

Comparison of Biological Water Quality of River Ganga (2014-18)

Major Findings:

In Uttarakhand stretch of the River Ganga, at Haridwar barrage (UK-6) biological water quality improves from Slight pollution to clean. However, downstream of Jagjeetpur STP outfall is one of the most impactful location on entire stretch where a gradual deterioration of water quality was observed from clean to heavy pollution in consecutive 4 years.

In Uttar Pradesh stretch, biological water quality is consistently moderately polluted in all the rounds during the period from 2014 to 2018 except River Ganga of mainstream in Kannauj (UP 16) after confluence with 2 tributaries i.e. River Ramganga and Garra where river water is in Heavy Pollution range in Post-monsoon season during 2017-18. Tributaries such as Ramganga, Pandu, Varuna etc. were found to be more impactful locations with respect to biological water quality before confluence with the mainstream of River Ganga. Biological water quality of tributary River Ramganga d/s of Moradabad (UP 10) is found to be improved from Heavy (2014-16) to Moderate Pollution in the following year (2017-18). River Pandu was found to be biologically dead in the pre-monsoon sampling of 2017-18 (Severe Pollution) while oligochaetes colonization was observed in abundance (Total no. 256) after monsoon (Heavy pollution). Biological water quality of River Varuna was found to be improved from Severe to Moderate pollution after monsoon (2017-18). Subsequently, biological water quality of River Ganga after confluence with River Tons (UP 40) observed to be degraded from Slight (2014-15) to Moderate Pollution [2015-16; 2017-18 (pre- & post-monsoon)]. Biological water quality of River Ganga at Ghatia ghat, Farrukhabad (UP14) was found to be moderately polluted during 2014-15; 2015-16 & 2017-18 (Post-Monsoon) whereas in pre-monsoon season of 2017-18, it was found to be slightly polluted.

In Bihar, River Ganga at Gandhi ghat in Patna city (BH 12a) was in Heavy Pollution range during 2015-16 while all other locations in all rounds of bio-monitoring were consistently found moderately polluted.

In West Bengal, River Ganga downstream of Srirampore (WB 22 downstream) was found in Slight pollution range during 2017-18 (pre-monsoon) while all other locations in all rounds of bio-monitoring were consistently found in moderate pollution range.

The summary table of above comparison is attached at Annexure-I along with locational details attached at Annexure-II.

Annexure-I

Comparison of Biological Water Quality of River Ganga (2014-18)

Location City	Code	2014-15 (First Round)				2015-16 (Second Round)				2017-18 pre-monsoon				2017-18 post-monsoon			
		DS	SS	BWQ	BWQC	DS	SS	BWQ	BWQC	DS	SS	BWQ	BWQC	DS	SS	BWQ	BWQC
Haridwar	UK6	0.79	6.5	Slight	B	0.68	6.28	Slight	B	0.6	7.16	Clean	A	0.66	7.25	Clean	A
Jagjeetpur	UK8a	-	-	-	-	7.5	0.8	Clean	A	0.64	6.21	Slight	B	0.77	5.94	Moderate	C
Jagjeetpur	UK8b	0.6	7.16	Clean	A	0.64	6.21	Slight	B	0.48	5.75	Moderate	C	0.28	2.28	Heavy	D
Bijnour	UP2	0.54	3.7	Moderate	C	0.77	4.17	Moderate	C	0.54	5.47	Moderate	C	0.77	4.3	Moderate	C
Muzaffarnagar	UP3	0.84	4.2	Moderate	C	0.78	4.93	Moderate	C	0.71	5.13	Moderate	C	0.59	5.55	Moderate	C
Anupshahr	UP6	0.89	5.09	Moderate	C	0.65	4.44	Moderate	C	0.71	5	Moderate	C	0.62	5.33	Moderate	C
Narora	UP8	0.77	4.54	Moderate	C	0.84	5.13	Moderate	C	0.66	5.25	Moderate	C	0.66	4.31	Moderate	C
Badaun	UP9	0.77	5.43	Moderate	C	0.8	5.3	Moderate	C	0.61	5.25	Moderate	C	0.67	4.71	Moderate	C
Muradabad	UP10	0.4	3.8	Heavy	D	0.4	4.25	Heavy	D	0.45	4.4	Moderate	C	0.43	4.56	Moderate	C
Khudaganj	UP13	0.56	5	Moderate	C	0.74	5.9	Moderate	C	0.69	5	Moderate	C	-	-	-	-
Ghatia Ghat	UP14	0.79	4.6	Moderate	C	0.61	5.27	Moderate	C	0.81	6.17	Slight	B	0.4	5.09	Moderate	C
Kannauj	UP16	-	-	-	-	-	-	-	-	0.7	6	Moderate	C	0.23	4.64	Heavy	D
Kannauj	UP17	-	-	-	-	-	-	-	-	0.56	4.47	Moderate	C	0.6	5.1	Moderate	C
Bithoor	UP18	0.71	5.78	Moderate	C	0.675	5	Moderate	C	0.51	5.5	Moderate	C	0.48	5.4	Moderate	C
Kanpur	UP19	0.78	5.33	Moderate	C	0.7	4.81	Moderate	C	0.82	4.71	Moderate	C	0.7	4.77	Moderate	C
Kanpur	UP24	0.7	5.5	Moderate	C	0.49	4.75	Moderate	C	0.76	4.76	Moderate	C	0.68	4.76	Moderate	C
Shuklaganj	UP26	-	-	-	-	-	-	-	-	0.8	5.28	Moderate	C	0.6	5.15	Moderate	C
Pandu River	UP29	0.46	4.72	Moderate	C	0.76	4	Moderate	C	0	0	Severe	E	0.29	4	Heavy	D
Pandu River	UP29A u/s	-	-	-	-	-	-	-	-	0	0	Severe	E	-	-	-	-
Fatehpur	UP32	0.73	4.80	Moderate	C	0.59	5.66	Moderate	C	0.79	5	Moderate	C	0.46	4.42	Moderate	C
Allahabad	UP40	0.61	6.2	Slight	B	0.54	4.28	Moderate	C	0.71	5.14	Moderate	C	0.67	5.4	Moderate	C
Allahabad	UP46	-	-	-	-	-	-	-	-	0.71	5.14	Moderate	C	0.61	5.05	Moderate	C
Allahabad	UP47	-	-	-	-	-	-	-	-	0.6	5.22	Moderate	C	0.48	4.76	Moderate	C
Varanasi	UP51	0.54	5.1	Moderate	C	0.5	5.42	Moderate	C	0.46	4.9	Moderate	C	0.88	4.78	Moderate	C
Varanasi	UP53	0.53	4.55	Moderate	C	0.47	5.3	Moderate	C	0.76	4.72	Moderate	C	0.51	5	Moderate	C
Varanasi	UP54	0.59	4.9	Moderate	C	0.68	4.9	Moderate	C	0.06	1.67	Severe	E	0.54	3.6	Moderate	C
Varanasi	UP55	0.64	5.6	Moderate	C	0.65	5.4	Moderate	C	0.73	4.7	Moderate	C	0.75	5	Moderate	C
Varanasi	UP56	-	-	-	-	-	-	-	-	0.63	5.43	Moderate	C	0.84	5.09	Moderate	C

Patna	Bh7A u/s	0.4	6.11	Moderate	C	0.66	5.25	Moderate	C	0.63	4.93	Moderate	C	0.85	5.29	Moderate	C
Patna	BH12C d/s	-	-	-	-	-	-	-	-	0.72	5.2	Moderate	C	0.49	4.64	Moderate	C
Patna	BH12	-	-	-	-	-	-	-	-	4.5	0.79	Moderate	C	4.82	0.73	Moderate	C
Patna	BH12a	0.76	5.08	Moderate	C	0.16	3.71	Heavy	D	0.7	5.06	Moderate	C	0.64	5.25	Moderate	C
Falgu River	WB5	-	-	-	-	0.81	5.6	Moderate	C	0.68	5.87	Moderate	C	0.6	5.7	Moderate	C
Falgu River	WB6	-	-	-	-	0.67	5.1	Moderate	C	0.74	5.41	Moderate	C	0.87	4.82	Moderate	C
Murshidabad	WB10	-	-	-	-	0.65	5.94	Moderate	C	0.63	5.57	Moderate	C	0.66	4.22	Moderate	C
Behrampore	WB11	0.7	4.65	Moderate	C	0.58	5.86	Moderate	C	0.66	5.76	Moderate	C	0.56	5.57	Moderate	C
Srirampore	WB-22 d/s	0.66	5.69	Moderate	C	-	-	-	-	0.57	6.3	Slight	B	0.58	5.06	Moderate	C
Belgharia	WB23	0.33	6	Moderate	C	-	-	No Collection	High Tide	0.62	5.37	Moderate	C	0.55	4.96	Moderate	C
Ballykhal	WB24 d/s	-	-	-	-	-	-	-	-	0.56	5.17	Moderate	C	0.56	4.93	Moderate	C
Howrah Bridge	WB27	-	-	-	-	0.38	6	Moderate	C	0.5	6	Moderate	C	0.3	5.67	Moderate	C
Garden Reach	WHG-1	-	-	-	-	-	-	-	-	0.09	6	Moderate	C	0.6	5.25	Moderate	C

DS- Diversity Score; SS- Saprobic Score; BWQ- Biological water quality w.r.t. pollution; BWQC- Biological water quality class

Note: Total 93 unique locations were covered during 2014-16.Out of which 66 locations were covered in first round and 86 locations were covered in second round.

Annexure-II**Locational Details of River Ganga**

Sr. No.	Location Name	Location code
1.	Haridwar Barrage (Ganga)	UK6
2.	Jagjeetpur STP U/S (Ganga)	UK8a
3.	Jagjeetpur STP D/S (Ganga)	UK8b
4.	Madhya Ganga Barrage	UP2
5.	Shukratal Ghat (Saloni River)	UP3
6.	Bridge at Anupshahar (Ganga)	UP6
7.	Barrage at Narora (Ganga)	UP8
8.	River Ganga Kacchla Ghat	UP9
9.	Ramganga d/s of Moradabad	UP10
10.	Bridge on Kali River at Kanpur-Farrukhabad Road near Khudaganj	UP13
11.	Bridge at Ghatia Ghat on River Ganga	UP14
12.	Bridge SH21 d/s Kannauj	UP16
13.	Bridge SH40 d/s Of Kannauj	UP17
14.	Bridge at Bithoor	UP18
15.	Barrage U/S Kanpur	UP19
16.	U/s Bathing Ghat Kanpur (Deorighat) d/s Kanpur	UP24
17.	Bridge at KanpurI (Bridge at Shukla Ganj)	UP26
18.	Bridge 2 at Kanpur NH25 (River Pandu)	UP29
19.	Between Road rail bridge Bhruti near Panki (River Pandu)	UP29a upstream
20.	Bridge on River Ganga near Fatehpur (Asni Village)	UP32
21.	Bridge d/s of tributaroy near Sirsa (pontoon bridge near Sirsa, Allahabad)	UP40
22.	Nalla at Allahabad 4	UP46
23.	Bridge on GT Road, Allahabad	UP47
24.	Varanasi Upstream	UP51
25.	Varanasi downstream (d/s Rajghat bridge)	UP53
26.	Bathing Ghat at Varanasi 1 (Puranapul)	UP54
27.	Bridge on (river Gomti) tributary in Varanasi	UP55
28.	Tribuatry at Rajwari (CCS Pump Canal Pumping station)	UP56
29.	Dighaghat (Janardan Ghat) Patna	Bh7A upstream
30.	River Ganga at Fatuha	BH12c downstream
31.	River Ganga at Malsalami	BH12
32.	River Ganga at Gandhi Ghat	BH12a
33.	1 st inlet stream from west u/s of Ganga Nallah (Falgu River)	WB5
34.	2 nd inlet stream u/s of Ganga Nallah	WB6
35.	Ganga river d/s Murshidabad (u/s Beharmpore)	WB10
36.	Ganga river d/s of Murshidabad (d/s of Beharmpore)	WB11
37.	Nalla opposite Ghat d/s of Srirampore	WB-22 downstream
38.	Ganga river Near Belgharia	WB23
39.	Nalla at Ballykhal	WB24 downstream
40.	River Ganga near Howrah Bridge	WB27
41.	River Ganga at Garden Reach	WHG-1