

# ACTION PLAN

FOR CLEAN-UP OF POLLUTED STRETCH OF

# PANCHGANGA RIVER

**2025**

## **CONTENTS**

LIST OF FIGURES .....	2
PANCHGANGA RIVER (Shirol to Kolhapur) .....	3
1.1 Executive Summary of Action Plan Restoration of Water Quality of Panchanga River .....	3
1.2 Background.....	11
1.3 Status of Domestic Sewage Generation and Treatment.....	14
1.4 Status of Industrial Effluent Generation and Treatment .....	17
1.5 Drains out-falling into River Panchganga .....	21
1.6 Status of Water Quality.....	24
1.7 Status of Ground Water Quality.....	27
1.8 Waste Management.....	29
1.8.1 Solid Waste Management .....	29
1.8.2 Bio-medical waste Management.....	29
1.8.3 E-Waste management .....	29
1.8.4 Hazardous Waste Management .....	30
1.9 Greenery Development Plan of Forest Department, Government of Maharashtra .....	31
1.10 Plan for Restoration of Water Quality.....	32
Table 15 Time Bound Action Plan for Panchganga River .....	32

## **LIST OF TABLES**

Table 1 Introduction of river stretch .....	14
Table 2 Domestic sewage aspects on the river stretch.....	14
Table 3 Details of Sewage Generation & treatment from respective Corporation & Council .....	15
Table 4 Details of Proposed Sewage Treatment Plant.....	16
Table 5 Particulars of Industries in Kolhapur District .....	18
Table 6 Details of Textile Industries.....	19
Table 7 Details of Sugar Industries.....	20
Table 8 Highly Polluting Industries as on 31/3/2018.....	20
Table 9 Particulars of drains falling into the river .....	21
Table 10 Status of water quality of the drains .....	23
Table 11 Water Quality for Panchganga River.....	26

Table 12 Water Quality at U/s of Kolhapur town near Balinga Pumping Station .....	26
Table 13 Water Quality Index for one location (surface water & ground water) during .....	28
Table 14 Status of Waste Management in Pune .....	30
Table 15 Time Bound Action Plan for Panchganga River.....	32
Table 16 Timelines for Implementation of Restoration Plan.....	37

## **LIST OF FIGURES**

Figure 1 Stretch of Panchganga River.....	12
Figure 2 Map Showing Stretch of Panchganga River.....	13
Figure 3 Map Shwoing NWMP Station across Panchganag River.....	25

## PANCHGANGA RIVER (Shirol to Kolhapur)

### 1.1 Executive Summary of Action Plan Restoration of Water Quality of Panchanga River

Sr. No.	Description of Item	Details								
1.	Name of the identified polluted river and its tributaries	:	Shirol to Kolhapur							
2.	Is river is perennial and total length of the polluted river	:	Perennial Length- 67 Km							
3.	Priority-2018 by CPCB Priority No-V  Revised priority as per as per CPCB Report 2022- Panchganga River removed from Priority List by CPCB in 2022  Latest Priority 2024 study by MPCB	:	Priority-2018 by CPCB Priority No-V  Revised priority as per as per CPCB Report 2022- Panchganga River removed from Priority List by CPCB in 2022  Latest Priority 2024 study by MPCB- Priority-IV							
4.	No of drains contributing to pollution and names of major drains	:	21 nos of major drains. The characteristics and details are provided in detail below.							
5.	Major Towns on the banks of the river with population	:	<table><tr><th>Local Body</th><th>Population</th></tr><tr><td>Kolhapur</td><td>6,67,000</td></tr><tr><td>Ichalkaranji</td><td>3,91,000</td></tr></table>	Local Body	Population	Kolhapur	6,67,000	Ichalkaranji	3,91,000	
Local Body	Population									
Kolhapur	6,67,000									
Ichalkaranji	3,91,000									
6.	a. Sewage generation & Treatment in MLD	:	<b>Kolhapur Municipal Corporation:</b> Sewage Generation : 149.1 MLD Sewage Treatment: 106.7 MLD  <b>Ichalkaranji Municipal Council:</b> Sewage Generation: 40 MLD Sewage Treatment: 20 MLD  <b>Other villages (ZP):</b> Sewage Generation: 19.69 MLD Sewage Treatment: NIL							
	b. Total no. of existing STPs and proposed STPs with total capacities in MLD	:	<b>Kolhapur Municipal Corporation:</b> 02 nos of STPs located at Kasaba Bavada, Kolhapur (Capacity 76 MLD & 4.0 MLD) and Dudhali area, Kolhapur (Capacity 17 MLD).  <b>Ichalkaranji Municipal Council:</b> 01 STP located at Sangali Naka, Near MSW site, Ichalkaranji (Capacity 20 MLD)							

	c. Gaps in sewage treatment in MLD and no. of towns not having STPs	:	Kolhapur – 42.4 MLD Ichalkaranji – 20.0 MLD Other villages (ZP) – 19.69 MLD
7.	Major industrial estates located with total no. of industries	:	Total 107 nos of industries located in the Panchganga river basin  Sugar Industries: 08 nos.
			Sugar and Distillery Units: 15 nos. Textile units: 81. Other units: 11. CETPs: 03 nos having capacities of 12 MLD, 1 MLD and 10 MLD
	a. Total water consumption and total industrial effluent generation in MLD	:	Industrial Effluent Generation: Approx 18.30 MLD.  Treatment: 18.30 MLD in individual ETPs and 03 nos of CETP.
	b. No. of industries having captive ETPs	:	107 effluent generating industries have captive ETPs
	c. No of CETP's and their treatment capacity	:	03 nos having capacities of 12 MLD, 1 MLD and 10 MLD
	d. Gaps in treatment of industrial effluent	:	None
8.	Waste Management	:	
	a. Solid Waste Generation & processing	:	<b>Kolhapur Municipal Corporation:</b> MSW Generation : 210 MT/day MSW Treatment: 200 MT/day by Composting, Bio Methanization, RDF, Waste to Energy (0.2 MW) Dumping: 10 MT/day  <b>Ichalkaranji Municipal Council:</b> MSW Generation: 140 MT/day MSW Treatment: 40 MT/day by composting Dumping: 100 MT/day
	b. Biomedical Waste Generation & treatment	:	Kolhapur District: Total Biomedical waste generated: 2152 kg/day. Total Biomedical waste treated: 2152 kg/day
	c. E-Waste Management Generation & treatment	:	E-waste generated by industries is sent to MPCB authorized E-waste reprocessor

	d. Hazardous waste Management	:	<ul style="list-style-type: none"> <li>• There are 192 Hazardous waste generating industries in Kolhapur district. These industries generated about 23783 MT Hazardous waste in year 2024-25.</li> <li>• The HW from Kolhapur district is scientifically disposed through Maharashtra Enviro Power Ltd., MIDC Ranjangaon, Dist. Pune.</li> <li>• CHWTSDf capacity – Landfill – 60000 MT/A, Incineration – 3 TPA.</li> </ul>
9.	Action plan includes mainly covering aspect such as (Proposal for utilization of sewage, ground water recharging or rain water harvesting, measures for regulating ground water use, protection and management of flood plain zone, maintaining minimum E-flows and water shed management, plantation on both sides of the river, setting up of bio-diversity parks etc., as per Hon'ble NGT Orders dated 20.09.2018 and 19.12.2018)	:	<ul style="list-style-type: none"> <li>• RRC has already requested to Water Resource Dept, GoM for maintaining minimum E-flows and water shed management, plantation on both sides of the river, setting up of bio-diversity parks.</li> <li>• Water resource department, GoM has prepared integrated State Water Plan, which includes recycling of Treated sewage.</li> <li>• MPCB - Action plan for Utilization of Treated Sewage has been submitted to CPCB.</li> </ul>
10.	Min. and Max. required time period for implementation of action plans		Max: 3 years
11.	Total estimated budget in crores towards implementation of proposed action plans with break-up (e.g. No. of STPs, capacity, total cost; No of CETPs, total capacity, Cost towards interception and diversion of sewage/effluent to STPs/CETPs etc.,)	:	<p><b>Four STPs with capacity 6 MLD, 9 MLD, 15 MLD &amp; 19.50 MLD at Kolhapur costing Rs. 70.77 crores</b></p> <p>One STP of capacity 18 MLD at Ichalkaranji costing Rs 50 Crores.</p> <p>The Maharashtra Pollution Control Boards has also reserved Rs. 461.42 Cr. for preparation of action plan for abatement &amp; Control of Pollution of River Water due to sewage &amp; solid waste disposal from B &amp; C Municipal Councils (342 Nos of Urban Local Bodies.), Nagar Panchayat &amp; Gram Panchayats. The said funds will be used for DPR preparation, development of infrastructure for sewage collection &amp; treatment &amp; development of infrastructure for Solid Waste Management. The DPR preparation &amp; implementation of the same will be completed by year 2028 (i.e in next 3 years).</p>

12.	Whether 'River Rejuvenation Committee (RRC) constituted by the State Govt./UT Administration and If so, Date of constitution of 'RRC'.	:	River Rejuvenation Committee (RRC) constituted as per the Maharashtra Government G.R. issued by the Environment Dept, GoM vide No. NGT 2018/PC-2/TC-3 dtd.13.12.2018.
13.	Responsible Organisation (s) for implementation of proposed action plans	:	<ol style="list-style-type: none"> <li>1. Water Resource Department, GoM</li> <li>2. Urban Development Department</li> <li>3. Kolhapur Municipal Corporation</li> <li>4. Ichalkaranji Municipal Council</li> </ol>
14.	Expected deliverables w r to achieving Goals	:	<ol style="list-style-type: none"> <li>1. To achieve 100% sewage collection and treatment</li> <li>2. To achieve 100% MSW collection, transportation and treatment.</li> </ol>
			<ol style="list-style-type: none"> <li>3. To achieve river water quality of Bathing standards by 2028.</li> <li>4. Augmentation of River Flow and restoration of water quality-2028</li> </ol>

5.	Initiatives taken by Govt. of Maharashtra and MPCB.	:	<ul style="list-style-type: none"> <li>• Maharashtra Government through its forest department has announced The Plantation Program.</li> <li>• MPC Board will provide financial &amp; technical assistance to villages in next three years to comply with sewage &amp; waste management.</li> <li>• MPC Board has issued Direction to the local bodies to make 25% budgetary provision for scientific treatment and disposal of Sewage and Solid Waste. Accordingly, Municipal Corporations have passed resolution in their General Body meeting and reserved the funds. These funds are reserved and made mandatory to utilize for preparation of DPR, establishing treatment facility, O &amp; M of treatment facility etc. The review of the same is taken from time to time by the Board.</li> <li>• MPC Board has issued directions to 08 Municipal Corporations to penalize to the tune of 1pais/litre of sewage generation under 'Polluter pays principle'.</li> <li>• MPC Board has issued directions to non-complying CETPs to penalize to the tune of 2 paisa/litre for remediation &amp; upgradation to comply with the consented standards.</li> </ul>
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	<p>Budget Estimates &amp; Pooling of Resources from Local Bodies, State Pollution Control Board, State Government &amp; Central Government</p>	<ul style="list-style-type: none"> <li>• Maharashtra Government will provide necessary funds in next 3 years i.e. by 2027 for Sewage management.</li> <li>• The Maharashtra Pollution Control Boards has also reserved Rs. 461.42Cr. for preparation of action plan for abatement &amp; Control of Pollution of River Water due to sewage &amp; solid waste disposal from B &amp; C Municipal Councils (342Nos of Urban Local Bodies.), Nagar Panchyat &amp; Gram Panchayat for reducing polluted stretches in compliance with Hon'ble NGT, principal bench directions w.r.t. "More River Stretches are now Critically Polluted". The said funds will be used for DPR preparation, development of infrastructure for sewage collection &amp; treatment &amp; development of infrastructure for Solid Waste Management. The DPR preparation &amp; implementation of the same will be completed by year 2028 (i.e in next 3 years).</li> <li>• The Maharashtra Government through Urban Development Department has approved DPR of all Urban Local Bodies for Solid Waste Management. The funds for the same amounting to Rs. 2560.0Cr has been already approved by Government &amp; the said DPRs will be implemented &amp; Solid Waste Management issues will be resolved by 2027.</li> </ul>
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## **Preamble -**

In the matter of OA No. 673 of 2018-"More river stretches are critically polluted now: CPCB", the Hon'ble NGT has passed order dated 20.09.2018 for constitution of River Rejuvenation Committee (RRC) and Special Environment Surveillance Task Force (SESTF). The report comprises 351 polluted river stretches in India out of which 53 polluted river stretches are in Maharashtra. In the state, 9 polluted stretches in priority I & 6 polluted stretches in priority II. It has been mandated to prepare Action Plan for River Stretches and make them pollution free. In compliance of the orders of the Hon'ble NGT, the State Government has constituted RRC.

River Rejuvenation Committee (RRC) constituted as per the Maharashtra Government G.R. issued by the Environment Dept, GoM vide No. NGT 2018/PC-2/TC-3 dtd.13.12.2018 with 5 members under the guidance of Principal Secretary for preparation of action plans and to monitor the implementation of these action plans. The members of RRC are as mentioned under:

1. Commissioner / Director, Directorate of Municipal Administration
2. Chief Executive Officer – Maharashtra Industrial Development Corporation
3. Director (Environment)
4. Director (Industries)
5. Member Secretary – Maharashtra Pollution Control Boards- Member & Co-ordinator of RRC

Further State Government also constituted District Level Special Task Force comprising of the following:

1. Representative of District Collector
2. Representative of District Superintendent of Police
3. Representative of Regional Officer, MPCB
4. Representative of the District Judge of the concerned District

## **Meetings of the RRC Committee:**

- 1<sup>st</sup> Meeting of River Rejuvenation Committee (RRC) convened on 14.12.2018.  
RRC reviewed draft action plans of polluted river stretches of Priority I prepared by Maharashtra PCB. It was decided by the all the committee members, to take review of local bodies and accordingly to communicate the outcomes of the meeting to the Hon'ble NGT, Principal Bench. Maharashtra PCB submitted nine draft action plans of polluted river stretches of Priority I to CPCB along with minutes of 1<sup>st</sup> meeting of RRC and submitted progress report of polluted river stretches to Hon'ble NGT on 15.12.2018
- 2<sup>nd</sup> Meeting of River Rejuvenation Committee (RRC) convened on 09.01.2019.  
RRC reviewed draft action plans of polluted river stretches of Priority II prepared by

Maharashtra PCB. It was decided in the meeting to add in the draft action plans funding details like source, name of scheme, timeline etc for proposed STPs by concern local bodies.

- 3rd Meeting of River Rejuvenation Committee (RRC) convened on 23.01.2019. RRC reviewed and finalised draft action plans of polluted river stretches of Priority I, II, III, IV and V prepared by Maharashtra PCB. RRC also decided to call the local bodies and review the timelines proposed in action plans from time to time.
- Maharashtra PCB submitted 53 draft action plans of polluted river stretches of Priority I, II, III, IV and V to CPCB along with minutes of 2<sup>nd</sup> & 3<sup>rd</sup> meeting of RRC and submitted progress report of polluted river stretches to Hon'ble NGT on 31.01.2019. CPCB Task Team on Polluted River Stretches called MPCB to give presentation on Action Plan for Priority-I & II polluted river stretches on 12.02.2019. Accordingly, the presentations were reviewed by Task team & few improvements in the action plan were suggested.
- 4th Meeting of River Rejuvenation Committee (RRC) held on 16/02/2019 & it was decided to communicate with Water Resource Department to maintain e-flow in the rivers of Maharashtra adopting good irrigation practices, protection & management of flood plain zone (FPZ), rain water harvesting, ground water charging, planation on both sides of river, Setting up of biodiversity parks on flood plains by removing encroachments and Urban Development department communicated to take necessary steps to provide adequate funds to urban local bodies for installation of sewage treatment & MSW processing facilities in a time bound manner so as to comply with the Hon'ble NGT.
- 5<sup>th</sup> Meeting of River Rejuvenation Committee (RRC) held on 25/06/2019. It was decided that Director Environment will communicate with Water Resource Department and Urban Development Department regarding provision of funds in time bound manner for installation of STPs & MSWM facilities. RRC reviewed and approved Action Plans for restoration of polluted river stretches in priority III, IV & V.
- 6<sup>th</sup> Meeting – Meeting of River Rejuvenation Committee (RRC) held on 05/11/2019. Discussed issue about funds & implementation in time bound manner of STPs & MSWM facilities.
- 7<sup>th</sup> Meeting – 28.03.2025 – In this meeting issue of Panchganga River was not discussed. Issue of Pawana river was discussed.

**Achievable goal:**

The objective/goal of the action plan is that the quality of river water should meet with the required value as given under:-

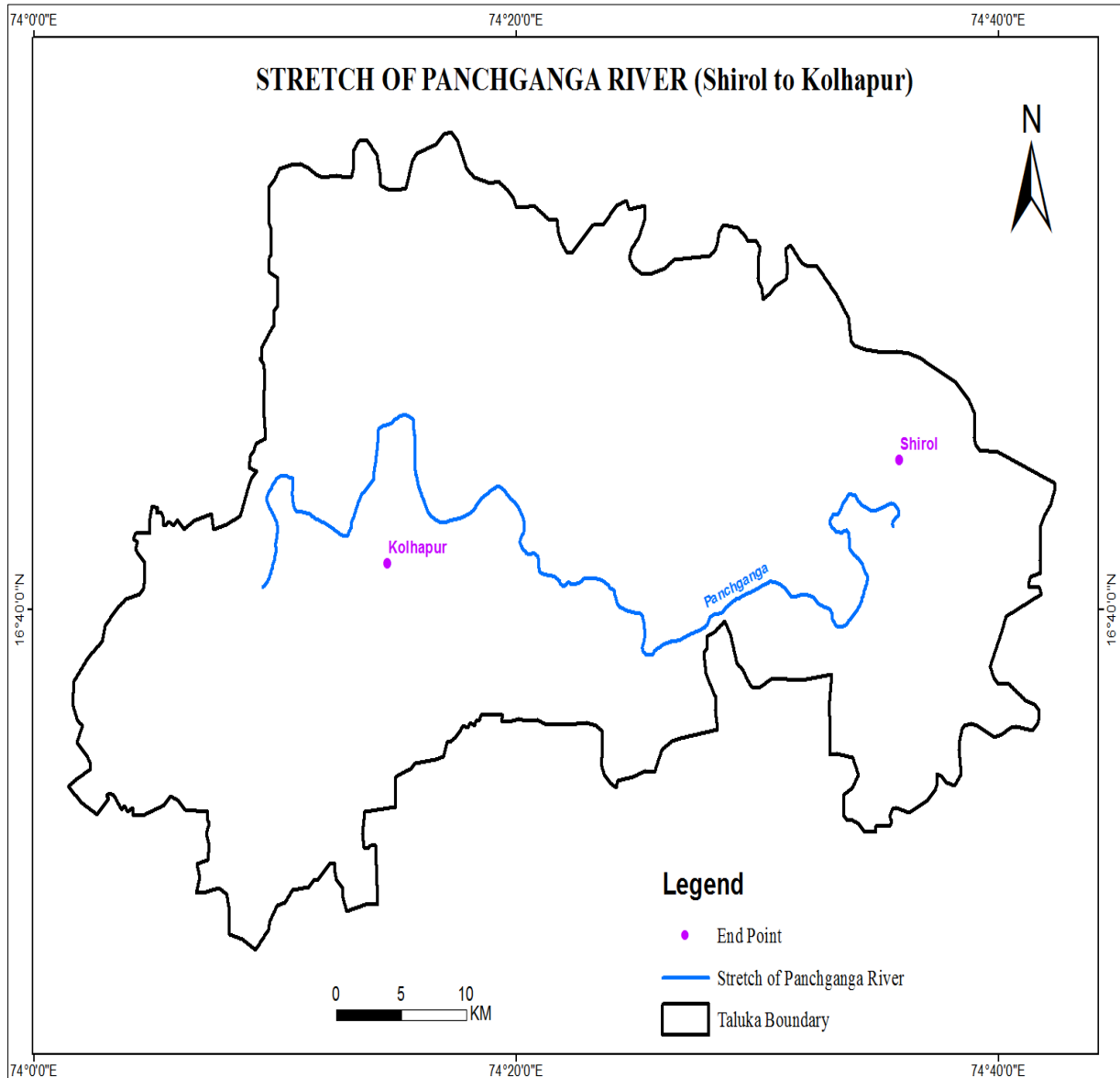
Quality Parameter	Standard to be achieved
BOD	3.0 mg/l.
Dissolved Oxygen (DO)	More than 5.0 mg/l.
Faecal Coliform	Less than 500 MPN/100ml.

## 1.2 Background

The Panchganga River is a major tributary of Krishna River, with which it joins at Narsobawadi. It flows through the borders of Kolhapur. It originates from Prayag Sangam (Village: Chikhli, Taluka: Karveer, Dist:Kolhapur). The Panchganga is formed, as has been noted already, by four streams, the Kasari, the Kumbhi, the Tulsi and the Bhogawati. Local tradition believes in an underground stream Saraswati which together with the other four streams make the Panchganga. From Kolhapur the Panchganga River falls into the Krishna at Kurundvad. The topography of Kolhapur city shows many undulations and the ground is generally sloping from south to north towards the Panchganga River. The city is close to the Konkan coast which is connected by 12 Ghats going through Western Ghats like Anuskura, Amba, Phonda, Amboli etc.



**Figure 1 Stretch of Panchganga River**



**Figure 2 Map Showing Stretch of Panchganga River**

The river stretch extends from Shirol to Kolhapur. The length of this stretch is 67 km. Kolhapur and Ichalkaranji towns are situated on the banks of the river. The population along this stretch is approx. 17,75,000 as per 2011 Census.

The status of the river as per the monthly sampling conducted between January to December 2024 reveals that water quality of the river meets bathing standards i.e. max BOD less than 3 mg/l.

**Table 1 Introduction of river stretch**

Sr. No.	Description of item	Details	
1	Approx. length of stretch	67 Km	
2	Major Towns located on the bank along with Population	<b>Local Body</b>	<b>Population</b>
		Kolhapur	6,07,419
		Ichalkaranji	2,92,060
3	Stretch of River Perennial or Non Perennial	Non - perennial	
4	Status of polluted river stretch (Jan – Dec 2018)	Meets bathing standards	

### 1.3 Status of Domestic Sewage Generation and Treatment

There are about 174 villages in the river Panchganga basin in Kolhapur with a total population of approx. 8.75 lakhs. Most of these villages do not have any form of treatment technology for treating the wastewater generated and thus further join the river contributing to the pollution in direct and indirect ways. 38 villages have been classified as major polluting villages by Zilla Parishad. These have population of approximately 4.34 lakhs. The Liquid Waste Management Project (LWM) supported by NABARD and Eco Development Plan (EDP) covers 6 and 2 villages out of the 38 polluting villages respectively.

The population in the villages varies from less than 5000 up to more than 20,000. Thus it is necessary to treat the wastewater generated in the villages before its subsequent disposal/re-use for agriculture. Since the villages have scattered population, therefore decentralised system of treatment for wastewater is suitable technology in the current scenario.

The total volume of waste water generated from these villages is 23896 cu. m (*Source: Primove Report on 'Pollution Abatement for Panchganga River', # - villages included in Liquid management Project by NABARD, @- villages included in Eco development Plan GoM*)

**Table 2 Domestic sewage aspects on the river stretch**

Sr. No.	Particular	Remarks
1	Proposal for utilization of sewage	The Infrastructure Projects are mandated by MPCB to recycle 60% of treated sewage for secondary use by providing dual pipeline. The Local Bodies will be encouraged to reuse treated sewage for various purposes including to Thermal Power Plants wherever possible. e.g. Koradi TPS is receiving 100 MLD of treated sewage from Nagpur city.
2	STP sludge management	STP sludge is disinfected and used as manure.



3	Proposal for ground water recharging/rain water harvesting	<ul style="list-style-type: none"> <li>Water resource department, GoM has prepared integrated State Water Plan, which includes recycling of Treated sewage.</li> <li>MPCB has submitted Action plan for Utilization of Treated Sewage to CPCB, in which it is mandated to utilize treated sewage for different class of users like Thermal Power Plants, Industrial Units, Construction activities, non-potable municipal uses, Agriculture-Irrigation, etc. depending on its availability.</li> <li>The Infrastructure Projects are mandated by MPCB to recycle 60% of treated sewage for secondary use by providing dual pipeline.</li> <li>The Local Bodies will be encouraged to reuse treated sewage for various purposes including to Thermal Power Plants wherever possible. e.g. Koradi TPS is receiving 100 MLD of treated sewage from Nagpur city.</li> </ul>
4	Adopting good irrigation practices	Agriculture Department, GoM & Water Resource Department, GoM is requested for implementation.
5	Protection and management of Flood Plain Zones (FPZ)	Water Resource Department, GoM is requested for implementation.
6	Plantation on both sides of the river	Water Resource Department, GoM is requested for implementation.
7	Setting up of biodiversity parks on flood plains by removing encroachment	Water Resource Department, GoM is requested for implementation.

**Table 3 Details of Sewage Generation & treatment from respective Corporation & Council**

Sr. No.	Corporation/ Council/ Zila Parishad	Sewage Generation (MLD)	Treatment Capacity (MLD)
1	Kolhapur Municipal Corporation:	149.1	106.7
2	Ichalkaranji Municipal Council	40	20
3	Other villages (ZP)	19.69	No Treatment



**Table 4 Details of Proposed Sewage Treatment Plant**

Name of ULB	Status of STP	Name and Address of STP	Designed Capacity (MLD)	Fund Allocation Details				Time line for various stages of work Completion	Target date of Completion
				Source of Funds	Allocation Status	Utilization status	Present Status of the work		
<b>Kolhapur Municipal Corporation</b>	Proposed	Dudhali area, Kolhapur.	6 MLD	<p>AMRUT scheme costing Rs. 70.77 crores is administratively approved vide Govt. G.R. no. 27/UD-33, dated 01/07/2017 for KMC. The components of the scheme are Sewage network for Dudhali zone (112.9 KM), 6 MLD additional STP at Dudhali nala, 4 MLD additional STP at Kasaba Bawada, I &amp; D work of Kasaba Bawada nala &amp; related works. The work order for the above mentioned components is issued to M/s Noble Construction company, Pune on dtd. 24/10/2017. MJP is working as a project Management Consultant for the AMRUT scheme of which the work is in progress.</p>		In process	The hydraulic design of STP is completed by the agency, inlet networking pipeline work is in process.	NA	Expected to complete on 31 <sup>st</sup> May, 2025
<b>Kolhapur Municipal Corporation</b>	Proposed	1. Near SSC Board Kolhapur 2. Bapat Kamp Kolhapur 3. Muskuti Talav Kolhapur	9 MLD 15 MLD 19.50 MLD			In process	Under construction.	NA	Expected to complete on 31 <sup>st</sup> August 2026
<b>Ichalkaranji Municipal Council</b>	Proposed	Ichalkaranji proposed STP at Takawade ves	18	Central-60%, state-20%, ULB-20%	Central-49.56 crore, state-16.52 crore, ULB-31.44 crore	Rs.50.83 Crores spent	Under construction	out of 97 km total sewerage lines, 71 km sewerage lines are laid, trial bores at STP site is completed, remaining work is in progress.	May-2025

6

## 1.4 Status of Industrial Effluent Generation and Treatment

Maharashtra is one of the most highly industrialized states in India. With a rise in industrial estates in the State, areas like Mumbai, Thane, Navi Mumbai, Kalyan, Nashik, Pune and Pimpri-Chinchwad that have a large number of pollution-prone industries are facing chronic industrial pollution.

In order to maintain a safe distance between industrial units and rivers to avoid discharge of effluent into water bodies, the State has its policy which also states that no industry will be allowed to establish along a river bank. Industries are being encouraged to recycle and reuse waste. The industrial statistics of Pune region are given in the table below.

Pune		
LSI	MSI	SSI
493	291	7101
1270	563	4608
1323	322	3637
White - 203		

Kolhapur is home to many industries like sugar, tannery, gold, silver, textiles among many others. Tannery, Hand sizing, Gold & Silver Units are some small scale industries which do not have treatment system. MPCB has given closure notice to some of these industries and had asked Kolhapur Municipal Corporation to take appropriate steps.

**Table 5 Particulars of Industries in Kolhapur District**

Sr. No.	Category of Industries	No of Industries	Remarks
1	Orange	1574	<ul style="list-style-type: none"> <li>There are total 106 nos of industries located in the Panchganga river basin having major industrial effluent generation, split-up of the same is as follows:               <ol style="list-style-type: none"> <li><b>Sugar Industries:</b> 08 nos.</li> <li><b>Distillery Units:</b> 07 nos.</li> <li><b>Textile units:</b> 81.</li> <li><b>Other units:</b> 10.</li> <li><b>CETPs:</b> 03 nos.</li> </ol> </li> <li>All effluent generating units have provided their own ETP and are members of CETP wherever applicable. There is about 18 MLD of industrial waste water generation for which industries have provided individual ETPs and 03 CETPs. MPCB do not allow any industry to discharge effluent to the river.</li> <li>All 08 sugar industries, 07 distilleries and 02 CETPs have provided OCEMS.</li> </ul>
	Red	1407	
2	No. of Directions issued to Industries		<b>Show Cause Notice (SCN):</b> 133 (2022-24) 100 (2024-25) <b>Proposed Direction:</b> 42 (2022-24) 100 (2024-25) <b>VCD:</b> 31 (2022-24) 20 (2024-25) <b>Conditional Direction:</b> 31 (2022-24) 20 (2024-25)
3	Total industrial effluent generation		Industrial Effluent Generation: Approx 18 MLD
4	No. of industries having captive ETPs and their treatment capacity in MLD		106 effluent generating industries have captive ETPs

5	No. of CETPs existing in the catchment of the polluted river stretch and the treatment capacity	03 nos having capacities of 12 MLD, 1 MLD and 10 MLD
6	Gaps in treatment of industrial effluent	No Gaps
7	OCEMS installation Status by Industries	All 08 sugar industries, 07 distilleries and 03 CETPs have provided OCEMS.
8	Status of Hazardous Waste Generation and Treatment	<p>There are 192 Hazardous waste generating industries in Kolhapur district. These industries generated about 23783 MT Hazardous waste in year 2024-25.</p> <p>The HW from Kolhapur district is scientifically disposed through Maharashtra Enviro Power Ltd., MIDC Ranjangaon, Dist. Pune.</p> <p>CHWTSDF capacity – Landfill – 60000 MT/A, Incineration – 3 TPA.</p>

**Table 6 Details of Textile Industries**

Sr. No.	Name of the Industry	Capacity of Waste water Generation (m <sup>3</sup> /day)	Capacity of Installed Effluent Treatment Plant (m <sup>3</sup> /day)	Treatment Provided	Disposal Treatment
1	Tessitura Monti India Pvt. Ltd.	1600	1450-1500	Primary, Secondary & Tertiary	-
2	Jubilee Pvt. Ltd	500	-	Primary	Common Hazardous Waste Treatment Storage & Disposal Facility (CHWTSDF)
3	Manpassand Textile processors Pvt. Ltd	300-325	-	Primary	-
4	Ichalkaranji textiles Pvt. Ltd.	25	-	Primary	CHWTSDF
5	Ramgopal Birla textile industry	30	-	Primary	-

Source: Study to Assess the Kolhapur-Ichalkarnaji Sewage Pollution of Panchganga River, Maharashtra by NEERI

**Table 7 Details of Sugar Industries**

Sr. No.	Name of the Industry	Capacity of Waste water Generation (m <sup>3</sup> /day)	Capacity of Installed Effluent Treatment Plant (m <sup>3</sup> /day)	Treatment Provided	Disposal Treatment
1	Chattrapati Rajaram Sakar kharkhana	400-500	-	Primary, Secondary & Tertiary	-
2	Kumbhi Kasari Sakhar Kharkhana	360-380	-	Primary, Secondary & Tertiary	-
3	D.Y. Patil Sahakari Sakhar Karkhana	210	-	Primary, Secondary & Tertiary	-
4	Bhogawati Sugar Industry	-	-	Primary & Secondary	
5	Dutt Dalmiya sugar Industry	200	-	Primary & Secondary	-
6	Ratna panna sugar factory	500	-	Primary & Secondary	-
7	Dutta nagar sugar factory, Shirol	510	-	Primary & Secondary	-
8	Jawahar Sugar Industry	700-750	-	Primary & Secondary	-

Source: Study to Assess the Kolhapur-Ichalkarnaji Sewage Pollution of Panchganga River, Maharashtra by NEERI

**Table 8 Highly Polluting Industries in Maharashtra as on 31/3/2025. (Kolhapur is at Sr no 5)**

Industry	Amravati	Aurangabad	Chandrapur	Kalyan	Kolhapur	Mumbai	Nagpur	Nashik	Navi Mumbai	Pune	Raigad	Thane	Grand Total
Cement	-	-	5	-	1	-	1	-	-	-	-	-	7
Distillery	1	15		-	17	-	1	22	-	36	-	-	92
Dyes and Dye-intermediates	-	-	2	3	2	-	1	-	1	-	7	2	18
Fertilizer	1	2	-	-	-	1	1	4	-	1	3	-	13

Integrated Iron and Steel	-	-	1	-	1	-	4	-	-	1	2	-	9
Oil Refinery	-	-	-	-	-	2	-	-	-	-	-	-	2
Pesticide	-	-	-	1	5	-	-	1	3	-	3	3	16
Pharmaceuticals	-	13	-	12	4	-	-	2	15	9	14	23	92
Pulp & Paper	-	-	1	-	-	-	-	-	-	1	-	-	2
Sugar	1	55	2	-	41	-	5	35	-	63	-	-	202
Tannery		1	-	-	-	-		-	-	-	-	-	1
Thermal Power Plant	2	1	7	-	2	1	12	3	-	-	-	1	29
Petrochemical	-	-	-	-	-	-	-	-	1	-	5	-	6
Grand Total	5	87	18	16	73	4	25	67	20	111	34	29	489

### 1.5 Drains out-falling into River Panchganga

There are total 21 drains that falls into the River Panchganga (12 from Kolhapur MC, 02 from Ichalkaranji MC & 07 other major drains). Many of which carry untreated domestic sewage generated from villages along the river. Details of these drains are given in the table below:

**Table 9 Particulars of drains falling into the river**

Sr. No.	Location	Name of the drain	Discharge (max)	Length (km)	Width (m)	Depth (m)
1	Near Shiv Mandir, Lakshirth vasahat, Kolhapur.	Lakshirth Nalla, Kolhapur	0.2	2.5	0.5	0.5
2	In front of Khanvilkar Petrol Pump, Kolhapur.	Jayanti Nalla, Kolhapur	65	9	6	2

3	At Dudhali, Kolhapur.	Dudhali Nalla, at Dudhali, Kolhapur.	24	2	3	1.5
4	Near Mahadev Temple, Kolhapur.	Jamdar Club Nalla	0.4	4	1	1
5	Juna Budhwar Peth, Kolhapur.	Siddharth Nagar Nalla	0.1	1	1	1
6	In front of CPR hospital, Near Dasara Chowk, Kolhapur.	CPR hospital Nalla,	0.5	1.5	1	1
7	Backside of Tarabai Park, Kolhapur.	Rajhans Nalla	1	1.2	1	1
8	New Palace area Kolhapur.	Ramanmala Nalla	1	1.8	1	1
9	West side of Ramanmala Javdekar Scheme, Kolhapur.	Dream World Nalla	0.3	1.4	1	1
10	Line Bazar area Kasabab Bawada, Kolhapur.	Line Bazar Nalla	3	1.3	1	1
11	Near Golibar Maidan, Kasaba Bawada, Kolhapur	Kasaba Bavada Nalla	0.2	0.7	1	1
12	At Bapat Camp, Kolhapur	Bapat Camp Nalla	0.5	2	1	1
13	Near Dr. Babasaheb Ambedkar Buddha Vihar, Ichalkaranj.	Kala Odha Nalla	32	6	6	4
14	At Chandur Ichalkaranji	Chandur Nalla,	7	5	2	1.5
15	At Gandhinagar, Tal: Karveer, Dist: Kolhapur	Gandhinagar Nalla	1.115	0.5	1	1
16	Near Birdev Mandir, Valiwade, Tal: Karveer, Dist: Kolhapur	Valiwade Nalla,	0.389	0.6	1	1
17	Tilawani/Rui, Tal: Hatkanangale, Dist: Kolhapur.	Tilawani/Rui Nalla	1.148	5.26	1	1
18	At Kabnur, Ichalkaranji. Tal:	Kabnur Nalla (Including	7	9.69	2	1.5

	Hatkanangale, Dist: Kolhapur.	Chandur nalla)				
19	Hupri, Tal: Hatkanangale, Dist: Kolhapur.	Hupri Nalla,	1.8	4.8	1	1
20	Shirdhon, Tal: Shirol, Dist: Kolhapur.	Shirdhon Nalla,	0.9	0.728	1	1
21	At Shirol, Tal: Shirol, Dist: Kolhapur.	Shirol Nalla.	1	1.57	1	1

**Table 10 Status of water quality of the drains**

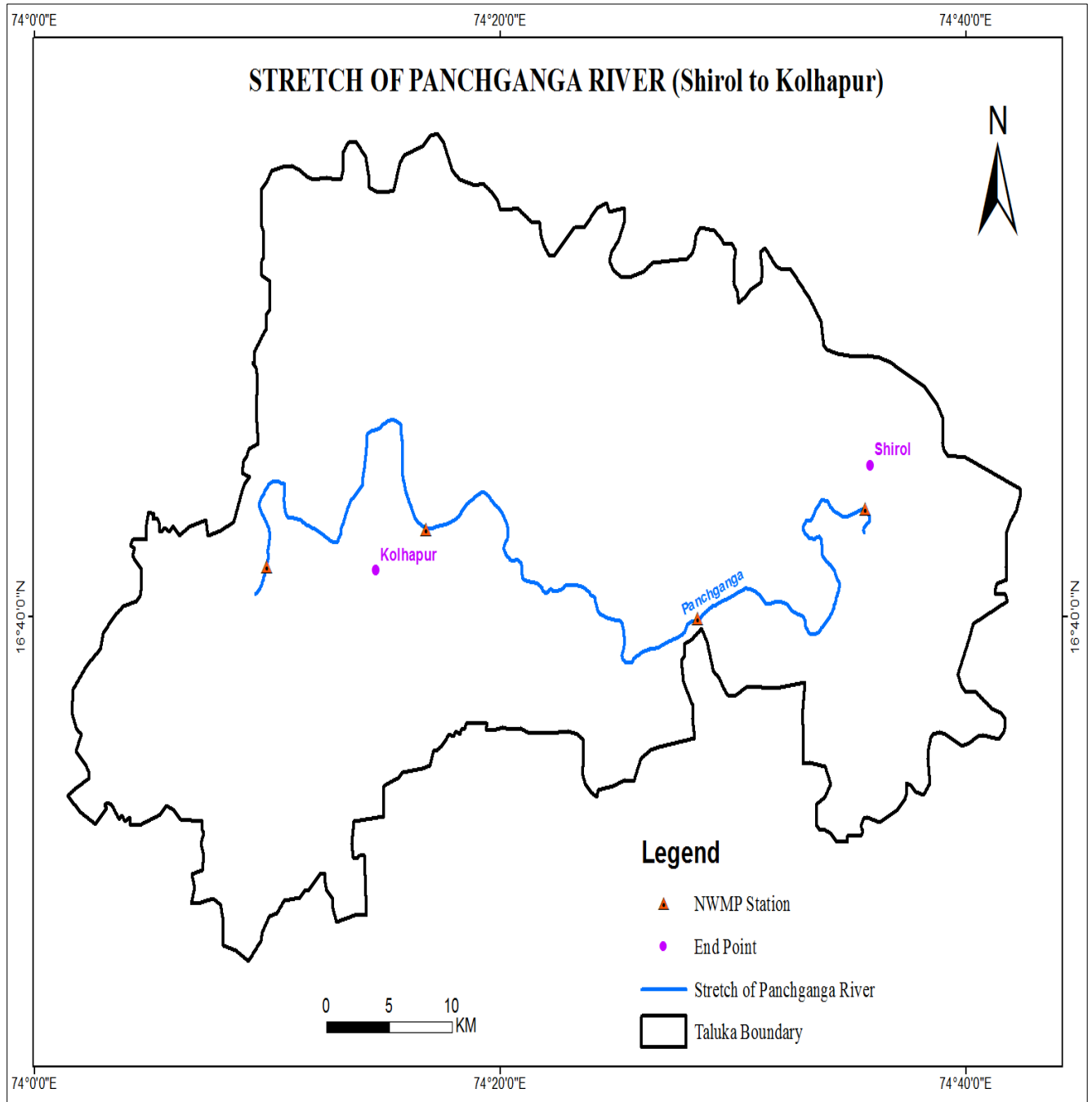
<b>Sr. No.</b>	<b>Major Drain</b>	<b>Major Drain</b>	<b>BOD (mg/l)</b>	<b>COD (mg/l)</b>
1	Lakshirth Nalla, Kolhapur	Lakshirth Nalla, Kolhapur	-	-
2	Jayanti Nalla, Kolhapur	Jayanti Nalla, Kolhapur	26.0	90.0
3	Dudhali Nalla, at Dudhali, Kolhapur	Dudhali Nalla, at Dudhali, Kolhapur	19.8	77.0
4	Jamdar Club Nalla (Phulewadi)	Jamdar Club Nalla	3.8	24.0
5	Siddharth Nagar Nalla (Juna Budhwar Peth)	Siddharth Nagar Nalla	38	172.0
6	CPR hospital Nalla,	CPR hospital Nalla,	89.0	248.0
7	Rajhans Nalla	Rajhans Nalla	14.0	50.0
8	Ramanmala Nalla	Ramanmala Nalla	16.0	70.0
9	Dream World Nalla	Dream World Nalla	10.0	40.0
10	Line Bazar Nalla	Line Bazar Nalla	12.0	48.0
11	Kasaba Bavada Nalla	Kasaba Bavada Nalla	28.0	98.0
12	Bapat Camp Nalla	Bapat Camp Nalla	21.0	66.0
13	Kala Odha Nalla	Near Takawade Ves Pumping Station, At Ichalkaranji, Tal: Hatkanangale, Dist: Kolhapur.	132.0	397.0
14	Chandur Nalla,	Chandur Nalla, At Chandur, Tal: Hatkanangale, Dist: Kolhapur.	20.0	88.0
15	Gandhinagar Nalla	Gandhinagar Nalla, near Yuvraj High school, Gandhinagar	240.0	612.0
16	Valiwade Nalla.	Near Birdev Mandir, Valiwade, at Valiwade	-	-



17	Tilawani/Rui Nalla	Near Rui Bandhara, At Rui, Tal: Hatkanangale, Dist Kolhapur.	120.	384.0
18	Kabnur Nalla	Kabnur/Chandur Nalla, At Chandur, Tal: Hatkanangale, Dist: Kolhapur.	20.	88.0
19	Hupri Nalla	Hupri Nalla, At Hupri, Tal: Hatkanangale, Dist Kolhapur	-	-
20	Shirdhon Nalla	Shirdhon Nalla, At Shirdhon, Tal: Shirol, Dist Kolhapur	-	-
21	Shirol Nalla.	Shirol Nalla, At Shirol, Tal: Shirol, Dist Kolhapur	-	-

## 1.6 Status of Water Quality

Water quality of River Panchganga is assessed at one location. It is observed that Dissolved Oxygen range between 4.8 – 7.2 mg/l putting together data of three years (2023-25) which is meeting the criteria limit f o r m a x i m u m of at least 4 mg/l. The Bio-chemical Oxygen Demand (BOD) varies between 1.8 – 5.2 mg/l for similar years which is exceeding the desired level of 3 mg/l for maximum values. The Chemical Oxygen Demand (COD) values ranged between 12.0-48.0 mg/l indicating low level of industrial pollution. The Fecal and Total Coliform numbers respectively for the years referred are in the range of 5-94 MPN/100ml and 46-350 MPN/100ml indicating significant contribution of untreated sewage. The details of parameter specific concentration are provided in the Table 11.



**Figure 3 Map Showing NWMP Station across Panchganga River**

**Table 11 Water Quality for Panchganga River**

Locations	Year	Parameters									
		pH		Dissolved Oxygen (Mg/l)		B.O.D. (mg/l)		C.O.D. (mg/l)		Fecal Coliform (MPN/100 ml)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Panchganga River at Shirol near Shirol intake well	2022	7.1	8.1	5	7.3	1.4	2.4	14.4	29.6	5.6	9.3
	2023	7.6	8.5	5.4	7.7	1.8	3	8	35.2	4	9.3
	2024	7.5	8.8	5.4	7.4	2.8	3.4	8	32	4.5	8.2

Locations	Year	Parameters				
		pH		Dissolved Oxygen (Mg/l)		Fecal Coliform (MPN/100 ml)
		Average		Average		Average
Panchganga River at Shirol near Shirol intake well	2022	7.76		6.33		6.47
	2023	8.12		6.58		7.02
	2024	7.98		6.61		6.1

**Table 12 Water Quality at U/s of Kolhapur town near Balinga Pumping Station**

Locations	Year	Parameters									
		pH		Dissolved Oxygen (Mg/l)		B.O.D. (mg/l)		C.O.D. (mg/l)		Fecal Coliform (MPN/100 ml)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Panchganga River at Balinga Pumping Station	2022	7.1	8.3	5.7	7.3	1.8	2.2	14.4	24	4	12
	2023	7.4	8.1	5.3	7.8	1.8	3	8	17.6	6	11
	2024	7.3	8.7	4.5	7.4	2.6	3.1	8	36	4	9.2

Locations	Year	Parameters				
		pH	Dissolved Oxygen (Mg/l)	B.O.D. (mg/l)	C.O.D. (mg/l)	Fecal Coliform (MPN/100 ml)
		Average	Average	Average	Average	Average
Panchganga River at Balinga Pumping Station	2022	7.55	6.58	1.9	18.7	5.75
	2023	7.87	6.81	2.4	13.67	7.45
	2024	7.7	6.56	2.93	13.83	6.02

### 1.7 Status of Ground Water Quality

Maharashtra Pollution Control Board (MPCB) regularly monitors the water quality across 250 Water Quality Monitoring Stations (WQMS) for both surface (155 on rivers, 34 on sea/creeks, 10 on drains, 1 dam) and ground water (24 Borewells, 24 Dugwell, 1 Handpumps, 1 Tubewell) under two programs of NWMP (National Water Monitoring Programme) project titled GEMS (Global Environment Monitoring System) and MINARS (Monitoring of Indian National Aquatic Resources). Surface water samples are monitored every month whereas the ground water samples are monitored every six months.

#### WQI for ground water

MPCB monitors ground water quality once in six months. Based on the stringency of the parameters and its relative importance in the overall quality of water for drinking purposes each parameter has been assigned specific weightage by CPCB. These weights indicate the relative harmfulness when present in water. Nine parameters (pH, Total Hardness, Calcium Hardness, Magnesium Hardness, Chloride, Total Dissolved Solids, Fluoride, Nitrate, Sulphate) are considered for calculating Water Quality Index of ground water.

Water Quality Index - Ground Water		
WQI	Water Quality	Colour Code
<50	Excellent	
50-100	Good Water	
100-200	Poor Water	
200-300	Very Poor Water	
>300	Water Unsuitable for drinking	

**Table 13 Water Quality Index for one location (ground water)**

Locations	Year	Parameters									
		pH		B.O.D. (mg/l)		C.O.D. (mg/l)		Fecal Coliform (MPN/100 ml)		WQI	Remark
		Min	Max	Min	Max	Min	Max	Min	Max		
Bore well at Parvati Industrial Estate, Yadrav, Kolhapur	2024	7.6	7.7	2.8	3	10	16	5.5	7.8	197.22	Poor Water

## 1.8 Waste Management

### 1.8.1 Solid Waste Management

Total generation of MSW from Kolhapur Municipal Corporation is about 210 MT/day out of which 107 MT/day is treated by Composting, Bio Methanization, RDF, Waste to Energy (0.2 MW)

Total generation of MSW from Ichalkaranji Municipal Council is about 140 MT/day. 40 MT/day is treated by composting and the rest 100 MT/day by dumping.

### 1.8.2 Bio-medical waste Management

Total Bio-medical waste generation in Kolhapur district is 1700 kg/day. All waste is collected, transported and treated at CBMWTSDf located at Nature In Need, K.Bawda, Kolhapur. The CBMWTSDf has installed capacity of Incinerator 150 Kg/Hr, shredder of capacity 150 kg/hr and Autoclave with installed capacity of 50 litre/cycle.

### 1.8.3 E-Waste management

- Maharashtra Pollution Control Board awarded work order to M/s. IRG Systems South Asia Pvt. Ltd. to carry out inventorisation of E-Waste generation in the State of Maharashtra.
- Interim inventorisation report is prepared. CPCB has approved EPR of 261 producers for Maharashtra. The list of the producers is enclosed here.
- Annual report for the year 2024-25 is submitted.

#### Action Taken by MPCB

- MPCB is undertaking regular monitoring of EPR Authorization conditions and regular inspection of the collection points/ centers mentioned in EPR Plan.
- MPCB has issued Directions u/s 5 of the Environment (Protection) Act, 1986 read with E- waste (Management) Rules, 2016 to all Municipal Corporations in Maharashtra for provision of collection centres.
- Co-ordination with Various State Government Departments
- Co-ordination with Urban Local Bodies (Municipal Committee /Council /Corporation).
- Awareness through Public Notice

#### Constraints:

- Channelization E-waste from informal sector to formal sector.
- Awareness about impact of E-waste on Environment and Rules of E-waste is required.
- Authorized collections and Segregation centers are required to be established by Local Bodies.

#### 1.8.4 Hazardous Waste Management

The state of Maharashtra has four Common Hazardous Waste Treatment, Storage and Disposal Facilities. These facilities are located at MIDC Taloja, Trans-Thane Creek Industrial Area, MIDC Ranjangaon, Pune and MIDC Butibori, Nagpur. These facilities collectively handle 340,847 MT of Hazardous waste per annum.

There are 192 Hazardous waste generating industries in Kolhapur district. These industries generated about 23783 MT Hazardous waste in year 2024-25.

The HW from Kolhapur district is scientifically disposed through Maharashtra Enviro Power Ltd., MIDC Ranjangaon, Dist. Pune.

CHWTSDF capacity – Landfill – 60000 MT/A, Incineration – 3 TPA.

In Kolhapur, out of the 23783 MT generation in 2024-25, 17181 MT was Landfillable, 3191 MT was Incinerable and 3410 MT was Recyclable.

**Table 14 Status of Waste Management in Kolhapur District**

Sr. No	Particular	Remarks
1	Total MSW Generation	<b>Kolhapur Municipal Corporation:</b> MSW Generation : 210 MT/day  <b>Ichalkaranji Municipal Council:</b> MSW Generation: 140 MT/day
2	Existing MSW treatment and disposal facilities	<b>Kolhapur Municipal Corporation:</b> MSW Treatment: 107 MT/day by Composting, Bio Methanization, RDF, Waste to Energy (0.2 MW) Dumping: 93 MT/day  <b>Ichalkaranji Municipal Council:</b> MSW Treatment: 40 MT/day by composting Dumping: 100 MT/day
3	Bio-medical waste Management	Hospitals are joined to Nature In Need, K.Bawda,Kolhapur <b>Kolhapur District:</b> Total Biomedical waste generated: 1700 kg/day. Total Biomedical waste treated: 1700 kg/day
4	E-Waste management	E-waste generated by industries is sent to MPCB authorized E-waste reprocessor.
5	Hazardous Waste Management	<ul style="list-style-type: none"> <li>There are 192 Hazardous waste generating industries in Kolhapur district. These industries generated about 23783 MT Hazardous waste in year 2024-25.</li> </ul>

		<ul style="list-style-type: none"> <li>• The HW from Kolhapur district is scientifically disposed through Maharashtra Enviro Power Ltd., MIDC Ranjangaon, Dist. Pune.</li> <li>• CHWTSDF capacity – Landfill – 60000 MT/A, Incineration – 3 TPA.</li> </ul>
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## 1.9 Greenery Development Plan of Forest Department, Government of Maharashtra

For maintaining the transparency, accountability and credibility, all the data relating to site selection for plantation with Geo-Tagging, development of Nurseries, digging of pits, availability of manpower, actual plantation and survival of the trees planted etc. is uploaded on the Digital Platform of Forest Department so that people can access the data at any given point of time. This has helped to build confidence amongst the people and their ever increasing participation in the plantation programme.

For the registration of plantation by the individuals, private NGOs and other stakeholders of society the mobile application called "My Plants" has been developed. Similarly, the programs like "Saplings at the Door Step", "Digital visibility on social media", "publicity campaign" are being implemented for greater public participation.

The Forest Department is trying it's level its level best to increase the Forest and Tree cover in the State by various innovative ideas by involvement of people in the plantation & its protection especially on Non-Forest areas as forest area is limited. Massive tree plantation program in urban & rural areas under the scheme "Nurturing Trees is Worshiping Nature" has been launched by the Govt. in line with Ranmala Village in Khed Taluka of Pune District.

The Tree based Agriculture under Mahatma Gandhi National rural Employment Guarantee Scheme (MG-NREGS) Kanya Van Samruddhi Yojana, Bhausahab Phundkar Horticulture Plantation Programme in co-ordination with Agriculture Department, Sericulture Plantation in coordination with Textile Department, Riverside Plantation are some of scheme initiated for increasing green cover in the Non- Forest areas.



## 1.10 Plan for Restoration of Water Quality

**Table 15 Time Bound Action Plan for Panchganga River**

<b>Sr. No.</b>	<b>Target/Action Plan Expected</b>	<b>Agency / Organization</b>	<b>Expected Duration for Implementation</b>
1	Provide STP for treatment of sewage generation from cities and villages along the river to avoid contamination of River	ULB/ZP	2 Years
2	Provide Effective MSW treatment Facility in the villages/towns located on the bank of river to avoid contamination of River	Concern Grampanchayat and Zilha Parishad	1.5 Years

3	In-Situ Nallah clean-up Treatment to stop untreated sewage entering into the River	Kolhapur Municipal Corporation & Ichalkaranji Municipal Council	6 Months
4	To stop bathing in river water & open defecation at bank of river. Also, proper disposal of human excreta and sewage.	Local Body & Police Department.	4-5 Months
5	Regular cleaning of river bed and regular flow monitoring should be initiated.	Local Body & Irrigation Department.	Continuous
6	To prevent growth of Algae/Eicchornia in river bed by installation of floating rafters and screen bars.	Local Body & Irrigation Department.	Continuous
7	Organize awareness programs about environment pollution	Kolhapur Municipal Corporation & Ichalkaranji Municipal Council	6 Month
8	Common toilets should be constructed in all areas to be covered. Stop open defecation and awareness program should be conducted in these areas	Kolhapur Municipal Corporation & Ichalkaranji Municipal Council	10 Months
9	Vehicle, cloths, animal wash should be stopped on the bank of river and awareness program should be conducted in river bank areas	Kolhapur Municipal Corporation & Ichalkaranji Municipal Council	6 Month
10	For biomedical solid waste, prepare a plan for collection, treatment & disposal.	Kolhapur Municipal Corporation & Ichalkaranji Municipal Council	6 Month

**Proposed plans for maintaining e-flow:** River flows only in Monsoon season & whenever dam water is released. The amount of water released from dam is such that it will not over flow from next weir at the downstream

**Recommendations:**

1. All domestic sewage should be properly treated and its entry into river water should be prevented. The treatment can be carried out as follows:
  - a. For small villages (population less than 1000) — root zone technology, phytoremediation techniques
  - b. For small villages or municipal councils (Population 1000 to 10000) – underground drainage system (100%) can be developed.
  - c. For towns and cities (Population more than 10000) – underground drainage system (100%) can be developed.

2. Agricultural runoff
  - a. Care should be taken to restrict the entry of banned chemical pesticides on the market.
  - b. Agriculture department should take necessary actions to control the use of chemicals in the fields.
  - c. Awareness should be created among the farmers on the use of chemicals in the fields.
3. Religious and other activities causing pollution
  - a. All Local self-Government Bodies are supposed to build special permanent water bodies: Visarjan Kund's for the purpose of idol immersion but none of the bodies have carried out their duties.
  - b. It is essential to create awareness, build special kunda for the idol immersion or come up with other feasible alternatives for this purpose.
  - c. Separate Raksha kund needs to be built for cremation ash disposal. Moreover electric cremation units are needed to be installed in clusters, cities and people should be made aware of its use.
4. The river has several non-point injections of domestic sewage flowing from the cities which is the major cause of river pollution. In order to avoid this, it is important to formulate strict regulations and monitoring to ensure the river does not get polluted due to man-made activities.
5. Monitoring stations must be increased so that all major areas are covered and the river water quality in such areas is known.
6. Non-point source discharges in river should be stopped. These flows can be treated before they join the river through in-situ treatment methods.
7. No industrial wastewater discharges should be allowed intentionally or unintentionally in any condition. Strict action should be taken against such polluting industries.
8. Activities such as washing clothes, bathing, and immersing organic materials for religious rituals must be discouraged.
9. The lakes in the city should be rejuvenated so that their water quality and aesthetics do not deteriorate. Systems such as floating wetlands can be used in treating the lake water. No untreated wastewater must be disposed in the lake.
10. Both the cities of Kolhapur and Ichalkaranji have inadequate sewerage network and treatment facilities that allow wastewater to directly get discharged into the river thus polluting the river to a considerable extent.
11. The nallas in Kolhapur and Ichalkaranji should be diverted to the closest wastewater treatment facility and treated effectively before disposal.
12. The treatment of the wastewater should be monitored closely with effective disinfection by MPCB and respective Municipal Corporation/Council.
13. Installation of RENEU (Restoration of nallah with ecological units) for the treatment of running sewage in the drain without disturbing shape /structure of nallah.

14. Functioning of STPs should be checked through proper monitoring. A laboratory should be setup within the plant to test for important parameters and also carry out jar tests in case the system does not perform upto the set standards. Important parameters should be analysed in daily routine.
15. Disinfection is necessary to reuse wastewater safely for irrigation.
16. In-situ treatment of wastewater flowing in the nallas by installing phytoid technology.
17. Setting up of environment cell at KMC and IMC can be useful in tackling the environmental issues seen in the city. These cells should employ individuals with different scientific background with the aim of making the city self-sustainable.
18. Proper operation & maintenance is the key in improving the efficiency of the plant.
19. All the CETP units should be tested once a month for their optimal performance, this shall not only help in understanding the issues faced by treatment system but will also aid in taking suitable actions without further delay and the individual industrial wastewater treatment facilities should be subjected to higher level of treatment to meet the standards.
20. The online systems should also be installed in the outlet of every member industry to monitor the flow and quality of wastewater sent to CETP for treatment.
21. The villages must have an improvised septic tank for primary treatment of wastewater/sewage generated at source before it overflows to join any of the designed treatment units.
22. Solid waste management for each village must have regular collection, segregation of wastes, recycling of reusable materials and composting of biodegradable wastes must take place. Proper allotment of land for such important activities should be undertaken with priority.
23. Segregation of solid wastes (Dry waste & Wet waste) at source is a very crucial step for efficient management of MSW.
24. Wastewater must not be released in municipal gutter or nallas. They should be recycled and reused within the company premises.
25. The design of gates provided to the K.T. Weirs should be modified to release the water from the bottom so that the sedimentation at the bottom can be minimized
26. Provision of adequate treatment facilities in time bound manner
27. Provision of sewer network ensuring 100% collection of wastewater
28. Recycle and reuse of treated effluents from STPs for irrigation. Water used for irrigation can be diverted to river for maintaining the flow.
29. Sewage entry into the lake should be prevented. Treatment systems like Florafits along with algal removal can help in improvement of lake water quality.
30. Interception and diversion of nallas to sewage treatment plants should be done. No flows except for storm water in monsoon should flow through nallas.
31. Wherever it is difficult to lay sewer lines, decentralized wastewater treatment should be implemented. The treated wastewater can be reused for irrigation purposes. Phytoid is one such system that does not require electricity or pumping for treating sewage to optimal standards
32. The flow measurement in nallas should be carried out on monthly basis to quantify the organic load entering the river.

33. Villages should be provided with proper sanitation system through provision of toilets and septic tank along with wastewater treatment systems and the households should be provided with modified designs of septic tanks.
34. Zilla Parishad should take time bound steps in providing sanitation system to villages in both cities.
35. In Kolhapur, site for scientific landfill should be acquired at the earliest.
36. The solid waste must be properly segregated so that the biodegradable waste can be used for composting and non-biodegradable waste can be sent for recycling.
37. De-sludging should be carried out regularly in order to get the desired quality of effluent.
38. Sugar industries must comply the zero discharge standards and the effluents from the sugar industries after adequate treatment should be applied over agricultural land in sugarcane fields.
39. Specific directions must be given to sugar industries to reduce their water consumption and subsequent effluent generation.
40. CETP should be provided to treat effluents generated from small scale industries such as tannery, jewellery, etc.
41. Industries should also be note the same regarding treatment of wastewater plant & reuse the wastewater for their needs and drain treated water for societal domestic purposes.
42. Accurate calculations for water & wastewater to be done from all areas from city & villages.
43. Installation of online monitoring system for water quality & GIS platform for creating & maintaining database.
44. Awareness programs should be conducted on a regular basis to create awareness among the people highlighting importance of health, sanitation, and cleanliness.

**Table 16 Timelines for Implementation of Restoration Plan**

<b>Activities/Year</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>
<b>Reconnaissance Survey</b>						
<b>Water Quality Sampling</b>						
<b>Preparation of Action Plan</b>						
<b>Propose and Execution (Setting up of STPs &amp; MSWM system)</b>						
<b>Dudhali area, Kolhapur.</b>						
<b>Kasabab Bawada, Kolhapur</b>						
<b>Ichalkaranji proposed STP at Takawade</b>						
<b>Augmentation of River Flow if any and restoration of water quality</b>						