

4.1.10. WASTE WATER

A. DOMESTIC WASTE WATER

1.0 Subject Matter

Waste water generation, waste water treatment infrastructure and performance of the water treatment (sector-wise and source wise):

- Domestic wastewater management
 - i. Status of Sewage generation
 - ii. Status of sewage collection Table 4.1.10.1 A
 - iii. Status of sewage treatment Table 4.1.10.1 B
 - iv. Status of treatment capacity utilization Table 4.1.10.1 C
 - v. Status of sewage recycle, reuse and disposal Table 4.1.10.1 D
 - vi. STP- Performance and Compliance to Sewage Quality norms Table 4.1.10.1 E

2.0 Availability & Utilizable Water

Treated/ Recycled Waste Water for Reuse is that water generated as waste within the System, round the Water Year, after some end-use which has been already accounted for in some form in the above sources of water, and is not an inflow into the system. So, considering that in Total Water Availability will lead to double-counting or Duplication. Table A13 is just for monitoring purpose.

A13. Treated/recycled Waste Water for Reuse (MCM)	REMARKS (For Monitoring Purpose)
Basin A/ Sub-basin	
Basin B/ Sub-basin	
Basin C/ Sub-basin	
TOTAL	

Treated water will enhance the availability of water internally (i.e. internal redistribution only) but not the total water availability of the system as it is not created or supplied into the system from outside. However, if utilizable water has been calculated by considering/setting aside bad quality water and if subsequently the quality of that untreated/used water (i.e. return flow) is improved by treatment then quantity of Utilizable Water will enhance.

B11. Water available from Treated/Recycled Waste Water minus any losses (Considering Table A13) (MCM)	REMARKS
Basin A/ Sub-basin	
Basin B/ Sub-basin	
Basin C/ Sub-basin	
TOTAL	

3.0 Issues and Challenges

4.0 Problem Tree / Root cause Analysis: Cause, Effect and Interventions

5.0 Governance / Management:

- a. Institutions governing / managing / monitoring the resources and Institutional structure.
- b. Areas of Peoples/Private Participation if any
- c. Schemes & Financing [Also, relevant tables on Water Financing and Economics may be looked into Chapter 7 and filled up with appropriate data/information]

6.0 Measurement, Monitoring and Data Constraints/ Management

7.0 Performance Indicators: for comparison across Districts/ Plants/ Units/ Products etc.

- a) Bench Marks/ Norms/ Standards and deviation from the norms/bench marks/standards currently.
 - a. Norms for STPs (Sector Wise) (Table 4.1.10.1.7 A)
 - i. Treatment efficiencies of the treatment plants and their mode of disposal.

- ii. Performance of ETPs/ CETPS.
 b) Status of various Performance Indicators – for comparison across Districts/ Plants/ Units/ Products etc.

	Indicator	Bench Mark/Unit	District.1/	District.2/
Sewage Measurement	Sewerage network area			
	% collection stations provided with flow meters (for whole district) for the area under sewerage network 4.1.10.1 F			
	% of properties connected to the Sewer Network Table G			
	% total area provided with flow meters for the area under sewerage network (for whole district) 4.1.10.1 F			
	% collection stations provided with flow meters (for whole district) for the urban area under sewerage network 4.1.10.1 F			
	% total area provided with flow meters for the urban area under sewerage network (for whole district) 4.1.10.1 F			
	% collection stations provided with flow meters (for whole district) for the rural area under sewerage network 4.1.10.1 F			
	% total area provided with flow meters for the rural area under sewerage network (for whole district) 4.1.10.1 F			
	% of properties connected onsite or local level collection system. Table G			
	% Non Sewered area in the district Table 4.1.10.1 A5			
	% of drains for which GPS coordinates is mapped on GIS platform.			
Sewerage Management	Urban Areas			
	Total sewerage generated (Total water supplied+ Estimated water use from other sources)*100 Table 4.1.10.1 A	100%		
	Total sewerage Collected(waste water collected through the systems 4.1.10.1 A			
	Total Sewerage Treated 4.1.10.1 B			
	Sewer network coverage 4.1.10.1 A [Area covered with Sewer network/total urban area] x 100	100%		
	Sewage Collection Efficiency [Sewage Collected / Sewage Generated] x 100 4.1.10.1 A			
	Sewage Treatment Efficiency [Sewage treated / Sewage Generated] x 100 4.1.10.1 B			
	Sewage Treatment capacity utilization (capacity) [Number of STPs complying / Total Number of STPs] x 100 4.1.10.1 C			
	STP – BOD Performance BOD load reduction/ Total BOD reduction as per design Table 4.1.10.1 E 1 and 4.1.10.1 E2			
	Number of STPs conforming to the discharge standards / Total number of STPs Table 4.1.10.1 E 1 and 4.1.10.1 E 2	100%		
	Re-cycle Efficiency [Sewage recycled / Sewage treated] x 100 Table-Sewage Recycle, Reuse and Disposal Table 4.10.1.1 C5			
	Reuse Efficiency [Sewage reused / Sewage treated] x 100 Table 4.10.1.1 C5			
	Energy Efficiency [Total electrical Energy consumed in operating STPs/Total Quantity of Sewage treated]			

Septic tanks and soak pits in rural area	% of rural areas covered with septic tanks and soak pits 4.1.10.1 G			
	% of rural population covered with septic tanks + soak pits 4.1.10.1 G			
Financing	Per capita capital investment for waste water for collection			
	Per capita capital investment for waste water treatment and disposal			
Economics	O&M cost of sewage collection, treatment and disposal, Rs. Crore per MLD per year			
	Revenue Generation, Rs. Crore per MLD per year			
	% cost recovery			
Peoples participation	Number of Campaigns for waste Water management			
	Grievances received and redressed			
PPP	Private partnerships in sewerage treatment and maintenance			

8.0 Reforms undertaken / being undertaken / proposed if any

9.0 Road map of activities / tasks proposed for better governance with timelines and agencies responsible for each task/activity.

Table 4.10.1.1 Sewage Generated (Collection, and Coverage):

Table 4.1.10.1 A: Sewerage Network coverage area and collection: Rural and Urban areas

District/ Basin	Area (Km ²)	Urban Area including Metro cities	Rural Area	Sewer network coverage (in Km) of Urban and Rural	Uncovered Sewerage Area of Urban and Rural	Operational Sewerage / Conveyance System of Urban and Rural	Sewage generation, MLD	Sewage collection through sewerage, MLD	Sewage collection through I&D (MLD)

Table 4.1.10.1 A1 Sewerage Network coverage area and collection

Metro cities/ District/ Basin	Area (Km ²)	Sewer network coverage (in Km ²)	Uncovered Sewerage Area (in Km ²)	Operational Sewerage / Conveyance System	Sewage generation, MLD	Sewage collection through sewerage, MLD	Sewage collection through I&D (MLD)

*Note: Collection efficiency of sewage networks: Reference service level Benchmark by MoUD Wastewater collected (the last column in this table)/ (Total water supplied+ Estimated water use from other sources)*100*

Table 4.1.10.1 A2 Sewerage Network coverage area and collection: Urban Area of Class I & II cities / Towns

District/ Basin	Area (Km ²)	Total Urban Area of Class I & II cities / Towns	Sewer network coverage (in Km)	Uncovered Sewerage Area	Operational Sewerage / Conveyance System	Sewage generation, MLD	Sewage collection through sewerage, MLD	Sewage collection through I&D (MLD)

Table 4.1.10.1 A3 Sewerage Network coverage area and collection: Urban Area other than Class I & II cities / Towns and Metros

District/ Basin	Area (Km ²)	Total Urban Areas (other than class I & II)	Sewer network coverage (in Km)	Uncovered Sewerage Area	Operational Sewerage / Conveyance System	Sewage generation, MLD	Sewage collection through sewerage, MLD	Sewage collection through I&D (MLD)

Table 4.1.10.1 A4 Sewerage Network coverage area and collection: Rural Area

District/ Basin	Area (Km2)	Total Rural Area	Sewer network coverage (in Km)	Uncovered Sewerage Area	Operational Sewerage / Conveyance System	Sewage generation, MLD	Sewage collection through sewerage, MLD	Sewage collection through I&D (MLD)

Table 4.1.10.1 B: Sewage Treatment:**Table 4.1.10.1 B1 Sewage Treatment Capacity Metros**

Metro cities/ District/ Basin	Total sewage generation MLD	Sewage collected MLD	Sewage treatment capacity	Treatment capacity gap	
				Quantity	%

Table 4.1.10.1 B2 Sewage Treatment Capacity in Urban areas Class I & II Cities and Towns

District/ Basin	Total sewage generation MLD from Class I & II cities / Towns	Sewage treatment capacity	Treatment capacity gap	
			Quantity	%
	100	80	20	

Table 4.1.10.1 B3 Sewage Treatment Capacity in Urban areas other than Class I & II Cities and Towns

District/ Basin	Total sewage generation MLD from other than class I & II cities	Sewage treatment capacity	Treatment capacity gap	
			Quantity	%

Table 4.1.10.1 B4 Sewage Treatment Capacity in Rural areas

District/ Basin	Total sewage generation MLD from Rural Areas	Sewage treatment capacity	Treatment capacity gap	
			Quantity	%

Table 4.1.10.1 B4.1 Septic tanks/Soak pits in rural areas

District/ Basin	Total no of House Holds	No of House Holds having Septic Tank/ Soak pits	Septic Tank/Soak pit facility	
			Quantity	%

Table 4.1.10.1B5 Sewage Treatment Capacity in Rural and Urban Areas

District/ Basin	Total sewage generation MLD Urban + Rural	Sewage treatment capacity	Treatment capacity gap	
			Quantity	%

Table 4.10.1.1 C: Sewage Treatment Capacity Utilization and performance (Design Norms compliant/ CPCB norms compliant/ MoEF notified Norms compliant)**Table 4.10.1.1C1 Sewage Treatment Capacity Utilization Metro city – Urban body wise**

Metro- urban body wise	Sewage Generation (in MLD)	Number of STPs	STP Installed Capacity (in MLD)	Actual capacity utilization (in MLD)	
				Quantity	%

Table 4.10.1.1C2 Sewage Treatment Capacity Utilization Class I & II Cities and Towns – Urban body wise

District/ Basin	Sewage Generation (in MLD) from Class I & II	Number of STPs	STP Installed Capacity (in MLD)	Actual capacity utilization (in MLD)	
				Quantity	%

Table 4.10.1.1C3 Sewage Treatment Capacity Utilization Urban Areas other than Class I&II Cites and Towns

District/ Basin	Sewage Generation (in MLD) from other than Class I & II	Number of STPs	STP Installed Capacity (in MLD)	Actual capacity utilization (in MLD)	
				Quantity	%

Table 4.10.1.1C4 Sewage Treatment Capacity Utilization Rural Areas

District/ Basin	Sewage Generation (in MLD) from Rural	Number of STPs	STP Installed Capacity (in MLD)	Actual capacity utilization (in MLD)	
				Quantity	%

Table 4.10.1.1C5 Sewage Treatment Capacity Utilization Urban and Rural Areas

District/ Basin	Sewage Generation (in MLD) from Urban + Rural	Number of STPs	STP Installed Capacity (in MLD)	Actual capacity utilization (in MLD)	
				Quantity	%

New tables or additional column in the above tables may be added for Compliant or Non Compliant STPs.

Some information regarding finances (operating cost and who bears the O&M cost) may also be added.

Table 4.1.10.1 D: Sewage Re-cycle, Re-use and Disposal**Table 4.1.10.1 D1: Sewage Re-cycle, Re-use and Disposal Metros**

Metro cities/ District/ Basin	Total sewage generation MLD	Sewage Treated MLD	Sewage untreated MLD	Treated MLD					Untreated MLD					
				Re-cycle	Re-use			Discharge		Un-organized re-use	Discharge			
				Industrial activity	Gardening	Irrigation	River / Lake discharge	Sea discharge	Irrigation	Land Application	River / Lake discharge	Sea discharge		

Table 4.1.10.1 D2: Sewage Re-cycle, Re-use and Disposal Urban Areas Class I&II Cities and Towns

District/ Basin	Total sewage generation MLD from Class I & II	Sewage Treated MLD	Sewage untreated MLD	Treated MLD					Untreated MLD					
				Recycled			Discharge		Un-organized	Discharge				
				In	G	Ir	R/LD	SD	Irrigation	LA	R/LD	SD		

Table 4.1.10.1 D3: Sewage Re-cycle, Re-use and Disposal Urban areas Other Than Class I&II Cities and Towns

District/ Basin	Total sewage generation MLD from other than Class I & II	Sewage Treated MLD	Sewage untreated MLD	Treated MLD					Untreated MLD					
				Recycled			Discharge		Un-organized reuse	Discharge				
				Industrial	G	Irri	R/LD	SD	Irrigation	LA	R/LD	SD		

Table 4.1.10.1 D4: Sewage Re-cycle, Re-use and Disposal Rural areas

District/ Basin	Total sewage generation MLD from Rural	Sewage Treated MLD	Sewage untreated MLD	Treated MLD					Untreated MLD					
				Recycled			Discharge		Un-organized reuse	Discharge				
				Ir	G	Ir	RD	SD	Irrigation	LA	RD	SD		

Table 4.1.10.1 D5: Sewage Re-cycle, Re-use and Disposal Urban + Rural areas

District/ Basin	Total sewage generation MLD from Urban + Rural	Sewage Treated MLD	Sewage untreated MLD	Treated MLD					Untreated MLD			
				Recycled			Discharge		Un-organized reuse	Discharge		
				In	G	Ir	RD	SD	Irrigation	LA	RD	SD

Table 4.1.10.1 D6: Sewage Management

Metro cities/ District/ Basin	Total sewage generation MLD Urban	Sewage Treated MLD	Sewage untreated MLD	Treated MLD					Untreated MLD			
				Re-cycle	Re-use			Discharge		Un- organized re- use	Discharge	
				Industrial activity	Garden ing	Irrigation	River discharge	Sea discharge	Irrigation	LA	RD	Sea discharge

Metro cities/ District/ Basin	Total sewage generation MLD of Rural Areas	Sewage Treated MLD	Sewage untreated MLD	Treated MLD					Untreated MLD			
				Re-cycle	Re-use			Discharge		Un- organized re- use	Discharge	
				Industrial activity	Garden ing	Irrigation	River discharge	Sea discharge	Irrigation	LA	RD	Sea discharge

Metro cities/ District/ Basin	Sewage generated	Sewage Collected	Sewage Treated	% of Sewage untreated	% of untreated sewage recycled	% of untreated sewage discharged in Rivers and Seas	% of sewage discharged in Rivers and Seas

Table 4.1.10.1 E: STP- Performance and Compliance to Sewage Quality norms

District/ Basin	City	Norms for various Parameters								
		pH	SS	COD	BOD	TDS	Heavy metals (Specify heavy metals of industrial origin only like Cr, Pb, Ni, Hg, Cd)	Bacteriological Parameters (MPN/100 ml)	TN	TP

Table 4.1.10.1 E2 STP- Performance and Compliance to Sewage Quality norms

District/ Basin	Urban body	Name of the STP/locati on/city/sta te	Capac ity MLD	Utilizati on MLD	Raw Sewage Quality	Expected Treated Effluent Quality as per Design		Actual Treated effluent quality		Discharge Norms	Expected BOD load reeducation as per design Kg/Day	Actual BOD load reduction Kg/Day
						B O D	C O D	B O D	C O D			

Table 4.1.10.1 F: Area under Sewered network and Collection Centers with Flow Meters

District/ Basin	Total area under sewer network		Number of glow meters in the sewer network area		Collection Centers		Number of Collection centers with flow meters	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural

Table 4.1.10.1 G: Collection Centers with Flow Meters

District/ Basin	Total Properties in the district		Total Properties connected to the sewer network		Total Properties in the district		Total Properties with septic tanks not connected to the sewer network	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural

Table 4.10.1.7 A

¹[SCHEDULE – VI]
(See rule 3A)

**GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL
POLLUTANTS PART-A : EFFLUENTS**

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(d)
1.	Colour and odour	See 6 of Annexure-I	--	See 6 of Annexure -I	See 6 of Annexure-I
2.	Suspended solids mg/l, Max.	100	600	200	(a) For process waste water-100 (b) For cooling water effluent 10 percent above total suspended matter of influent.
3.	Particulate size of suspended solids	Shall pass 850 micron IS Sieve	--	--	(a) Floatable solids, max. 3 mm. (b) Settleable solids, max. 850 microns.
² 4.	***	*	--	***	--
5.	pH Value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
6.	Temperature	shall not exceed 5°C above the receiving water temperature	--	--	shall not exceed 5°C above the receiving water temperature

B. INDUSTRIAL WASTE WATER

1.0 Subject Matter should include:

- Effluent from organized sector
- Effluent from unorganized sector

2.0 Waste water generation, waste water treatment infrastructure and performance of the water treatment (sector-wise and source wise): (Table A –D)

- a) Industrial wastewater management
 - i. Fresh water consumption, wastewater generation and their treatment system. (Sector wise)
 - ii. Inventory of Effluent Treatment Plants (ETPs) and Common ETPs

Treated/ Recycled Waste Water for Reuse is that water generated as waste within the System, round the Water Year, after some end-use which has been already accounted for in some form in the above sources of water, and is not an inflow into the system. So, considering that in Total Water Availability will lead to double-counting or Duplication. Table A13 is just for monitoring purpose.

A13. Treated/recycled Waste Water for Reuse (MCM)	REMARKS (For Monitoring Purpose)
Basin A/ Sub-basin	
Basin B/ Sub-basin	
Basin C/ Sub-basin	
TOTAL	

Treated water will enhance the availability of water internally (i.e. internal redistribution only) but not the total water availability of the system as it is not created or supplied into the system from outside. However, if utilizable water has been calculated by considering/setting aside bad quality water and if subsequently the quality of that untreated/used water (i.e. return flow) is improved by treatment then quantity of Utilizable Water will enhance.

B11. Water available from Treated/Recycled Waste Water minus any losses (Considering Table A13) (MCM)	REMARKS
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Basin B/ Sub-basin	
Basin C/ Sub-basin	
TOTAL	

3.0 Issues and Challenges

4.0 Problem Tree / Root cause Analysis: Cause, Effect and Interventions

5.0 Governance / Management:

- a) Institutions governing / managing / monitoring the resources and Institutional structure.
- b) Areas of Peoples/Private Participation if any
- c) Schemes & Financing [Also, relevant tables on Water Financing and Economics may be looked into Chapter 7 and filled up with appropriate data/information]

6.0 Measurement, Monitoring and Data Constraints/ Management

7.0 Performance Indicators: for comparison across Districts/ Plants/ Units/ Products etc: Table E and Table F

- a) Bench Marks/ Norms/ Standards and deviation from the norms/bench marks/standards currently.
 - i. Treatment efficiencies of the treatment plants and their mode of disposal.
 - ii. Performance of ETPs/ CETPS (Table E)
- b) Status of various Performance Indicators – for comparison across Districts/ Plants/ Units/ Products etc.

Table E: Indicators – District Wise

Category of Indicators (Illustrative)	Indicator	Bench Mark	District.1/	District.2/
Industrial Waste water management				
Measurement of intake of water by organized sector industry Measurement of Waste water from Sewerage Treatment plants if any	Number of Industries having water meters with computer recording / Total number of industries x 100 Quantity of waste water received	100%		
Return	Total wastewater generation / Total water use x 100			
Treatment	Number of Industries having full capacity ETPs or CETPs / Total number of industries x 100	100%		
Norms compliance	[Number of ETPs/CETPs complying norms / Total Number of ETPs/CETPs] x 100	100%		
Reuse	[Waste water reused / Waste water treated] x 100	100%		
Energy	[Total electrical Energy consumed in operating ETPs/CETPs/Total Quantity of Waste water treated] MWH/MLD		

Table F: Indicators – Sector wise

Category of Indicators (Illustrative)	Indicator	Bench Mark	Sector.1	Sector.2
Industrial Waste water management				
Measurement	Number of Industries having water meters with computer recording / Total number of industries x 100	100%		
Return	Total wastewater generation / Total water use x 100			
Water cost burden Vs OPEX	Total annual cost of water / Total annual OPEX			
Water cost burden Vs CAPEX	Total annual cost of water / Total annual CAPEX			
Specific water use	Specific water use			
Specific consumptive water use	Specific consumptive water use			
Treatment	Number of Industries having full capacity ETPs or CETPs / Total number of industries x 100	100%		
Norms compliance	[Number of ETPs/CETPs complying / Total Number of ETPs/CETPs] x 100	100%		
Reuse	[Waste water reused / Waste water treated] x 100	100%		
Energy	[Total electrical Energy consumed in operating ETPs/CETPs/Total Quantity of Waste water treated] MWH/MLD		

8.0 Reforms undertaken/ being undertaken/ proposed if any

9.0 Road map of activities / tasks proposed for better governance with timelines and agencies responsible for each task/activity.

Table A: Total wastewater generation & discharge by industries in the state (district wise & overall).

Sr. No.	District/ Basin	Type of Sector	Name of the Industry	Product(s) & Installed Capacity (Tonnes/annum) or (m3/annum)	Fresh Water Requirement (MLD)	Qty. of Effluent generated (MLD)	Qty. of water lost in process (consumptive use) (MLD)	ETP capacity (MLD)	Where discharged (Land/River/Sea)
1		E.g. Textile	ABC						
			XYZ						
Total Quantity of Effluent Generated									

Table B: Industrial wastewater treatment

District/ Basin	Industrial Sector	Total Fresh Water Requirement (MLD)	Total wastewater generation, MLD	Total water lost in process (consumptive use) (MLD)	Treatment capacity	Treatment capacity gap	
						Qty	%
	TPP						

Table C: Treatment capacity utilization

District/ Basin	Industrial Sector	Number of ETPs	Number of CETPs	Total installed Capacity (in MLD)	Actual capacity utilization (in MLD)	
					Qty	%
	TPP					

Table D: Industrial wastewater Re-cycle, Re-use and Disposal

District/ Basin	Sector	Total wastewater generation, MLD	Wastewater Treated MLD	Waste water untreated MLD	Treated MLD					Untreated MLD							
					Re-cycle		Re-use		Discharge		Un-organized re-use	Discharge					
					Industrial activity	Gardening	Irrigation	River discharge	Sea discharge	Irrigation		Land Application	River discharge	Sea discharge			

District/ Basin	Sector	Waste water generated	Waste water Treated	% of Waste water untreated	% of untreated waste water recycled	% of untreated waste water discharged in Rivers and Seas	% of waste water discharged in Rivers and Seas

Table E: ETP/CETPs - Performance and Compliance to waste water Quality norms

Sector	Norms for various Parameters						
	pH	SS	COD	BOD	TDS	Heavy metals	Others

District/ Basin	Sector	ETP/ CETP	Capacity MLD	District	Raw waste water Quality			Expected Treated waste water Quality as per Design			Actual Treated wastewater quality			Discharge Norms			Expected BOD load reeducation as per design Kg/Day	Actual BOD load reduction Kg/Day
					BOD	COD	HM	BOD	COD	HM	BOD	COD	HM	BOD	COD	HM		
Unit																		