

Areas of Interest for the INDO- UK

Water Legislation: National Level

The Water (Prevention and Control of Pollution) Act, 1974

Objective

To provide for the prevention and control of water pollution and to maintaining and restoring of wholesomeness of water

The Water (Prevention and Control of Pollution) Act, 1974

Defines:

1. The water pollution, occupier, outlet, trade effluent and the water bodies
2. Standards of discharge and responsibilities of generator and regulators
3. Mechanism of water pollution management

The Water (Prevention and Control of Pollution) Act, 1974.

Continue

Constitutes

- Central Pollution Control Board
- State Pollution Control Boards
- Joint Board (In case of any matter referred to resolve issue between two or more states)

The Water (Prevention and Control of Pollution) Act, 1974.

Continue

Empowers

- Central Government to issue directions to Central Board and
- Central Board to State Boards
- State Government to State Board

The Water (Prevention and Control of Pollution) Cess Act, 1977

- Levy and collection of cess on water consumed by persons for carrying industrial operations and local authorities to augment the resources of Central Board and States Boards

Industrial Pollution

- No. of Highly Polluting Industries : About 2800
- No. Grossly Polluting Industries : About 1300
- Estimated effluent generation : About 3500MLD
- Major Sectors: Distillery, Sugar, Pulp & paper, Textile, Tannery , Refinery, Petrochemical, Thermal Power plant, Pharmaceutical and Pesticides

River Ganga Main Stem

- No. of Grossly Polluting Industries : 764
- Estimated effluent generation : 500 MLD
- Major Sectors : Distillery, Sugar, Pulp & paper, Textile and Tannery

Domestic waste water

- Sewage generation: 62,000 MLD
- Capacity of STPs : 25,000 MLD
- No. of STPs (In operation) : 615
- No. of STPs (Under Commission) : 154
- No. of STPs (Needs Augmentation): 80

Primary Water Quality Criteria for Outdoor Bathing – Existing

CRITERIA	RATIONALE
Faecal Coliform (MPN/100ml): 500 (desirable) 2500 (Maximum Permissible)	To ensure low sewage contamination. Faecal coliform and faecal streptococci are considered as they reflect the bacterial pathogenicity.
Faecal Streptococci(MPN/100ml): 100 (desirable) 500 (Maximum Permissible)	The desirable and permissible limits are suggested to allow for fluctuation in environmental conditions such as seasonal changes, changes in flow conditions etc.
pH : Between 6.5-8.5	The range provides protection of the skin and delicate organs like eyes, nose, ears etc. which are directly exposed during outdoor bathing.
Dissolved Oxygen (mg/l) : 5 or more	The minimum dissolved oxygen concentration of 5 mg/l ensures reasonable freedom from oxygen consuming organic pollution immediately U/s which is necessary for preventing production of anaerobic gases (obnoxious gases) from sediments
Biochemical Oxygen (mg/l) Demand 3 day, 27°C : 3 or less	The Biochemical Oxygen Demand of 3 mg/l or less of the water ensures reasonable freedom from oxygen demanding pollutants and prevent production of obnoxious gases.

Primary Water Criteria Based On Designated Best Use

DESIGNATED-BEST-USE	CLASS OF WATER	CRITERIA
Drinking Water Source without conventional treatment but after disinfection	A	<ol style="list-style-type: none"> 1. Total Coliforms Organism MPN/100ml shall be 50 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 6mg/l or more 4. Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organized)	B	<ol style="list-style-type: none"> 1. Total Coliforms Organism MPN/100ml shall be 500 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 5mg/l or more 4. Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	<ol style="list-style-type: none"> 1. Total Coliforms Organism MPN/100ml shall be 5000 or less 2. pH between 6 to 9 3. Dissolved Oxygen 4mg/l or more 4. Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	<ol style="list-style-type: none"> 1. pH between 6.5 to 8.5 2. Dissolved Oxygen 4mg/l or more 3. Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	<ol style="list-style-type: none"> 1. pH between 6.0 to 8.5 2. Electrical Conductivity at 25°C micro mhos/cm Max.2250 3. Sodium absorption Ratio Max. 26 4. Boron Max. 2mg/l

Proposed Primary Water Quality Criteria for outdoor bathing

S.No.	Parameters	Criteria	Rationale
1.	Total Coliform (MPN/100ml)	50 MPN/ 100ml	Himalyan rivers are the direct source of drinking water
	(i) Fecal Coliform (MPN/100ml)	<1.8MPN /100 ml (MPN)	Fecal Coliform is considered as they reflect the bacterial pathogenicity through human origin. Presence of Fecal Coliform renders the river water unsuitable for drinking purposes. To ensure no fecal contamination in drinking and bathing water.
	(ii) Fecal Streptococci (MPN/100ml)	<1.8MPN/100ml	Fecal streptococci are considered as they reflect the bacterial pathogenicity through animal origin. To ensure no fecal contamination in drinking and bathing water.
2.	pH value	Between 6.5-8.5	The range provides protection to the skin and delicate organs like eyes, nose, ears etc. which are directly exposed during outdoor bathing
3.	Dissolved Oxygen	5 mg/l or more	The maximum dissolved Oxygen concentration of 5 mg/l ensures reasonable freedom from Oxygen consuming organic pollution immediately upstream which is necessary for preventing production of anaerobic gases (Obnoxious gases) from sediments.
4.	Bio-chemical Oxygen Demand 3 days, 27°C	3 mg/l or less	The Bio-chemical Oxygen Demand of 3 mg/l or less of the water ensures reasonable freedom from oxygen demanding pollutants and prevent production of obnoxious gases.
5.	Chemical Oxygen Demand(COD) mg/l	<10mg/l	To ensure no contamination from industrial source after treatment.
6	Colour	10-20 Hazen	To ensure that colored water is undesirable for drinking and bathing purposes.

Proposed Primary Water Quality Criteria for outdoor bathing – Continue

7	Odour	No noticeable offensive Odour	Specially caused by chemical compound like creosols, phenols, naphtha, pyridine, and benzene, toluene etc. causing visible coloration of water and tainting of and odour in fish flesh.
8.	Floating Matters	Nothing Obnoxious or detrimental for use purpose	None in such concentration that would impair usages specially assigned to this class.
8.1	Floating Materials, Oil, grease and scum (including Petroleum Products)	<1.0 mg/l	
8.2	Sludge deposits, Solid refuse floating solids, oil grease and scum	None except for such small amount that may result from discharge of approximately treated sewage and or industrial waste effluents	
9.0	Suspended Solids	<10mg/l from sewage or industrial waste origin	None in such concentration that would impair usages specially assigned to this class. Many places bathing water is utilized for hydro power generation where more than 10 mg of Suspended Solids, are unsuitable and chock the turbines.
10.0	Turbidity	30 NTU (Nephalo Turbidity Unit)	Measured at 0.9 depth
11.0	Aquatic life of Benthic Macro-invertebrates	Saprobic score range of 6-7 Diversity score range of 0.5-1.0	To ensure suitability of water quality standards for protection of aquatic life in bathing waters.

Water Quality Management Issues

Quantity

- Low River discharge, extreme seasonal variation
- Re-appropriation of water budgeting for irrigation, domestic and industrial use and for river front use
- Insufficient environmental flow

Quality

- Contaminated with fecal coliform
- Higher BOD level at many places

Polluted River Stretches in 275 Rivers

<u>Priority</u>	No. of stretches
Class I	34
Class II	17
Class III	36
Class IV	57
Class V	158
Total	302

Criteria for Priority

- Criteria for Priority 1
 - Monitoring locations exceeding BOD concentration 30 mg/l has been considered as it is the standard of sewage treatment plant and in river it appears without dilution.(River locations having water quality exceeding discharge standards for BOD to fresh water sources)
 - All monitoring locations exceeding BOD concentration 6 mg/l on all occasions.
 - Monitoring locations exceeding 3 mg/l BOD are not meeting desired water quality criteria but does not affect to Dissolved Oxygen level in water bodies. If BOD exceeds 6mg/l in water body, the Dissolved Oxygen is reduced below desired levels.
 - The raw water having BOD levels upto 5 mg/l are does not form complex chemicals on chlorination for municipal water supplies. Hence the water bodies having BOD more than 6 mg/l are considered as polluted and identified for remedial action.
- Criteria for Priority 2
 - Monitoring locations having BOD between 20-30 mg/l.
 - All monitoring locations exceeding BOD concentration 6 mg/l on all occasions.
- Criteria for Priority 3
 - Monitoring locations having BOD between 10-20 mg/l.
 - All monitoring locations exceeding BOD concentration 6 mg/l on all occasions.
- Criteria for Priority 4
 - Monitoring locations having BOD between 6-10 mg/l. ♦ List of identified stretches enclosed.
- Criteria for Priority 5
 - Monitoring locations having BOD between 3-6 mg/l.
 - The locations exceeding desired water quality of 3mg/l BOD.

Issues related to River Ganga

- No or less flow in River
- Environmental flow yet to be estimated
- Upper Ganga, Middle Ganga and Lower have different flow regime
- Dam changes the river Ecology
- Discharge varies from lean flow to monsoon flow, non lean to non monsoon flow

Causes of Pollution

- Partially treated discharge of industrial effluent
- Untreated waste water from cities/towns.
- Agricultural runoff carrying fertilizers and pesticides
- Open defecation on the river bank.
- Unscientific disposal of municipal solid waste
- Pious refusal at Pujasthal and bathing ghats
- Disposal of dead bodies

E-flow of River Ganga

- Pool and riffle concept followed
- 15 – 20% of lean flow (Dec – March) is estimated for ecological integrity
- Middle reach requires greater flow than Himalayan Ganga
- Environmental flow requires three times flow the existing flow

Zero Liquid Discharge

Sl. No.	Sectors	Technology Adopted	Overall target
1.	Pulp & Paper	Minimise water consumption by improving manufacturing technologies, Upgrade effluent Treatment system to obtained water quality standards upto improved irrigation quality of water	Irrigation standard effluent and no discharge into tributaries or drains
2.	Sugar	Recycling back maximum possible treated effluent in process use after tertiary treatment followed by use in irrigations	Irrigation standard effluent and no discharge into tributaries or drains
3.	Distilleries	Spent wash to be incinerated employing the evaporation and concentration techniques.	Zero Liquid Discharge
4.	Textiles	Improved collection of effluents in CETP, primary treatment, secondary treatment, Reverse Osmosis, Evaporation, reuse of the recovered permeate/concentrate	Zero Liquid Discharge
5.	Tanneries	Improved collection of effluent in CETP, primary treatment, secondary treatment, Reverse Osmosis, Evaporation, reuse of the recovered permeate/concentrate	Zero Liquid Discharge