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जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION

NAMAMI GANGE

12th Regional 3R & Circular Economy Forum in Asia and the Pacific

3rd-5th March; Jaipur

Circular Economy through the Reuse of Treated Wastewater

Brijendra Swaroop, IFS

Executive Director, Projects

National Mission for Clean Ganga (NMCG)

Department of Water Resources,

River Development and Ganga Rejuvenation

Ministry of Jal Shakti, Govt. of India

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NAMAMI GANGE PROGRAMME

The Vision for Ganga Rejuvenation constitutes restoring the wholesomeness of the river defined in terms of ensuring “Aviral Dhara” (Continuous Flow”), “Nirmal Dhara”(“Unpolluted Flow”), Geologic and ecological integrity

Considering the need & spread of the Programme, the Government of India has further extended the mission with a budgetary outlay of Rs. 22,500 crore from April 2021 to March 2026 (NGM - II)

Namami Gange has been recognized as one of the Top 10 Restoration Flagships of the World by the UN in December 2022

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FIVE PILLARS OF NAMAMI GANGE

NIRMAL GANGA - Unpolluted Ganga

Focuses on wastewater management by constructing sewage treatment plants (STPs), enforcing industrial effluent regulations, Solid Waste Management and promoting decentralized waste management to keep the river clean.

AVIRAL GANGA - Ecology & flow

Ensures ecological flow by regulating water abstraction, improving irrigation efficiency, and promoting sustainable water use to maintain the river's natural flow.

JAN GANGA - People's participation

Encourages public involvement, awareness campaigns, and stakeholder engagement, including religious groups, NGOs and local communities, to instill a sense of responsibility for the river.

GYAN GANGA - Knowledge & research

Supports scientific research, data collection, and technological innovations to enhance decision-making and policy implementation for sustainable river management.

ARTH GANGA - Economic benefits of Ganga

Focuses on promoting river as an economic asset by supporting livelihood generation, eco-tourism, sustainable agriculture and circular economy initiatives in Ganga River basin.

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NAMAMI GANGE

CORE ACTIVITIES

467 projects worth

₹ 39,081 Cr.
(4.5 Billion $)

Completed projects 292

Projects in progress 130

Projects under tendering/ sanctioned 45

Pollution Abatement
(362 Projects)
Rs. 37549 Cr.

- Sewage Treatment
- Solid Waste Management
- Industrial Effluent Treatment
- Surveillance & Monitoring
- R&D Projects

Ecological Projects
(64 Projects)
Rs. 909 Cr.

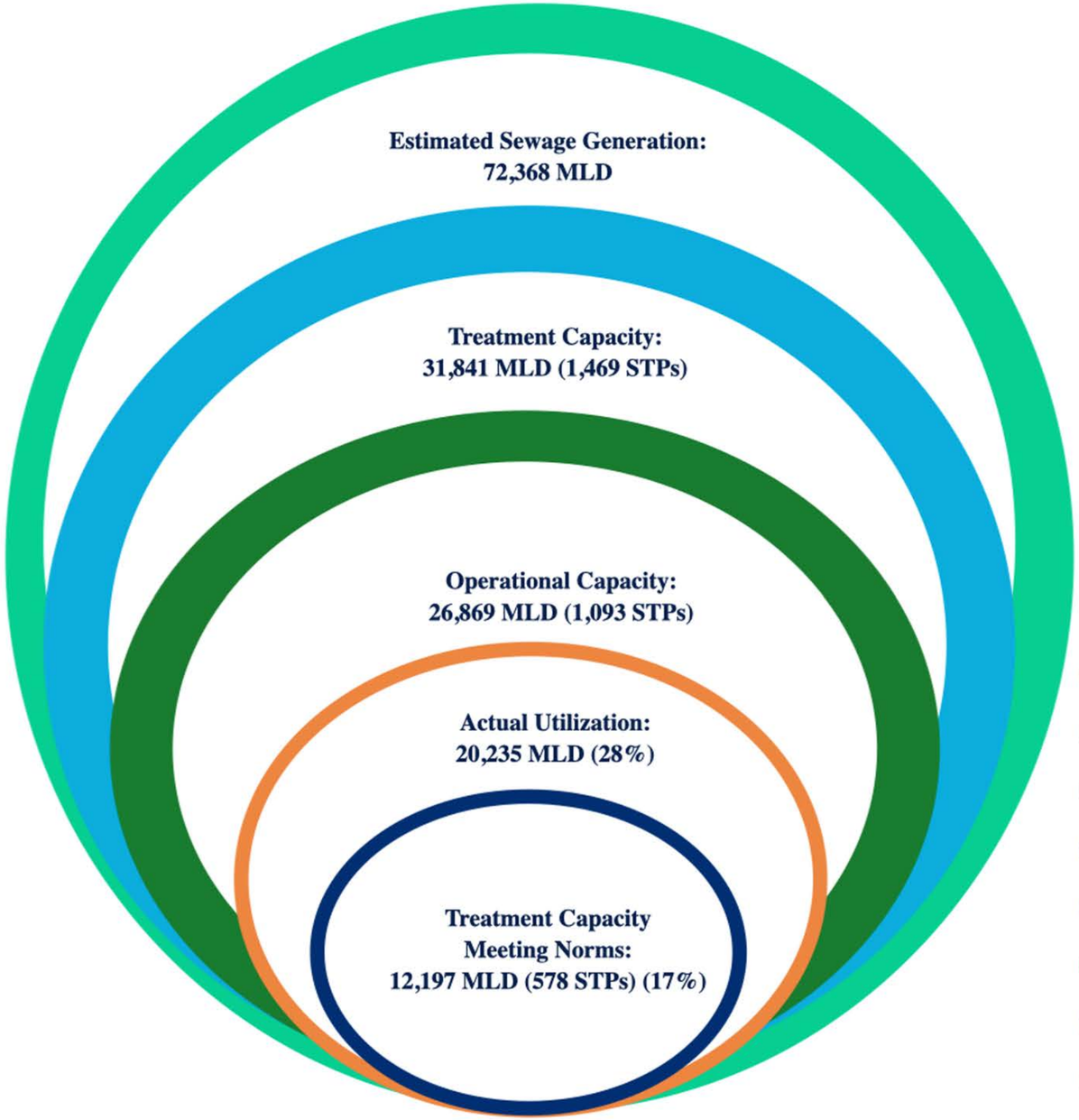
- Biodiversity & Afforestation
- R&D Projects

Knowledge Projects
(32 Projects)
Rs. 578 Cr.

Public Outreach
(15 Projects)
Rs. 390 Cr.

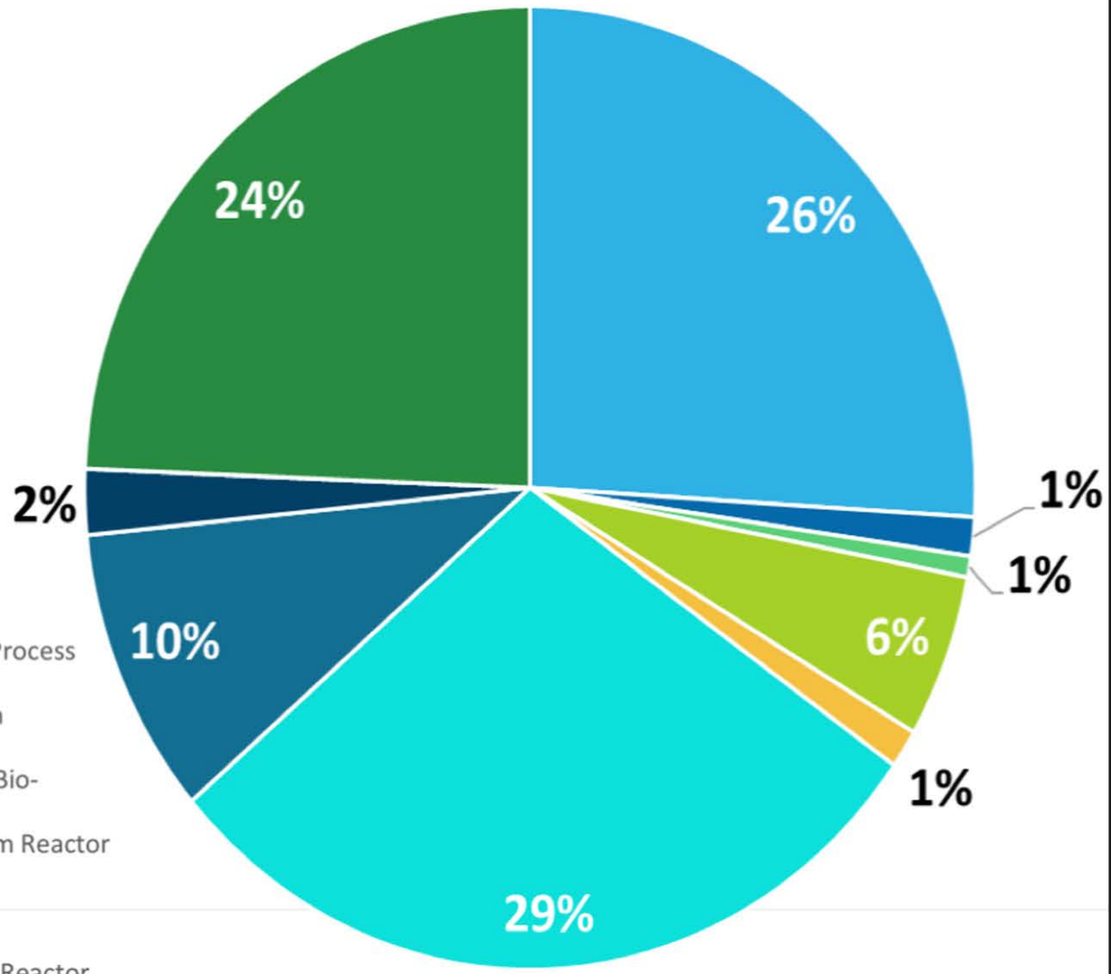
Livelihood Projects
(9 Projects)
Rs. 44 Cr.

WASTEWATER SCENARIO IN INDIA



Source: Central Pollution Control Board (CPCB), March 2021

Wastewater Treatment Technologies



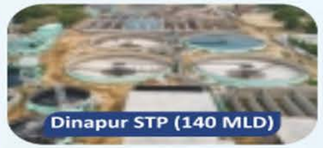
SEWERAGE PROJECTS UNDER NAMAMI GANGE

HIMACHAL PRADESH
1 Sewerage Projects : ₹ 11.6 Cr.
1.7 MLD

HARYANA
2 Sewerage Projects : ₹ 217.9 Cr.
145 MLD
41 Km.

UTTARAKHAND
42 Sewerage Projects : ₹ 1716.9 Cr.
244 MLD
208 Km.

UTTAR PRADESH
69 Sewerage Projects : ₹ 14110.3 Cr.
2346 MLD
1894 Km.



BIHAR
38 Sewerage Projects : ₹ 6576 Cr.
756 MLD
1793 Km.

RAJASTHAN
1 Sewerage Projects : ₹ 258.5 Cr.
36 MLD
146 Km.

DELHI
9 Sewerage Projects : ₹ 1951 Cr.
1268 MLD
37 Km.

JHARKHAND
5 Sewerage Projects : ₹ 1310.3 Cr.
262 MLD
151 Km.

WEST BENGAL
29 Sewerage Projects : ₹ 4838.5 Cr.
921 MLD
982 Km.
*As on date

199 Projects sanctioned: $ 3.7 Billion+

STP Capacity Creation: 6217 MLD

Sewerage Network: 5282 km

"The Ganga is at the heart of our civilization. It is our culture and economic lifeline"

Shri Narendra Modi
Hon'ble Prime Minister of India

"The widespread adoption of reuse of treated wastewater should be taken on priority"

Shri C. R. Paatil
Hon'ble Minister of Jal Shakti

A Flagship Programme launched in 2015 by government of India to clean river Ganga and its tributaries

Key activities Sewerage infrastructure, Industrial pollution abatement, forestation, biodiversity & wetland conservation, artha ganga, water governance, climate resilience, mitigation, and people participation

Largest river rejuvenation & conservation project in the world

KEY ACHIEVEMENTS

- Improved Water quality
- Environmental flow Notification-2018
- Scientific afforestation
- Enhanced sewage treatment capacity of the Ganga Basin
- Enhanced Bio-Diversity
- Innovative models for Wastewater Management
- Industrial pollution abatement
- Strengthened people-river connect

NATIONAL FRAMEWORK ON SAFE REUSE OF TREATED

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

The Ganga Action Plan, 1986

The Environment Protection Act, 1986

National Water Quality Monitoring Programme (NWQMP)

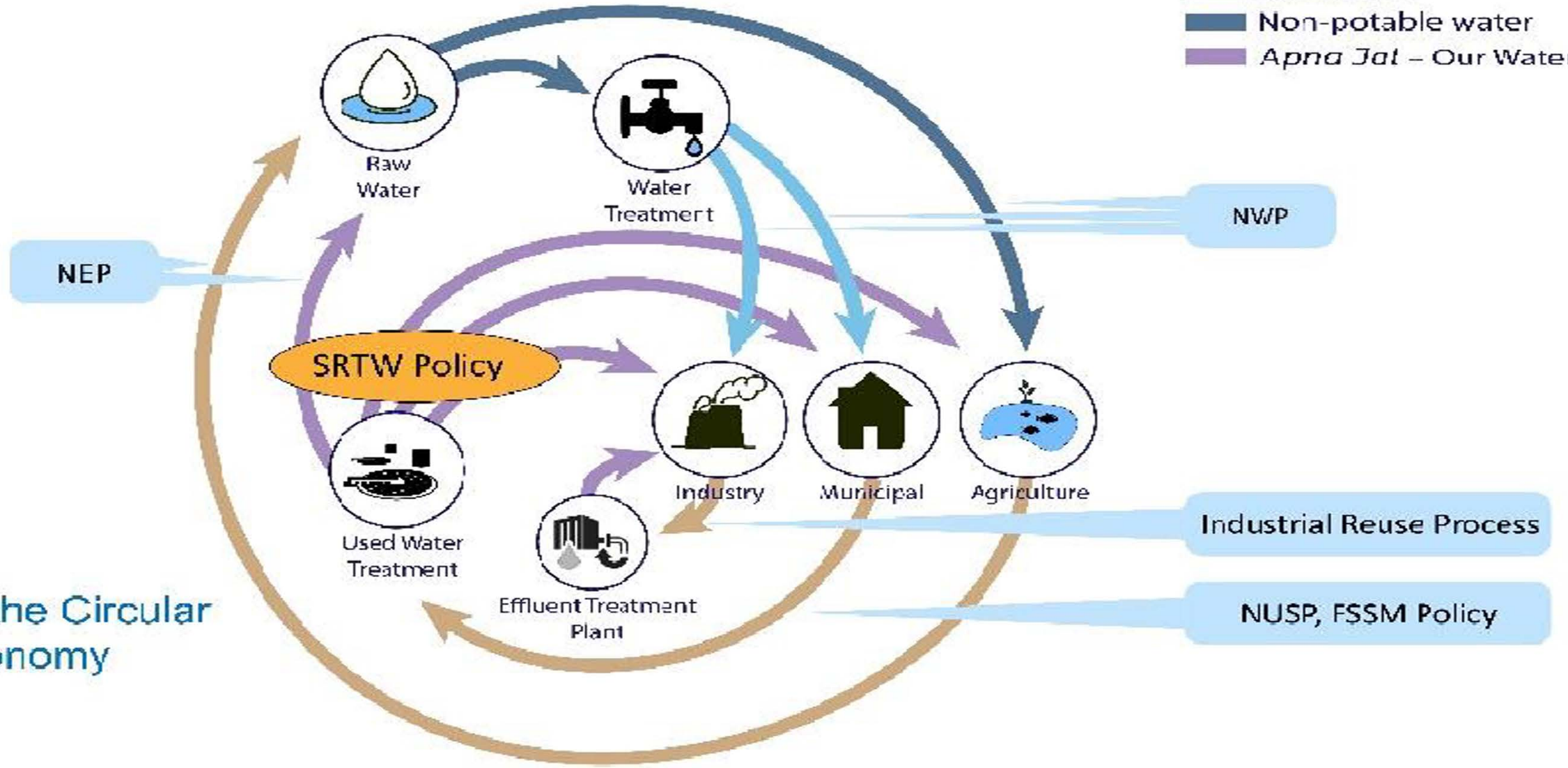
Service Level Benchmarks (SLBs) of MoHUA

Guidelines of National Building Code 20162

National Guidelines on Zero Liquid Discharge (ZLD)

CGWB Master Plan for Artificial Recharge to Ground Water in India (2013)

SRTW in the Circular Water Economy



Adapted from Water Reuse Europe Review, 2018

MODEL FRAMEWORK FOR STATE/UT SRTW POLICY

1. Objective
2. Legislative and Regulatory Context
3. Roles and Responsibilities
4. Water Quality Standards and Environmental Considerations
5. Business Models
6. Financing SRTW
7. Implementation Approach and Timeline
8. Monitoring, Evaluation, Surveillance and Review
9. Capacity Building, Research and Training

Effluent Discharge standards for treated effluent of Sewage Treatment Plants

S. No.	Parameters	Norms as per NGT direction dated 30/04/2019 in the matter of OA No 1069 of 2018	MoEFCC Notification dated October 2017	
			Cities (more than 10 lakh population)	Areas / regions other than mentioned above
1	pH	5.5-9.0	6.5-9.0	
2	BOD, mg/L	10	20	30
3	COD, mg/L	50	-	-
4	TSS, mg/L	20	50	100
5	NH4-N, mg/L	-	-	-
6	N-Total, mg/L	10	-	-
7	Fecal Coliforms, MPN/100 mL	100 Desirable, 230 Permissible	1000	

Note:
Metro Cities*, all State Capitals except in the State of Arunachal Pradesh, Assam, Manipur, Meghalaya Mizoram, Nagaland, Tripura Sikkim, Himachal Pradesh, Uttarakhand, Jammu and Kashmir and Union territory of Andaman and Nicobar Islands, Dadar and Nagar Haveli Daman and Diu and Lakshadweep
*Metro Cities are Mumbai, Delhi, Kolkata, Chennai, Bengaluru, Hyderabad, Ahmedabad and Pune.

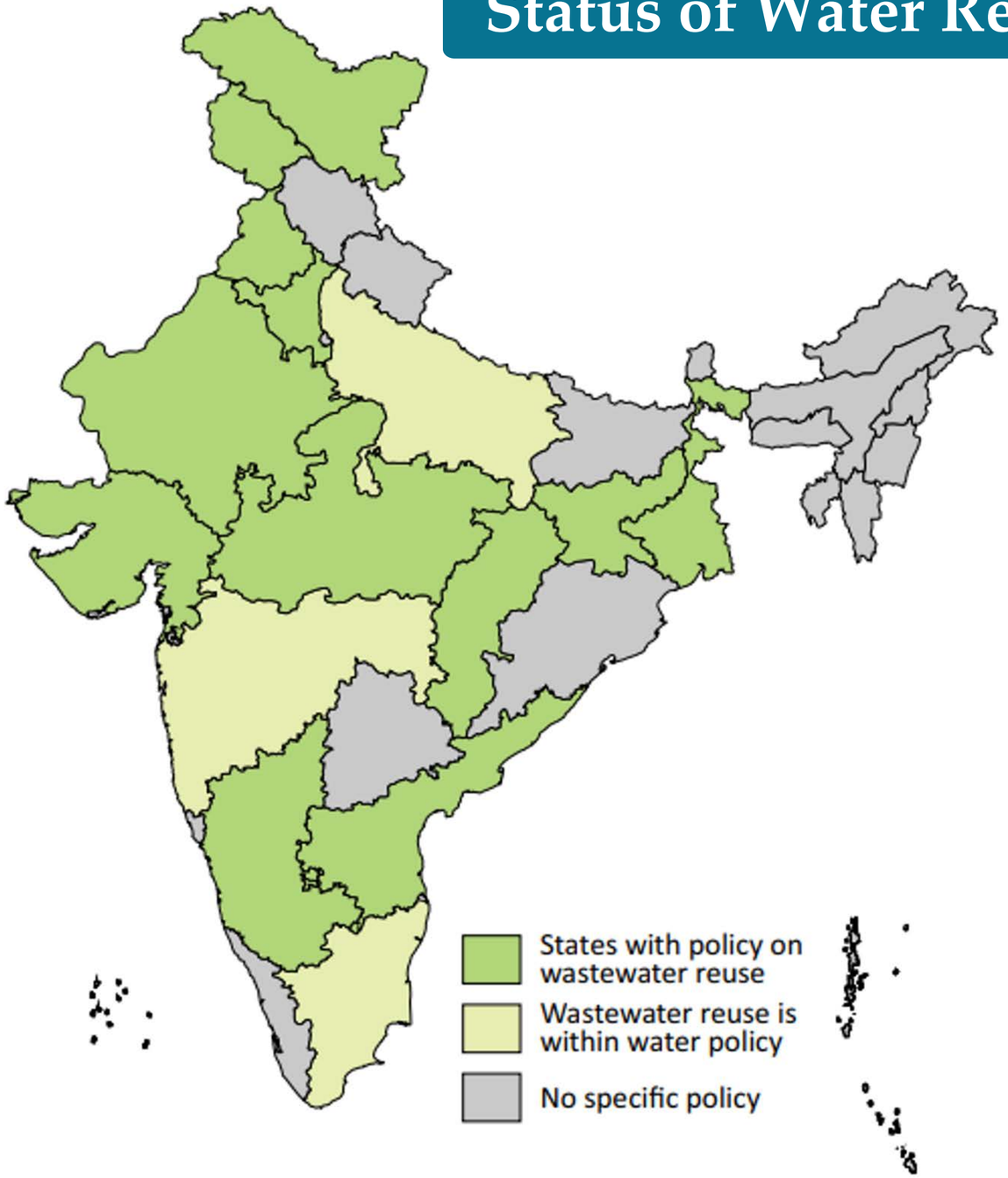
CPHEEO RECOMMENDED NORMS OF TREATED SEWAGE FOR SPECIFIED POINT OF USE

S. No.	Parameter	Toilet flushing	Fire protection	Vehicle Exterior washing	Recreational use (bathing etc.)	Non-contact impoundments	Landscaping, Horticulture & Agriculture			
									Crops which are eaten	
									Raw	Cooked
1	Turbidity (NTU)	<2	<2	<2	<2	<2	AA	AA	AA	AA
2	SS	AA	AA	AA	AA	AA	AA	AA	AA	AA
3	TDS	2100								
4	pH	6.5 to 8.5								
5	Temperature ° C	Ambient								
6	Oil & Grease	10	nil	nil	nil	nil	10	10	nil	nil
7	Nitrate Nitrogen as TN	10	10	10	10	10	AA	AA	AA	AA
8	BOD	≤6	10	≤6	≤6*	10	≤6 – 10 (≤6 preferred)			
9	COD	AA	AA	AA	AA	AA	AA	AA	AA	AA
10	Total Phosphorous as TP	1	1	1	1	1	AA	AA	AA	AA
11	Minimum Residual Chlorine	1	1	1	≤0.5	0.5	nil	nil	nil	nil
12	Faecal Coliform in 100 ml	nil	nil	nil	≤50	100	nil	100	nil	≤50
13	Helminthic Eggs/ litre	AA	AA	AA	AA	AA	AA	<1	<1	<1
14	Color	Colorless						AA	Colorless	
15	Odor	Aseptic which means not specific and no foul odor								

Tolerance limit for Irrigation, Industrial Cooling or Controlled Water Disposal as per ISI-IS: 2296-1982

S. No.	Parameters	Tolerance limits for Irrigation, industrial cooling or controlled water disposal as per ISI-IS: 2296-1982
1	pH	6.0-8.5
2	Electrical Conductance at 25°C, µS, Max	2250
3	Sodium Adsorption Ratio, Max	26
4	Boron (as B), mg/l, Max	2.0
5	TDS (inorganic), mg/l, Max	2100
6	SO4, mg/l, Max	1000
7	Chlorides (as Cl), Mg/l, Max	600
8	Sodium Percentage, Max	60
9	Alpha emitters, µc/ml, Max	10-9
10	Beta emitters, µc/ml, Max	10-8

Status of Water Reuse Policies in India



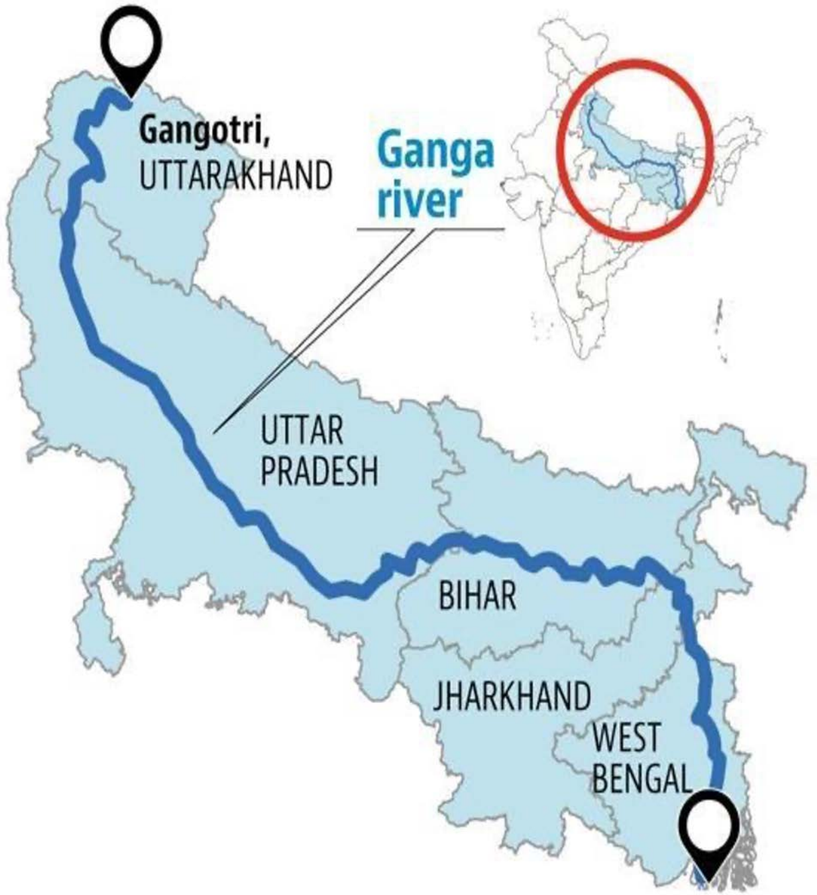
13 States have developed Policy on Water Reuse

3 States developed Policies on Water Reuse within the State Water Policy

12 States are yet to formulate Water Reuse Policy

Status of Water Reuse Policies in Ganga Basin States

State	Year of Used Water Reuse & Recycle Policy	Reuse Targets as per the Policy	Recommended/Mandated Avenues
Uttarakhand	Yet to be formulated	NA	• Agriculture • Construction • Domestic (Non-Potable) • Fire fighting • Ground water recharge • Industrial • Landscaping • Thermal power plant • Cooling • Lake Rejuvenation
Uttar Pradesh	2017	NA	
Bihar	Bihar Water Policy 2010	NA	
Jharkhand	2017	100%	
West Bengal	2020	25% - by 2022 50% -by 2025 80% - by 2030	
Madhya Pradesh	2017	No Targets	
Rajasthan	2019	50% by 2026	
Haryana	2019	80% by 2033	
Himachal Pradesh	Yet to be formulated	NA	
Chhattisgarh	Yet to be formulated	NA	



Status of Safe Reuse of Treated Water in Ganga Basin States

No	States	Current Status
1	Delhi	90 MGD for Horticulture in various parks in Delhi. 45 MGD in Development / Rejuvenation of Lakes / Water Bodies. As per the SC orders, 267 MGD of treated water needs to be utilized for mandatory return flow. (1MGD-4.5 MLD)
2	Haryana	For reuse of treated sewage, 27 STPs of 339.50 MLD have been selected in Phase I for installing micro irrigation system and 18 of them are planned to be completed by 2023-24, another 7 by 2024-25 & the balance 2 by 2025-26.
3	Himachal Pradesh	JSV is providing facility for bulk water user at all the STPs to enable drawing the effluent for reuse.
4	Madhya Pradesh	At present, 315.8 MLD of treated water is being used for irrigation/ gardening.
5	Uttarakhand	Treated waste water of 27 MLD & 68 MLD STP's at Jagjeetpur, Haridwar is already being re-used for irrigation through Canal system constructed for this purpose.
6	Uttar Pradesh	Treated water from STPs is proposed to be used in nearby Power Plants. At present, 8 MLD treated water from STPs at Mathura is being used by IOCL, Mathura. This shall be scaled up in other towns as well. Treated sewage and sludge from STP is auctioned to farmers, used in land filling and as manure, disposed in Nagar Palika land, for construction activity and in horticulture.
7	West Bengal	Government of West Bengal has notified a policy on Reuse of Treated Waste Water.

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ARTH GANGA

VERTICALS OF ARTH GANGA

- Zero Budget Natural Farming
- Livelihood Generation
- Monetization and Reuse of Sludge and Wastewater
- Cultural Heritage and Tourism

PROMOTION OF CIRCULAR

AGRICULTURE

Reuse of treated Wastewater & Sludge for Agricultural purposes

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PROMOTION OF CIRCULAR ECONOMY

NAMAMI GANGE

INDUSTRY

Tertiary treated water reused in Mathura Refinery, IOCL

Reuse of treated effluent from tanneries in Kanpur and Unnao

Reuse of treated water in Industries

a) Mathura sewerage scheme: from Trans Yamuna STP treated water (8MLD) will be provided to Indian Oil Corporation (IOCL). Supply of treated water to IOCL, Mathura Refinery for non- potable purpose has started.

b) Begusarai Sewerage Scheme: for providing treated water from Begusai STP to Indian Oil Corporation Ltd. (IOCL), Barauni is under discussion.

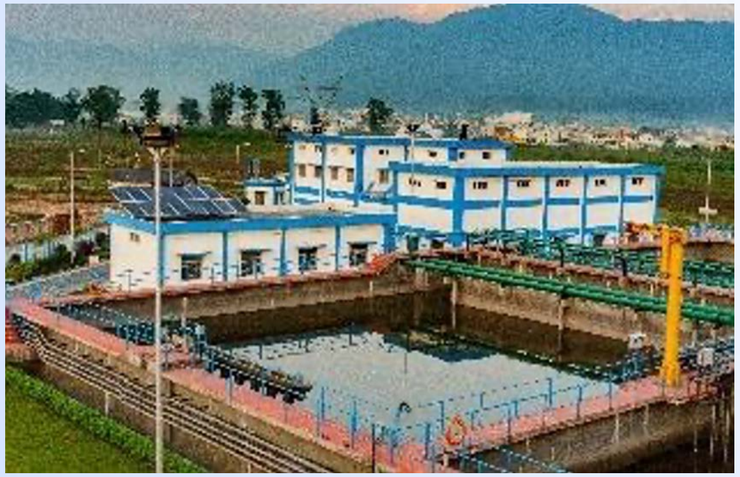
c) 5 CETP has been established under Namami Gange Programme for Reuse of treated water from Combined Effluent Treatment Plant (CETP).

S.N.	Name Of CETP	Capacity	Status	Reuse
1	Jajmau, Kanpur, UP	20MLD	Under construction	
2	Unnao, Kanpur, UP	2.65 MLD	Under construction	
3	Banthar, Kanpur, UP	4.5MLD	Under construction	
4	Mathura, UP	6.25 MLD	Completed	Using 50 % water in Industrial area for different purposes
5	Gorakhpur, UP	7.5 MLD	Under construction	

Best case studies for Safe Reuse of Treated water

140 MLD STP Dinapur, Varanasi

26 MLD STP Lakkad Ghat, Rishikesh



41 MLD STP Bhatpara, West Bengal

42 MLD STP Naini, Prayagraj

Pollution, Inventorization, Assessment and Surveillance on Ganga river

Annual inspection of Grossly Polluting Industries has resulted in:

- Reduction of effluent discharge from 349 MLD in 2017 to 249.31 MLD in 2023
- Reduction in Pollution load from 26 TPD in 2017 to 13.73 TPD in 2023 i.e. 47.2%

Industry Specific Interventions

- 20 MLD CETP Jajmau (Kanpur)
- 4.5 MLD CETP at Banthar with Zero Liquid Discharge

20 MLD Common Effluent Treatment Plant at Jajmau, Kanpur

Common Chrome Recovery Unit 3x300 KLD at CETP, Jajmau, Kanpur

43 MLD STP Beur, Patna

41 MLD STP Bhatpara, West Bengal

POWER

MoU signed with Ministry of Power to use treated wastewater in all thermal power plants within 50 km range of STPs

Reuse of treated water from Bingawan STP in Panki Power Plant

Thermal Power Plants

a) Tariff Policy, 2016 of Min of Power says- The thermal power plant(s) including the existing plants located within 50 km radius of sewage treatment plant of Municipality/local bodies/similar organization shall in the order of their closeness to the sewage treatment plant, mandatorily use treated sewage water produced by these bodies.

b) In the first phase 23 TPPs are being monitored for the reuse of treated water in Thermal Power Plants by the Ministry of Power. Out of these 23 TPPS, 3 TPPs have already using the treated water from STP. (Pragati II, Pragati III CCPP of NCT Delhi and Jojobera TPS of Jharkhand).

RAILWAYS

MoU signed with Ministry of Railways to use treated wastewater from STPs

Reuse of treated water in Railways

a) MoU has been signed between Ministry of Railways and Ministry of Water Resources River Development and ganga Rejuvenation, GoI on 3rd December 2015regarding use of non potable water released after treatment from sewage/ effluent treatment Plant located in Ganga and Yamuna river zones for railways purposes.

b) DSEs of Agra, Jhansi & Prayagraj Railway Divisions have been designated as nodal officers for creating infrastructure for reuse of treated water from STPs.

c) The work for providing 2 MLD non potable water from 25 MLD Kodra Sewerage Plant, Prayagraj to Railways at Railgaon and Subedarganj area is under process.

d) The work for providing 2 MLD non potable water from 60 MLD Rajapur Sewerage Plant, Prayagraj to Railways at Prayagraj Junction area is under process.

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NMCG Contributing to 9 SDGs

NAMAMI GANGE

4 QUALITY EDUCATION

- Igniting young mind - university connect initiative
- Ganga Prahari and Ganga Doots support in Namami Gange Programme
- Ganga Task Force Territorial Army Unit

6 CLEAN WATER AND SANITATION

- 199 Sewerage infrastructure projects across Ganga basin towns
- URMP, Wetlands Management Afforestation etc.

8 DECENT WORK AND ECONOMIC GROWTH

- Promote environment tourism in ganga
- Beautification of Ghats
- Ganga Tarini - Floating Ganga Museum in Varanasi

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

- E-Flow notification
- Wetlands Conservation
- Recycle and Reuse of Wastewater
- Waste to Energy - Solid waste management
- Industrial effluents management

11 SUSTAINABLE CITIES AND COMMUNITIES

- Urban River Management Plan
- Cultural Mapping of architectural, intagible, built and Natural Heritage
- RFD projects
- River Cities alliance

13 CLIMATE ACTION

- Afforestation, wetland & conservation
- Sustainable agriculture practices and managing e-flow

15 LIFE ON LAND

- Wetland conservation
- Afforestation activities

14 LIFE BELOW WATER

- Biodiversity conservation projects
- Water quality monitoring
- Removal of invasive species in wetlands
- GIS-based mapping of microbial diversity
- Fish ladders on dams - For migration

17 PARTNERSHIPS FOR THE GOALS

- International Cooperation with
- World Bank
- Germany GIZ & PTB
- Japan - OISCA & JICA
- Israel
- United Kingdom
- Scotland
- The Netherlands
- Denmark

Thank You

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