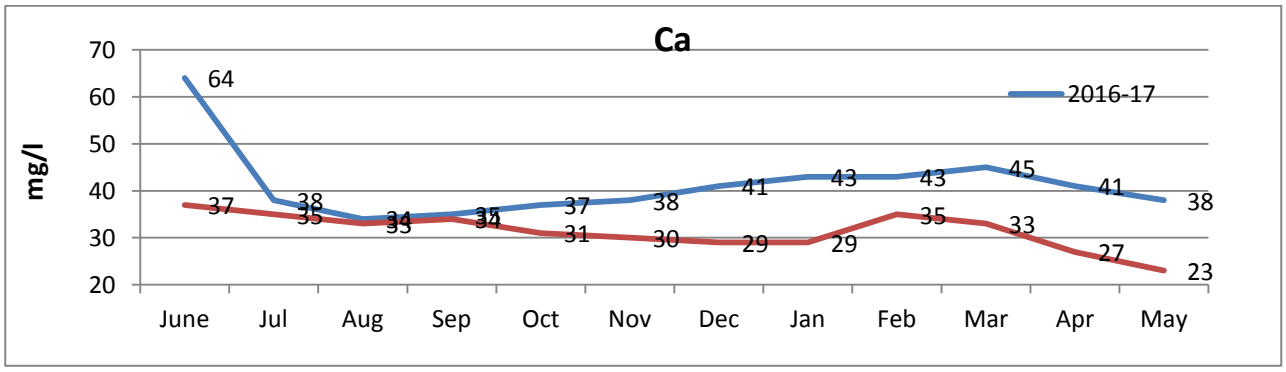
4.4. COMPARISION OF WATER QUALITY PARAMETERS DURING THE WATER YEAR 2016-2017 AND 2017 - 18:

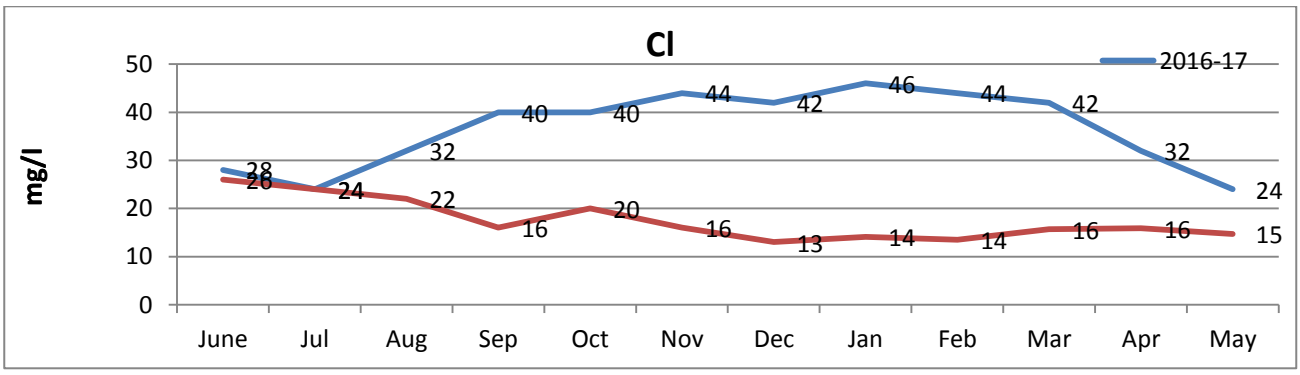
4.4.1 Kuldahbridge- River Son

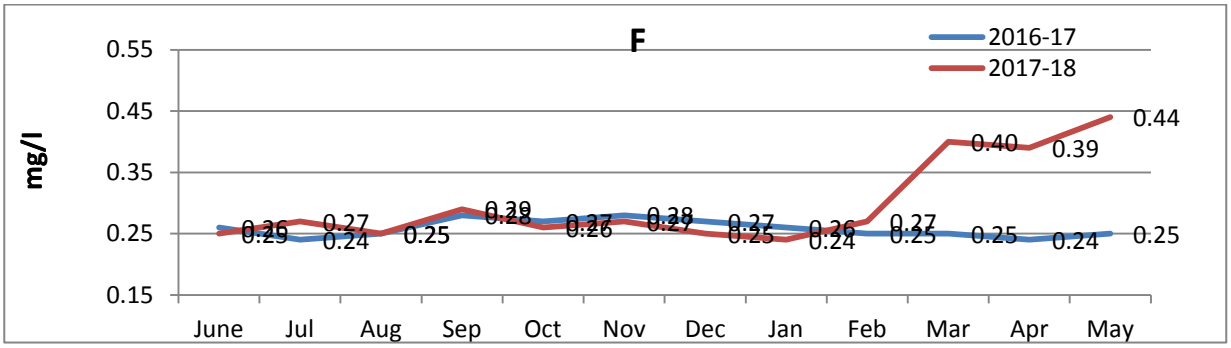


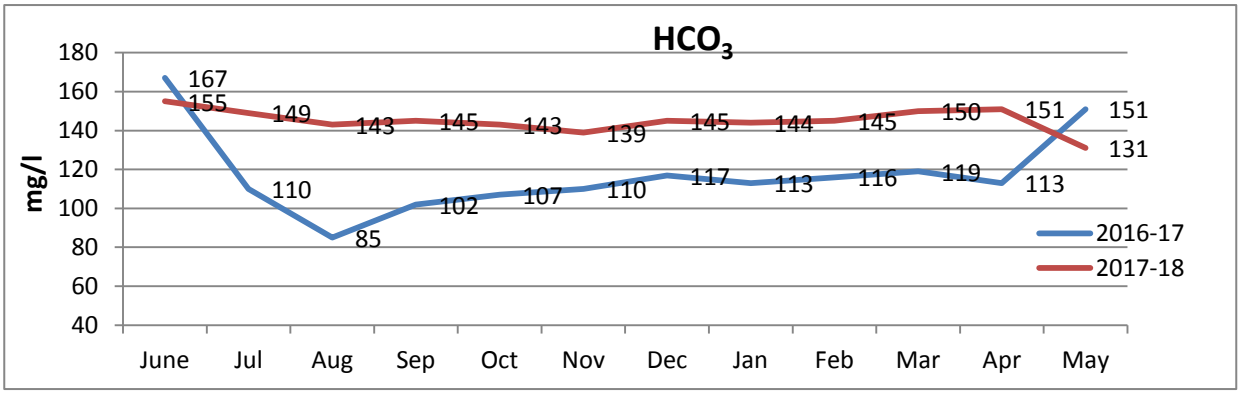

E C
µmhos/cm
300
250
200
150
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
239 227 212 239 162 268 248 272 247 242 238
228 186 170 211 206 244 251 262 247 284 224
2016-17

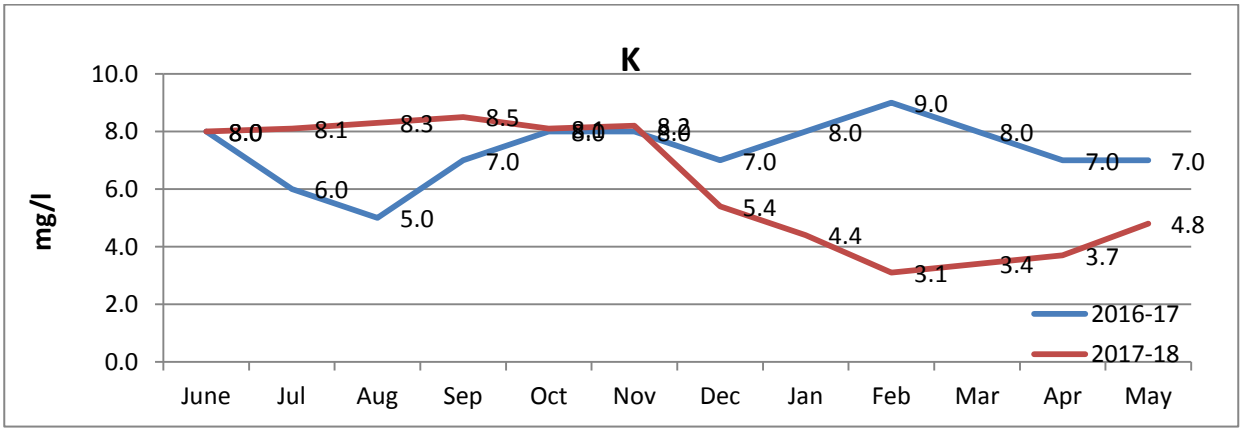

T D S
mg/l
160
140
120
100
80
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
150 139 130 120 88 145 122 136 124 121 129
128 106 96 120 103 121 126 124 128 142 119
2016-17

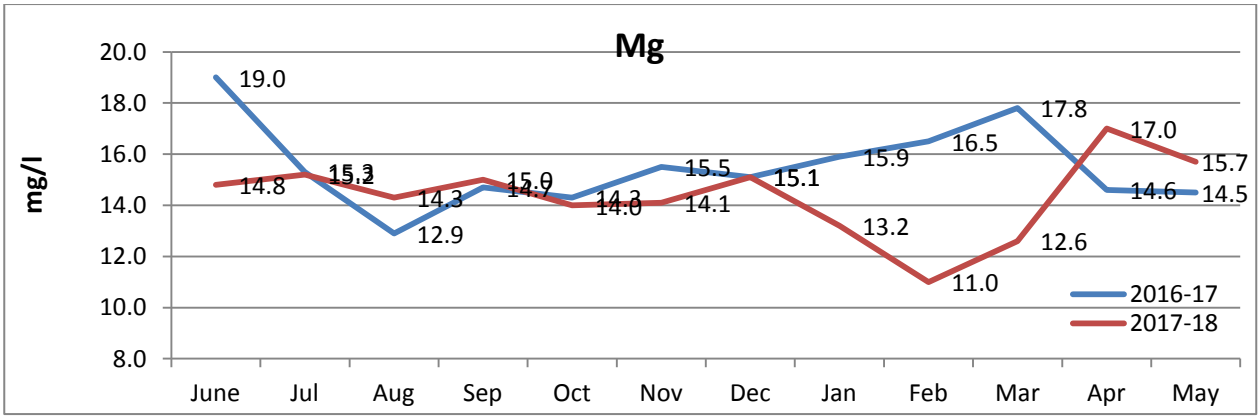

Ca
mg/l
70
60
50
40
30
20
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
64 38 35 37 38 41 43 43 45 41 38
37 35 34 31 30 29 29 35 33 27 23
2016-17

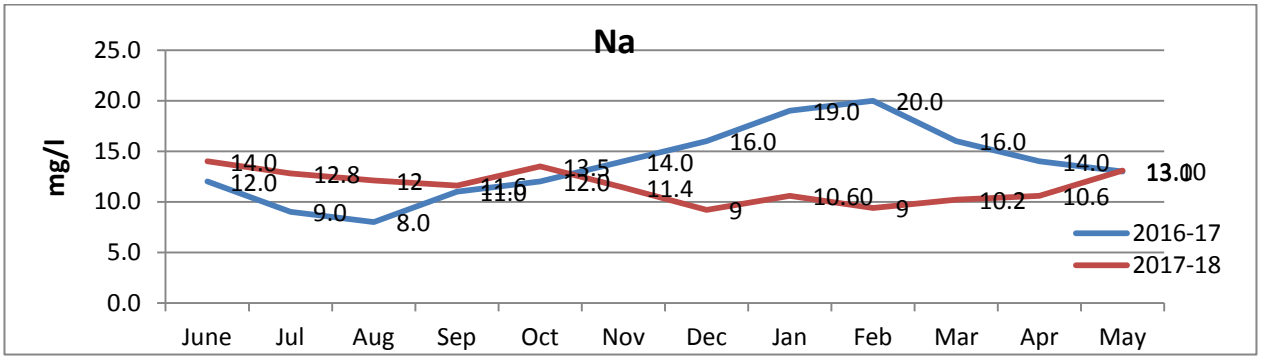

Cl
mg/l
50
40
30
20
10
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
28 32 40 40 44 42 46 44 42 32 24
26 24 22 16 20 16 13 14 14 16 16 15
2016-17

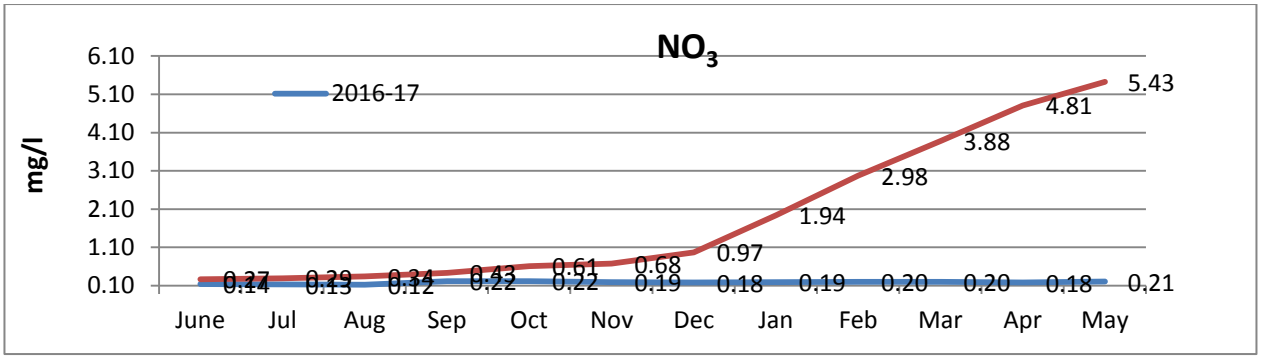

F
2016-17
2017-18
mg/l
0.55
0.45
0.35
0.25
0.15
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
0.44
0.40
0.39
0.25
0.24

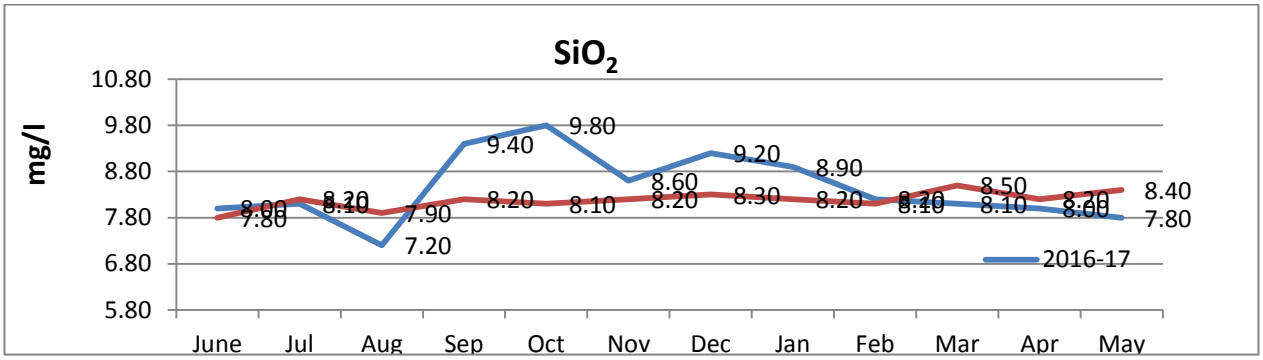

HCO3
mg/l
180
160
140
120
100
80
60
40
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
167
155
149
143
145
143
139
145
144
145
150
151
131
110
85
102
107
110
117
113
116
119
113
151
2016-17
2017-18

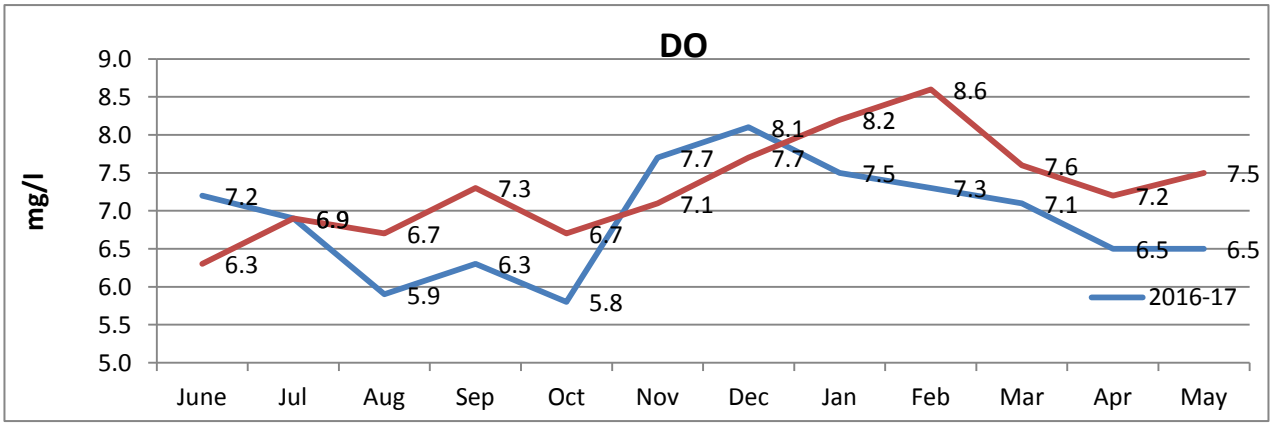

K
mg/l
10.0
8.0
6.0
4.0
2.0
0.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
8.0
8.1
8.3
8.5
6.0
5.0
7.0
7.0
7.0
8.0
9.0
8.0
7.0
7.0
5.4
4.4
3.1
3.4
3.7
4.8
2016-17
2017-18

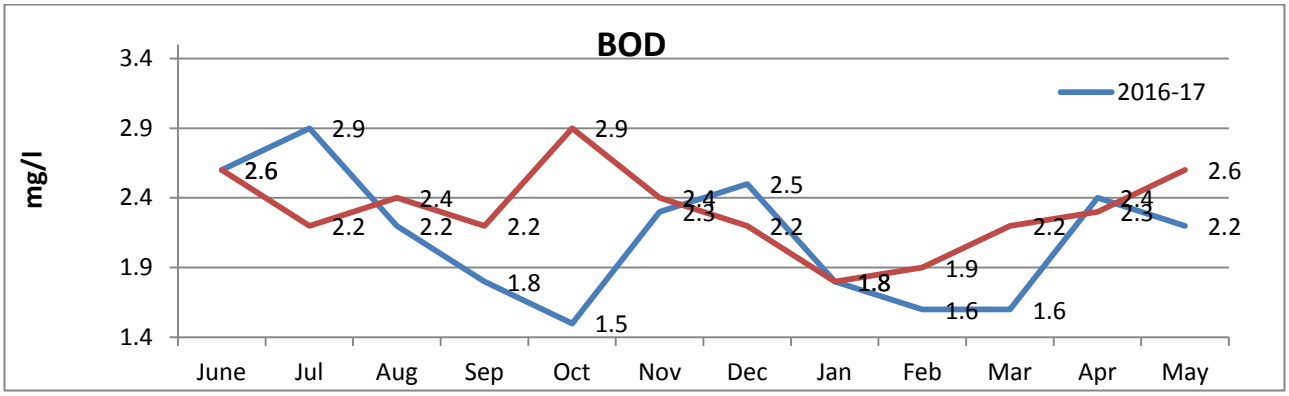

Mg
mg/l
20.0
18.0
16.0
14.0
12.0
10.0
8.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
19.0
14.8
12.9
14.3
14.7
14.0
14.1
15.1
15.9
16.5
17.8
14.6
14.5
13.2
11.0
12.6
17.0
15.7
2016-17
2017-18

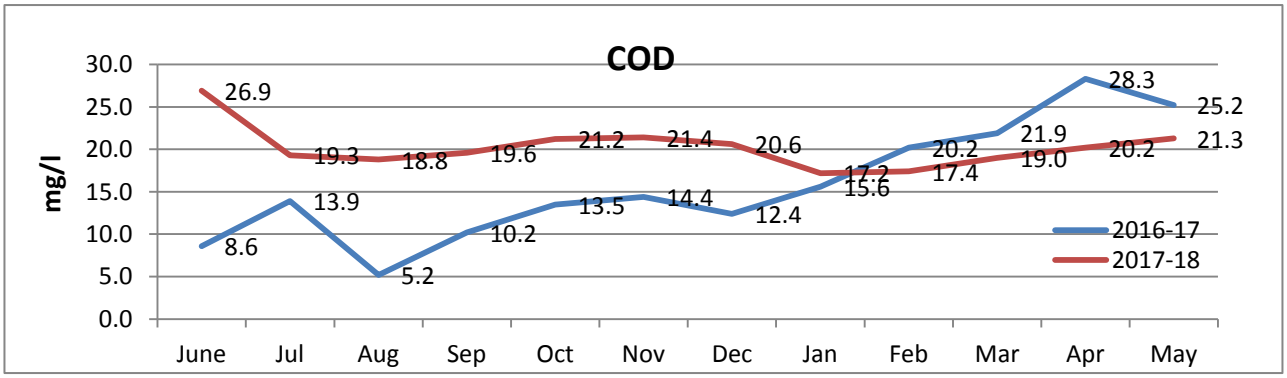

Na
mg/l
25.0
20.0
15.0
10.0
5.0
0.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17
2017-18

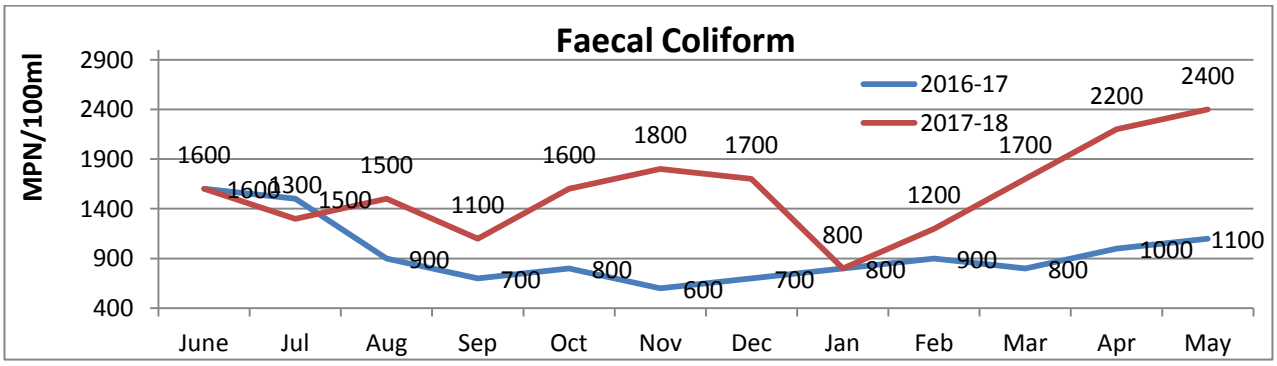

NO3
mg/l
6.10
5.10
4.10
3.10
2.10
1.10
0.10
2016-17
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May

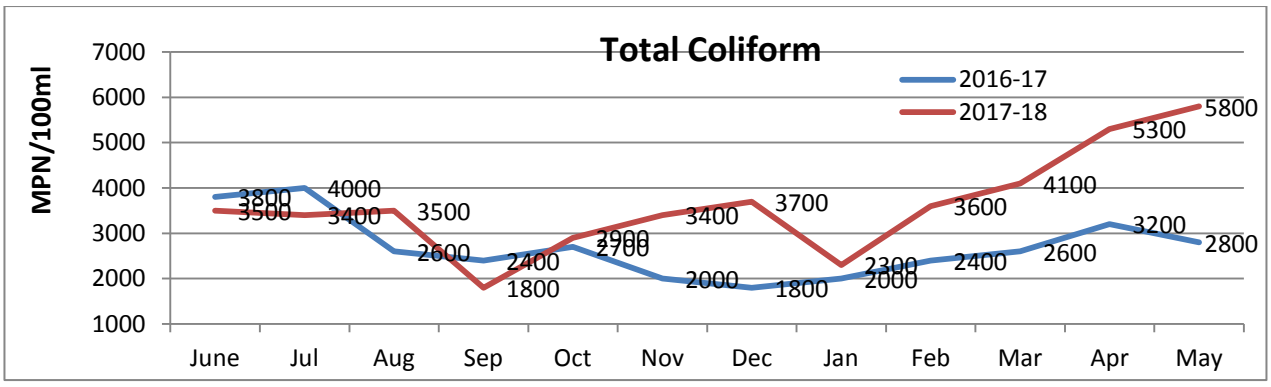

SiO2
mg/l
10.80
9.80
8.80
7.80
6.80
5.80
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17

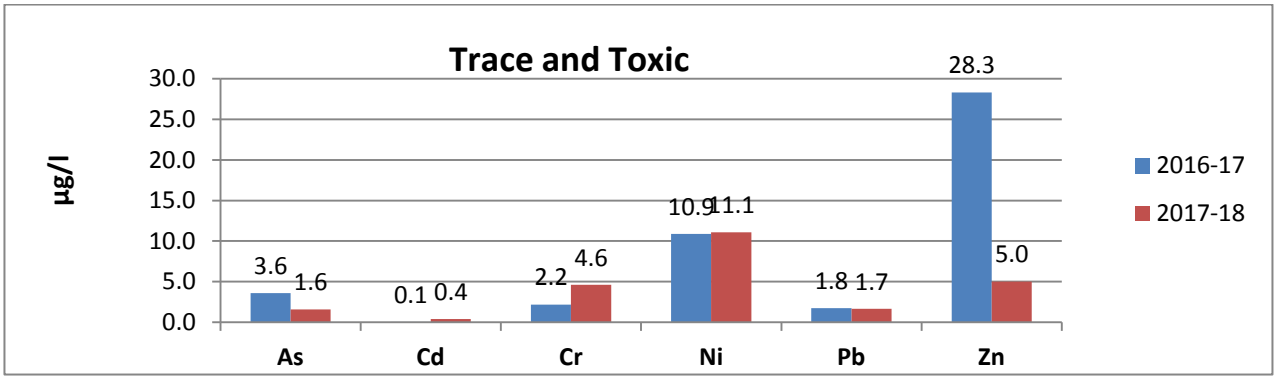

DO
mg/l
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17

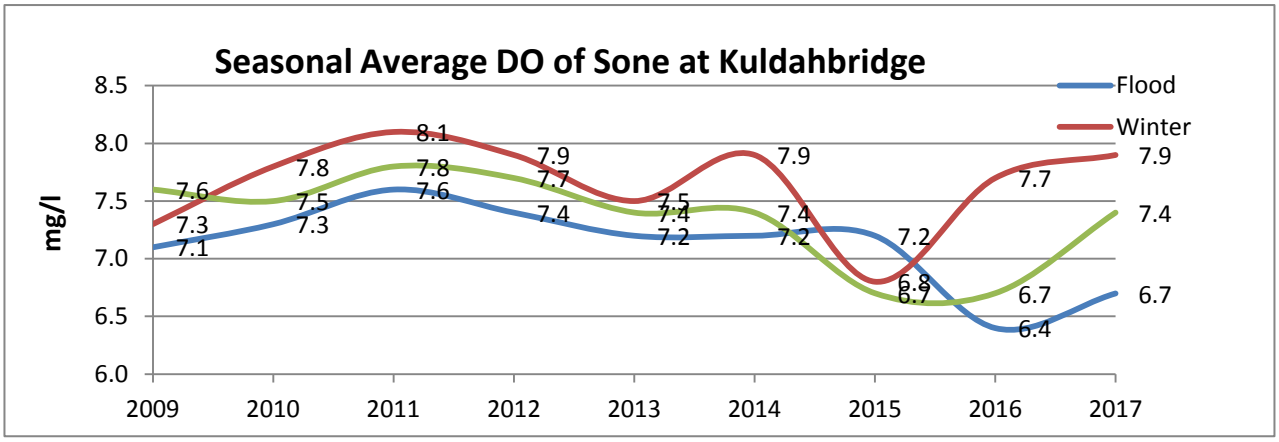

BOD
mg/l
3.4
2.9
2.4
1.9
1.4
2016-17
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May

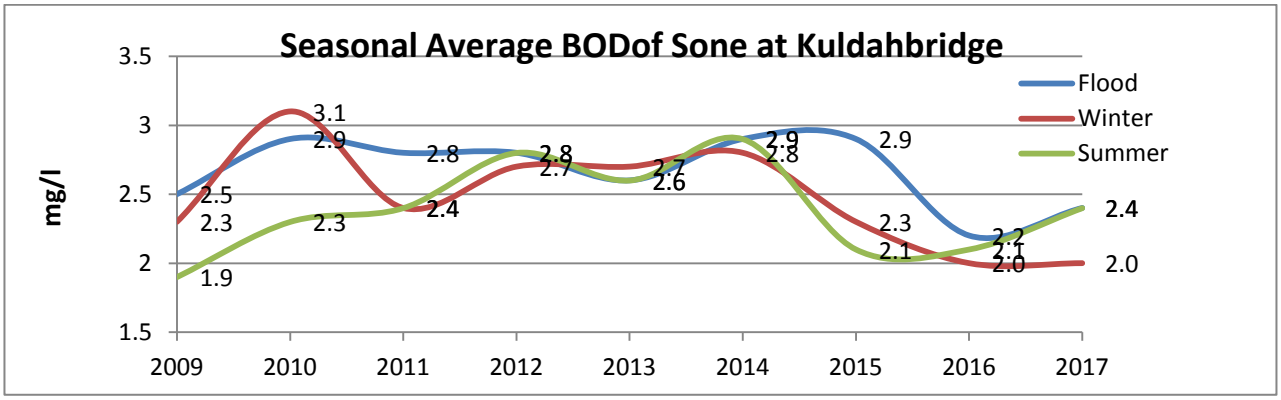

COD
mg/l
30.0
25.0
20.0
15.0
10.0
5.0
0.0
2016-17
2017-18
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May


Faecal Coliform
MPN/100ml
2900
2400
1900
1400
900
400
2016-17
2017-18
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May

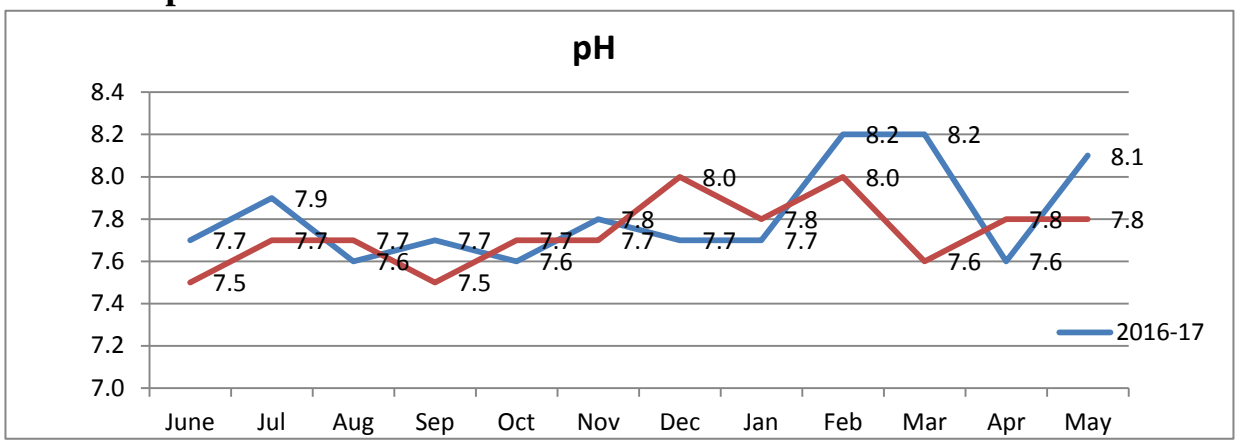

Total Coliform
MPN/100ml
7000
6000
5000
4000
3000
2000
1000
2016-17
2017-18
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May

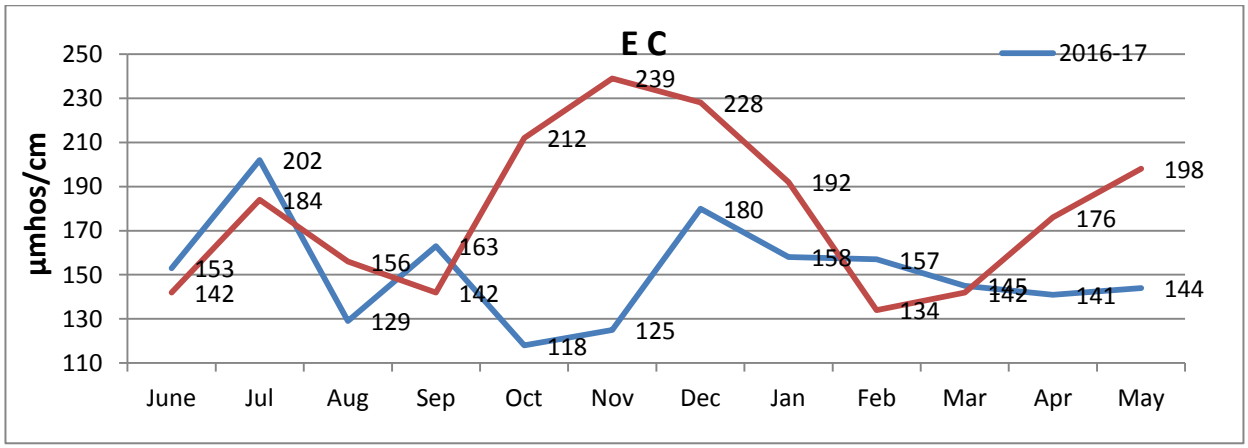

Trace and Toxic
µg/l
30.0
25.0
20.0
15.0
10.0
5.0
0.0
3.6
1.6
0.1
0.4
2.2
4.6
10.9
11.1
1.8
1.7
28.3
5.0
As
Cd
Cr
Ni
Pb
Zn
2016-17
2017-18

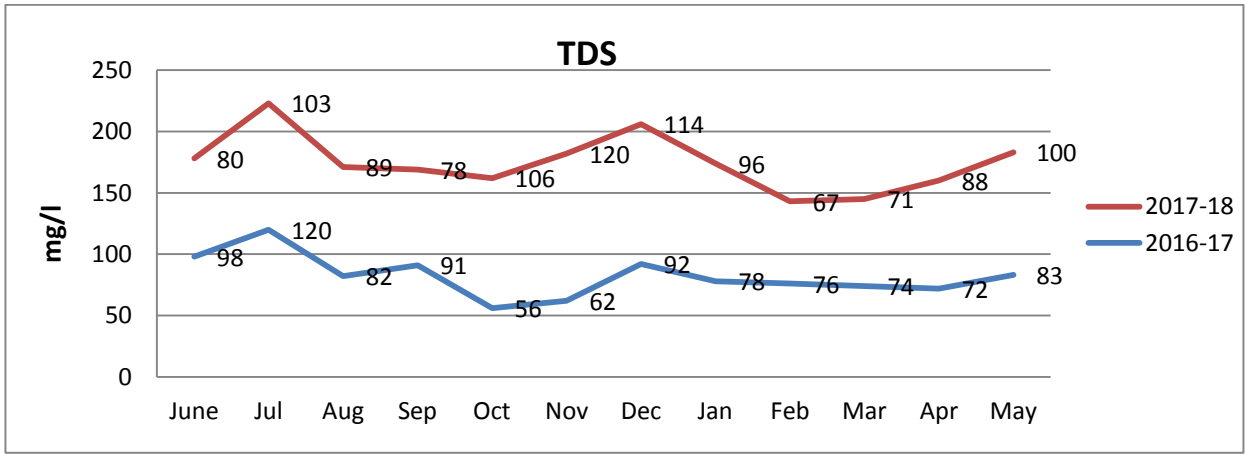

Seasonal Average DO of Sone at Kuldahbridge
mg/l
8.5
8.0
7.5
7.0
6.5
6.0
2009
2010
2011
2012
2013
2014
2015
2016
2017
Flood
Winter
7.9
7.4
6.7

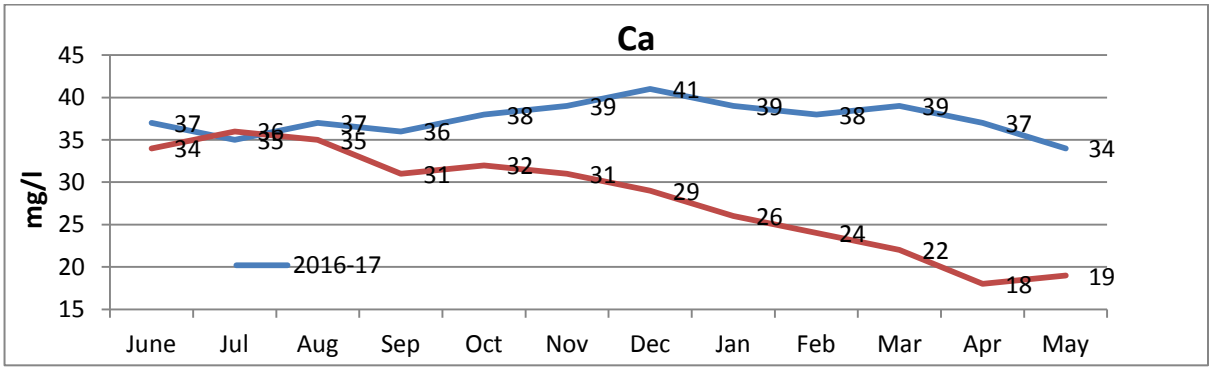

Seasonal Average BODof Sone at Kuldahbridge
mg/l
3.5
3
2.5
2
1.5
2009
2010
2011
2012
2013
2014
2015
2016
2017
Flood
Winter
Summer
2.4
2.0

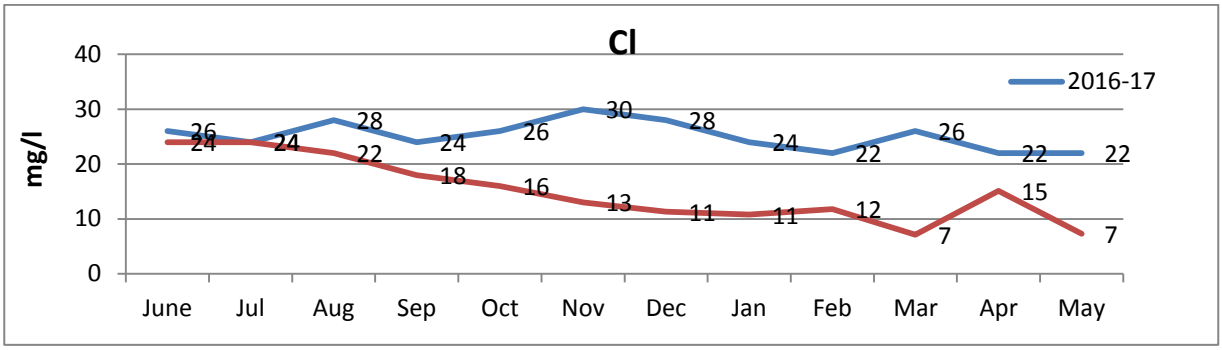
4.4.2 Chopan – River Sone

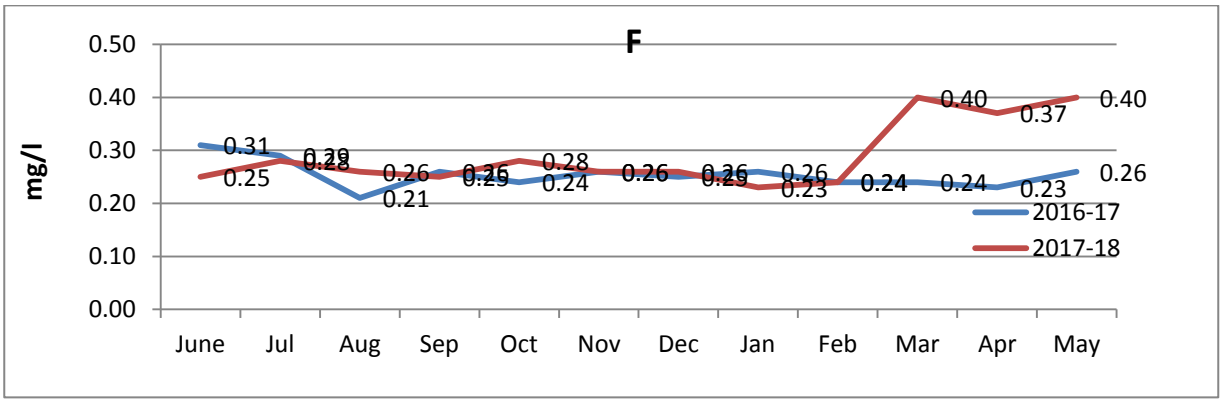


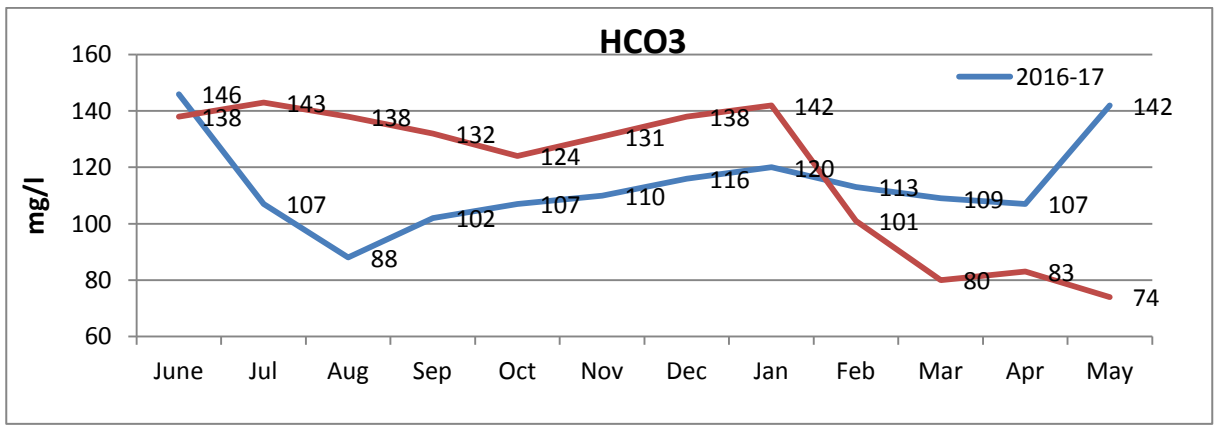


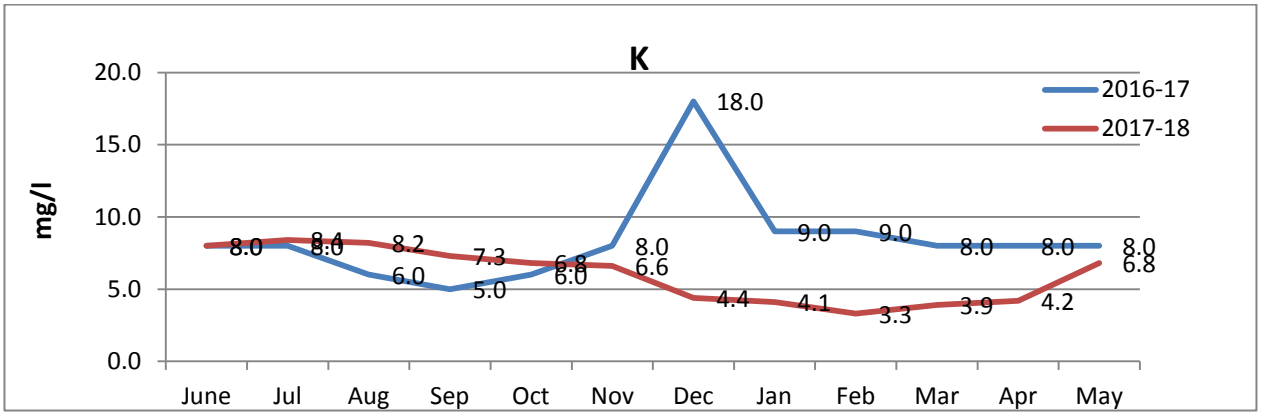


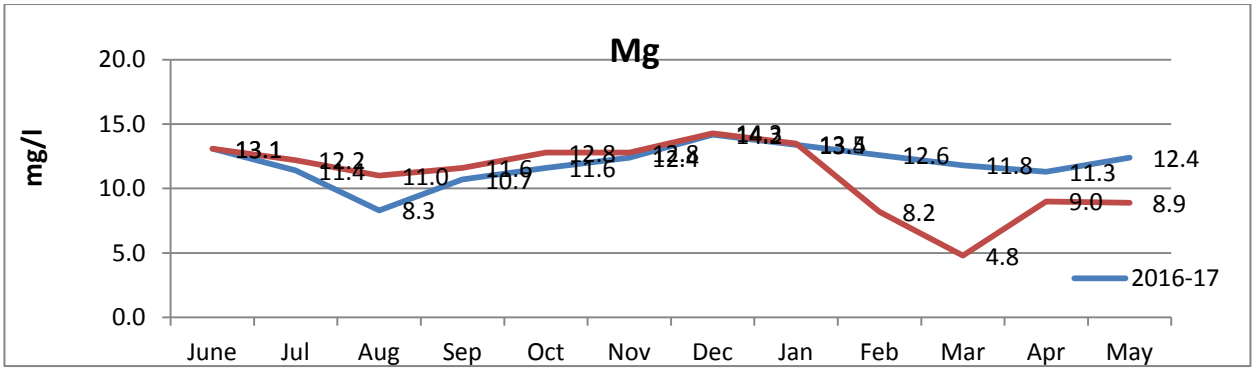

Ca
mg/l
45
40
35
30
25
20
15
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
37 36 37 36 38 39 41 39 38 39 37 34
34 35 35 31 32 31 29 26 24 22 18 19
2016-17

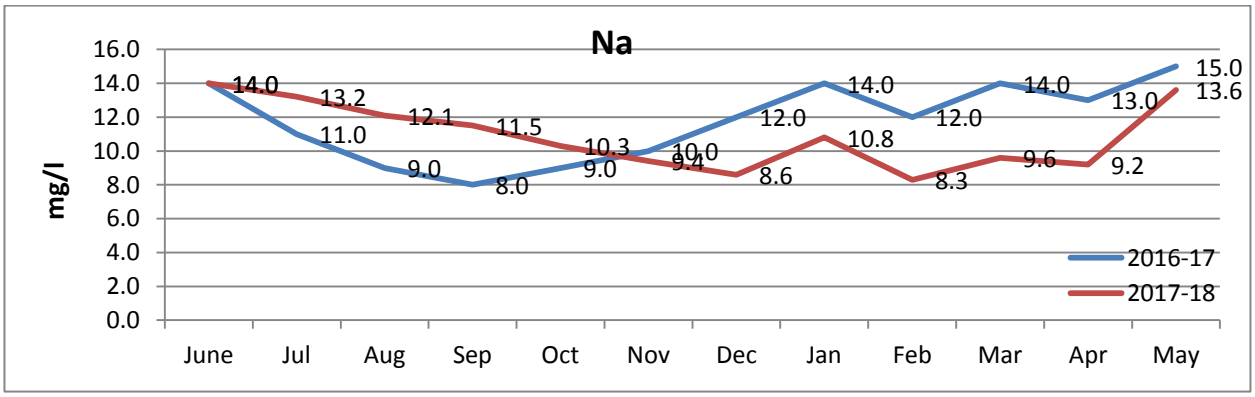

Cl
mg/l
40
30
20
10
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
26 28 24 26 30 28 24 22 26 22 22
24 24 22 18 16 13 11 11 12 7 15 7
2016-17

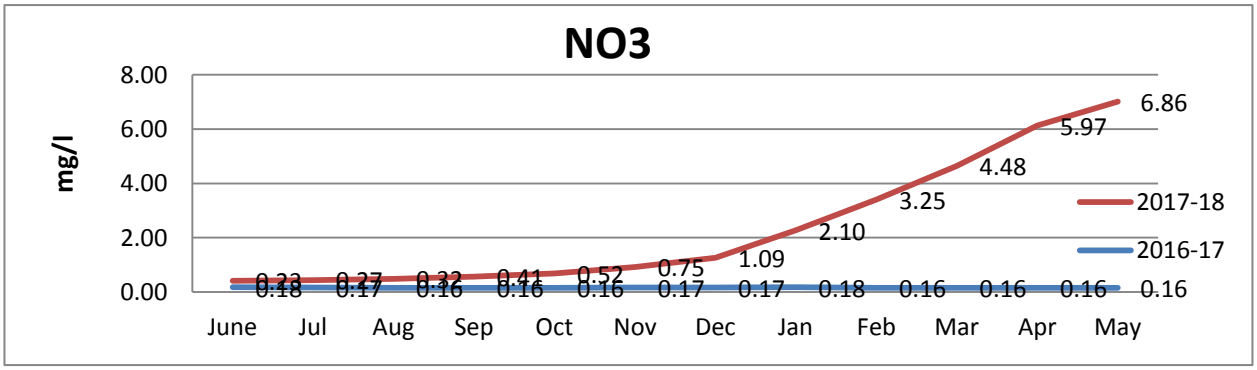

F
mg/l
0.50
0.40
0.30
0.20
0.10
0.00
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
0.31 0.21 0.24 0.26 0.24 0.23 0.24 0.24 0.23 0.26
0.25 0.26 0.26 0.28 0.26 0.26 0.23 0.40 0.37 0.40
2016-17
2017-18

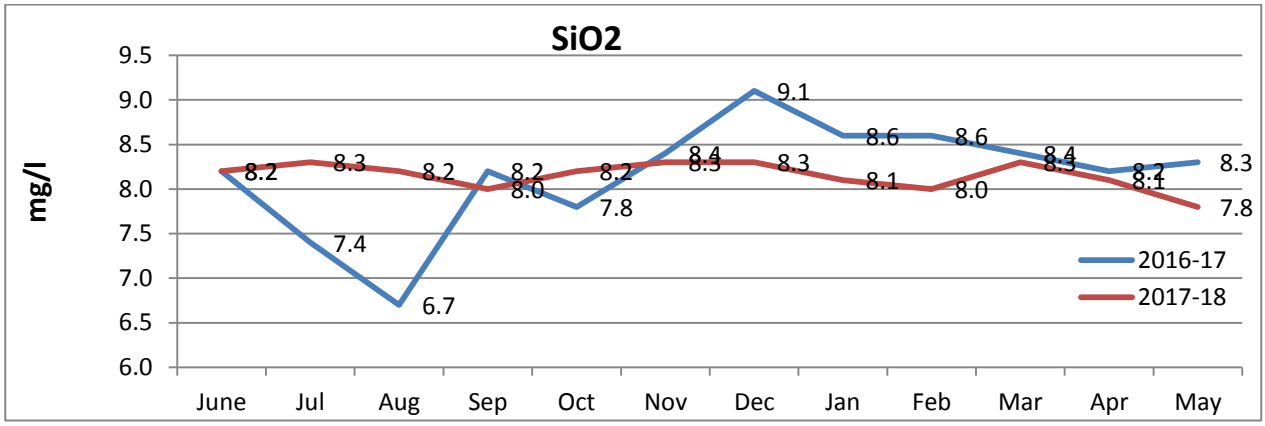

HCO3
mg/l
160
140
120
100
80
60
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
146 107 88 102 107 110 116 120 113 109 107 142
138 143 138 132 124 131 138 142 101 80 83 74
2016-17

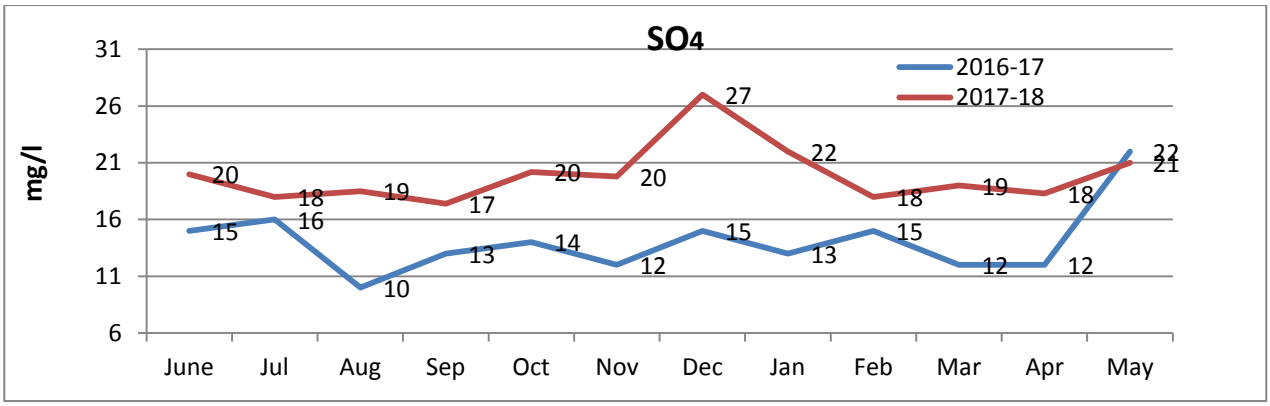

K
mg/l
20.0
15.0
10.0
5.0
0.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17
2017-18
8.0 8.4 8.2 7.3 6.8 8.0 9.0 9.0 8.0 8.0 8.0
8.0 8.0 6.0 5.0 6.0 6.6 4.4 4.1 3.3 3.9 4.2 6.8
18.0

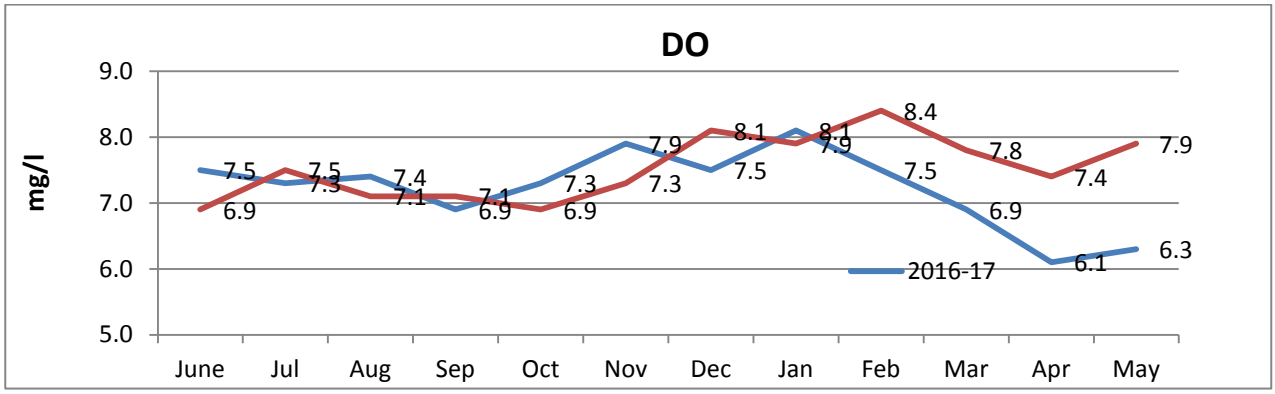

Mg
mg/l
20.0
15.0
10.0
5.0
0.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17
13.1 12.2 11.0 11.6 12.8 14.3 13.4 12.6 11.8 11.3 12.4
11.4 8.3 10.7 11.6 12.4 8.2 4.8 9.0 8.9

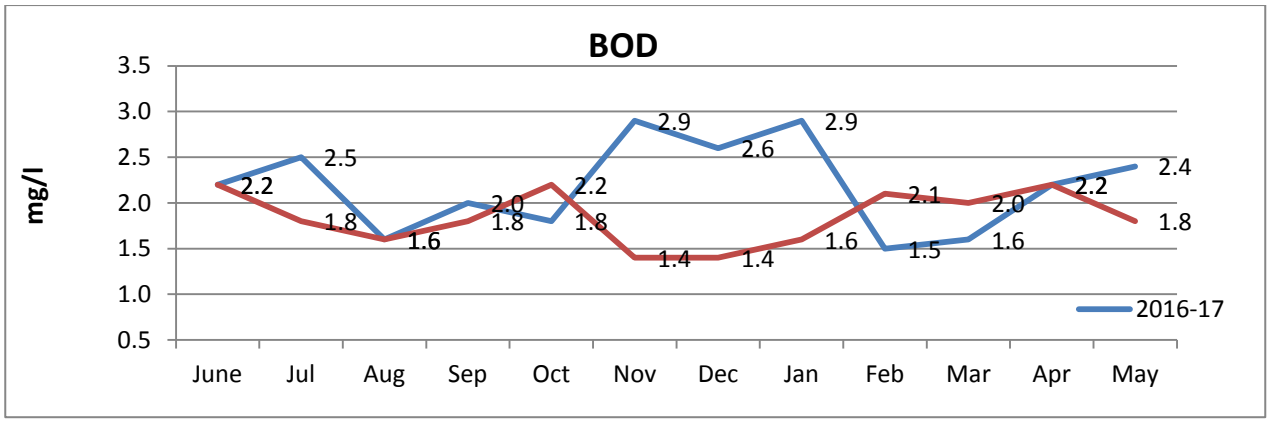

Na
mg/l
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17
2017-18
14.0 13.2 12.1 11.5 10.3 10.0 12.0 14.0 12.0 14.0 13.0 15.0
11.0 9.0 8.0 9.0 9.4 8.6 10.8 8.3 9.6 9.2 13.6

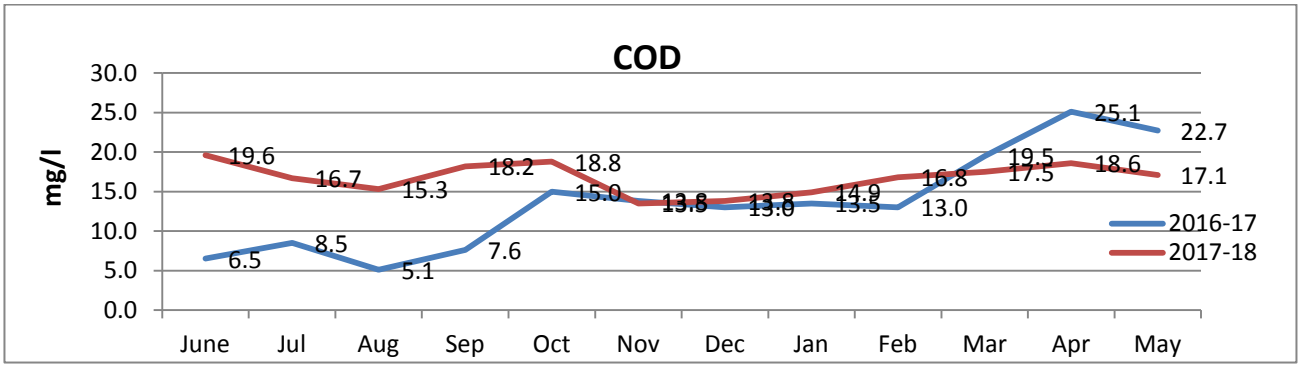

NO3
mg/l
8.00
6.00
4.00
2.00
0.00
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2017-18
2016-17
0.23 0.27 0.32 0.41 0.52 0.75 1.09 2.10 3.25 4.48 5.97 6.86
0.18 0.17 0.16 0.16 0.16 0.17 0.17 0.18 0.16 0.16 0.16 0.16

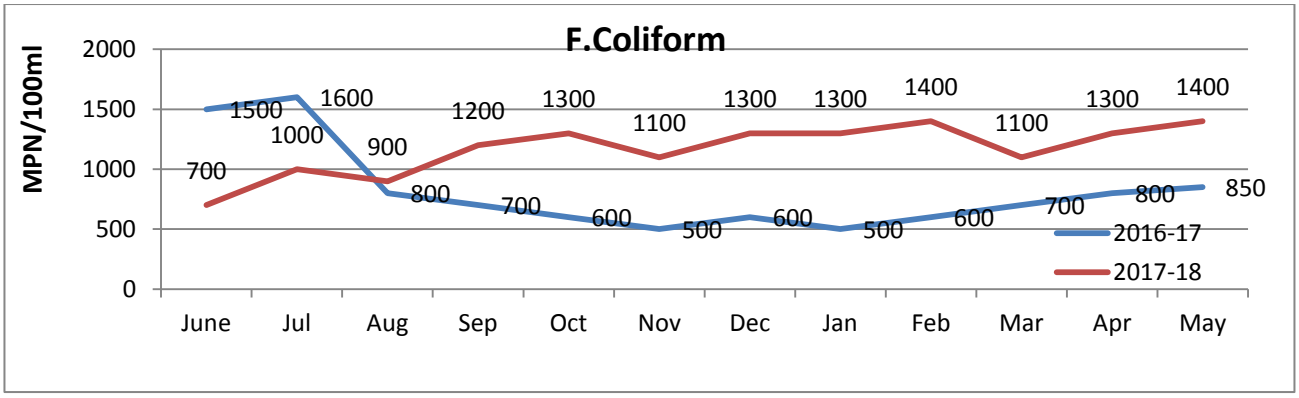

SiO2
mg/l
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17
2017-18

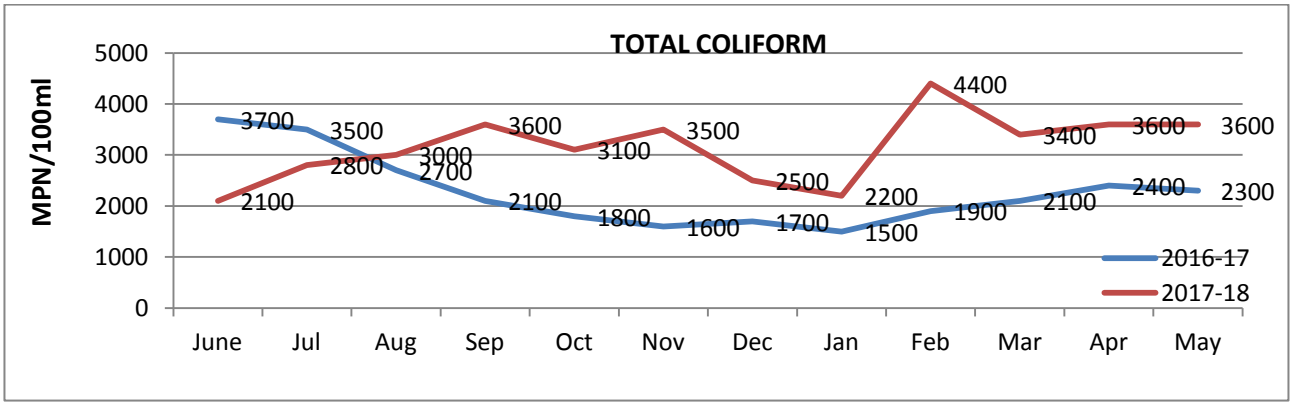

SO4
mg/l
31
26
21
16
11
6
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17
2017-18

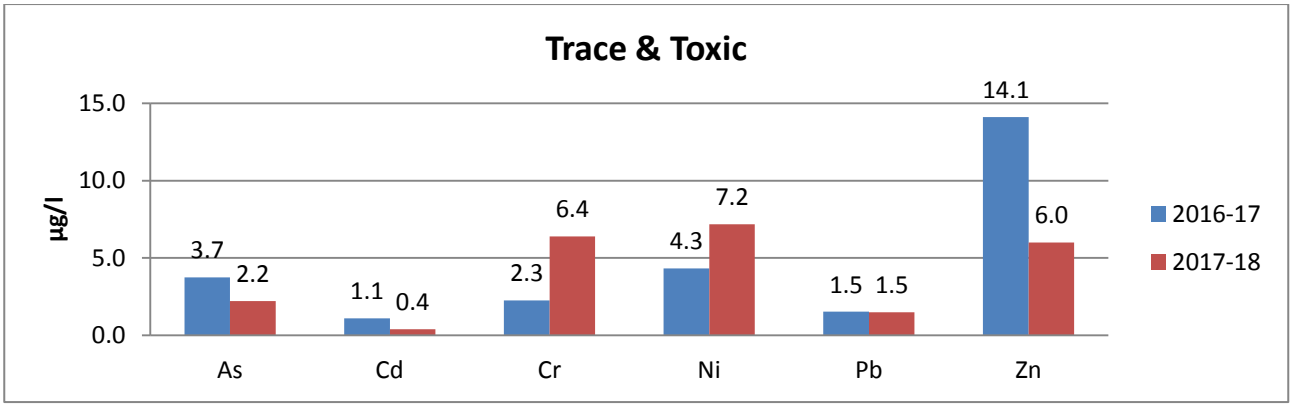

DO
mg/l
9.0
8.0
7.0
6.0
5.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17

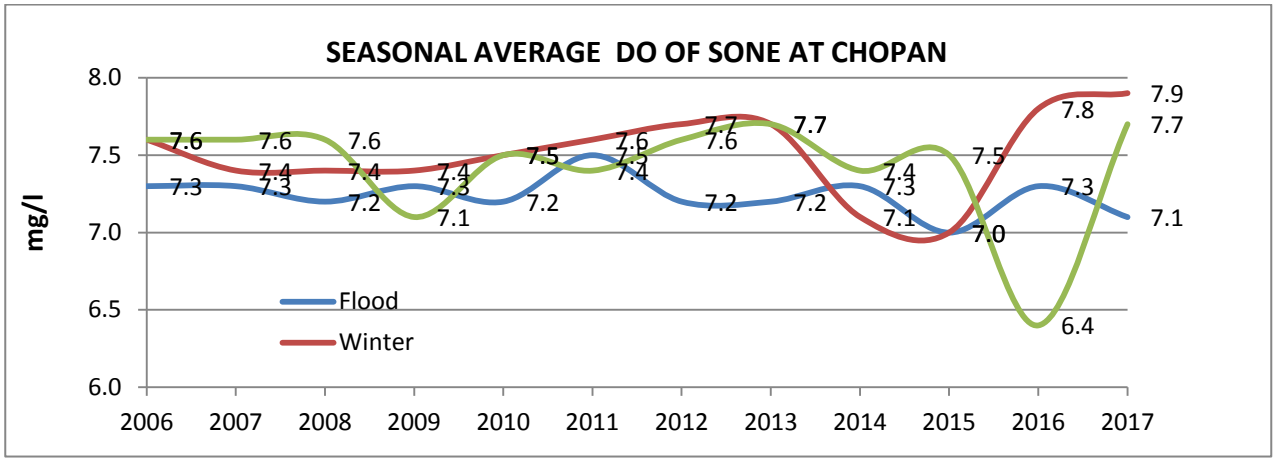

BOD
mg/l
3.5
3.0
2.5
2.0
1.5
1.0
0.5
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
2016-17

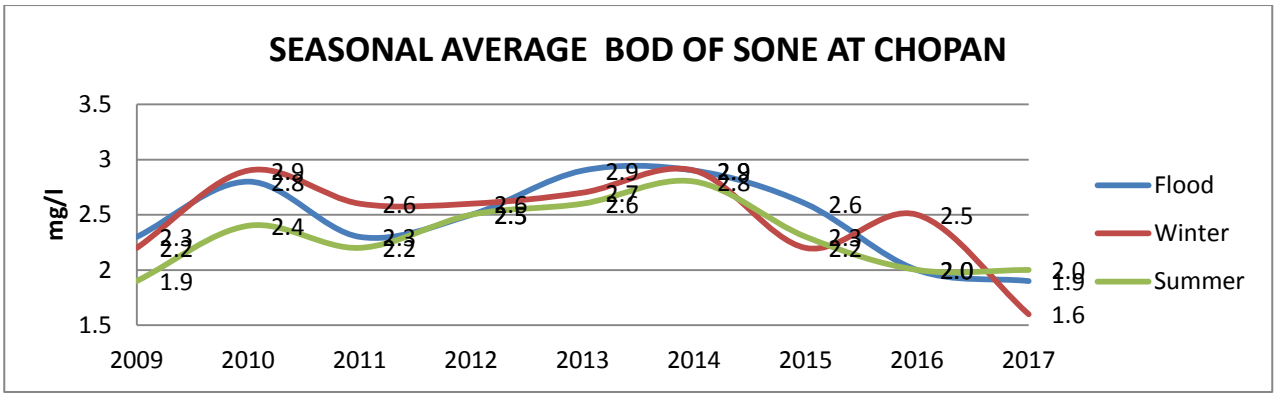

COD
mg/l
30.0
25.0
20.0
15.0
10.0
5.0
0.0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
19.6 16.7 15.3 18.2 18.8 15.0 13.8 13.0 14.9 16.8 19.5 18.6
6.5 8.5 5.1 7.6 15.0 13.8 13.0 13.5 13.0 17.5 25.1 22.7
2016-17
2017-18


F.Coliform
MPN/100ml
2000
1500
1000
500
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
1500 1600 1200 1300 1100 1300 1300 1400 1100 1300 1400
700 1000 900 800 700 600 500 600 500 600 700 800 850
2016-17
2017-18

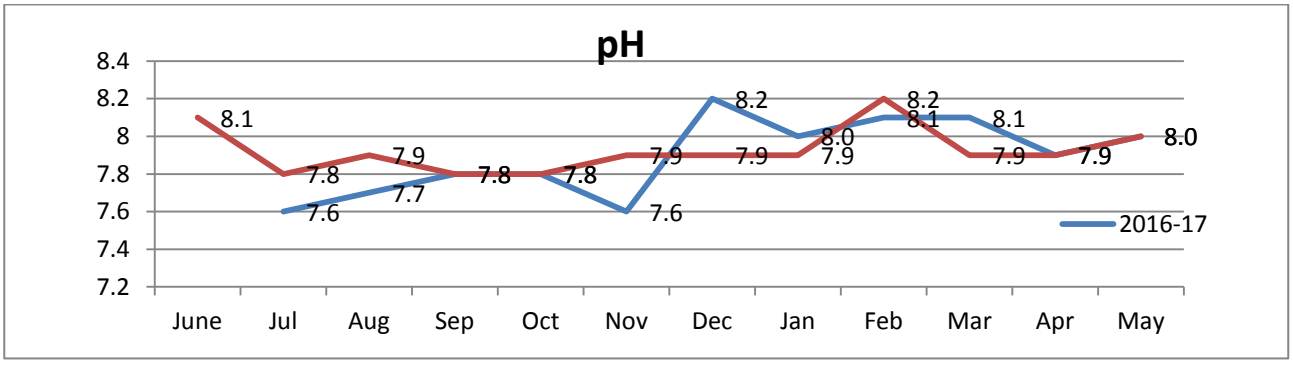

TOTAL COLIFORM
MPN/100ml
5000
4000
3000
2000
1000
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
3700 3500 2800 3000 2700 3600 2100 3100 1800 3500 1600 2500 1700 4400 2200 1500 3400 3600 1900 2100 2400 3600 2300
2016-17
2017-18

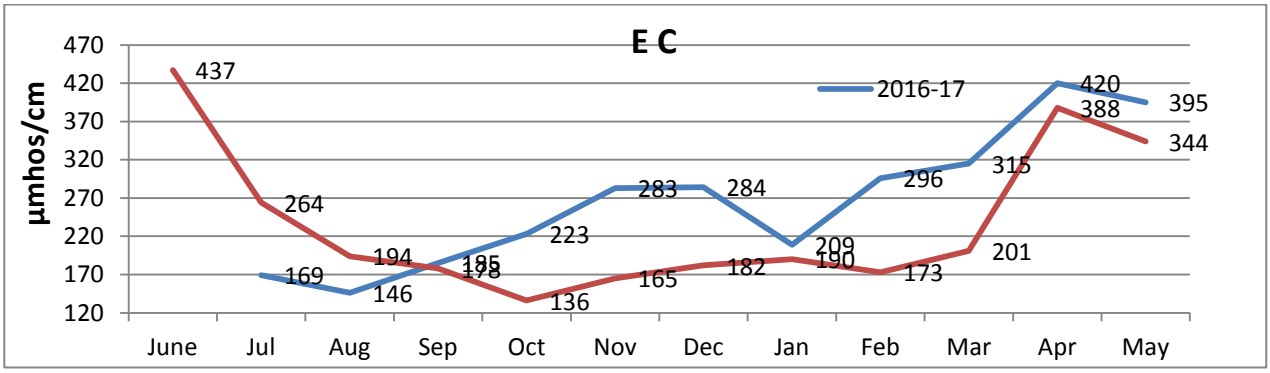

Trace & Toxic
µg/l
15.0
10.0
5.0
0.0
As Cd Cr Ni Pb Zn
3.7 2.2 1.1 0.4 2.3 6.4 4.3 7.2 1.5 1.5 14.1 6.0
2016-17
2017-18

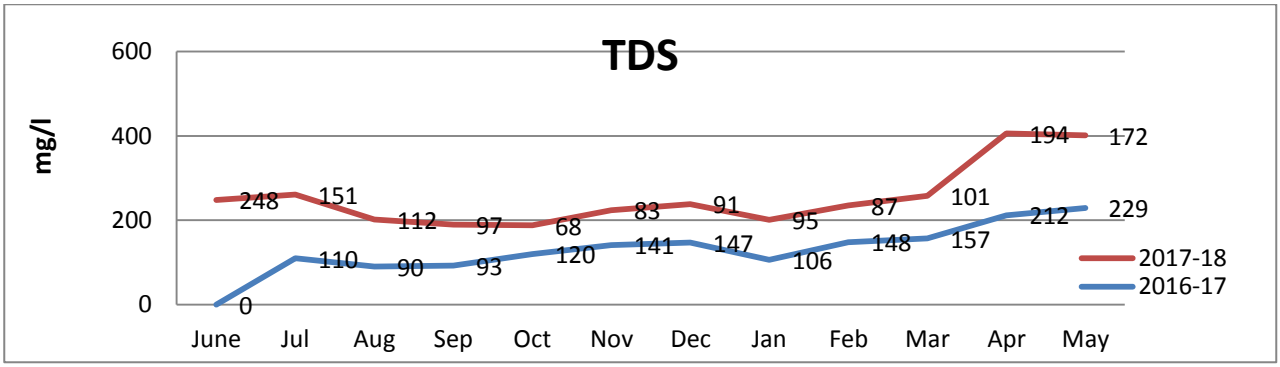


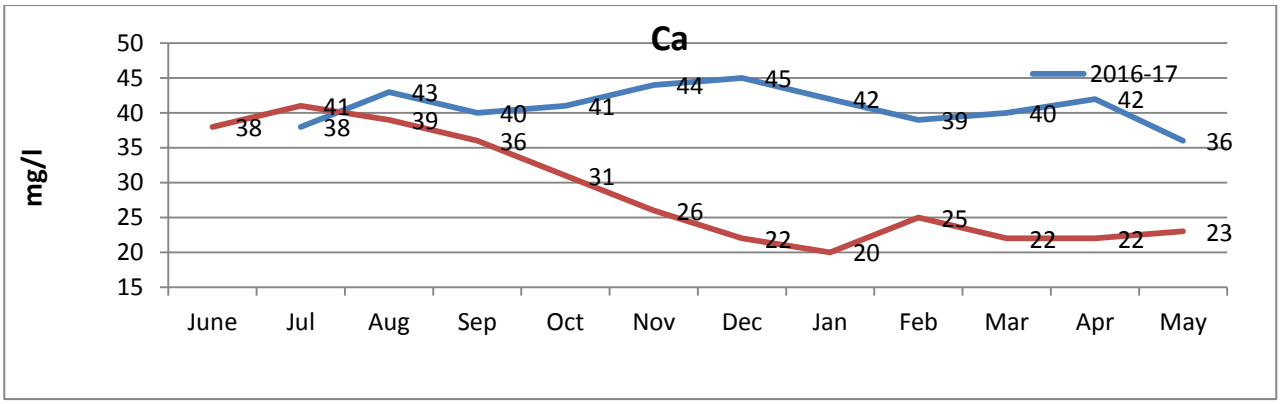


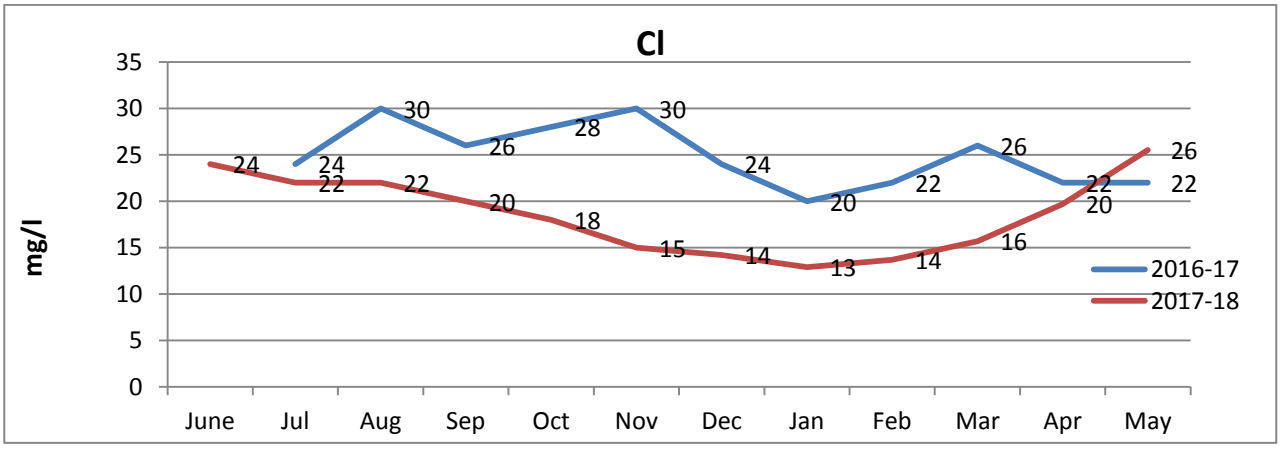
4.4.3 Duddhi – River Kanhar

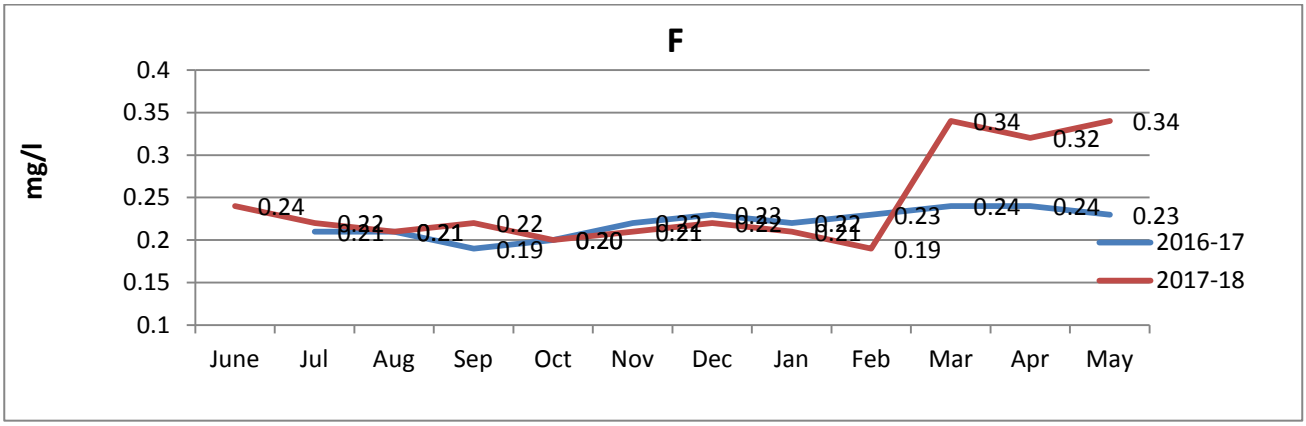


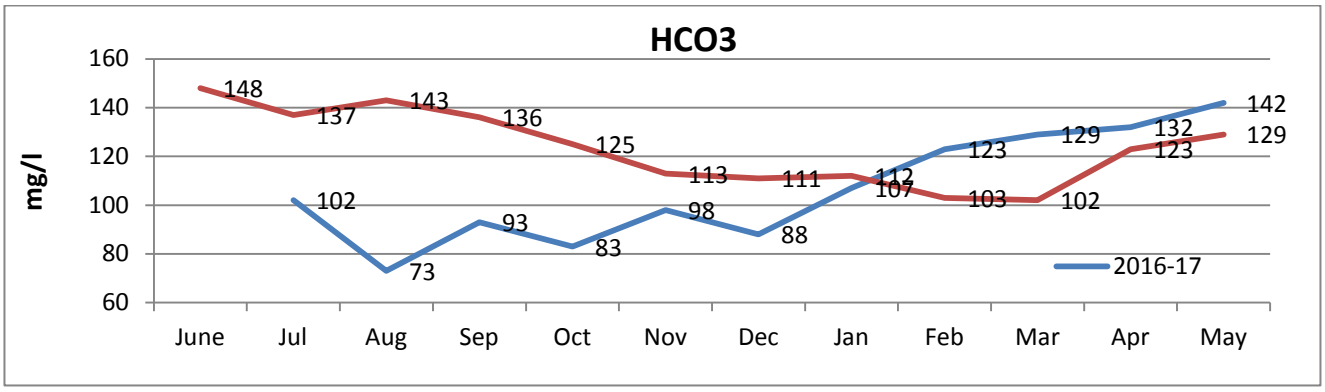

E C
µmhos/cm
2016-17
470
420
370
320
270
220
170
120
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
437 264 194 169 146 178 223 283 284 209 296 315 420 395
388 344 201 190 173 165 136 182

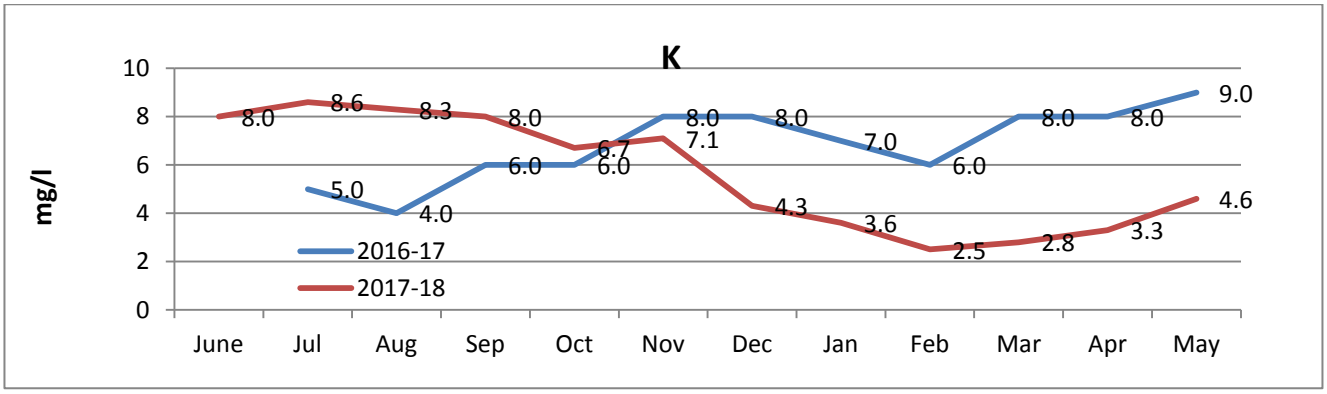

TDS
mg/l
600
400
200
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
248 151 112 97 68 83 91 95 87 101 194 172
0 110 90 93 120 141 147 106 148 157 212 229
2017-18
2016-17

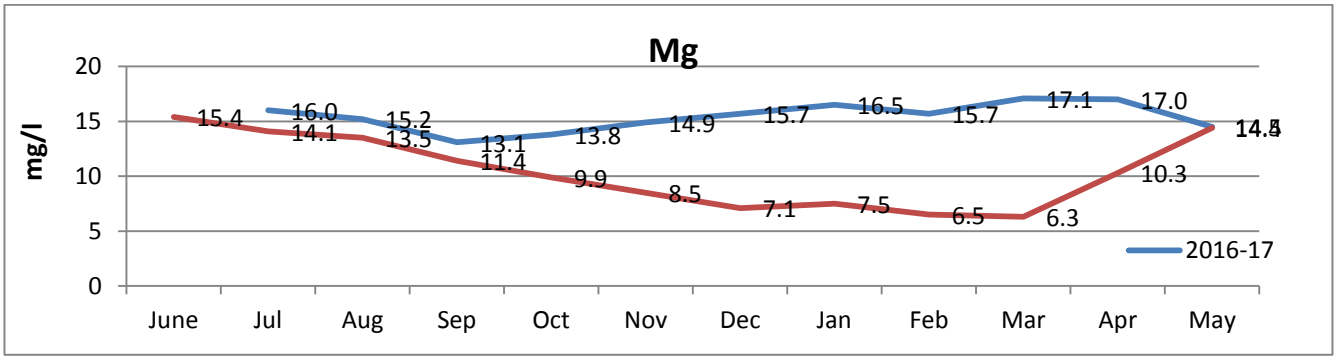

Ca
mg/l
50
45
40
35
30
25
20
15
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
38 41 39 36 31 26 22 20 25 22 22 23
38 43 40 41 44 45 42 39 40 42 36
2016-17

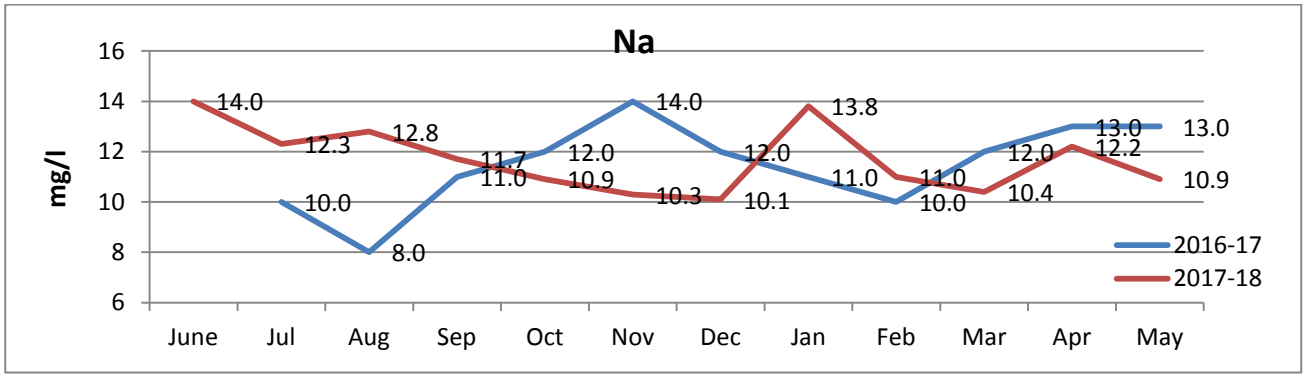

Cl
mg/l
35
30
25
20
15
10
5
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
24 22 22 20 18 15 14 13 14 16 20 26
24 30 26 28 30 24 20 22 26 22 22
2016-17
2017-18

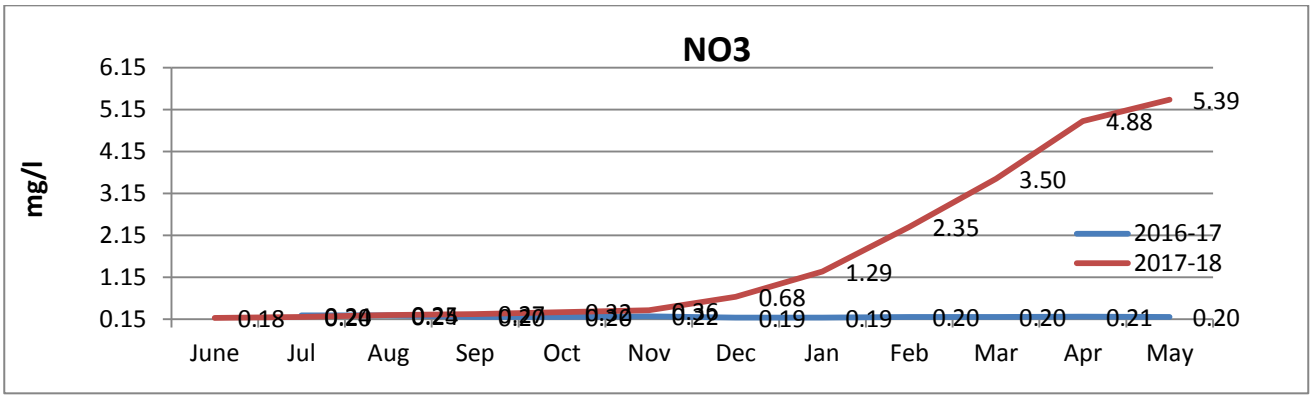

F
mg/l
0.4
0.35
0.3
0.25
0.2
0.15
0.1
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
0.24
0.21
0.21
0.22
0.19
0.20
0.21
0.22
0.21
0.19
0.34
0.32
0.34
0.23
0.24
0.24
0.23
2016-17
2017-18

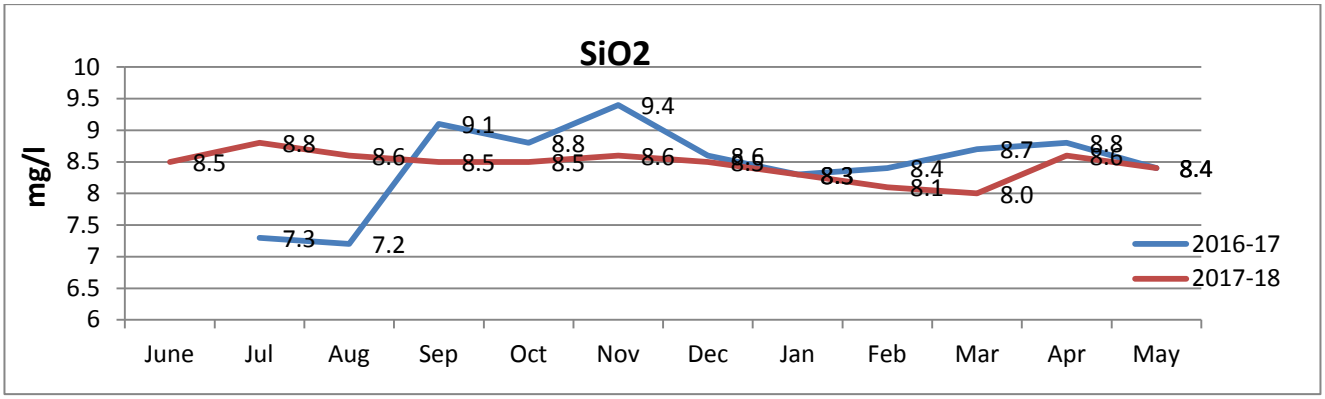

HCO3
mg/l
160
140
120
100
80
60
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
148
137
143
136
125
113
111
112
103
102
123
129
132
142
129
102
73
93
83
98
88
107
123
2016-17

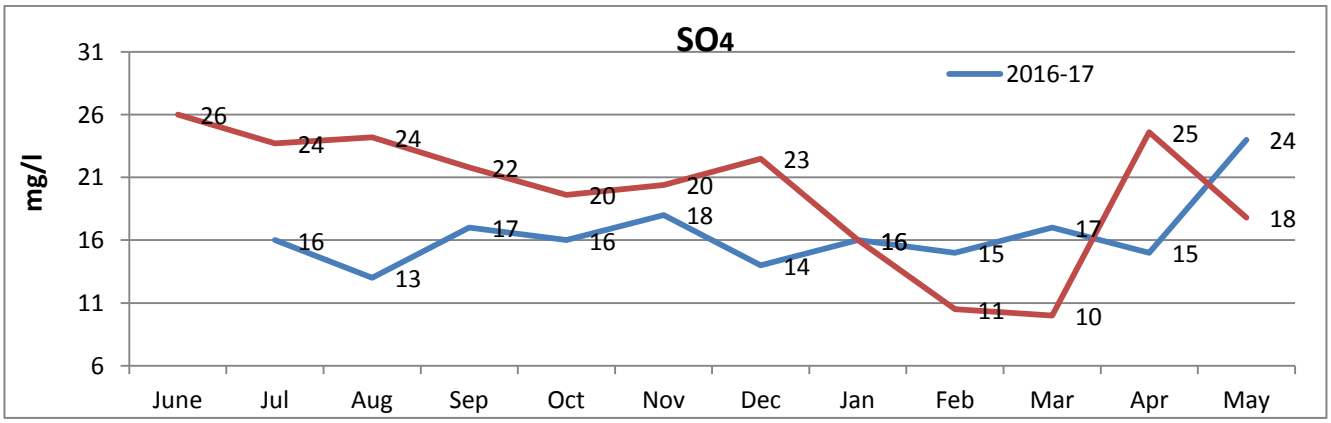

K
mg/l
10
8
6
4
2
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
8.0
8.6
8.3
8.0
6.7
7.1
4.3
3.6
2.5
2.8
3.3
4.6
5.0
4.0
6.0
6.0
8.0
8.0
7.0
6.0
8.0
8.0
9.0
2016-17
2017-18

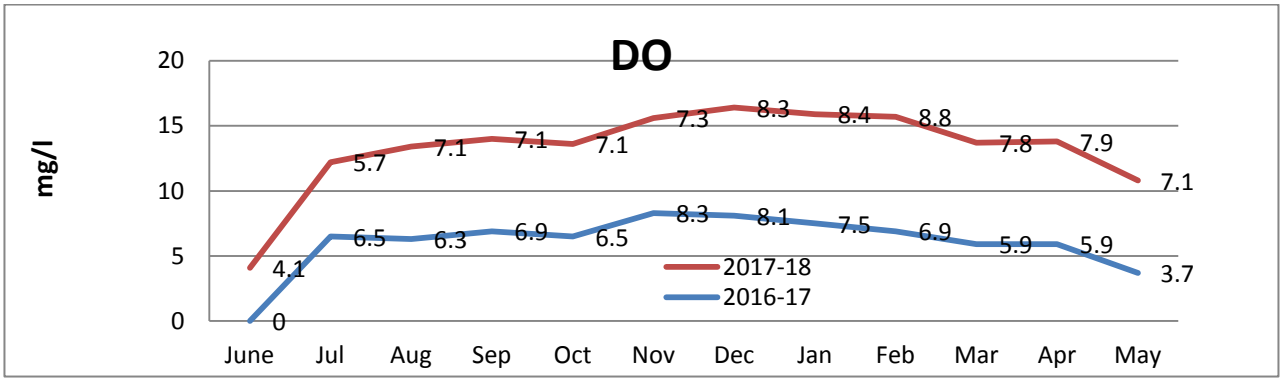

Mg
mg/l
20
15
10
5
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
15.4
14.1
13.5
11.4
9.9
8.5
7.1
7.5
6.5
6.3
10.3
14.5
16.0
15.2
13.1
13.8
14.9
15.7
16.5
15.7
17.1
17.0
2016-17

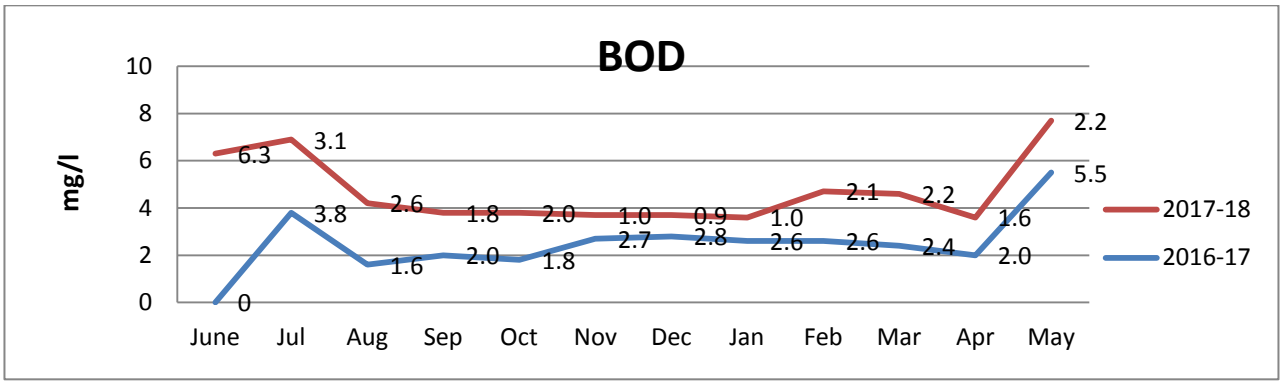

Na
mg/l
16
14
12
10
8
6
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
14.0 12.3 12.8 11.7 12.0 14.0 12.0 11.0 11.0 12.0 13.0 13.0
10.0 8.0 11.0 10.9 10.3 10.1 13.8 10.0 10.4 12.2 10.9
2016-17
2017-18

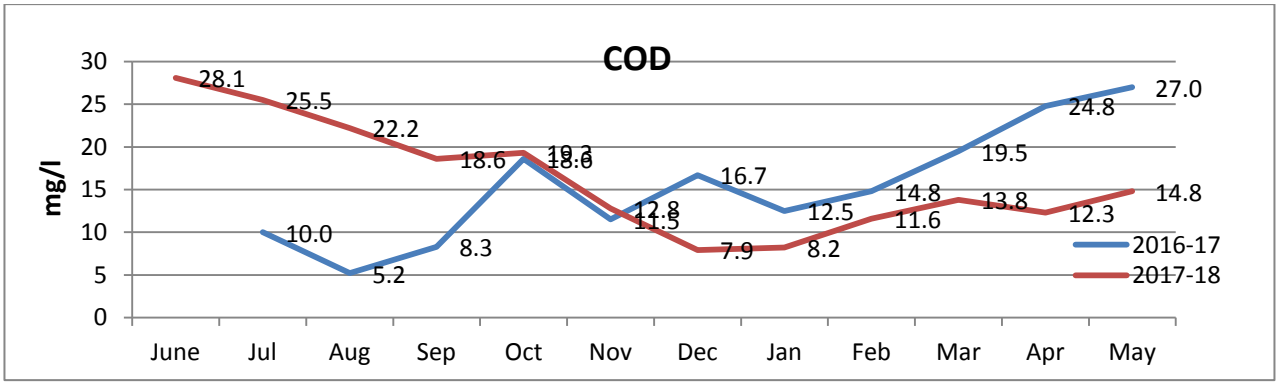

NO3
mg/l
6.15
5.15
4.15
3.15
2.15
1.15
0.15
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
0.18 0.20 0.25 0.27 0.32 0.36 0.68 1.29 2.35 3.50 4.88 5.39
0.19 0.19 0.20 0.20 0.21 0.20
2016-17
2017-18

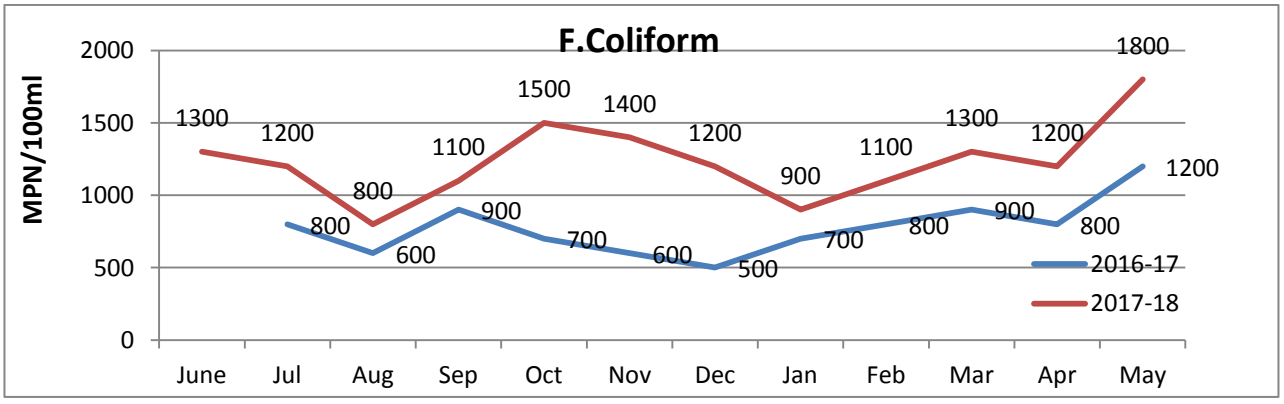

SiO2
mg/l
10
9.5
9
8.5
8
7.5
7
6.5
6
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
8.5 8.8 8.6 9.1 8.8 9.4 8.6 8.3 8.4 8.7 8.8 8.4
7.3 7.2 8.5 8.5 8.6 8.6 8.1 8.0 8.6
2016-17
2017-18

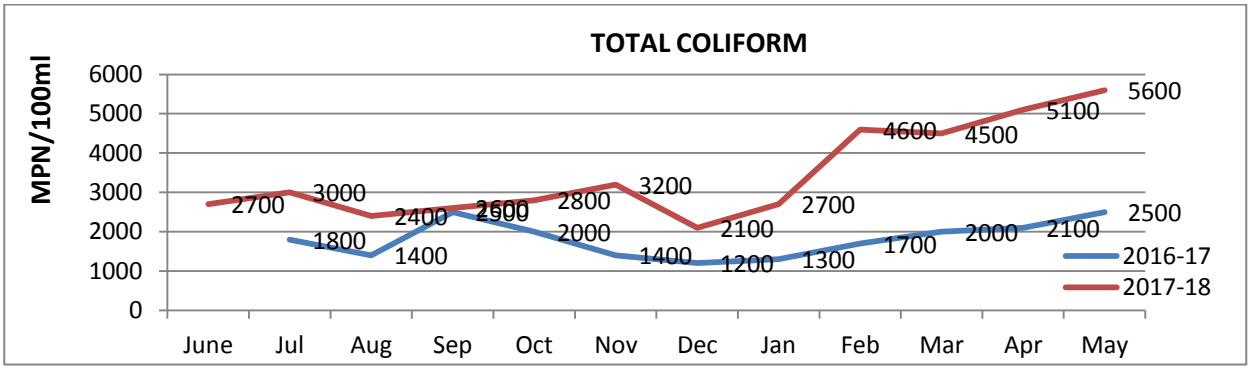

SO4
mg/l
31
26
21
16
11
6
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
26 24 24 22 20 23 16 15 11 10 25 18
16 13 17 16 18 14 16 15 17 15 24
2016-17

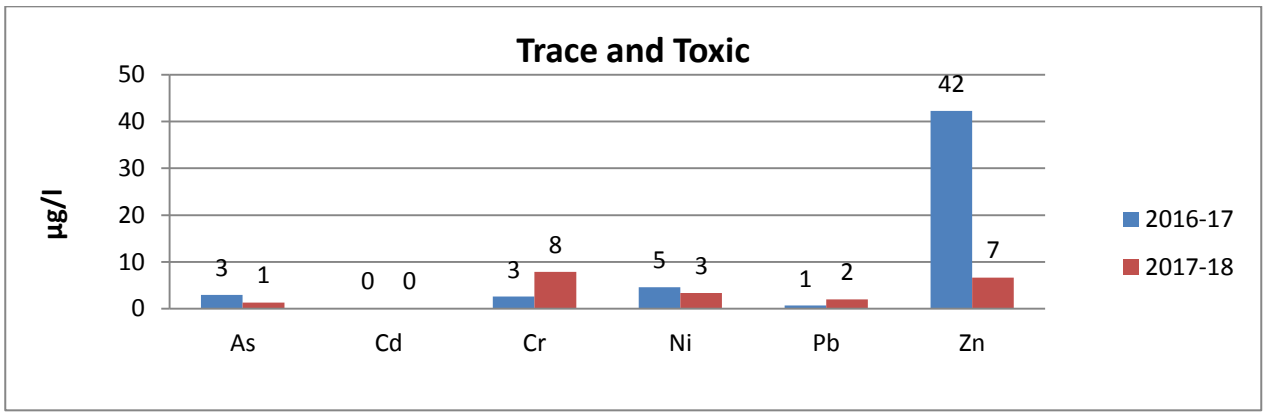

DO
mg/l
20
15
10
5
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
5.7 7.1 7.1 7.1 7.3 8.3 8.4 8.8 7.8 7.9 7.1
4.1 6.5 6.3 6.9 6.5 8.3 8.1 7.5 6.9 5.9 5.9 3.7
0
2017-18
2016-17

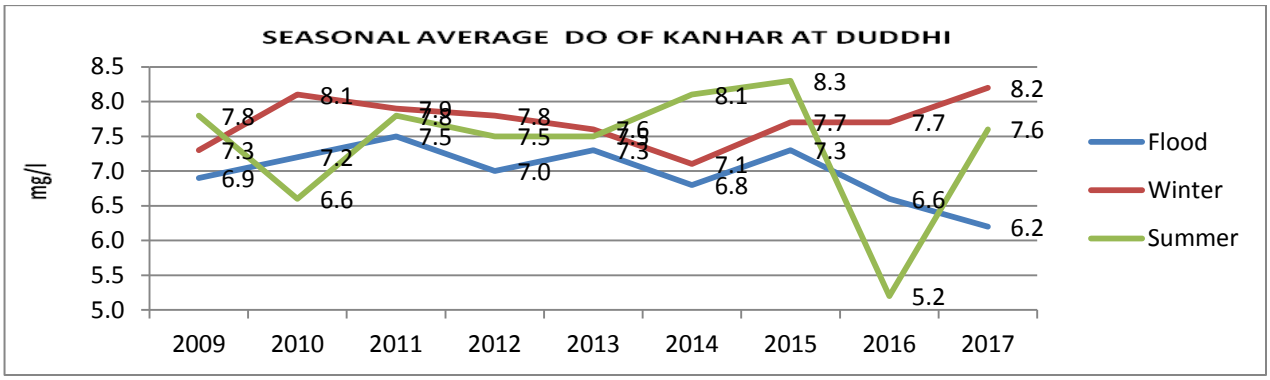

BOD
mg/l
10
8
6
4
2
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
6.3 3.1 2.6 1.8 2.0 1.0 0.9 1.0 2.1 2.2 1.6 2.2
0 3.8 1.6 2.0 1.8 2.7 2.8 2.6 2.6 2.4 2.0 5.5
2017-18
2016-17

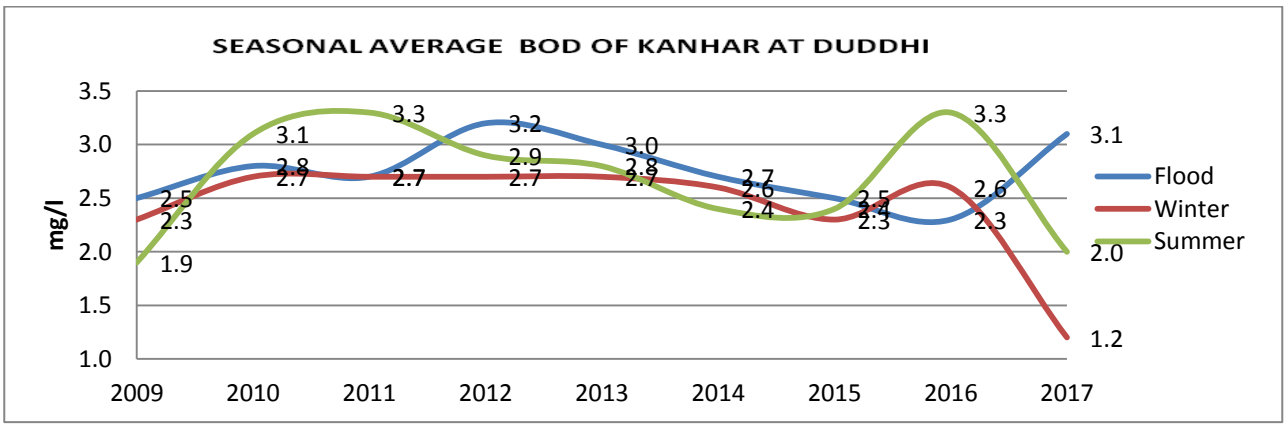

COD
mg/l
30
25
20
15
10
5
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
28.1 25.5 22.2 18.6 19.3 11.5 7.9 8.2 11.6 13.8 12.3 14.8
10.0 5.2 8.3 18.6 12.8 16.7 12.5 14.8 19.5 24.8 27.0
2016-17
2017-18


F.Coliform
MPN/100ml
2000
1500
1000
500
0
June Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
1300 1200 800 1100 1500 1400 1200 900 1100 1300 1200 1800
800 600 900 700 600 500 700 800 900 800 1200
2016-17
2017-18


TOTAL COLIFORM
MPN/100ml
6000
5000
4000
3000
2000
1000
0
June
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
2700
3000
1800
2400
1400
2600
2500
2800
2000
3200
1400
2100
1200
2700
1300
4600
1700
4500
2000
5100
2100
5600
2500
2016-17
2017-18


Trace and Toxic
µg/l
50
40
30
20
10
0
As
Cd
Cr
Ni
Pb
Zn
3
1
0
0
3
8
5
3
1
2
42
7
2016-17
2017-18


SEASONAL AVERAGE DO OF KANHAR AT DUDDHI
mg/l
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
2009
2010
2011
2012
2013
2014
2015
2016
2017
7.8
7.3
6.9
8.1
7.2
6.6
7.8
7.5
7.8
7.5
7.0
7.6
7.3
8.1
7.1
6.8
8.3
7.7
7.3
7.7
6.6
5.2
8.2
7.6
6.2
Flood
Winter
Summer


SEASONAL AVERAGE BOD OF KANHAR AT DUDDHI
mg/l
3.5
3.0
2.5
2.0
1.5
1.0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2.5
2.3
1.9
3.1
2.8
2.7
3.3
2.7
3.2
2.9
2.7
3.0
2.8
2.7
2.7
2.6
2.4
2.5
2.3
3.3
2.6
2.3
3.1
2.0
1.2
Flood
Winter
Summer

5. General Remark / Conclusion about W.Q. trend:

Sone River: Kuldahbridge and Chopan are water quality monitoring station on river Sone.

- During the year 2017-18 the maximum BOD observed was 2.9 mg/l. The dissolved oxygen(DO) content was in the range of 6.3 mg/l to 8.6 mg/l. Total Coliform fell in between 1800 to 5800 MPN. All other parameters including trace and toxic were within the permissible range.
- From the historical data it can be gathered that the values of BOD in all years was either equal to or less than 3.0 mg/l. The Dissolved oxygen average values have been above 7.4 mg/l.Total coliform values shows increasing trend is a matter of concern. The Coliform values during 2017-18 were on a higher side when compared to the year 2016-17, which may be due to very good rainfall during the year 2016-17. The quality of water at these stations is relatively Good except the presence of high Fecal and Total coliform values.

River Kanhar: This is the only water quality monitoring station on river Kanhar, tributary of Sone river

- In the year 2017-18, the maximum BOD values observed was 6.3 mg/l during summer season and minimum being 0.9 in flood season. The DO values ranged between 4.1 to 8.8 mg/l. Total Coliform fell in between 2100 to 55600 MPN. All other parameters including trace and toxic were within the permissible range.
- The water quality monitoring at this station started from 2004.In the month of June there is no flow condition and Due to negligible flow in summer season the BOD values are high in comparison to other month of year. The Fecal and Total Coliform values are above the permissible limits. Overall the water quality of the river is relatively good when compared to other rivers in Ganga basin.

History Sheet

Water Quality Data

2017-2018

HISTORY SHEET (WATER QUALITY)

		Water Year	: 2017 - 2018
Site	: KULDAH BRIDGE	**Code**	: 012-MGD3VNS
State	: Madhya Pradesh	**District**	Sidhi
Basin	: GANGA	**Independent River**	: Ganga
Tributary	: Sone	**Sub Tributary**	: -
Sub-Sub Tributary	: -	**Local River**	: Sone
Division	: Middle Ganga Division-III (MGD-III), Varanasi	**Sub-Division**	: Middle Ganga Choti Saryu Sub-Division,
Drainage Area	: 23276.0 Sq. Km.	**Bank**	: Right
Latitude	: 24°25'0''	**Longitude**	: 81°41'0''
Current Zero of Gauge (m)	: 234		

CATEGORY		Opening Date	Closing Date
Gauge	:	13/12/1959	
Discharge	:	13/12/1959	
Sediment	:	01/01/1981	
Water Quality	:		

Reduced Level	Opening Date	Closing Date
234.0	13/12/1959	02/06/2014
234.0	02/06/2014	12/01/2017
234.0	12/01/2017	-

Water Quality Datasheet (River Water Analysis) for the period : 2017 - 2018

Station Name: KULDAH BRIDGE(012-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varana

PARAMETERS	01/06/2017	01/07/2017	01/08/2017	01/09/2017	03/10/2017	01/11/2017	01/12/2017	01/01/2018	01/02/2018	01/03/2018	02/04/2018	01/05/2018
Q (cumec)	46.03	214.08	94.66	82.98	225.12	65.96	64.24	51.41	50.54	31.16	24.94	13.94
CHEMICAL												
NO2-N(mg/L	0	0										
TOT(mgCaC(	127.2	122	117.2	118.8	116.8	113.6	118.61	117.82	118.89	122.75	122.75	122.75
SO4(mg/L)	18	20.6	20.2	21.1	21.8	22.4	12.2	7.4	4.8	13	13	13
NH3-N(mgN/	0.05	0.05	0	0	0	0	0	0	0	0	0	0
Mg(mg/L)	14.76	15.17	14.34	14.96	14.04	14.14	15.11	13.24	11	12.57	12.57	12.57
K(mg/L)	8	8.1	8.3	8.5	8.1	8.2	5.4	4.4	3.1	3.4	3.4	3.4
Phen(mgCaC(	0	0	0	0	0	0	0	0	0	0	0	0
HCO3(mg/L)	155.18	148.84	142.98	144.94	142.5	138.59	144.71	143.74	145.04	149.75	149.75	149.75
Cl(mg/L)	26	24	22	16	20	16	13.03	14.1	13.52	15.72	15.72	15.72
P-Tot(mgP/L	0.05	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.05
CO3(mg/L)	0	0	0	0	0	0	0	0	0	0	0	0
Ca(mg/L)	36.64	34.74	33.37	34.06	31.3	30.44	28.99	28.54	34.58	33.29	33.29	33.29
Na(mg/L)	14	12.8	12.1	11.6	13.5	11.4	9.2	10.6	9.4	10.2	10.2	10.2
SiO2(mg/L)	7.83	8.15	7.92	8.24	8.09	8.23	8.32	8.19	8.07	8.52	8.52	8.52
B(mg/L)	0	0	0	0	0	0	0	0	0	0	0	0
F(mg/L)	0.25	0.27	0.25	0.29	0.26	0.27	0.25	0.24	0.27	0.4	0.4	0.4
NO3-N(mgN/	0.2	0.18										
O2+NO3(mgN	0.2	0.18										
TRACE & TOXIC												
PESTICIDES												
BIOLOGICAL/BACTEOROLOGICAI												
SAT%(Percen	78.69	86.17	6.66	7.25	6.66	7.06	7.7	8.24	8.59	7.63	7.63	7.63
MPN(MPN/1	1600	1300	1500	1100	1600	1800	1700	800	1200	1700	1700	1700
BOD3-27(mg/	2.55	2.16	2.35	2.15	2.94	2.35	2.22	1.75	1.85	2.15	2.15	2.15
MPN(MPN/1	3500	3400	3500	1800	2900	3400	3700	2300	3600	4100	4100	4100
Chlf-a(µg/L)												
COD(mg/L)	26.9	19.3	18.8	19.6	21.2	21.4	20.6	17.2	17.4	19	19	19
DO(mg/L)	6.27	6.86										
PHYSICAL												

Water Quality Datasheet (River Water Analysis) for the period : 2017 - 2018

Station Name: KULDAH BRIDGE(012-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varana

Colour_Cod(-	Clear	Brown	Brown	Clear	Clear		Clear	Clear	Clear	Clear		Clear
I_GEN(pH ur	7.93	7.87	7.91	8	7.81	8	8.15	7.98	8.22	7.97	7.97	7.97
Odour_Code(	odour free	odour free	odour free	odour free	odour free		odour free	odour free	odour free	odour free		odour free
H_FLD(pH un	8	7.8	7.9	8	7.8	8	8.1	7.9	8.2	7.9	7.9	7.9
_FLD(µmho/(	220	190	180	220	210	240	260	250	260	250	250	250
GEN(µmho/	228	186	170	211	206	236	251	248	256	247	247	247
Degrees Celsi	27	27.5	27.5	30.5	24.5	26.5	20	15	17	21.5	21.5	21.5
TDS(mg/L)	128	106	96	120	103	118	126	124	128	124	124	124
SS(mg/L)								0	0			
ecchi(Meters	91.6	86.85										
CHEMICAL INDICES												
Total(mgCaC	153.1	150.06	174.89	179.32	165.52	162.18	158.57	152.02	171.58	170.13	170.13	170.13
_Ca(mgCaCC	473.92	456.69	437.23	448.29	413.79	405.46	396.42	380.04	428.96	425.33	425.33	425.33
RSC(-)	0	0										
%(Percentag	15.79	14.86										
SAR(-)	0.49	0.46										

Water Quality Summary (River Water Summary) for the period : 2017 - 2018

Station Name: KULDAH BRIDGE(012-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

PARAMETERS	No. of Observations	Maximum	Minimum	Mean	Flood (Jun-Oct)	Winter (Nov-Feb)	Summer (Mar-May)
Q (cumec)	364	671.3	11.36	80.56	138.82	51.58	21.17
CHEMICAL							
Cl	14	26	13.03	18.7	22.57	14.16	15.72
HCO3	14	155.18	99.9	141.6	137.31	143.02	149.75
SiO2	14	8.52	7.83	8.18	8.03	8.2	8.52
F	14	0.4	0.24	0.29	0.26	0.26	0.4
P-Tot	14	0.05	0.03	0.04	0.03	0.04	0.05
B	14	0	0	0	0	0	0
NO2-N	2	0	0	0	0		
Na	14	14	9.2	11.57	12.97	10.15	10.2
NO2+NO3	2	0.2	0.18	0.19	0.19		
NO3-N	2	0.2	0.18	0.19	0.19		
Alk-Phen	14	0.58	0	0.07	0.14	0	0
SO4	14	22.4	4.8	16.15	20.04	11.7	13
ALK-TOT	14	128.03	100.51	119.12	118.65	117.23	122.75
K	14	8.5	3.1	6.31	8.16	5.28	3.4
CO3	14	1.2	0	0.13	0.26	0	0
Mg	14	15.17	11	13.89	14.74	13.37	12.57
Ca	14	36.64	28.54	33.14	34.5	30.64	33.29
NH3-N	14	0.05	0	0.01	0.01	0	0
TRACE & TOXIC							
PESTICIDES							
BIOLOGICAL/BACTEOROLOGICAL							
Tcol-MPN	14	4100	1800	3378.57	3142.86	3250	4100
COD	14	26.9	17.2	20.4	21.71	19.15	19
BOD3-27	14	2.94	1.75	2.25	2.41	2.04	2.15
DO	2	6.86	6.27	6.57	6.57		
FCol-MPN	14	1800	800	1471.43	1428.57	1375	1700
DO_SAT%	14	86.17	6.27	18.07	28.37	7.9	7.63
PHYSICAL							
TDS	14	128	96	118.21	112.43	124	124
pH_GEN	14	8.22	7.81	7.97	7.9	8.09	7.97
EC_GEN	14	256	170	224.79	202.14	247.75	247
Temp	14	30.5	15	23.89	27.36	19.62	21.5
pH_FLD	14	8.2	7.8	7.94	7.9	8.05	7.9
SS	2	0	0	0		0	
Secchi	2	91.6	86.85	89.23	89.23		
EC_FLD	14	260	180	228.43	205.43	252.5	250
CHEMICAL INDICES							
RSC	2	0	0	0	0		
HAR_Total	14	189.57	150.06	167.85	170.73	161.09	170.13
HAR_Ca	12	473.92	380.04	426.4	445.98	402.72	425.33
SAR	2	0.49	0.46	0.47	0.47		
Na%	2	15.79	14.86	15.33	15.33		

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: KULDAH BRIDGE(012-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

PARAMETERS																Flood (Jun-Oct)
	2007	2008	2009	2010	2011	2012	2014	2015	2016	2017	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Q (cumec)	76.07	95.32	74.7	99.25	319.56	116.28	145.24	124.31	545.28	138.82	40.84	47.48	41.44	54.02	29.43	49.08
BIOLOGICAL/BACTEOROLOGICAL																
BOD3-27			2.46	2.86	2.77	2.8	2.92	2.94	2.17	2.41			2.33	3.1	2.37	2.73
COD	1.3		3.84	9.52	10	10.38	14.14	9.74	10.28	21.71	1		7.02	7.6	9.88	13.02
DO			7.15	7.25	7.64	7.42	7.22	7.17	6.42	6.57			7.35	7.82	8.11	7.93
DO_SAT%			93	93.03	92.44	92.51	91.33	91.33	84.63	28.37			80.76	89.12	91.82	84.16
FCol-MPN			640	640	780	780	800	900	1100	1428.57			1425	275	775	775
Tcol-MPN			1180	1820	2040	2060	2140	2180	3100	3142.86			2550	1100	2200	2050
CHEMICAL																
ALK-TOT	91.2	85.8	164.29	127.56	102.4	112.1	113.6	112.29	93.84	118.85	141.16	115	162.88	141.48	106	112.2
Alk-Phen	0	0	7.97	2.66	0	0	0	0	0	0.14	2.85	0	1.99	6.64	0	0
B	0.01	0.04	0.01	0	0.01	0.01	0.01	0	0	0	0	0.07	0	0.03	0.03	0.02
CO3	0	0	9.6	3.2	0	0	0	0	0	0.25	3.43	0	2.4	8	0	0
Ca	33.95	29.42	38.78	30.11	32.15	36.53	31.92	25.83	41.35	34.54	37.46	36.95	24.6	29.69	32.89	33.97
Cl	33.2	17.33	59.73	19.8	21.8	23.6	25.53	16.89	32.8	22.66	30.29	29.2	69.14	24	28.5	27.5
F	0.28	0.13	0.43	0.53	0.35	0.45	0.34	0.27	0.26	0.26	0.23	0.18	0.2	0.43	0.45	0.43
Fe	0.69	0.01	0.01	0.01	0.04	0.08	0.03	0.03	0.03		0.49	0.01	0.01	0.03	0.08	0.13
HCO3	111.26	104.68	180.91	149.12	124.93	136.76	138.59	136.99	114.48	137.81	135.94	140.3	193.83	156.34	129.32	136.88
K	5.4	5.38	5.52	4.4	7	7	6.4	5.62	6.8	8.15	6.57	5.45	6.73	5.5	7.75	7.25
Mg	14.65	11.33	12.71	25.42	24.43	25.15	20.01	12.94	15.21	14.75	21.57	12.4	18.24	25.61	26.61	25.45
NH3-N	0.05	0.05	0.05	0.05	0.05	0.05	0	0	0.05	0.02	0.05	0.05	0.05	0.05	0.05	0.05
NO2+NO3	0.18	0.01	0.05	0.13	0.18	0.22	0.18	0.15	0.17	0.19	0.24	0.27	0.02	0.61	0.36	0.22
NO2-N	0.03	0	0.02	0	0.04	0	0	0	0	0	0	0	0.01	0.02	0	0
NO3-N	0.15	0.01	0.03	0.13	0.15	0.22	0.18	0.15	0.17	0.19	0.24	0.27	0.01	0.59	0.36	0.22
Na	11.4	10.9	50.82	12.4	14	17.2	16.84	11.45	10.4	12.99	14.57	19.39	56.41	14.75	17.75	17.5
Ni																
Org-N	0.01		0.01	0.01							0.01		0.01	0.01		
P-Tot	0.02	0	0.01	0	0	0	0.02	0.02	0.04	0.03	0	0.04	0.01	0	0	0
SO4	18.6	31.04	13.28	50	7.6	12	24.38	17.48	16	20.02	23.14	27.39	2.89	47.5	10.94	16.25
SiO2	9.67	9.1	7.97	8.43	7.63	8.29	7.92	6.77	8.48	8.03	7.16	8.26	9.36	7.81	8.08	8.17

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: KULDAH BRIDGE(012-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

o-PO4-P							0	0								
CHEMICAL INDICES																
HAR_Ca										445.98						
HAR_Total	145.91	120.77	149.89	181.2	182.15	196.1	163.19	118.12	166.76	166.48	208.13	144.04	137.51	180.95	193.09	190.97
Na%	14.1	15.55	41.68	12.85	13.89	15.35	17.65	16.18	11.65	15.33	14.33	21.57	45.79	14.65	16.14	16.05
RSC	0	0	0.3	0	0	0	0	0.03	0	0	0	0	0.53	0	0	0
SAR	0.41	0.43	1.81	0.4	0.45	0.53	0.57	0.45	0.35	0.47	0.48	0.71	2.11	0.48	0.56	0.55
PESTICIDES																
PHYSICAL																
EC_FLD	220	196	180	177.4	226.8	244.2	224	214	210	205.43	267.5	231.25	177.25	200.75	243.25	256.75
EC_GEN	173.4	188	177.2	173	218.4	238.2	219.4	226.6	215.8	202.14	234	217.5	174.5	195.75	235.5	248
SS																
Secchi	84.88	73.55	96.95	75.28	80.37	91.33	79.81	64.44	103.38	89.22	101.19	92.39	61.5	74.22	82.24	84.93
TDS			90.6	105.4	119.8	167.6	133.2	136.4	125.4	112.43			88.75	123.75	130.5	169
Temp	28.6	27.8	29.2	28.6	25.1	26.8	27.7	27.9	29.8	27.36	19.38	20.62	20	21.88	21.5	18.38
Turb			0.18	0.26	0.9	0.42	0.8	1.62	3.18				0.1	0.2	0.1	0.1
pH_FLD	8	8	8.08	7.9	8.5	7.84	8	7.88	8.03	7.9	8.12	8.12	7.88	8.17	8.48	8.08
pH_GEN	8.5	8.2	8.22	8.01	8.7	7.92	8.1	7.8	7.92	7.9	8.61	8.2	8.23	8.31	8.65	8.27
TRACE & TOXIC																
As																
Cd																
Cr																
Pb																
Zn																

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: KULDAH BRIDGE(012-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

2014-2015	2015-2016	2016-2017	2017-2018	2008	2009	2010	2011	2012	2013	2015	2016	2017	2018	2013	2013-2014	2014
51.74	32.47	39.26	51.58	16.79	9.51	2.79	8.85	18.42	25.72	20.42	19.66	39.36	21.17			
2.8	2.35	2.03	2.04			1.87	2.27	2.41	2.79	2.92	2.09	2.06	2.15	2.62	2.69	2.61
14.67	11.8	15.65	19.15			16.54	9.27	10.97	12.53	16.13	9.43	24.97	19	8.66	9.9	11.4
7.94	6.76	7.67				7.63	7.47	7.82	7.69	7.35	6.73	6.71		7.21	7.47	7.37
86.18	76.38	86.16	7.9			93.53	86.62	93.55	91.94	89.57	83.92	41.42	7.63	92.5	84.18	88.71
725	1075	750	1375			1566.67	466.67	633.33	633.33	1000	1166.67	966.67	1700	640	750	1000
1900	2350	2050	3250			2400	1566.67	2300	2233.33	2433.33	2866.67	2866.67	4100	1980	2100	2400
123	98	93.6	117.23	148.56	130.83	150.72	97.12	117.38	116.17	134.69	97.31	102.75	122.75	117.87	121.41	140
0	0	0	0	6.87	0	13.28	0	0	0	0	0	0.3	0	3.32	4.98	9.96
0.01	0	0	0		0.02	0	0.04	0.04	0.03	0	0	0	0	0.01	0.03	0.03
0	0	0	0	8.28	0	16	0	0	0	0	0	0.68	0	4	6	12
34.39	23.24	41.28	30.64	44.16	52.77	32	31.26	34.17	34.53	33.43	22.44	41.25	33.29	35.65	33.56	33.74
29.42	14	44	14.16	30.69	51.72	50.53	19.03	29.28	29.97	26.66	16.66	32.58	15.72	24.4	22.5	26.03
0.38	0.24	0.26	0.26		0.19	0.43	0.46	0.42	0.42	0.35	0.26	0.25	0.4	0.43	0.42	0.41
0.04	0.02	0.06			0.01	0.01	0.09	0.04	0.04	0.04	0.02	0.05		0.03	0.03	0.03
150.06	119.56	114.19	143.02	164.41	159.62	151.35	118.49	143.2	141.72	164.32	118.72	114.68	149.75	135.66	135.92	146.4
7.25	5.75	8	5.27	6.34	5.59	5.72	5	9.34	8.69	7.67	6.33	7.33	3.4	7.4	6.75	6.67
21.43	11.71	15.74	13.37	25.2	8.19	13.01	20.91	23.67	24.13	20.09	12.35	15.57	12.57	24.13	24.55	24.47
0	0	0.05	0		0.05	0.05	0.05	0.05	0.05	0	0	0.03	0	0.05	0.05	0.05
0.21	0.14	0.19			0.01	0.02	0.34	0.34	0.26	0.19	0.14	0.19		0.2	0.23	0.22
0	0	0			0	0	0	0	0	0	0	0		0	0	0
0.21	0.14	0.19			0.01	0.02	0.34	0.34	0.26	0.19	0.14	0.19		0.2	0.23	0.22
18.99	8.5	17.25	10.15	21.86	51.6	35.69	11.02	20.02	20.02	18.31	9.33	14.32	10.2	16.8	18.5	19
							15	8	10	14	6.5	4				12.2
						0.01	0.01									
0.02	0.02	0.07	0.04		0.04	0	0	0	0	0.02	0.06	0.05	0.04	0	0	0
24	13.75	16.5	11.7	29.5	30.03	5.13	55.02	12.71	15	23.34	12.33	14.36	13	12	12.75	13.02
7.93	6.4	8.73	8.2		8.47	9.24	8.26	8.44	8.36	7.82	6.16	7.93	8.52	8.45	8.31	8.46

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: KULDAH BRIDGE(012-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

0										0						
			402.72									527.4	425.33			
175.23	106.91	168.77	161.09	213.21	166.04	134.2	165.16	183.9	186.86	167.39	107.61	182.41	170.13	189.66	186.18	186.29
18.38	13.95	17.33		18.05	38.66	35.7	12.29	18.28	18.12	18.46	14.94	15		15.59	17.2	17.61
0	0	0		0	0	0.42	0	0	0	0	0	0		0	0	0
0.63	0.36	0.58		0.65	1.74	1.35	0.37	0.64	0.64	0.62	0.39	0.48		0.53	0.59	0.61
302.5	245	249	252.5	430	238.33	215	215	254.67	259	268.33	256.67	243.33	250	220.8	239	270
293.25	238.25	255.5	247.75	405.67	231.67	210.67	210.67	243.67	252	263.67	250.67	246	247	213.6	232	264
			0													
85.96	58.11	103.2		109.42	131.93	79.99	78.14	85.36	86.29	83.62	56.11	103.2		89.13	83.9	84.35
181.5	145	129.25	124			107.33	128	154.67	174	164.67	149	128.67	124	169.8	183.25	174
19.62	21.25	21	19.62	23.83	25	26.17	22.83	24.67	24.5	25.33	26.83	21.83	21.5	28.4	21.38	25.17
0.25	1.73	1.22				0.1	0.1	0.1	0.1	0.3	0.9	0.63				
7.9	8	8.01	8.05	7.63	8.07	8.07	8.13	8.57	8.37	7.63	7.68	8.2	7.9	7.86	8.15	8.13
8.03	8.05	7.92	8.09	8.41	8.2	8.28	8.18	8.67	8.46	7.8	7.78	8.16	7.97	8.12	8.27	8.33
							10	19	17	12	7.5	6				15.5
							4	7.9	8.2	5	2	1				7.7
							12	14	15	11	8	6.5				13.9
							45	12.7	11.4	11	9					14.6
							17	5	9.5	12	8.5					10

HISTORY SHEET (WATER QUALITY)

			Water Year	:	2017 - 2018
Site	:	CHOPAN	**Code**	:	013-mgd3vns
State	:	Uttar Pradesh	**District**		Sonbhadra
Basin	:	GANGA	**Independent River**	:	Ganga
Tributary	:	Sone	**Sub Tributary**	:	-
Sub-Sub Tributary	:	-	**Local River**	:	Sone
Division	:	Middle Ganga Division-III (MGD-III), Varanasi	**Sub-Division**	:	Middle Ganga Choti Saryu Sub-Division,
Drainage Area	:	46198.0 Sq. Km.	**Bank**	:	Right
Latitude	:	24°32'0''	**Longitude**	:	83°2'59''
Current Zero of Gauge (m)	:	155			

CATEGORY		Opening Date	Closing Date
Gauge	:	26/04/1959	
Discharge	:	26/04/1959	
Sediment	:	01/01/1963	
Water Quality	:		

Reduced Level	Opening Date	Closing Date
155.0	02/06/2014	12/01/2017
155.0	26/04/1959	02/06/2014
155.0	12/01/2017	-

Water Quality Datasheet (River Water Analysis) for the period : 2017 - 2018

Station Name: CHOPAN(013-mgd3vns) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

PARAMETERS	01/06/2017	01/07/2017	01/08/2017	01/09/2017	03/10/2017	01/11/2017	01/12/2017	01/01/2018	01/02/2018	01/03/2018	02/04/2018	01/05/2018
Q (cumec)	248.26	855.65	644.93	514.55	736.16	251.16	142.02	195.94	604.75	596.47	245.04	157.11
CHEMICAL												
B(mg/L)	0.03		0.02		0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03
P-Tot(mgP/L	0.02		0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.03	0.02
SiO2(mg/L)	8.22		8.15	8.02	8.18	8.27	8.34	8.12	7.95	8.33	8.05	7.82
CO3(mg/L)	0.3	0.4	0	0	0	0	0	0	0	0	0	0
Ca(mg/L)	33.71	36.29	34.92	30.62	31.99	31.13	29.46	25.72	24.24	21.66	17.58	19.44
NH3-N(mgN/L	0		0	0	0	0	0	0	0	0	0	0
Phen(mgCaC	0.25	0.33	0	0	0	0	0	0	0	0	0	0
HCO3(mg/L)	92.5	116.7	137.62	132.25	123.95	130.78	138.4	141.8	100.77	79.58	82.52	74.22
Na(mg/L)	14	13.2	12.1	11.5	10.3	9.4	8.6	10.8	8.3	9.6	9.2	13.6
Mg(mg/L)	13.11	12.18	11.04	11.56	12.8	12.8	14.34	13.53	8.15	4.81	8.95	8.86
TOT(mgCaC	92.79	96.32	112.8	108.4	101.6	107.2	113.44	116.23	82.6	65.23	67.64	60.84
NO2-N(mg/L												
Cl(mg/L)	24	24	22	18	16	13	11.28	10.81	11.78	17.06	15.11	17.25
SO4(mg/L)	20	18	18.5	17.4	20.2	19.8	14.8	8.8	7.2	19	18.3	21
K(mg/L)	8	8.4	8.2	7.3	6.8	6.6	4.4	4.1	3.3	3.9	4.2	6.8
F(mg/L)	0.25		0.26		0.28	0.26	0.26	0.23	0.24	0.4	0.37	0.4
TRACE & TOXIC												
PESTICIDES												
BIOLOGICAL/BACTEOROLOGICAI												
COD(mg/L)	19.6	16.7	15.3	18.2	18.8	13.5	13.8	14.9	16.8	17.5	18.6	17.1
MPN(MPN/1	2100	2800	3000	3600	3100	3500	2500	2200	4400	3400	3600	3600
Chlf-a(µg/L)												
SAT%(Percen	6.86	7.45	7.06	7.06	6.86	7.25	8.09	7.86	8.39	7.83	7.35	7.92
MPN(MPN/1	700	1000	900	1200	1300	1100	1300	1300	1400	1100	1300	1400
OD3-27(mg/	2.16	1.77	1.57	1.77	2.16	1.37	1.44	1.56	2.05	1.96	2.15	1.8
PHYSICAL												
I_GEN(pH ur	7.49	7.69	7.68	7.49	7.73	7.65	8.04	7.76	7.98	7.62	7.83	7.79
Degrees Celsi	26.5	25.5	25	26	25.5	23	18	19.5	18	20	22	25.2
SS(mg/L)												

Water Quality Datasheet (River Water Analysis) for the period : 2017 - 2018

Station Name: CHOPAN(013-mgd3vns) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

Colour_Cod(-	Clear	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear
TDS(mg/L)	80	103	89	78	106	120	114	96	67	71	88	100
H_FLD(pH un	7.5	7.6	7.6	7.4	7.7	7.6	8	7.7	7.9	7.6	7.8	7.7
GEN(µmho/	142	184	156	142	212	239	228	192	134	142	176	199
dour_Code(	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
_FLD(µmho/(	150	190	160	150	220	240	230	200	140	150	180	200
CHEMICAL INDICES												
_Ca(mgCaCO	433.08	454.14	432.75	391.21	413.23	404.27	396.5	352.48	303.44	255.69	239.06	257.88
Total(mgCaC	173.23	181.66	173.1	156.48	165.29	161.71	158.6	140.99	121.38	102.28	95.62	103.15

Water Quality Summary (River Water Summary) for the period : 2017 - 2018

Station Name: CHOPAN(013-mgd3vns) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

PARAMETERS	No. of Observations	Maximum	Minimum	Mean	Flood (Jun-Oct)	Winter (Nov-Feb)	Summer (Mar-May)
Q (cumec)	365	2361.23	84.48	474.61	658.51	368.25	307.53
CHEMICAL							
Cl	12	24	10.81	16.69	20.8	11.72	16.47
HCO3	12	141.8	74.22	112.59	120.6	127.94	78.77
SiO2	11	8.34	7.82	8.13	8.14	8.17	8.07
F	10	0.4	0.23	0.29	0.26	0.25	0.39
P-Tot	11	0.03	0.01	0.02	0.02	0.02	0.02
B	10	0.03	0.02	0.03	0.03	0.03	0.03
Na	12	14	8.3	10.88	12.22	9.27	10.8
Alk-Phen	12	0.33	0	0.05	0.12	0	0
SO4	12	21	7.2	16.92	18.82	12.65	19.43
ALK-TOT	12	116.23	60.84	93.76	102.38	104.87	64.57
K	12	8.4	3.3	6	7.74	4.6	4.97
CO3	12	0.4	0	0.06	0.14	0	0
Mg	12	14.34	4.81	11.01	12.14	12.2	7.54
Ca	12	36.29	17.58	28.06	33.51	27.64	19.56
NH3-N	11	0	0	0	0	0	0
TRACE & TOXIC							
PESTICIDES							
BIOLOGICAL/BACTEOROLOGICAL							
Tcol-MPN	12	4400	2100	3150	2920	3150	3533.33
COD	12	19.6	13.5	16.73	17.72	14.75	17.73
BOD3-27	12	2.16	1.37	1.81	1.89	1.61	1.97
FCol-MPN	12	1400	700	1166.67	1020	1275	1266.67
DO_SAT%	12	8.39	6.86	7.5	7.06	7.9	7.7
PHYSICAL							
TDS	12	120	67	92.67	91.2	99.25	86.33
pH_GEN	12	8.04	7.49	7.73	7.62	7.86	7.75
EC_GEN	12	239	134	178.83	167.2	198.25	172.33
pH_FLD	12	8	7.4	7.67	7.56	7.8	7.7
Temp	12	26.5	18	22.85	25.7	19.62	22.4
EC_FLD	12	240	140	184.17	174	202.5	176.67
CHEMICAL INDICES							
HAR_Total	12	181.66	95.62	144.46	169.95	145.67	100.35
HAR_Ca	12	454.14	239.06	361.14	424.88	364.17	250.88

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: CHOPAN(013-mgd3vns) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

PARAMETERS	Flood (Jun-Oct)											W				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Q (cumec)	410.54	543.87	442.85	356.5	1264.74	644.61	643.14	410.88	316.28	1480.33	658.51	70.55	147.78	105.31	170.17	351.78
BIOLOGICAL/BACTEOROLOGICAL																
BOD3-27			2.25	2.81	2.35	2.53	2.85	2.87	2.62	2	1.89			2.25	2.92	2.57
COD	3.45		5.63	9.96	11.98	10.34	8.92	13.86	8.48	8.54	17.72	1		6.43	8.32	8.7
DO	7.35	7.24	7.32	7.22	7.51	7.22	7.22	7.28	7.02	7.3		7.39	7.35	7.43	7.54	7.62
DO_SAT%	92.32	91.53	91.29	90.6	94.95	91.35	89.4	90.44	84.44	90.03	7.06	81.75	82.89	83.05	87.01	90.65
FCol-MPN	375	275	1220	480	720	740	900	1180	1100	1040	1020	327.78	525	3675	500	525
Tcol-MPN	1033.33	1025	2520	1400	2060	2280	2280	2440	2960	2760	2920	950	1575	6175	1475	2000
CHEMICAL																
ALK-TOT	110.43	93.4	112.8	126.31	128.08	91.99	97.87	92.4	93.81	90.4	102.38	150.98	115	99.88	104.56	160
Alk-Phen	19.92	5.98	0	19.92	23.9	0	3.32	0	0	0	0.12	19.92	0	1.99	9.96	34.86
B	0	0.02	0	0	0	0.01	0.02	0.01	0.03	0.03	0.03	0	0.01	0	0.03	0.03
CO3	24	7.2	0	24	28.8	0	4	0	0	0	0.14	24	0	2.4	12	42
Ca	27.44	23.13	21.24	29.24	31.09	33.21	33.47	30.28	21.84	36.67	33.51	31.69	33.51	22	28.49	31.86
Cl	26.8	28.83	38.98	18	19.4	27.4	26.4	25.01	18.85	25.6	20.8	24.86	31.33	41.8	20	22.5
F	0.11	0.23	0.41	0.63	0.39	0.48	0.51	0.35	0.34	0.26	0.26	0.05	0.16	0.15	0.37	0.39
Fe	0.2	0.02	0.16	0.32	0.1	0.23	0.24	0.19	0.2	0.18		0.17	0.17	0.19	0.26	0.19
HCO3	72.22	99.31	137.62	105.3	97.69	112.23	111.26	112.73	114.45	110.29	120.6	67.62	140.3	116.97	103.17	109.8
K	8.8	6.79	5.23	5.4	6.8	6.2	8.2	7.43	5.43	6.6	7.74	9.86	5.46	2.73	6.5	6.5
Mg	17.96	12.21	12.11	17.63	18.79	20.39	19.33	17.76	12.56	11	12.14	19.2	13.19	10.85	17.14	19.39
NH3-N	0.05	0.05	0.08	0.05	0.05	0.05	0.05	0	0	0.05	0	0.05	0.05	0.05	0.05	0.05
NO2+NO3	0.03	0.06	0.08	0.19	0.25	0.3	0.29	0.27	0.19	0.16		0.02	0.25	0.07	0.42	0.24
NO2-N	0	0	0	0	0	0	0	0	0	0		0.01	0.01	0	0	0
NO3-N	0.03	0.06	0.07	0.19	0.25	0.3	0.29	0.27	0.19	0.16		0.01	0.23	0.07	0.42	0.24
Na	21.2	19.23	28.75	12.2	13	15.6	16	14.21	11.82	10.2	12.22	24.43	21.39	33.01	13.75	14.5
Ni																
Org-N	0.04		0.02	0.01								0.01		0.08	0.01	
P-Tot	0	0	0.01	0	0	0	0	0.02	0.02	0.02	0.02	0	0.01	0.01	0.02	0.01
SO4	6.8	15.74	10.56	17.6	11.22	13.4	13.8	13.76	15.04	13.6	18.82	7.57	20.04	11.88	26	11
SiO2	8.82	7.12	8.03	7.92	7.84	8.46	8.3	7.81	6.49	7.66	8.14	8.71	9.36	6.75	7.88	8.2

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: CHOPAN(013-mgd3vns) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

o-PO4-P								0	0							
CHEMICAL INDICES																
HAR_Ca											424.88					
HAR_Total	143.43	108.68	103.58	146.55	155.99	167.98	164.2	149.71	106.71	137.52	169.95	159.05	138.77	100.22	142.65	160.43
Na%	23.41	26.9	35.99	14.8	14.69	16.1	16.7	16.4	18.54	13.15		24	24.11	40.96	16.64	15.84
RSC	0	0	0.2	0.09	0.04	0	0	0	0	0		0	0	0.08	0	0.15
SAR	0.78	0.82	1.22	0.44	0.45	0.53	0.55	0.51	0.5	0.38		0.86	0.79	1.45	0.5	0.5
PESTICIDES																
PHYSICAL																
EC_FLD	150	168	179.8	174	181.4	151	203	205	182	149	174	150	181.25	154.25	175.75	197.5
EC_GEN	138.6	157.6	177.4	169.6	174.6	146.4	202.2	198.6	164.4	153	167.2	136	169.5	152	170.75	194.5
Secchi	68.6	57.81	53.11	73.1	77.72	83.03	83.67	75.7	54.51	91.67		80.15	83.79	54.99	71.22	79.65
TDS			92.8	116.6	92.2	104.8	124.2	120.6	98.6	89.4	91.2			82.5	105	96
Temp	27.3	27.8	26.8	27.3	27.6	27.7	26.4	26.6	24.8	26.4	25.7	20.25	21.75	21.12	22.62	24.12
Turb			0.64	2.4	2.42	0.42	2.24	2.1	1.5					0.1	0.33	0.1
pH_FLD	8	8	7.92	8.12	8.6	7.78	7.9	7.96	7.48	7.8	7.56	8.1	7.93	8.05	8.15	8.59
pH_GEN	8.36	8.33	8	8.35	8.71	7.94	8.08	8.06	7.72	7.7	7.62	8.34	8.2	8.09	8.49	8.72
TRACE & TOXIC																
As																
Cd																
Cr																
Pb																
Zn																

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: CHOPAN(013-mgd3vns) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

Winter (Nov-Feb)						Summer (Mar-May)										
2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
330.5	275.07	229.74	160.6	264.92	368.25	85.22	165.93	143.84	91.07	271.16	229.61	216.74	202.75	126.66	263.98	307.53
2.64	2.69	2.86	2.2	2.46	1.6			1.86	2.36	2.2	2.45	2.65	2.79	2.35	2.03	1.97
12.23	9.75	14	6.4	13.32	14.75	1		9.6	9.07	10.03	10.73	11.3	15.93	5.33	22.43	17.73
7.73	7.66	7.1	6.96	7.76		7.63	7.6	7.12	7.5	7.38	7.63	7.69	7.39	7.51		
83.29	81.35	75.31	70.18	85.83	7.9	88.49	89.25	82.09	91.94	87.65	84.36	88.05	80.29	88.64	6.44	7.7
825	1050	800	1225	550	1275	100	333.33	2700	700	800	866.67	1300	1066.67	1066.67	766.67	1266.67
2100	2275	2125	3100	1675	3150	600	1533.33	8533.33	2300	2400	2233.33	2600	2800	3033.33	2266.67	3533.33
91	87	105	92	94.2	104.87	151.88	133	144.88	122.21	158.83	93.31	92	103.08	104	91.79	64.57
0	0	0	0	0	0	19.92	0	10.62	15.64	33.31	0	0	0	0	0.55	0
0.03	0.04	0.02	0.03	0.09	0.03		0.01	0	0.04	0.04	0.04	0.04	0.04	0.02	0.03	0.03
0	0	0	0	0	0	24	0	12.8	18.84	40.14	0	0	0	0	0.93	0
32.98	33.34	30.19	22.03	39	27.64	31.53	36.67	33.51	26.94	32.43	32.38	34.3	28.83	21.89	36.52	19.56
25.25	22.5	26.25	18.97	26	11.72	24.33	58.34	45.38	21.32	25.97	26.66	26.69	24.39	19.31	23.33	16.47
0.4	0.38	0.37	0.25	0.25	0.25		0.05	0.28	0.26	0.35	0.34	0.38	0.35	0.27	0.24	0.39
0.2	0.23	0.25	0.18	0.2			0.15	0.19	0.14	0.23	0.22	0.23	0.21	0.17		
111.02	106.14	128.1	113.36	114.92	127.94	68.17	162.26	150.72	110.8	112.16	113.84	112.24	125.76	126.88	90.8	78.77
6	6.25	6.97	5	11	4.6	8	3.9	3.93	7	7.02	7.34	6.33	7.7	5.33	8	4.97
20.2	19.67	18.46	11.21	13.16	12.21	18.79	12.12	12.45	21.22	19.77	19.85	20.04	16.95	11.38	11.8	7.54
0.05	1.29	0	0	0.05	0		0.05	0.05	0.05	0.05	0.05	0.05	0	0	0	0
0.26	0.25	0.28	0.18	0.17			0.05	0.04	0.36	0.35	0.32	0.26	0.22	0.18		
0	0	0	0	0			0	0	0	0	0	0	0	0	0	
0.26	0.25	0.28	0.18	0.17			0.05	0.04	0.36	0.35	0.32	0.26	0.22	0.18		
14.5	15	14.24	13.03	12	9.27	23.67	41.78	35.94	14	15.02	13.02	16	15.03	12.66	14	10.8
									20	6	14	9	11	6.5		
								0.05	0.01							
0.01	0.01	0.02	0.01	0.02	0.02		0.01	0	0.01	0	0	0.01	0.02	0.01	0.02	0.02
13.5	11.5	15.74	13.49	13.75	12.65	8.67	8.32	10.21	15.32	14.03	13.02	14.69	20.1	12.31	15.33	19.43
7.69	8.31	7.17	6.67	8.66	8.17		9.31	7.51	8.23	8.48	8.47	8.44	7.07	6.8	8.28	8.07

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: CHOPAN(013-mgd3vns) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Sone Sub Division: Middle Ganga Choti Saryu Sub-Division, Varanasi

		0.01											0.01			
					364.17										454.18	250.88
166.63	165.29	152.4	101.88	152.33	145.67	157.14	142.18	135.66	155.75	163.5	163.77	169.26	142.35	102.22	181.67	100.35
15.38	15.94	16.2	20.74	13.62		23.59	37.93	36.26	15.71	16	14.13	16.5	17.9	20.14		
0	0	0	0	0		0	0	0.29	0	0.13	0	0	0	0.05		
0.49	0.51	0.5	0.56	0.42		0.82	1.53	1.36	0.49	0.51	0.44	0.54	0.55	0.54		
214.5	232.5	247.5	175	149.5	202.5	186.67	196.67	166	180	211.33	235	249.33	220	193.33	140.67	176.67
206	225.25	241	169	155	198.25	162.33	184.33	162.33	174.67	205	229.33	241.33	215	188.33	143.33	172.33
82.45	83.35	75.48	55.11	97.51		78.83	91.68	83.78	67.23	81.08	80.95	85.75	71.87	54.77		
141.25	142	140	101.5	77	99.25			86.67	115.33	97	140.67	144	133.67	114	76.33	86.33
19.38	18.38	18.25	15.88	20.38	19.62	23	23.67	22.5	25.67	24	20.33	22.5	19.5	23.83	22.83	22.4
0.2	0.33	1.9	0.9					0.1	0.1	0.1	0.1	0.1	0.33	0.97		
7.97	7.78	7.98	7.38	7.93	7.8	7.9	7.87	8.23	8.3	8.6	8.33	8	7.77	7.63	8	7.7
8.25	7.91	8.1	7.72	7.84	7.86	8.87	8.2	8.32	8.61	8.74	8.54	8.12	7.92	7.76	7.95	7.75
									18	20	23	19	17	9.5		
									5	2.6	2.5	1.8	2	2		
									8	13	10.5	12.3	11	7		
									110	7	9	7.2	8	8.5		
									7	9	10	8.8	10	7.5		

HISTORY SHEET (WATER QUALITY)

		Water Year	: 2017 - 2018
Site	: DUDHHI	**Code**	: 025-MGD3VNS
State	: Uttar Pradesh	**District**	Sonbhadra
Basin	: GANGA	**Independent River**	: Ganga
Tributary	: Sone	**Sub Tributary**	: Kanhar
Sub-Sub Tributary	: -	**Local River**	: Kanhar
Division	: Middle Ganga Division-III (MGD-III), Varanasi	**Sub-Division**	: Upper Sone Rihand Sub-Division, Rewa
Drainage Area	: 5169.0 Sq. Km.	**Bank**	: Left
Latitude	: 24°13'37''	**Longitude**	: 83°16'29''
Current Zero of Gauge (m)	: 200		

CATEGORY	Opening Date	Closing Date
Gauge :		
Discharge :		
Sediment :		
Water Quality :		

Reduced Level	Opening Date	Closing Date
0.0	29/05/2015	31/05/2016
200.0	01/06/2016	-
200.0	01/06/2004	31/12/2009

Water Quality Datasheet (River Water Analysis) for the period : 2017 - 2018

Station Name: DUDHHI(025-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Kanhar Sub Division: Upper Sone Rihand Sub-Division, Rewa

PARAMETERS	01/06/2017	01/07/2017	01/08/2017	01/09/2017	03/10/2017	01/11/2017	01/12/2017	01/01/2018	01/02/2018	01/03/2018	02/04/2018	01/05/2018
Q (cumec)	0.2	4.02	330.39	260.34	123.89	10.65	8.47	3	1.69	1.69	0.66	0.93
CHEMICAL												
P-Tot(mgP/L	0.03	0.02			0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.03
Ca(mg/L)	38.01	41.11	39.22	35.95	31.3	25.97	22.49	19.91	24.56	22.14	22.02	23.21
K(mg/L)	8	8.6	8.3	8	6.7	7.1	4.3	3.6	2.5	2.8	3.3	4.6
NH3-N(mgN/L	0.05	0.05			0	0	0	0	0	0	0	0
F(mg/L)	0.24	0.22			0.2	0.21	0.22	0.2	0.19	0.34	0.32	0.34
NO2-N(mg/L	0	0										
B(mg/L)	0.03	0.03			0.02	0.03	0.02	0.02	0.03	0.03	0.03	0.03
HCO3(mg/L)	147.86	136.64	143.47	136.15	125.42	112.73	111.2	112.17	102.66	101.71	123.32	129.42
Cl(mg/L)	24	22	22	20	18	15	14.2	12.94	13.71	15.72	19.65	25.48
Phen(mgCaC	0	0	0	0	0	0	0	0	0	0	0	0
TOT(mgCaC	121.2	112	117.6	111.6	102.8	92.4	91.15	91.94	84.15	83.37	101.08	106.08
SO4(mg/L)	26	23.7			19.6	20.4	11	6.4	4.2	10	24.6	17.8
SiO2(mg/L)	8.53	8.77			8.5	8.55	8.49	8.26	8.1	8.01	8.56	8.4
Na(mg/L)	14	12.3	12.8	11.7	10.9	10.3	10.1	13.8	11	10.4	12.2	18.9
CO3(mg/L)	0	0	0	0	0	0	0	0	0	0	0	0
Mg(mg/L)	15.38	14.14	13.52	11.35	9.91	8.46	7.12	7.53	6.48	6.28	10.3	14.38
NO3-N(mgN/	0.21	0.2										
N2+NO3(mgN	0.21	0.2										
TRACE & TOXIC												
PESTICIDES												
BIOLOGICAL/BACTEOROLOGICAL												
COD(mg/L)	28.1	25.5	22.3	19.6	19.3	12.8	7.9	8.2	11.6	13.8	12.3	14.8
SAT%(Percen	52.64	72.57	7.06	7.06	7.06	7.25	8.29	8.43	8.79	7.83	7.93	7.13
Chlf-a(µg/L)												
OD3-27(mg/	6.28	3.14	2.55	1.76	1.96	0.98	0.85	0.98	2.05	2.15	1.58	2.2
MPN(MPN/1	1300	1200	800	1100	1500	1400	1200	900	1100	1300	1200	1800
MPN(MPN/1	2700	3000	2400	2600	2800	3200	2100	2700	4600	4500	5100	5600
DO(mg/L)	4.12	5.68										
PHYSICAL												

Water Quality Datasheet (River Water Analysis) for the period : 2017 - 2018

Station Name: DUDHHI(025-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Kanhar Sub Division: Upper Sone Rihand Sub-Division, Rewa

SS(mg/L)												
TDS(mg/L)	248	151	112	97	68	83	91	95	87	101	194	172
GEN(µmho/	437	264	194	178	136	165	182	190	173	201	388	344
_FLD(µmho/(	430	270	200	180	140	170	190	190	180	210	390	350
)egrees Celsi	28	28	24	24	26	19	17.5	16	17	18.5	22	25
Colour_Cod(-	Light Brown	Light Brown	Brown	Light Brown	Light Brown	Light Brown	Light Brown	Clear	Clear	Clear	Clear	Clear
)dour_Code(	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free	odour free
_GEN(pH ur	8.11	7.78	7.86	7.8	7.77	7.85	7.9	7.88	8.16	7.87	7.93	8.02
H_FLD(pH un	8.2	7.72	7.8	7.8	7.7	7.8	7.9	7.8	8.1	7.8	7.9	8
ecchi(Meter	95.02	102.78										
CHEMICAL INDICES												
_Ca(mgCaCO	492.06	516.6	493.04	445.42	387.98	323.39	278.77	254.46	296.33	269.88	293.75	331.64
Total(mgCaC	159.11	161.69	197.22	178.17	155.19	129.36	111.51	101.78	118.53	107.95	117.5	132.66
SAR(-)	0.48	0.42										
RSC(-)	0	0										
%(Percentag	15.32	13.48										

Water Quality Summary (River Water Summary) for the period : 2017 - 2018

Station Name: DUDHHI(025-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Kanhar Sub Division: Upper Sone Rihand Sub-Division, Rewa

PARAMETERS	No. of Observations	Maximum	Minimum	Mean	Flood (Jun-Oct)	Winter (Nov-Feb)	Summer (Mar-May)
Q (cumec)	365	1947.03	0.17	80.51	187.38	5.29	0.87
CHEMICAL							
Cl	14	25.48	12.94	19.19	21.71	13.96	20.28
HCO3	14	147.86	101.71	122.45	131.59	109.69	118.15
SiO2	11	8.77	8.01	8.43	8.58	8.35	8.32
F	11	0.34	0.19	0.25	0.22	0.21	0.33
P-Tot	11	0.03	0.01	0.02	0.02	0.02	0.02
B	11	0.03	0.02	0.03	0.03	0.02	0.03
NO2-N	3	0	0	0	0		
Na	14	18.9	10.1	12.48	12.57	11.3	13.83
NO2+NO3	2	0.21	0.2	0.21	0.21		
NO3-N	2	0.21	0.2	0.21	0.21		
Alk-Phen	14	0.41	0	0.03	0.06	0	0
SO4	12	26	4.2	17.78	23.8	10.5	17.47
ALK-TOT	14	122.03	83.37	103.53	114.18	89.91	96.84
K	14	8.6	2.5	6.03	8.03	4.38	3.57
CO3	14	1.8	0	0.16	0.33	0	0
Mg	14	15.38	6.28	11.03	13.4	7.4	10.32
Ca	14	41.11	19.91	30.36	37.82	23.23	22.46
NH3-N	11	0.05	0	0.01	0.03	0	0
TRACE & TOXIC							
PESTICIDES							
BIOLOGICAL/BACTEOROLOGICAL							
Tcol-MPN	14	5600	2100	3357.14	2742.86	3150	5066.67
COD	14	28.4	7.9	17.86	24.1	10.12	13.63
BOD3-27	14	6.28	0.85	2.56	3.59	1.22	1.98
DO	2	5.68	4.12	4.9	4.9		
FCol-MPN	14	1800	800	1235.71	1200	1150	1433.33
DO_SAT%	14	72.57	4.12	15.13	22.31	8.19	7.63
PHYSICAL							
TDS	14	248	68	135.57	153.57	89	155.67
pH_GEN	14	8.16	7.77	7.92	7.89	7.95	7.94
EC_GEN	14	437	136	253.79	272.86	177.5	311
pH_FLD	14	8.2	7.7	7.89	7.87	7.9	7.9
Temp	14	28	16	22.93	26.57	17.38	21.83
Secchi	2	102.78	95.02	98.9	98.9		
EC_FLD	14	430	140	257.14	274.29	182.5	316.67
CHEMICAL INDICES							
RSC	2	0	0	0	0		
HAR_Total	14	206.64	101.78	148.15	179.26	115.3	119.37
HAR_Ca	12	516.6	254.46	365.28	467.02	288.24	298.42
SAR	2	0.48	0.42	0.45	0.45		
Na%	2	15.32	13.48	14.4	14.4		

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: DUDHHI(025-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Kanhar Sub Division: Upper Sone Rihand Sub-Division, Rewa

PARAMETERS	Flood (Jun-Oct)											W				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Q (cumec)	179.58	152.44	117.88	57.76	273.1	156.37	114.13	63.47	97.71	331.49	187.38	15.33	6.78	7.61	4.12	11.31
BIOLOGICAL/BACTEOROLOGICAL																
BOD3-27			2.44	2.9	2.73	3.17	3.04	2.74	2.55	2.29	3.59			2.32	2.7	2.69
COD	1.68	2.77	3.95	7.53	7.44	6.62	8	10.62	13.04	10.53	24.1	1.55	2.5	4.85	8	5.97
DO			6.92	7.21	7.46	7	7.26	6.8	7.33	6.56	4.9			7.3	8.07	7.83
DO_SAT%			89.36	90.87	92.99	87.48	90.18	77.29	92.92	80.2	22.31			76.65	92.74	86.27
FCol-MPN	40	97.5	2150	132.14	320	260	260	240	320	750	1200	25	125	1475	150	266.67
Tcol-MPN	580	475	4000	785.71	940	900	920	880	1180	1925	2742.86	425	725	2575	800	833.33
CHEMICAL																
ALK-TOT	154.07	89.1	124.4	85.19	134.4	122.21	110.44	95.69	92.87	72	114.26	216.95	113.5	129.5	97.28	119.9
Alk-Phen	0	0	0	4.04	23.9	8.61	3.98	0	0	0	0.06	0	0	1.99	6.78	19.92
B	0.05	0.01	0.01	0.01	0	0.02	0.03	0.01	0.03	0.03	0.03	0.03	0.07	0	0.05	0.03
CO3	0	0	0	4.87	28.8	10.38	4.8	0	0	0	0.32	0	0	2.4	8.17	24
Ca	29.75	25.61	22.77	28.43	30.33	33.87	28.9	30.45	25.67	40.42	37.88	36.02	30.21	21.99	23.31	22.98
Cl	29.2	29.47	37.7	39.04	33.2	32.79	32	26.8	16	27	21.76	25.43	35.77	44.29	41.47	29.33
F	0.11	0.1	0.66	0.48	0.49	0.55	0.49	0.36	0.26	0.2	0.22	0.13	0.08	0.48	0.46	0.36
Fe	0.43	0.01	0.15	0.22	0.06	0.23	0.21	0.21	0.03	0.03		0.46	0.12	0.15	0.24	0.22
HCO3	145.7	108.7	151.77	94.04	105.41	128	124.98	116.74	113.3	87.84	131.96	132.29	138.47	153.11	102.07	97.48
K	6.6	7.49	3.98	5.78	5.6	8.42	7.2	5.8	5.6	5.25	8.04	7.29	8.48	2.34	6.2	5.33
Mg	16.14	10.97	15.61	13.78	13.49	14.6	14.48	13.64	11.71	14.52	13.45	15.52	15.26	15.93	17.4	16.53
NH3-N	0.05	0.05	0.08	0.05	0.05	0.05	0.05	0	0	0.05	0.03	0.05	0.05	0.05	0.14	0.05
NO2+NO3	0.43	0.09	0.22	0.22	0.21	0.23	0.21	0.19	0.28	0.22	0.21	0.01	0.01	0.21	0.43	0.31
NO2-N	0.02	0.02	0.04	0	0	0	0	0	0	0	0	0	0	0.05	0	0
NO3-N	0.41	0.07	0.18	0.22	0.21	0.23	0.21	0.19	0.28	0.22	0.21	0.01	0.01	0.16	0.43	0.31
Na	23.8	22.22	26.63	23.54	13.2	12.64	11.4	11	11	10.25	12.59	27.43	24.21	31.86	25.91	11
Ni																
Org-N	0.03	0.01	0.01	0.51		0.05						0.01	0.01	0.01	1	
P-Tot	0.02	0	0.01	0	0	0	0	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.03	0
SO4	18.2	35.14	12.67	34.37	18.8	23.83	22.4	18.8	15.63	15.5	23.85	26.43	32.52	5.53	28.25	22
SiO2	9.65	6.25	7.77	7.21	7.54	8.76	8.33	8.02	7.64	8.09	8.59	8.59	8.31	6.83	8.38	7.93

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: DUDHHI(025-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Kanhar Sub Division: Upper Sone Rihand Sub-Division, Rewa

o-PO4-P								0	0							
CHEMICAL INDICES																
HAR_Ca											467.02					
HAR_Total	141.64	109.72	121.97	128.83	132.02	145.39	132.6	132.97	112.92	161.53	175.07	153.8	139.11	121.34	131	126.3
Na%	25.8	29.1	31.64	27.43	17.22	14.93	14.94	14.7	16.54	11.77	14.4	26.96	26.14	35.9	28.87	15.32
RSC	0.08	0	0.11	0	0.19	0.03	0	0	0	0	0	0	0	0.18	0	0
SAR	0.87	0.93	1.06	0.91	0.5	0.46	0.43	0.42	0.45	0.35	0.45	0.97	0.9	1.26	0.99	0.43
PESTICIDES																
PHYSICAL																
EC_FLD	200	190	307	230	203	554.2	214.4	214	216	175.75	274.29	187.5	202.5	273.75	258	213.33
EC_GEN	149.6	180.8	302.4	225.8	195.6	189.8	206.8	208.2	190	180.75	272.86	143.25	192.5	269.75	254.4	207.67
Secchi	74.38	64.02	56.92	70.92	75.82	84.64	72.26	76.13	64.12	101.05	98.9	90.47	75.53	54.98	58.5	57.44
TDS			162.6	129.84	98.8	101	120.4	123.8	114.4	103.25	153.57			135.25	153.6	102.33
Temp	29.7	29.2	29	27.31	27	26.8	26.5	21.7	27.6	25.6	26.57	21.12	19.38	18	22.1	20.17
Turb				0.1	1.8	0.62	2.42	4.04	3.28	2.37					0.1	0.4
pH_FLD	8	7.94	8.15	7.96	8.06	7.72	7.92	7.88	7.62	7.84	7.87	8	7.98	7.72	8.08	8.2
pH_GEN	8.19	8.18	8.21	8.24	8.5	7.84	8.1	8	7.7	7.73	7.89	8.16	8.17	8.01	8.37	8.47
TRACE & TOXIC																
As																
Cd																
Cr																
Pb																
Zn																

Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: DUDHHI(025-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Kanhar Sub Division: Upper Sone Rihand Sub-Division, Rewa

Winter (Nov-Feb)						Summer (Mar-May)										
2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
17.21	21.04	3.85	4.8	18.82	5.29	2.5	0.31	0.17	0.55	1.64	2.51	3.7	1.48	0.74	0.96	0.87
2.67	2.7	2.62	2.25	2.64	1.21			1.94	3.1	3.26	2.89	2.77	2.44	2.45	3.28	1.98
10.4	10.25	14.3	11.62	13.87	10.12	1	2.57	7.88	7.03	7.27	9.63	12	15.2	10.9	23.77	13.63
7.83	7.61	7.13	7.69	7.71				7.85	6.65	7.78	7.54	7.5	8.1	8.33	5.2	
81.29	85.73	77.17	79.22	81.03	8.19			90.92	77.46	87.77	84.5	85.26	91.71	90.89	31.51	7.63
225	295	225	600	650	1150	0	116.67	833.33	183.33	233.33	233.33	333.33	333.33	900	966.67	1433.33
850	1000	900	1300	1400	3150	233.33	766.67	1300	866.67	833.33	800	1133.33	1400	1600	2200	5066.67
121	107	100.9	98	85.2	89.91	237.48	124	139.56	110.75	135.97	136.14	114.69	116.07	102	110.28	96.84
12.45	7.47	0	0	0	0	0	0	14.52	13.28	19.92	19.92	9.96	0	0	0.18	0
0.03	0.03	0.03	0.02	0.03	0.02		0	0	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.03
15	9	0	0	0	0	0	0	17.49	16	24	24	12	0	0	0.57	0
31.22	26.19	32.54	26.05	42.23	23.23	33.64	27.12	28.58	36.66	24.73	28.82	28.43	34.01	26.45	39.36	22.46
31.5	26.5	28	15.5	24	13.96	24.69	36.92	47.23	22.98	30	30.64	21.34	24.43	19	23.32	20.28
0.37	0.31	0.32	0.24	0.23	0.21		0.21	0.65	0.52	0.44	0.39	0.31	0.35	0.25	0.24	0.33
0.21	0.23	0.19	0.02	0.03			0.09	0.17	0.3	0.26	0.25	0.25	0.04	0.02	0.03	
117.12	112.24	123.1	119.56	103.94	109.69	144.81	151.28	134.7	102.59	117.09	117.29	115.52	141.6	124.44	122.94	118.15
6.75	6.75	7.25	5	7.25	4.38	6.66	5.72	2.42	6	7.36	7.36	6.33	7.36	6	8.34	3.57
13.93	14.89	14.69	11.47	15.69	7.4	14.66	17.51	13.38	12.75	17.19	15.34	15.62	15.56	12.2	16.19	10.32
0.05	0.05	0	0	0.05	0		0.05	0.05	0.05	0.05	0.05	0.05	0	0	0.03	0
0.27	0.2	0.28	0.25	0.2			0.13	0.04	0.3	0.31	0.28	0.21	0.36	0.25	0.2	
0	0	0	0	0			0.02	0	0	0	0	0	0	0	0	
0.27	0.2	0.28	0.25	0.2			0.11	0.04	0.3	0.31	0.28	0.21	0.36	0.25	0.2	
11.25	10.75	13.25	10.25	11.75	11.3	25.55	27.37	33.44	13.67	14.02	14.03	9	15.38	12	12.67	13.83
									1.8	1	1	2	3		2.5	
							0.01	0.01			0.05					
0	0	0.02	0.02	0.02	0.02		0	0	0	0	0	0	0.02	0.02	0.02	0.02
21	20.5	24	15.5	15.75	10.5	26.5	21.76	9.25	25.88	21.71	22.03	21.67	23.41	15.5	18.72	17.47
7.97	8.19	8.37	7.58	8.67	8.35		9.66	6.56	8.73	8.53	8.5	8.23	8.95	7	8.61	8.32

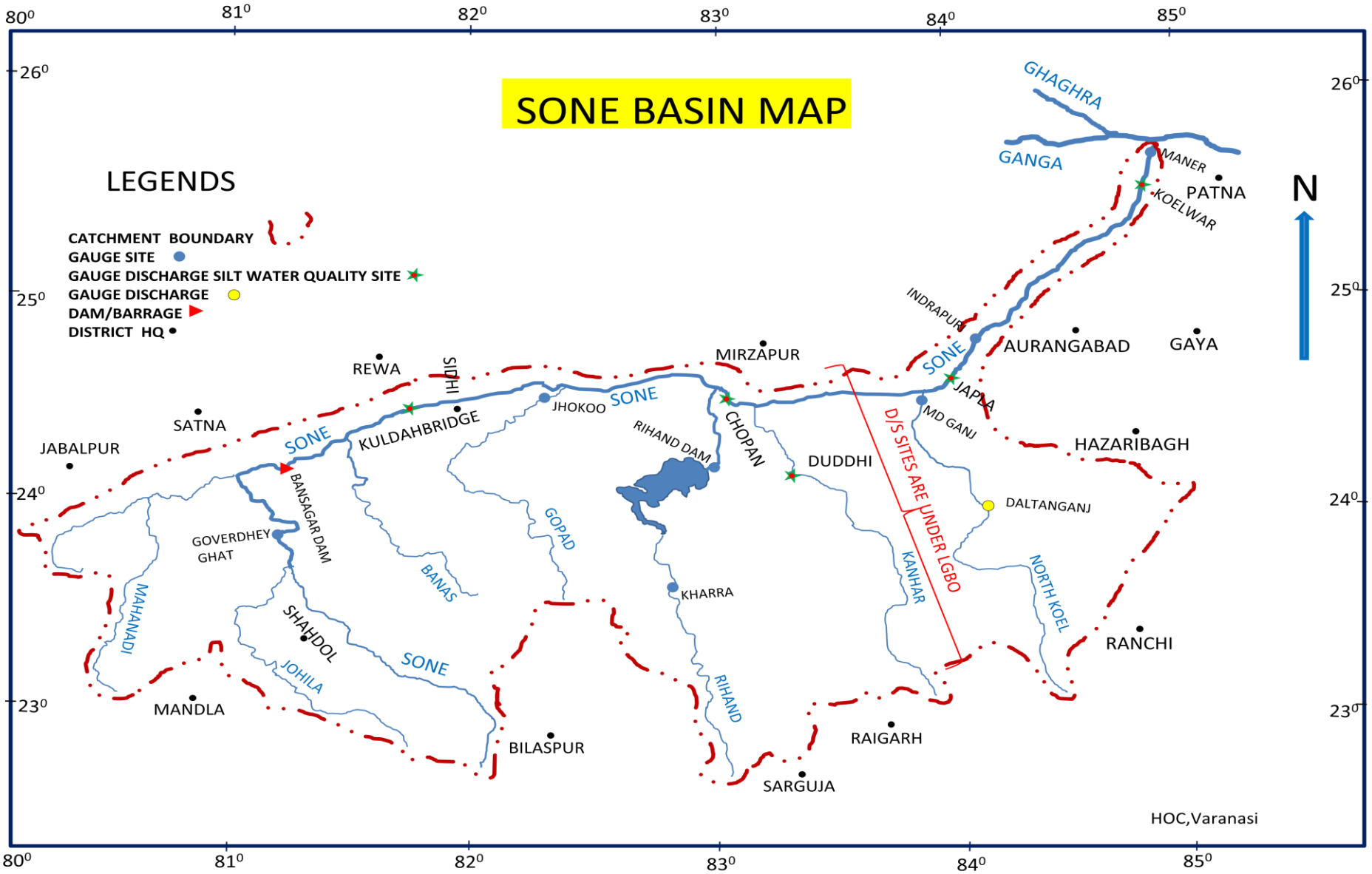
Water Quality Seasonal Average (River Water) for the period : 2017 - 2018

Station Name: DUDHHI(025-MGD3VNS) Division: Middle Ganga Division-III(MGD-III), Varanasi

Local River: Kanhar Sub Division: Upper Sone Rihand Sub-Division, Rewa

		0											0			
					288.24										511.55	298.42
136.1	127.51	142.55	112.9	170.93	115.3	145.1	140.76	127.15	144.58	133.28	135.83	136.14	149.75	116.96	178.86	119.37
14.54	14.89	15.97	15.75	12.45		26.66	28.75	36.06	16.63	17.7	17.41	12.02	17.36	17.13	13.6	
0	0.06	0	0	0		0	0	0.26	0	0.09	0.03	0	0	0	0	
0.42	0.42	0.48	0.42	0.39		0.93	1.01	1.3	0.5	0.53	0.52	0.34	0.55	0.48	0.43	
220.75	249	287.5	185	262.5	182.5	200	300	330.18	173.33	220.33	236.33	258.67	320	200	370	316.67
215	242.5	285.25	179	268	177.5	181	286.67	323.29	168.67	214	228.67	252	312.67	194.5	376.67	311
78.05	65.48	81.35	65.12	105.56		84.03	67.8	71.37	91.67	61.71	72.13	71.06	84.96	66.12	98.47	
139.5	137.5	167	109.25	135.5	89			175.57	112	110.67	164.67	138	186.67	117	199.33	155.67
17.38	21.25	19.25	17	17.88	17.38	21.83	22	23.07	23.17	21.17	21.17	21.83	21.33	19.5	21.33	21.83
0.2	0.33	1.45	0.52	1.1				0.1	0.1	0.1	0.1	0.1	0.27	0.7	0.1	
8.07	8.18	8.02	7.68	8.05	7.9	9	7.67	8.13	8.5	8.37	8.17	8.07	7.73	7.65	8.07	7.9
8.21	8.41	8.07	7.8	7.98	7.95	9.11	8.18	8.47	8.9	8.47	8.27	8.29	7.97	7.81	8	7.94
									9	1	3	13	9		8	
									1	0.05	0.12	2.1	3		3	
									6	2	5	9	10		7	
									4.8	4	1	9.8	4		3.5	
									2.1	3	0.5	2	5		4	

Index Map


SONE BASIN MAP
LEGENDS
CATCHMENT BOUNDARY
GAUGE SITE
GAUGE DISCHARGE SILT WATER QUALITY SITE
GAUGE DISCHARGE
DAM/BARRAGE
DISTRICT HQ
N
80⁰
81⁰
82⁰
83⁰
84⁰
85⁰
26⁰
25⁰
24⁰
23⁰
GHAGHRA
GANGA
MANER
PATNA
KOELWAR
INDRAPURI
AURANGABAD
GAYA
SONE
JAPLA
MIRZAPUR
REWA
SIDHI
KULDAHBRIDGE
JHOKOO
RIHAND DAM
CHOPAN
MD GANJ
HAZARIBAGH
DUDDHI
DALTANGANJ
D/S SITES ARE UNDER LGBO
SATNA
JABALPUR
BANSAGAR DAM
GOVERDHEY GHAT
GOPAD
BANAS
KANHAR
NORTH KOEL
KHARRA
RANCHI
MAHANADI
SHAHDOL
JOHILA
RIHAND
MANDLA
BILASPUR
RAIGARH
SARGUJA
HOC,Varanasi

ABBREVIATIONS AND SYMBOLS

N	: North
E	: East
sq. km.	: Square Kilometre
m	: Metre
o	: Degree
’	: Minute
”	: Second
SP	:Sodium Percentage
RSC	: Residual Sodium Carbonate
SAR	: Sodium Adsorption Ratio
HAR	: Hardness
mg/l	: Milligram per Litre
ml.	: Millilitre
pH	: Negative Logarithm of Hydrogen Ion Concentration