

# RESTORATION OF POLLUTED RIVER STRETCHES

## CONCEPT AND PLAN



**CENTRAL POLLUTION CONTROL BOARD**

# CONTENTS

<b>River Pollution – Identification of Polluted River Stretches</b>	<u><a href="#">RIVER POLLUTION</a></u>
River Quality Restoration Plan	<u><a href="#">RIVER QUALITY RESTORATION PLAN</a></u>
Concept Plan on River Hindon	<u><a href="#">MODEL WATER QUALITY RESTORATION PLAN - RIVER HINDON</a></u>

# RIVER POLLUTION AND LEGAL PROVISIONS

- Water (Prevention and Control of Pollution) Act, 1974 delineated

**Assessment of quality of river water to ascertain wholesomeness**



Wholesomeness - defined through the Use based Water Quality Criteria



Water uses further defined parameters that are required to be maintained for wholesomeness

- Core parameters for assessment to study impact on river water quality from polluting activities
  - BOD (organic matter) consuming Dissolved Oxygen
  - Dissolved Oxygen (life-support system for a aquatic ecosystem)
  - Faecal Coliform group of bacteria responsible for gastro-intestinal diseases

# RIVER POLLUTION AND LEGAL PROVISIONS (contd.)

- Maintaining wholesomeness is governed through control of pollution by
  - Development of source specific Discharge Standards
  - Consent management system
  - Surveillance of discharges and river water quality
- Role of Central Board to regulate polluting activities defined under Section 16 of Water Act, 1974

## FUNCTIONS OF THE CENTRAL BOARD

- Role of State Boards to regulate polluting activities defined under Section 17 of Water Act, 1974

## FUNCTIONS OF THE STATE BOARDS/POLLUTION CONTROL COMMITTEES

# PRESENT MANAGEMENT PRACTICE

- Isolation of operation of Programme on Control of sources of pollution and Monitoring of Environmental Water Quality
- River Action Plans executed so far did not improve water quality despite investing huge resources by Govt. both at Central and State level
- Lack of Integration of efforts of stakeholder organisations of Central and State Govt.

# **HISTORICAL PERSPECTIVE- RIVER ACTION PLAN**

- Ganga Action Plan phase – I launched during 1985 based on Assessment of River Water Quality by CPCB and SPCBs/PPCs
- River Action Plan on 39 major rivers and tributaries covered 190 cities in 20 States under National River Action Plan
- Despite these efforts, rivers and streams water quality has not improved
- Obvious reasons are gaps in sewage/ industrial effluent generation and treatment, growth of urban centres, indiscriminate disposal of waste through drains and depleting levels of waters in rivers and streams
- Visible state of grey or black water in river/ streams is in conformity to the scientific assessment of water quality

# EMERGING RIVER POLLUTION

- Polluted rivers are identified over the years based on water quality trends
- Expansion of monitoring network has emerged higher number of rivers as polluted
  - Water quality assessment of rivers revealed non-conformity to Water Quality Criteria
  - River locations not meeting criteria are defined as '***polluted***'
  - Sequence of consecutive polluted river locations constitute a polluted stretch

# IDENTIFICATION OF POLLUTED RIVER STRETCHES

- 302 polluted stretches identified based on BOD (2008-12 assessment)
- 317 stretches based on BOD & Fecal coliform (2015 assessment)

## STRETCHES

- 2013-17 exercise is being carried out and report shall be published in May, 2018

- **Primary Water Quality Criteria:**

Dissolved Oxygen	:	> 4.0 mg/l
Biological Oxygen Demand	:	< 3.0 mg/l
Faecal Coliform (Desirable)	:	< 500 MPN/ 100 ml
(Acceptable)	:	< 2500 MPN/ 100 ml
Total Coliform	:	< 5000 MPN/ 100 ml



# COMMUNICATIONS TO SPCBs/PCCs

- Assessment Report communicated to SPCBs/PCCs for conservation and restoration of polluted stretches of Rivers in March, 2015
- Issued Directions to SPCBs/PCCs under *Section 18 (1) (b) of the Water (Prevention and Control of Pollution) Act, 1974* regarding '**Treatment & Utilization of sewage**', in April 2015
- Issued Directions to Municipal Corporations of 46 Metropolitan cities and 20 State Capitals under *Section 5 of the Environment (Protection) Act, 1986* regarding '**Treatment and Utilization of Sewage for Restoration of Water Quality of River**' in October, 2015

[CONTENTS](#)

# RIVER QUALITY RESTORATION PLAN

**Broad concept for development of water quality restoration plan for polluted rivers/stretches**

**Step 1** - Reconnaissance visit, sampling of river/stream / drains and demarcation on the water shed map

**Step-2-** Identification of sources of pollution, quantification of pollution load vis-a-vis treatment facilities for municipal wastewater and industrial effluents

**Step-3-** Treatment technologies, prevailing discharge standards, available flow in the river/stream and review of discharge standards/stream flow

**Step-4-** Assessment of water quality trend of river/stream and to work out augmentation of river/stream flow

**Step-5-** Consolidation of information on assessment/ interventions and monitoring of improvement in water quality.

# RESTORATION OF POLLUTED RIVER STRETCHES

## Four phases for full scale water shed management

### **(i) Recognition Phase:**

Survey, sampling & assessment of Water quality

### **(ii) Restoration Phase:**

DPR preparation, Identification of sources of pollution, In situ bio-remediation

### **(iii) Protection Phase:**

Setup of treatment facilities for sewage & industrial effluent based on discharge standards, available river flow, adoption of available technologies

### **(iv) Improvement Phase :**

Augmentation of river flow

# TIMELINE AND DELIVERABLES

Activities	2017	2018	2019	2020	2021	2022
Reconnaissance Survey						
Water Quality Sampling						
Preparation of DPR						
Execution (Setting up of STPs, CETPs)						
Augmentation of River Flow if any and restoration of water quality						

*Note: Subject to availability of Funds & Manpower*

# **APPROACH: RESTORATION OF POLLUTED RIVER STRETCHES**

## **Sewage management**

- SPCBs to assess Sewage generation, existing treatment capacity (Operational/ non operational), estimation of gaps & to frame action plan to meet the gap of treatment
- Operationalize the existing STPs and set up new STPs with State-of-the-art technologies

## **Industrial Wastewater Management**

- Mapping of sources- industrial clusters, measurement of flow of drains discharging into Rivers and its tributaries
- Detailed project report preparation
- Shifting to cleaner technologies by industries.
- Technical support to be provided by CPCB and expert institutions

# PROPOSED ACTIONS - RESTORATION PLAN

- Review design standards for STPs
- Suggest parameter limits in compliance to Water Quality requirement viz. discharge of BOD <3 mg/l, COD <10 mg/l and SS <10 mg/l if no fresh water flows.
- Review Consent conditions for industrial units and suggest parameters in compliance to Water Quality requirement viz. discharge of BOD <3 mg/l, COD <10 mg/l and SS <10 mg/l if no fresh water flows.
- Explore possibility to create storages in the water shed of Rivers for release of water during non-monsoon period.

# PROPOSED ACTION PLANS

- Review of identified Polluted River Stretches
- Assessment:
  - Municipal Sewage generation and existing treatment capacity
  - Industrial waste water generation and existing treatment capacity
  - Gaps: Total waste water generation and need for enhancement in treatment capacity
- Assessment of Water Quality of Aquatic Resources
- Identification of new Polluted River Stretches
- Preparation of Action Plans for Restoration of Polluted River Stretches
- Sharing of knowledge and exchange of experiences- at State Level

## PROPOSED ACTION PLANS (CONTD.)

- Constitution of committees for review of implementation of action plan.
  - Committee for municipal sewage management - under the Chairmanship of Principal Secretary Urban Development State Govt., comprising members of CPCB, MOEF&CC, SPCBs/PCCs, research institutions and concerned state departments. *Review meetings once in a quarter.*
  - Committee for Industrial waste water management - under the Chairmanship of Chairman, respective SPCBs/PCCs comprising members of CPCB, MOEF&CC, SPCBs/PCCs, Industry Associations, research institutions and concerned state departments. *Review meetings once in a quarter.*
  - At Central level, constitution of review committee under the Chairmanship of CPCB comprising members from Central Govt. Depts. (MoEF&CC, NRCD, NMCG, MoWR, CGWB), IITs, GEZ, NGRI, NRSA, NEERI, ITRC, NIH & NIO). *Review meetings with SPCBs/PCCs half yearly.*

[Formats: Information Gathering SPCBs/PCCs](#)

[CONTENTS](#)

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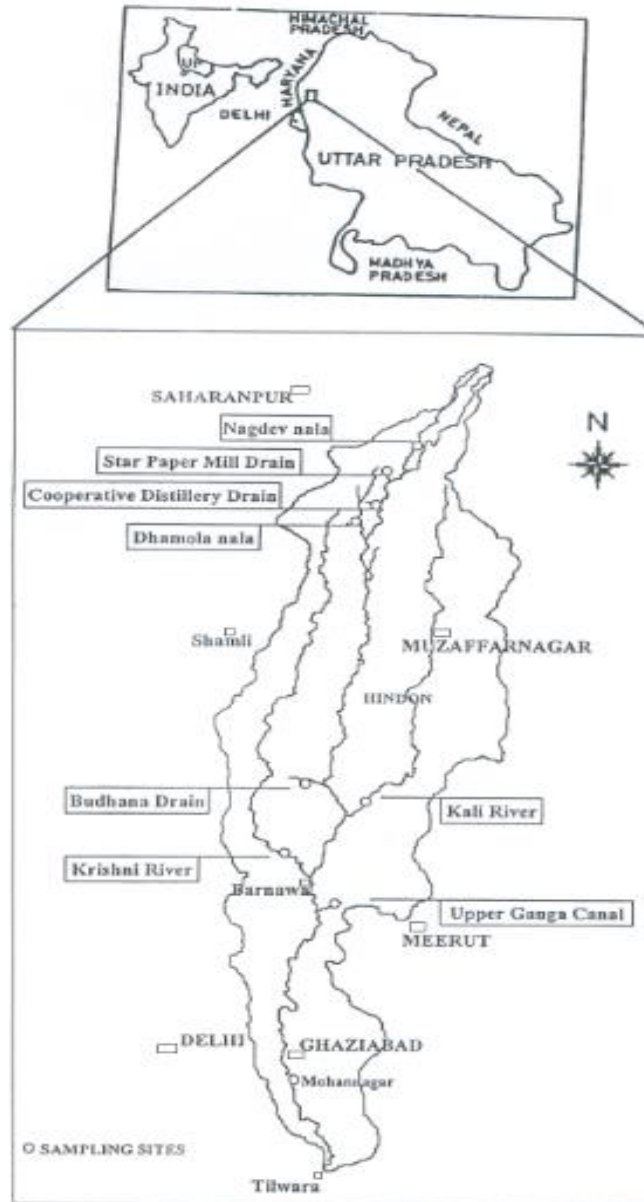


**MODEL**  
**WATER QUALITY RESTORATION PLAN**  
**-**  
**RIVER HINDON**

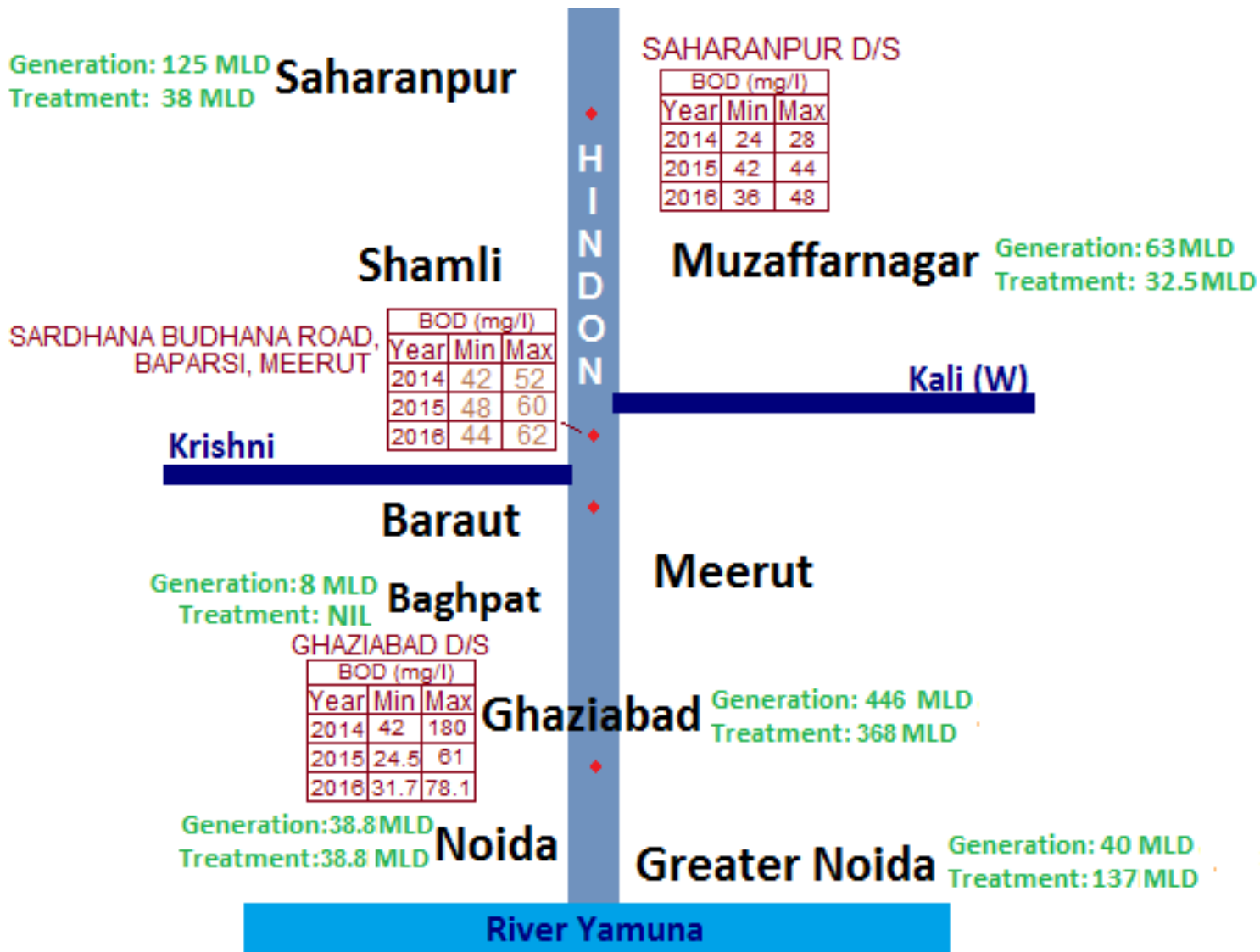
# RIVER HINDON

- River Hindon originates from Upper Shivaliks (Lower Himalayas) and covers a distance of about 200 Km before joining the river Yamuna downstream of Delhi
- River pass through the districts  
Saharanpur, Muzaffarnagar, Shamli, Meerut, Baghpat, Ghaziabad and Gautambudh Nagar
- Tributary streams - River Kali (W) and River Krishni

# CATCHMENT OF RIVER HINDON



# SCHEMATIC DIAGRAM - RIVER HINDON WATER QUALITY - SEWAGE GENERATION/ TREATMENT CAPACITY



# INDUSTRIES IN HINDON CATCHMENT

- Category wise number of industrial units –Uttar Pradesh  
Distillery-8, Pulp & Paper-41, Sugar-15, Tannery-5, Textile-92, Others- 150
- Out of 311 industrial units, 264 units provided Effluent Treatment Plant, 43 industrial units closed by UPPCB and 4 units are non-polluting
- Category wise number of industrial units –Uttarakhand  
Pulp & Paper-5  
Sugar-2 Units (discharging in river Sheela in Hardwar District)
- Distillery units maintaining zero liquid discharge
- Pulp & Paper Units -online monitoring system connected
- Textile and Tannery units to follow the charter and to attain zero liquid discharge

# MUNICIPAL SEWAGE GENERATION AND TREATMENT

- Townships: Saharanpur, Muzaffarnagar, Shamli, Baraut, Bagpat, Ghaziabad Noida and Greater Noida
- Total Sewage Generation : 930 MLD
- Sewage Treatment Capacity : 702 MLD
- Untreated Sewage : 228 MLD
- Treatment Plants Designed Standards
  - COD : 250 mg/l
  - BOD : 30 mg/l
  - SS : 100 mg/l

# DRAIN OUT FALLING IN RIVER HINDON

- Drains discharging in river Hindon: 13
  - Saharanpur : 3
  - Muzafarnagar : 4
  - Bagpat : 1
  - Ghaziabad : 2
  - Gautam Budh Nagar : 3  
(Noida-Greater Noida)

# SOURCES OF POLLUTION IN RIVER HINDON

- Effluents of Nagdev Nala and star paper mill at Saharanpur generate the flow of water in the river
- Municipal waste water generated from Saharanpur is discharged into Hindon river through Dhamola Nala
- Main sources of pollution in the river Kali include municipal wastewater of Muzaffar Nagar city, industrial waste from a variety of industries (such as pulp and paper, sugar, distilleries, steel, rubber, ceramic, chemicals, plastic, dairy and laundries)
- Prominent industrial units are Mansurpur sugar mill and distillery outfalling in river Kali and Shamli sugar factory and distillery discharge in the river Krishni
- River Kali opens into river Hindon near the village of Atali and river Krishni near Sardhana.
- Municipal waste water from Budhana town also join the river in this stretch



# SOURCES OF POLLUTION IN RIVER HINDON

- River Kali meets river Hindon on its left bank near the village of Atali and carries municipal waste water and effluents of industries located in the Muzaffarnagar city
- Another tributary - Krishni meets Hindon on its right bank at village Barnawa in Meerut district and transports the waste water from sugar mill and distillery
- Downstream of Karhera village (Ghaziabad district), major part of the river flow is diverted to Hindon cut canal at Mohan Nagar which meets river Yamuna upstream of Okhla barrage
- Thereafter river Hindon receives waste water through Dhasana Drain at village Bisrakh in Ghaziabad district
- Dhasana drain carries the waste water of municipal as well as industrial establishments in Ghaziabad
- River Hindon flows further downstream and joins river Yamuna at village Tilwara

# TIME TARGETED MANAGEMENT PLAN

- Review consent conditions for industrial units
  - Suggest parameters in compliance to water quality requirement viz. discharge of BOD not more than 10 mg/l, COD 50 mg/l and Suspended solids 10 mg/l
- Review design standards for existing STPs
  - Suggest parameters in compliance to ambient water quality requirement viz. discharge of BOD not more than 10mg/l, COD 50 mg/l and Suspended solids 10 mg/l
- Natural in situ treatment system (Bioremediation-Root Zone-Sponge Based) be established on all the drains having more than 1.00 MLD flow.
  - Natural system be a combination of inert material such as boulders, gravels pebbles and synthetic sponges embedded with root zones of plants
- Explore possibility to create storages in water shed of River Hindon and its tributaries for release of fresh water during non-monsoon period

# TIME TARGETED MANAGEMENT PLAN

- Plan may be implemented in a time bound manner by fragmenting activities as modification of consent conditions, surveillance of sources of pollution in contrast to the norms and regular assessment of water quality of river Hindon, tributaries and drains
- Convene Half Yearly meeting of stakeholder organizations viz. U.P Jal Nigam, Dept. of Industries, Electricity supply agency, Regional Offices of U.P Pollution Control Board, Central Pulp and Paper Research Institute, Distillery Association, Sugar Mill Association, U.P. Irrigation Dept. under the Chairmanship of Commissioner/District Magistrate at District Level in Saharanpur, Muzaffarnagar, Ghaziabad and Gautam Budh Nagar
- Convene quarterly meeting of stakeholder organizations under the Chairmanship of Chief Secretary

# STATUS OF DOMESTIC POLLUTION IN RIVER HINDON

Sl. No.	District	Total Sewage Generation MLD	Sewage treatment Capacity MLD	Details of STP
1.	Saharanpur	125	38	
2.	Muzaffarnagar	63	32.50	
3.	Meerut	209	88	
4.	Baghpat	8	Nil	
5.	Ghaziabad	446	368	<ol style="list-style-type: none"> <li>1. 74 MLD SBR, Indrapuram</li> <li>2. 56 MLD SBR, Indrapuram</li> <li>3. 56 MLD UASBR, Indrapuram</li> <li>4. 56 MLD SBR, Dhudaheda, Vijay Nagar</li> <li>5. 70 MLD, UASBR, Dhudaheda, Vijay Nagar</li> <li>6. 56 MLD, SBR, Govindpuram</li> <li>7. 56 MLD, BapuDham (No Sewage at Present)</li> <li>8. 56 MLD Morti (sewer line not connected)</li> <li>9. 30 MLD, Sadulhabad, Loni(Not in operation at present)</li> </ol>
6.	Gautambudh Nagar (a)Noida	35 MLD 3.8 MLD (From NTPC)	35 3.8 MLD	<ol style="list-style-type: none"> <li>1. 01 STPs of 35 MLD capacity</li> <li>2. 01 STP of 3.8 MLD capacity (At NTPC)</li> </ol>
	b)Greater Noida	35-40 MLD	137MLD	01 STP of 137 MLD

# RIVER-WISE INDUSTRIES - WATER SHED OF RIVER HINDON/TRIBUTARIES

Sl. No.	Category	Hindon (U.P.)	Kali (West) (U.P.)	Krishni (U.P.)	Shila (Uttarakhand)	No. of total industries	No of industries closed	Polluting process stopped	Distillation process stopped
1	Sugar	7	5	2	2	16	1	0	0
2	Distillery	5	1	2	0	8	0	0	2
3	Pulp and Paper	10	29	2	5	46	5	0	0
4	Straw Board	16	0	0	0	16	9	1	0
5	Slaughter House	5	1	0	0	6	0	0	0
6	Frozen meat packaging	5	0	0	0	5	0	0	0
7	Dairy	3	0	1	0	4	1	0	0
8	Tannery	5	1	0	0	6	1	0	0
9	Textile	105	0	0	0	105	13	2	0
10	Thermal Power plant	1	0	0	0	1	0	0	0
11	Electroplating/ Phosphating/ Galvanizing	39	0	0	0	39	1	0	0
12	Others/Misc	68	3	0	0	71	10	1	0
<b>Total</b>		<b>269</b>	<b>40</b>	<b>7</b>	<b>7</b>	<b>323</b>	<b>41</b>	<b>4</b>	<b>2</b>

# DETAILS OF DRAINS FALLING INTO RIVER HINDON

S.No.	Location	Name of Inletting River/Drain	Discharge (Cusec)		Length (Km)	Width (M)	Depth (M)	Gradient of the river (Cm/Km)
			Max.	Min.				
1	Saharanpur	Nagdev Rao	20000	20	25.00	35.00	2.00	120
2	Saharanpur	Local drain	80	20	8.00	5.00	1.20	--
3	Saharanpur	Paondhoi & Dhamola River	20000	100	25.00	35.00	2.00	60
4	Muzaffarnagar	Titawi Sugar Mill drain	100	20	6.00	6.00	1.00	30
5	Muzaffarnagar	Budhana Sewage Drain	200	50	5.50	5.00	1.00	--
6	Muzaffarnagar	Budhana Sewage Drain Baparasi	230	20	10.00	6.00	1.20	--
7	Muzaffarnagar	Kali River (West)	10000	170	90.00	40.00	2.50	20
8	Meerut	Sardhana Paper Mill	100	20	7.00	5.00	1.00	
9	Baghpat	Krishni River	5000	51	130.00	30.00	2.20	20
10	Meerut	Kinauni Suger Mill Drain	100	20	4.80	5.00	1.40	--
11	Meerut	Jani Escape	4000	1110	13.20	26.00	2.50	30
12	Ghaziabad	Hindon barrage D/S	100000	1601-1500 =101	--	--	--	--
13	Ghaziabad	Indirapuram drain	100	20	8.00	5.00	1.50	30
14	Gautambudh Nagar	Dasna-Shahberi drain	415	100	19.31	13.70	1.78	20
15	Gautambudh Nagar	Hawalia Drain	1700	100	14.00	17.50	2.30	20
16	Gautambudh Nagar	Before Yamuna	100000	621	--	--	--	--

# STATUS OF WATER QUALITY IN MAJOR DRAINS

Regional Office	Major Drain	BOD(mg/l)	COD(mg/l)
Saharanpur	Dhamola Drain	N.A.	N.A.
Muzaffarnagar	Nagarpalika Drain (Near Shamshan Ghat Muzaffarnagar)	110	496
	Nagarpalika Drain (Near Shamli Road Bridge Muzaffarnagar)	107	480
	Kukra Drain(Bridge Jansath-MZN road)	104	448
	Deoband Drain	86	416
	Dhandera Drain	80	400
Meerut	Kinauni Drain(Before meeting Hindon)	30	120
	Sardhana Drain(Before meeting Hindon)	60	272
Ghaziabad	Jawli Drain after meeting C.E.T.P. Drain at Chandipur Road.	127.0	271.0
	Karheda Drain, Loni, Road	126.0	306.0
	Hindon Vihar Drain	121.0	376.0
	Meerut Road+Kaila Bhatta Drain at Shamshanghat	105.6	214.0
	Arthla Drain	114.0	372.0
	Pratap Vihar Drain	148.0	350.0
	Indira Puram Drain	87.0	520.0
	Dasna Drain	118.0	232.0
GautamBudh Nagar	Dasna drain	102.00	544.00
	Sec-123 STP drain	18.00	92.00
	Hawaliya drain	72.00	368.00

# QUANTITY OF EFFLUENT IN SUB TRIBUTARY DRAINS MEETING TO MAJOR DRAINS

SL. No.	Distt.	Name of the Drain	Place where drains join with river	Quantity of effluent (MLD)	Remarks
1	2	3	4	5	6
1	Saharanpur	Chilkana Nala (Dhobighat Tubewell)	Treated effluent from STP & Drains discharge in River Dhamola which joins river Hindon.	12.5	Out of total discharge of 77 mld, 38 mld is being treated in existing STP and rest is going to river without treatment.
2		Jamshed Nai (Dhobighat)		0.06	
3		Jawahar Nagar, Bansal Publisher		0.4	
4		Jawahar Nagar (Khurana Niwas)		0.65	
5		Kalyani Sales		0.45	
6		Swami Dental Clinic		0.5	
7		Braj Tansport		12.5	
8		Aggarwal Dharamshala		0.7	
9		Aggarwal Dharamshala		0.15	
10		Near Janak Hotel		1.2	
11		Khumran Pul Rikshwa Stand		0.5	
12		Sharab Theka ke Samne		0.75	
13		Natraj Drycliners		0.45	
14		Sabzi Mandi Pul		0.7	
15		Rajdhani Plywood		0.6	
16		State Bank of Patiyala		0.45	
17		Khumran Pul Mandi Ke Pas		0.75	
18		Ashu Sharma		0.25	
19		Daal Mandi Pumping Station Ke Samne		1.25	
20		Machhali Bazar		0.6	
21		Jogiyaan Pul		0.6	
22		Taj Nala		16.4	
23		Satyug Aashram		0.7	
24		Pthanpura - Ajmer Niwas		0.7	
25		Govind Nagar - Shri Hiramal Niwas		0.4	



# QUANTITY OF EFFLUENT IN SUB TRIBUTARY DRAINS MEETING TO MAJOR DRAINS

26		Govind Nagar - Shri Ganga Devi Niwas	0.45	
27		Govind Nagar - Shri Mohan Niwas	0.55	
28		Railway Drain	0.45	
29		Karlya Sahayak Chhetra Parbandhak U.P. Rajya Sadak Parivahan	0.55	
30		Gil Colony Charch Ke Pas	0.45	
31		Chawla Property Dealer - Hath Gate	12	
32		Bharti Dairy Court Road	0.65	
33		Parnesti Das Jewellers - Court Road	0.55	
34		Police Up-Mahaniraksh Niwas	0.45	
35		Karchari Rajya Bima Nigam Jain College Road	0.45	
36		Pratap Clinic Jain College Road	0.4	
37		Baba Deep Garment Jain College Road	0.55	
38	Saharanpur	Jai Laxmi Furniture House Malhipur Road	0.45	
39		Hakikat Nagar Tiraha	0.55	
40		Shiv Mandir (Dr. Mehta)	0.3	
41		Sadar Thane Ke Pichhe	0.25	
42		Hanuman Mandir Ghantaghar	0.2	
43		Numaish Camp Risksha Stand	0.35	
44		Numaish Camp Aarti Tant House	0.2	
45		Punjabi Barat Ghar	0.1	
46		Bhagat Singh Chowk Ke Samne	0.25	
47		Jai Jormal Store Link Road	0.3	
48		Pahlwan Pulia	0.33	
49		Mayur Service Center Link Road	0.55	
50		Vardan Hospital Link Road	0.45	
51		Dhamola Nadi Ka Pul Sapna Takies	0.55+0.46	
<b>TOTAL</b>			<b>77.00</b>	

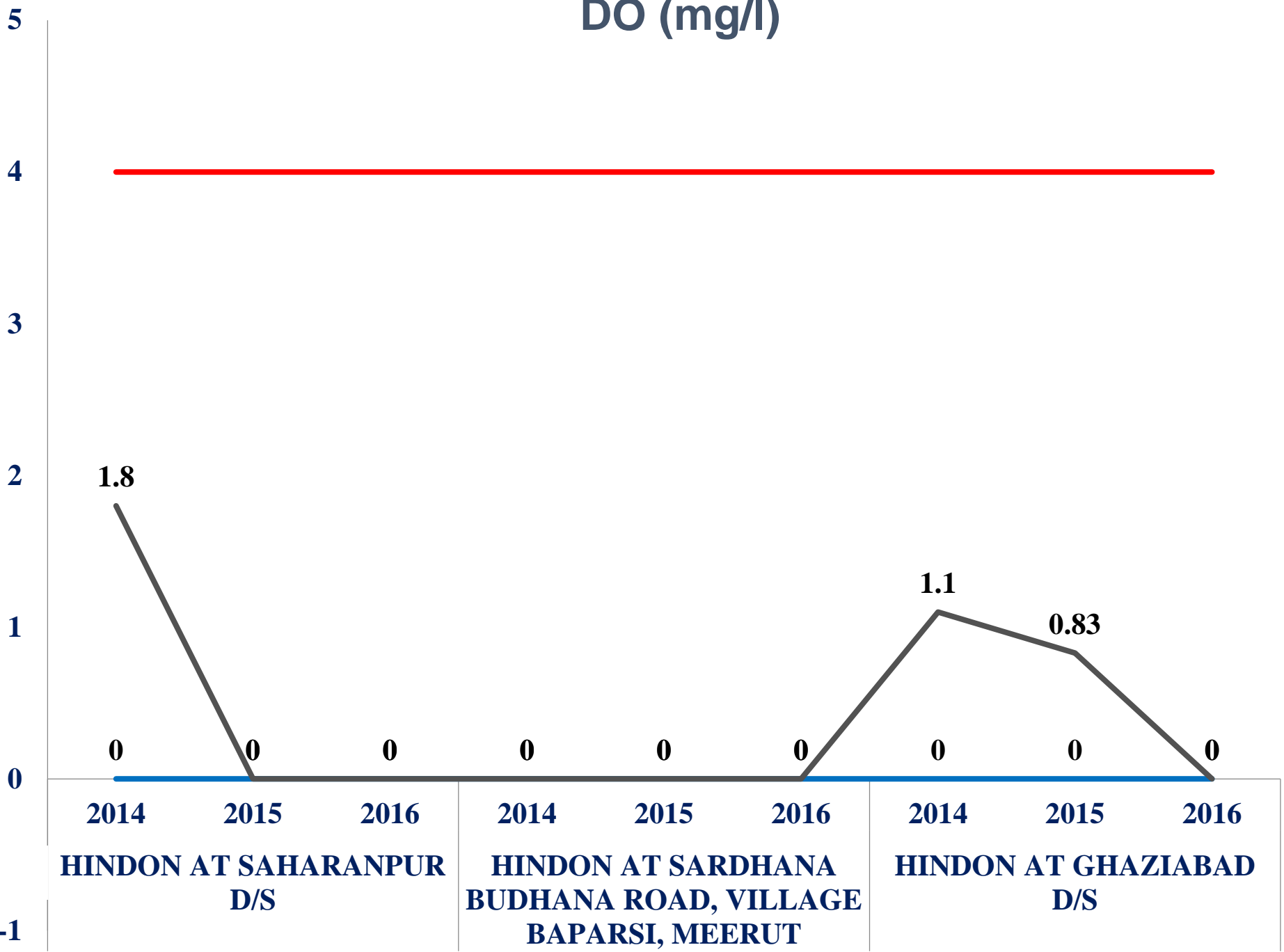
# QUANTITY OF EFFLUENT IN SUB TRIBUTARY DRAINS MEETING TO MAJOR DRAINS

SL. No.	Distt.	Name of the Drain	Place where drains join with river	Quantity of effluent (MLD)	Remarks
1	2	2	3	4	5
52	Muzaffarnagar	South Khala Par	Treated effluent from STP & Drains discharge in River Kali west that goes to River Hindon.	22	Out of total discharge of 60 mld, 32.5 mld is being treated in existing STP and rest is going to river without treatment.
53		Prempuri - 1		14	
54		Prempuri - 2		3	
55		Gaushala		4.5	
56		Niyajupura		1.5	
57		Ramleela Kila		15	
<b>TOTAL</b>				<b>60.00</b>	
58	Baghpat	Khas Nala, Down Stream of Baraut	Baghpat	5	Preparation of DPR for sewerage is under consideration.
59		Baghpat Nala, Down Stream of Baraut		4	
60		Basai Drain, Near Tronica City, Ghaziabad		3	
<b>TOTAL</b>				<b>12.00</b>	
61	Ghaziabad	Hindon Vihar Drain	Hindon Ghaziabad	5	Out of total discharge of 223 mld, 196 mld is being treated in STP and Only 27 mld untreated discharge will flow to River Hindon
62		Karheda Drain		5	
63		Meerut Road/Kailabhata Drain		10	
64		Arthala Mohan Nagar Drain		3	
65		Indirapuram Drain		56 (Treated) (STP at Indirapuram THA GZB)	
66		Pratap Vihar Drain		4	
67		Vijay Nagar, B.S.Road, Dasana Drain		70 (Treated) STP at Dundahera CHA GZB)	
68		Sahibabad Drain		Chilla Regulator Delhi	
<b>TOTAL</b>				<b>223.00</b>	
<b>GRAND TOTAL</b>				<b>372.00</b>	

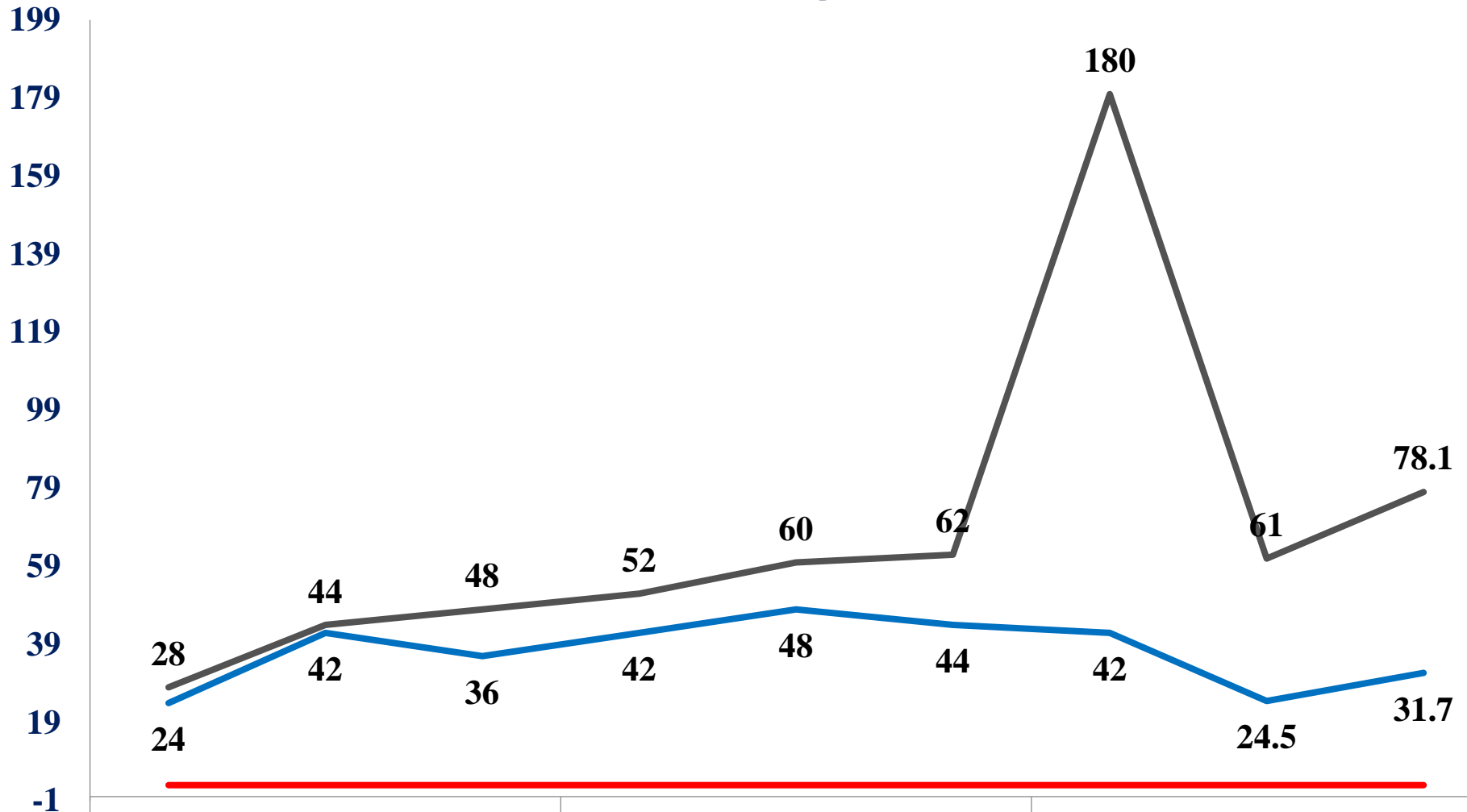
# STATUS OF WATER QUALITY OF RIVER HINDON

Year	LOCATIONS	DO		pH		BOD		COD		FECAL COLIFORM		TOTAL COLIFORM	
		(mg/l)				(Mg/l)		(mg/l)		(MPN/100ml)		(MPN/100ml)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2014	HINDON AT SAHARANPUR D/S	0	1.8	7.2	7.55	24	28	192	212	3300	7500	4300	12000
2015		0	0	7.4	7.5	42	44	220	246	14000	21000	28000	39000
2016		0	0	7.3	7.5	36	48	242	248	15000	15000	21000	21000
2014	HINDON AT SARDHANA BUDHANA ROAD, VILLAGE BAPARSI, MEERUT	0	0	7.4	7.6	42	52	224	288	4000	94000	110000	170000
2015		0	0	7.3	7.7	48	60	240	330	79000	110000	94000	170000
2016		0	0	7.2	7.7	44	62	210	320	79000	130000	110000	170000
2014	HINDON AT GHAZIABAD D/S	0	1.1	7	7.6	42	180	104	612	160000	190000	220000	310000
2015		0	0.83	6.3	7.5	24.5	61	59.9	150	160000	220000	240000	320000
2016		0	0	6.7	7.5	31.7	78.1	108.8	269	130000	220000	240000	320000

# DO (mg/l)



# BOD (mg/l)



**2014**    **2015**    **2016**  
**HINDON AT SAHARANPUR D/S**

**2014**    **2015**    **2016**  
**HINDON AT SARDHANA BUDHANA ROAD, VILLAGE BAPARSI, MEERUT**

**2014**    **2015**    **2016**  
**HINDON AT GHAZIABAD D/S**

**78.1**

**31.7**

**180**

**61**

**62**

**60**

**52**

**48**

**44**

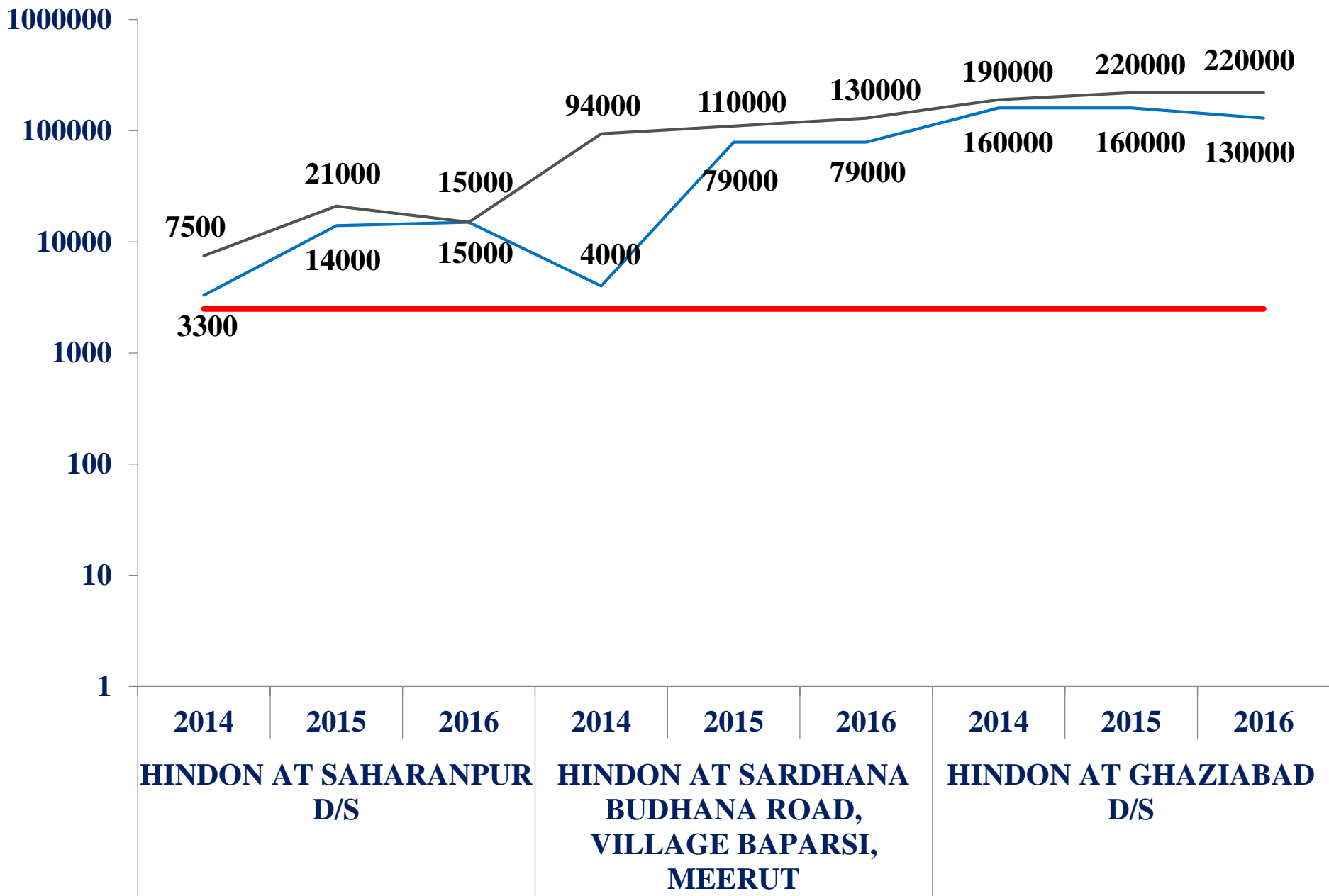
**28**

**24**

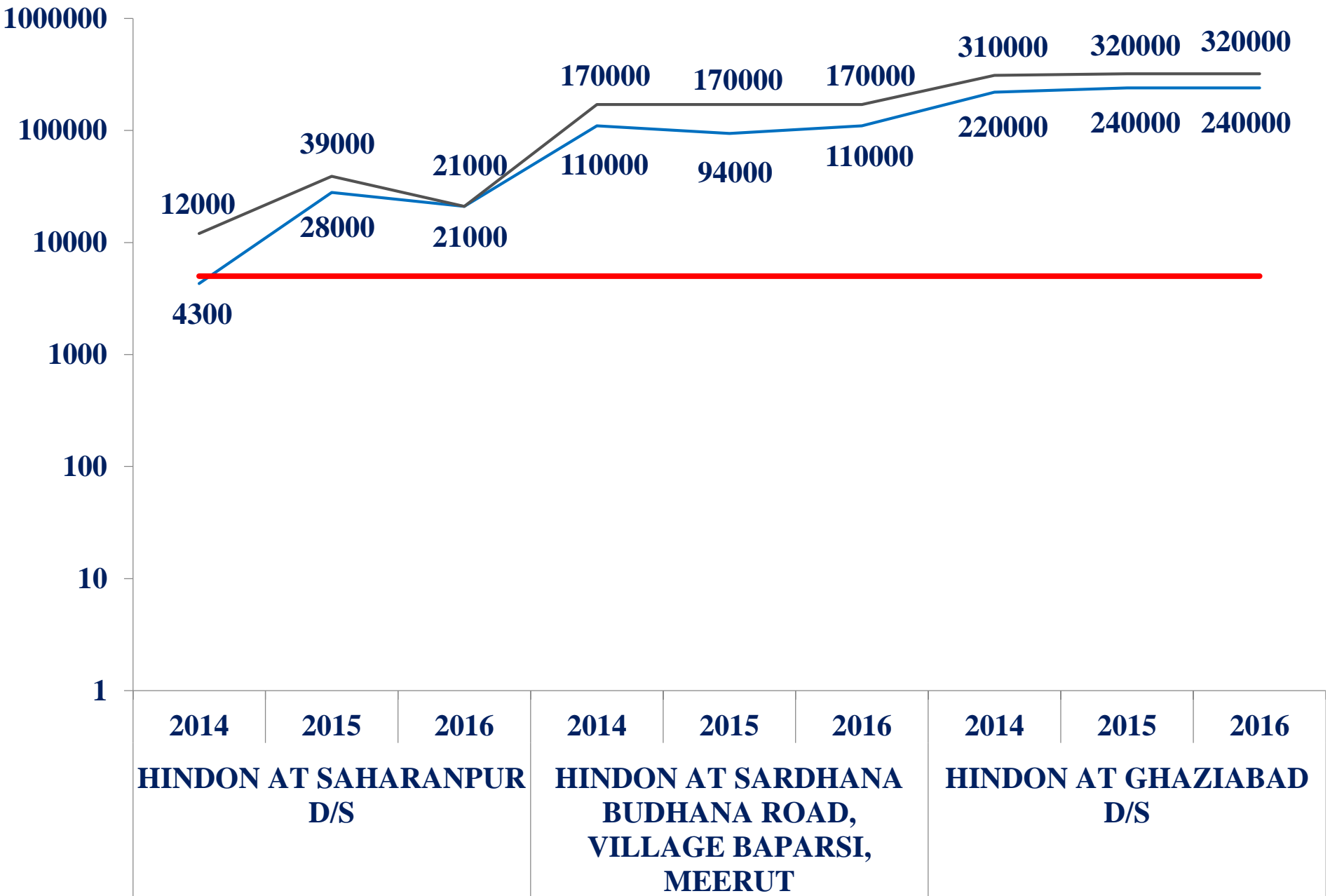
**19**

**-1**

# Fecal Coliform (MPN/100ml)



# Total Coliform (MPN/100ml)



**THANK YOU**







# FUNCTIONS OF THE CENTRAL BOARD

- To promote cleanliness of streams and wells in different areas of the State
- To advise Central Govt. on any matter concerning prevention & control of pollution
- Co-ordinate the activities of States and resolve disputes amongst them
- To provide technical assistance to State Boards
- Collect, compile and publish technical data relating to water pollution
- Lay down, modify or annul in consultation with State for standards for streams and wells
- Nation-wide programmes for abatement and control of pollution

# FUNCTIONS OF THE STATE BOARDS/POLLUTION CONTROL COMMITTEES

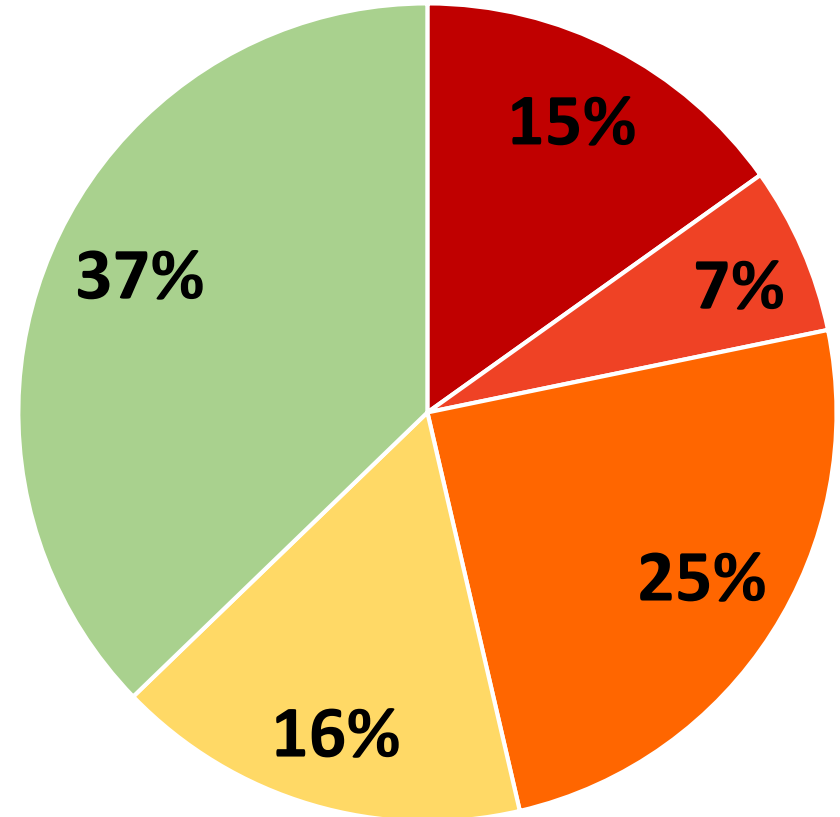
- Section 17 of the Water (Prevention and Control of Pollution) Act, 1974
- State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) to plan comprehensive programme for prevention, control or abatement of pollution of streams and wells in the respective State/ UT
- State Board to advise the State Govt. on any matter concerning the prevention, control or abatement of water pollution
- To collect and disseminate information relating to water pollution and its prevention and control

# **FUNCTIONS OF THE STATE BOARDS/POLLUTION CONTROL COMMITTEES (contd.)**

- To evolve economical and reliable methods of treatment of sewage and trade effluents
- Prohibition of use of stream or well for disposal of polluting matter
- Restriction on new outlets and new discharges
- Emergency measures in case of pollution of stream or well
- Provision regarding existing discharge or sewage or trade effluent

# STRETCHES IN EACH PRIORITY CLASS

- **Priority-I** (BOD > 30 mg/l) : 48  
(FC > 100000 MPN/100ml)
- **Priority-II** (BOD between 30 and 20 mg/l) :21  
(FC between 50001 and 100000 MPN/100ml)
- **Priority-III** (BOD between 20 and 10 mg/l) :78  
(FC between 5001 and 50000 MPN/100ml)
- **Priority-IV** (BOD between 10 and 6 mg/l) :52  
(FC between 2501 and 5000 MPN/100ml)
- **Priority-V** (BOD between 6 and 3 mg/l) :118  
(FC between 501 and 2500 MPN/100ml)



■ Priority I   ■ Priority II   ■ Priority III  
■ Priority IV   ■ Priority V

# PRIORITY WISE DETAILS OF POLLUTED RIVER STRETCHES

<b>Priority Class</b>	<b>Polluted River Stretches</b>	<b>Towns identified</b>	<b>Metropolitan cities</b>
<b>I</b>	48	110	14
<b>II</b>	21	55	2
<b>III</b>	78	171	8
<b>IV</b>	52	116	3
<b>V</b>	118	207	8
<b>Total</b>	<b>317</b>	<b>659</b>	<b>35</b>

# URBAN CENTRES ALONG POLLUTED RIVER STRETCHES

- **659** towns identified along the **317** polluted river stretches identified on **293** rivers
- The state-wise number of towns/cities in descending order are – **Maharashtra (170)**, **Assam (50)**, West Bengal (44), **Madhya Pradesh (41)**, **Uttar Pradesh (36)**, **Kerala (34)**, Odisha (31), **Gujarat (27)**, **Tamil Nadu (24)**, **Karnataka (23)**, Bihar (22), **Goa (21)**, **Telangana (19)**, Jammu & Kashmir (16), Chhattisgarh (11), Uttarakhand (11), **Andhra Pradesh (10)**, Himachal Pradesh (10), Jharkhand (10), Sikkim (9), Haryana (7) Meghalaya (7), **Punjab (5)**, Rajasthan (5), Manipur (4), Nagaland (4), Tripura (5), Daman & Diu (2), Delhi (1) Puducherry (1)
- Out of 46 metropolitan cities (Census 2011), **35** cities (**Agra, Ahmedabad, Bengaluru, Delhi, Ghaziabad, Howrah, Hyderabad, Indore, Kolkata, Lucknow, Meerut, Mumbai, Patna, Varanasi, Bhopal, Ludhiana, Allahabad, Faridabad, Kalyan, Kanpur, Nagpur, Nashik, Pimpri-chinchwad, Pune, Jabalpur, Ranchi, Srinagar, Dhanbad, Gwalior, Raipur, Surat, Thane, Vadodara, Vasai And Vijayawada**) are identified along the polluted river stretches

# STATE-WISE OF BREAKUP: NO. OF POLLUTED STRETCHES AND TOWNS IDENTIFIED

State/ UT	No. of Polluted Stretches	No. of Towns
Andhra Pradesh	5	10
Assam	31	50
Bihar	15	22
Chhattisgarh	3	11
Daman, Diu, Dadra Nagar Haveli	1	2
Delhi	1	1
Goa	15	21
Gujarat	14	27
Haryana	2	7
Himachal Pradesh	6	10
Jammu & Kashmir	7	16
Jharkhand	6	10
Karnataka	16	23
Kerala	23	34
Madhya Pradesh	20	41

State/ UT	No. of Polluted Stretches	No. of Towns
Maharashtra	56	170
Manipur	3	4
Meghalaya	7	7
Nagaland	3	4
Odisha	18	31
Puducherry	1	1
Punjab	2	5
Rajasthan	1	5
Sikkim	3	9
Tamil Nadu	8	24
Telangana	9	19
Tripura	2	4
Uttar Pradesh	13	36
Uttarakhand	9	11
West Bengal	17	44



**Formats:  
Information Gathering  
SPCBs/PCCs**

# INVENTORISATION OF DRAINS

1.	<b>Name of the Drain</b>	:			
2.	<b>Source of pollution load:</b>	:	(Domestic/Industrial/Mixed)		
3.	If Industrial /Mixed (name of the units & sector) and details to be confirmed from the regional officers of SPCB	:	Sl. No.	Name of Industry	Sector
			1.		
			2.		
			3.		
4.	<b>Traceable length (in Km) before meeting the river (through google earth/map)</b>	:			
5.	Co-ordinate of the confluence point (if not reachable indirect through google earth/map) (Decimal units)	:	Latitude		
			Longitude		
	Distance from confluence point (find out over google earth/map), KM	:			
		:	Longitude		
6.	<b>Landmarks / Address of the Location</b>	:			
7.	<b>Flow (if in MLD) if zero, indicate whether dry or stagnant</b>	:			
8.	<b>Observations</b>	:			



# STATUS OF INDUSTRIAL EFFLUENT GENERATION TREATMENT & MODE OF DISCHARGE

1. Name and Address of Industry-

2. Economy of Scale -

Large -

Medium-

Small-

3. Type of Industry (With respect to product)-

4. Quantity of Discharge ( $M^3$ /Day)-

6. Discharge to -

7. Name of the drain -

# STATUS OF COMMON EFFLUENT TREATMENT PLANTS (CETPs)

1. Name and Address of the CETP :
2. Name, Designation of Contact Person & Phone No. :
3. No. of Member Industries of CETP :
4. Type of Industries :
5. Installed Treatment Capacity (M<sup>3</sup>/Day) :
6. CETP Operating Capacity (Existing) (M<sup>3</sup>/Day) :
7. Details of Treatment Technologies :
8. Quantity of Influent :
9. Quantity & Quality of Treated Effluent :
10. Mode of Disposal of Treated Effluent :
11. ETP Sludge Disposal Details- Captive Storage/  
Secured Landfill/Common Hazardous Waste TSDF :

PROPOSED ACTION PLANS (CONTD.)

# SOURCES OF POLLUTION IN RIVERS

- **Municipal Waste Water-Generation and Treatment: Towns/Cities along Polluted River Stretches**
  - 30042 million liters per day (MLD) of domestic sewage is generated from urban areas along the polluted river stretches
  - The installed sewage treatment capacity is about 16846 MLD leaving a gap of about 13196 MLD (44%)
- **Industrial wastewater Discharge**
  - Industrial effluent discharge into rivers- inventory & mapping is not available, needs to be done
  - 3376 units of 17 categories of highly polluting industries identified for compliance and Continuous online effluent monitoring installed in 1989 units

# **COST ESTIMATION: RESTORATION OF POLLUTED STRETCH (SEWAGE MANAGEMENT)**

- Setting up of STPs & Cost Estimation - INR 2.50 Crore/ MLD (Capital Cost excluding O&M cost)
  - 659 towns along the polluted rivers/stretchers generates sewage of 30042 MLD and available treatment capacity is 16846 MLD
  - To bridge the gap of 13196 MLD untreated sewage, estimated cost shall be **INR 32990 Crore** in the identified cities and towns along the stretch
- Since cost of setting up of STPs are high, in-situ bioremediation of drains and moderately polluted river stretches may be taken up (CAPEX- **INR 50 Lakhs/ Million Liters, OPEX @10%**)

# INDUSTRIAL POLLUTION CONTROL

- Strict enforcement, transparency & SMS alerts generation through Online Continuous Emission Monitoring Systems (OCEMS)
- Sector-specific initiatives in Ganga River Basin may be adopted throughout the Country
  - Process improvement through adoption of Cleaner Technologies in industrial sectors
  - Zero Liquid Discharge (ZLD) in Distilleries
  - Water conservation in Pulp and Paper, Distilleries, Sugar Sectors
  - Stoppage of black Liquor & Spent wash discharge
  - Upgradation of ETP system in Textile units
  - Upgradation of Primary Effluent Treatment Plants (PETPs)/ CETPs in Tannery clusters
  - Third party assessment and monitoring by involving expert institutions