National River Conservation Directorate
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Infrastructure and Planning in Godavari River Basin

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National River Conservation Directorate (NRCD)

The National River Conservation Directorate, functioning under the Department of Water Resources, River Development & Ganga Rejuvenation, and Ministry of Jal Shakti providing financial assistance to the State Government for conservation of rivers under the Centrally Sponsored Schemes of 'National River Conservation Plan (NRCP)'. National River Conservation Plan to the State Governments/ local bodies to set up infrastructure for pollution abatement of rivers in identified polluted river stretches based on proposals received from the State Governments/ local bodies.

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Centres for Godavari River Basin Management and Studies (cGodavari)

The Center for Godavari River Basin Management and Studies (cGodavari) is a Brain Trust dedicated to River Science and River Basin Management. Established in 2024 by CSIR-NEERI and IIT Hyderabad, under the supervision of cGanga at IIT Kanpur, the center serves as a knowledge wing of the National River Conservation Directorate (NRCD). cGodavari is committed to restoring and conserving the Godavari River and its resources through the collation of information and knowledge, research and development, planning, monitoring, education, advocacy, and stakeholder engagement.

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Centres for Ganga River Basin Management and Studies (cGanga)

cGanga is a think tank formed under the aegis of NMCG, and one of its stated objectives is to make India a world leader in river and water science. The Centre is headquartered at IIT Kanpur and has representation from most leading science and technological institutes of the country. cGanga's mandate is to serve as a think-tank in implementation and dynamic evolution of Ganga River Basin Management Plan (GRBMP) prepared by the Consortium of 7 IITs. In addition to this, it is also responsible for introducing new technologies, innovations, and solutions into India.

www.cganga.org

Acknowledgment

This report is a comprehensive outcome of the project jointly executed by CSIR-NEERI (Lead Institute) and IIT Hyderabad (Fellow Institute) under the supervision of cGanga at IIT Kanpur. It is submitted to the National River Conservation Directorate (NRCD) in 2024. We gratefully acknowledge the individuals who provided information and photographs for this report.

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Preface

In an era of unprecedented environmental change, understanding our rivers and their ecosystems has never been more critical. This report aims to provide a comprehensive overview of our rivers, highlighting their importance, current health, and the challenges they face. As we explore the various facets of river systems, we aim to equip readers with the knowledge necessary to appreciate and protect these vital waterways.

Throughout the following pages, you will find an in-depth analysis of the principles and practices that support healthy river ecosystems. Our team of experts has meticulously compiled data, case studies, and testimonials to illustrate the significant impact of rivers on both natural environments and human communities. By sharing these insights, we hope to inspire and empower our readers to engage in river conservation efforts.

This report is not merely a collection of statistics and theories; it is a call to action. We urge all stakeholders to recognize the value of our rivers and to take proactive steps to ensure their preservation. Whether you are an environmental professional, a policy maker, or simply someone who cares about our planet, this guide is designed to support you in your efforts to protect our rivers.

We extend our heartfelt gratitude to the numerous contributors who have generously shared their stories and expertise. Their invaluable input has enriched this report, making it a beacon of knowledge and a practical resource for all who read it. It is our hope that this report will serve as a catalyst for positive environmental action, fostering a culture of stewardship that benefits both current and future generations.

As you delve into this overview of our rivers, we invite you to embrace the opportunities and challenges that lie ahead. Together, we can ensure that our rivers continue to thrive and sustain life for generations to come.

Centre for the Godavari River Basin
Management and Studies (cGodavari)
CSIR-NEERI, IIT Hyderabad

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Abbreviations and Acronyms

GRB	Godavari River Basin
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
STP	Sewage Treatment Plant
MLD	Megalitres per day (unit of measure for discharge)
ULB	Urban Local Body
ODF	Open Defecation Free
SBM	Swachh Bharat Mission
F STP	Faecal Sludge Treatment Plants
TSC	Total Sanitation Campaign
CLTS	Community Led Total Sanitation
MT/D	Metric Tonnes per Day
NRDWP	National Rural Drinking Water Program
GVP	Garbage Vulnerable Point
TMC	Thousand Million Cubic feet
IPCC	Intergovernmental Panel on Climate Change

1. Introduction

Godavari, the largest river in the southern part of India, has a drainage area covering nearly 10% of the country's total geographical area. A major part of the basin is covered with agricultural land (~ 60% of the total basin area), followed by forest area (~ 30%) and water bodies (~2%) (Godavari Basin, 2024). Additionally, the river basin primarily comprises rural and urban environments, with infrastructure significantly influencing their socio-economic conditions.

The rural infrastructure generally includes irrigation facilities such as canal networks, dams/barrages for flood protection and water storage, reservoirs, tubewells, solar pumps, community watershed management systems including rainwater harvesting structures, basic health, and sanitation, wastewater treatment plants, as well as hospitals, energy facilities, roads etc. Several schemes of the government have been trying to enhance the facilities in villages, such as Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), Agriculture Infrastructure Fund (AIF), Pradhan Mantri Gram Sadak Yojana (PMGSY), Swachh Bharat Mission - Gramin (SBM-G), Jal Jeevan Mission (JJM), Pradhan Mantri Gramin Awas Yojana (PMAY-G), Nirmal Bharat Abhiyan, etc. The development of rural infrastructure becomes critical to reduce the burden on cities and for the equitable development of districts.

Cities in India have been experiencing rapid urbanization in the past few decades. The increased rural-to-urban migration has necessitated proper city infrastructure management. It includes pipeline networks (sewage and water supply), water treatment plants, stormwater drainage, wastewater treatment facilities, public toilets, solid waste management (includes facilities for landfilling, composting, incineration, biomethanization), etc. Some of the schemes implemented by the government to enhance urban infrastructure include Pradhan Mantri Awas Yojana - Urban (PMAY-U), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swachh Bharat Mission - Urban (SBM-U), Jal Jeevan Mission - Urban (JJM-U), PM Gati Shakti for seamless multi-modal connectivity, etc.

Some major cities within the river basin with a population exceeding 1 Lakh (Tier-I as per the 2011 census) include, Nashik, Chhatrapati Sambhaji Nagar (Aurangabad), Jalna, Parbhani, Latur, Nanded, Udgir, Bidar, Yavatmal, Nizamabad, Patancheru, Serilingampally, Chhindwara, Nagpur, Wardha, Hinganghat, Chandrapur, Adilabad, Jagtial, Ramagundam, Karimnagar, Warangal, Seoni, Gondia, Jagdalpur, Rajahmundry, across different states (Figure 1). As seen in the figure, Rajahmundry (Rajamahendravaram), Andhra Pradesh is the only major city located in the downstream of the Godavari basin.

Lately, the emphasis has been on smart cities (Smart Cities Mission) that use Information and Communication Technologies (ICT) to increase operational efficiency of infrastructure, thereby improving government services and citizen welfare. At the same time, nature based solutions such as sponge cities and Miyawaki method for urban dense afforestation need to be explored.

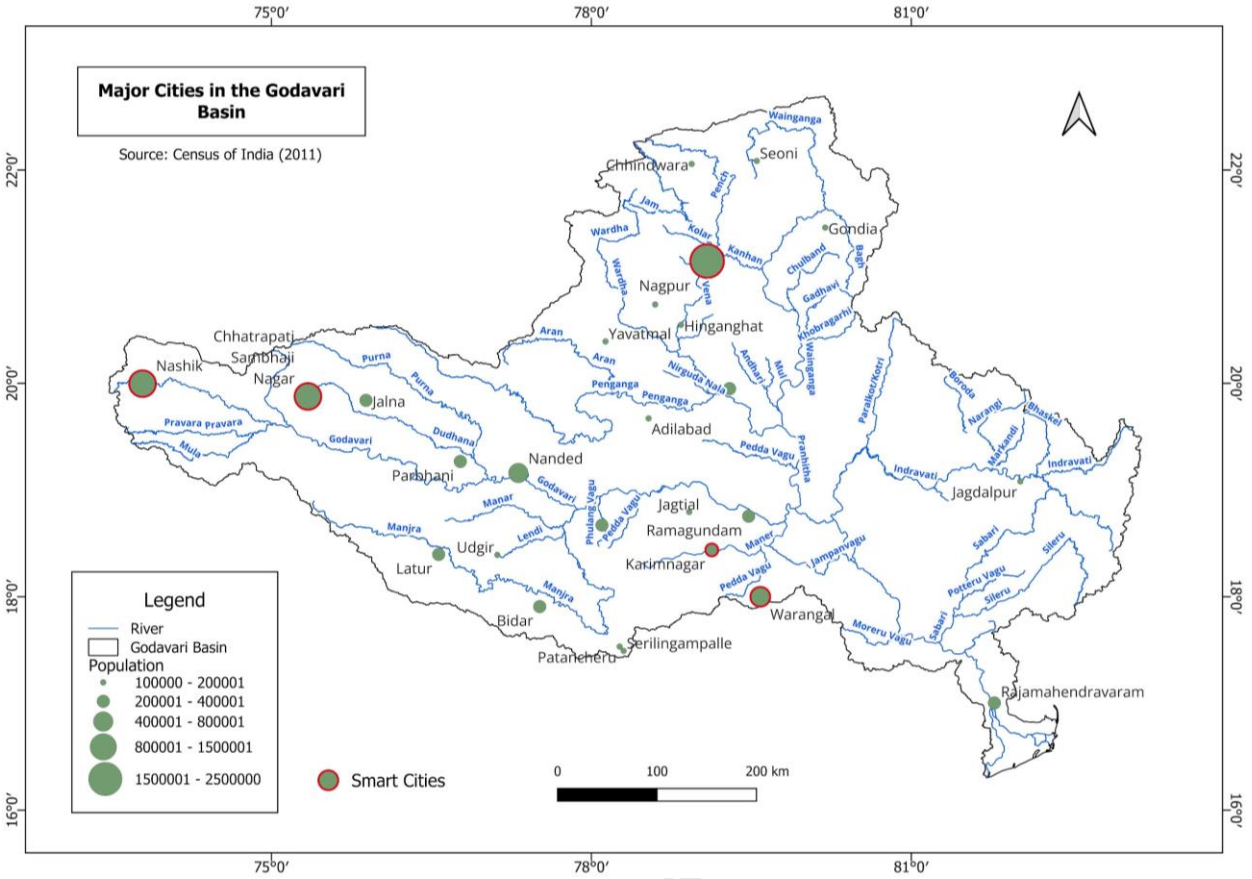

Figure: 1 Major cities in the Godavari basin with above 1 Lakh population as per the 2011 Census of India.

The Kaleshwaram Lift Irrigation Project, a major infrastructure development on the Godavari River in Telangana, is currently the world's largest multi-stage lift irrigation project and it is designed for multi-purpose use across 13 districts of Telangana. The project's main conveyance system spans approximately 500 km with a total canal network exceeding 1,800 km. The project aims a total water lift of 240 TMC, allocating 169 TMC for irrigation, 30 TMC for Hyderabad's municipal water supply, and the remainder for industry and rural domestic consumption. (https://bhoopalapally.telangana.gov.in/tourist-place/kaleshwaram-lift-irrigation-project/). The Gosekhurd Major Irrigation Project is a significant infrastructure development on the Wainganga River, a major tributary of the Godavari River, in Maharashtra. The project incorporates four lift irrigation schemes to distribute water across the Vidarbha region.

Hydroclimate extremes, both floods and drought are seen in different parts of the Godavari basin, where particularly lower part of the coastal areas are more flood prone because of cyclones and storm surges. Further, these deltaic regions tend to face drainage congestion due to flat terrain. Droughts of different types exist, i.e., meteorological, hydrological, agricultural and socio-economic droughts. Severe meteorological droughts were observed in the central portion of the basin. Further, shifts in drought prone regions from the western part to the eastern part of the basin were also observed (Sarkar 2022, 2023). Given the changes in patterns of extremes with time (non-stationarity) as well as to deal with differences in between water availability and supply across different basins and states in combination with climate change effects, both structural and non-structural measures need to be

revised if they exist, or new measures need to be proposed. This implies that infrastructure and planning in rural and urban areas must be taken into account.

Although climate change may occur both as result of natural and anthropogenic activities, the latter are considered the prime drivers of climate change. The combustion of fossil fuels, deforestation, agriculture and livestock farming have increased the concentration of greenhouse gases in the atmosphere. Historical carbon emission rate and temperature based on various representative greenhouse gas concentration pathways were found to be linearly related. The change in global temperature and precipitation has increased the risk of drought occurrences and water crisis. Rise in sea level, melting of snow and ice cover, shrinking of glaciers, change in precipitation pattern and increase in flood, drought and cyclone events have been clear manifestation of climate change.The recent report by Intergovernmental Panel on Climate Change (IPCC) has also highlighted the significant impacts of human-induced climate change on extreme weather events. The global temperature is further likely to increase up to 1.5°C by 2050. Climate change may have multi-dimensional effects on agricultural, food security, biodiversity, public health, and economy. Natural disasters of different magnitudes resulted in the loss of 32,550 lives and economic damages of nearly US $ 70.3 billion on a global scale in 2015 (Masroor & Sajjad 2024).

On examining the prevalence of drought and flood events of the Godavari River Basin (GRB) for the last four decades, their spatial distribution, frequency, and intensity are found to be non-uniform. A 20-year breakdown, 1980–1999 and 2000–2019, shows a drastic increase in drought frequency in Manjra and Pranhita sub-basins, while Godavari Upper, Indravati, and northern part of Weinganga have registered increased flood frequency. Dryness severity trend is highest in Pranhita, followed by Manjra, Wardha, and Lower Godavari sub-basins, and the increasing wetness severity trend is in Upper Godavari, while rest of the sub-basins do not show any significant trend. The interior districts of the basin are more prone to the high drought conditions in near future if the current trends persist. To sustain the future climate change challenges, the vulnerable districts need urgent structural and non-structural changes in their current water resource management practices (Sarkar 2022).

As per another study, the frequency of droughts with higher intensity and magnitude increased in the present decade compared to the past three decades in the GRB. 75% area showed higher vulnerability to drought risks, whereas only 25% showed lower risks and less vulnerability to drought occurrences. Drought severity varies from one sub-basin to another. More drought episodes were predicted for the central belt, particularly over the sub-basins of Wardha, Wainganga, Pranitha, and part of Indravati and Lower Godavari. 11% of the area covering six districts in the GRB was identified as highly vulnerable, and rice production was drastically reduced accounting for 41.02% of production loss during the worst-case drought event. The frequency of severe-to-extreme droughts is expected to increase under future scenarios. Effective mitigation strategies are recommended to minimise the agriculture drought risks, economic loss (Bharambe et al. 2023), and hence farmer suicides.

With several large and smaller dams, the Godavari River is a highly regulated river system in India. They may be used for irrigation or hydroelectric projects, apart from drinking/water supply and pisciculture. The construction of the **Polavaram Dam** would lead to valleys and sandbars adjoining the river being submerged within the Papikonda National Park. This would lead to the loss of nesting

and feeding habitats for several riverine birds. It would also act as a physical barrier to the movement of fish, which would impact the avifaunal communities (Ray et al. 2020).

Large-scale deforestation and loss of aquatic habitats in the upper catchments of the Godavari River, such as that found in and around Papikonda National Park which is ~ 80 km upstream of the estuary, also exacerbates the negative impacts on the estuarine biodiversity. Fish kills have become a regular occurrence in the creek draining into the Coringa Wildlife Sanctuary due to the release of untreated effluents by the aquaculture ponds and the industries located upstream. The industrial city of Kakinada (also the headquarters of the East Godavari district) is located adjacent to the mangroves and the estuary. However, the discharge of untreated effluents from aquaculture farms and industries into the river, canals and mangrove creeks, sand mining at the river bed, dredging of the creeks and river mouth, alteration of the natural flow of Godavari River, and obstruction of freshwater discharge and sediment load into the estuary and mangroves due to damming are threatening the local marine life and ecosystems (Ray et al. 2022).

Therefore, it is necessary to take a balanced approach wherein the infrastructure development takes place without compromising the environment and sustainability. This approach is in tune with the SDG goals such as Clean Water and Sanitation (6), Industry, Innovation and Infrastructure (9), and Sustainable Cities and Communities (11). Basic, Built, and Critical Infrastructure encompass sectors such as - energy, transportation, environment, water and sanitation, and communications.

The following topics will be covered in this report:

- Land use zoning, urban expansion, smart city initiatives,
- Water source management, pipeline networks, water treatment plants,
- Sewerage system mapping, stormwater drainage, wastewater treatment facilities,
- Public toilets, waste management, community sanitation programs,
- Initiatives on riverbank protection and ecological restoration,
- Identification of inefficiencies in current infrastructure and misalignment with urban growth, conclusion/solutions.

2. Development plan

2.1 Urban Expansion

Urban expansion is defined simply as the physical extension of the geographical footprints of towns, cities, and metropolitan areas into the surrounding countryside, encompassing surrounding villages and towns in the process. What recent studies of urban expansion have revealed is that this expansion process is initially fragmented and sometimes even leapfrogs over vacant open spaces, but these vacant open spaces on the urban fringe typically fill in gradually as outward expansion continues. Expansion on the urban periphery occurs at lower average densities than those of central cities because land on the urban periphery is cheaper than land in city centers. Urban expansion is a consequence of urban population growth because urban settlements consume land. Both urban densification and urban expansion can accommodate this growth. (**Annexure I :** The district-wise urban expansion in the Godavari River Basin, from 2005-06 to 2015-16)

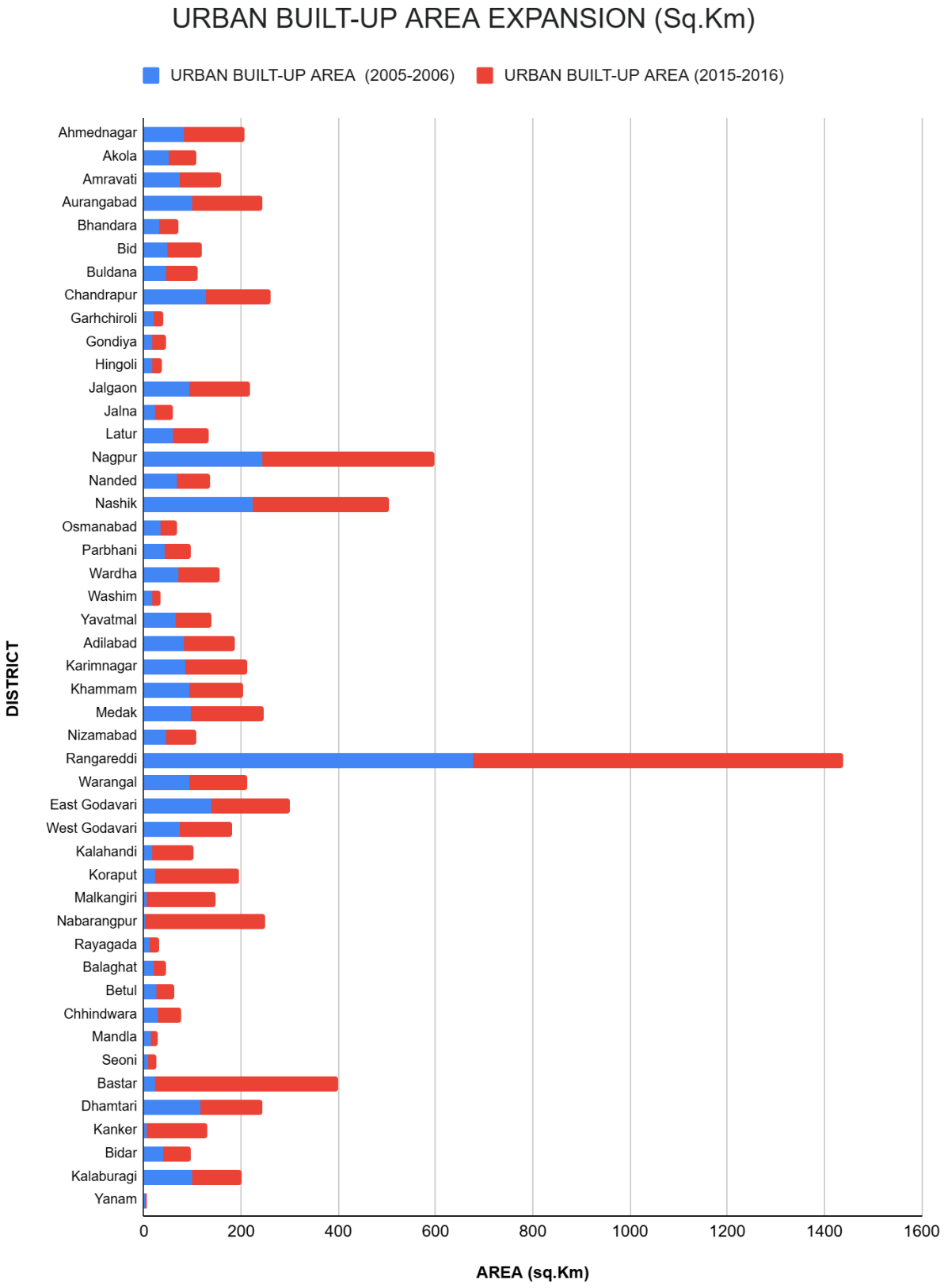

Figure: 2 District wise urban build up area expansion

Source: Bhuvan | Thematic Data dissemination | Free GIS Data | OGC Services | Clip and Ship

The above graph represents urban built-up area expansion in the Godavari River Basin showing a clear trend of increasing urban expansion between 2005-2006 and 2015-2016 (Figure 2) across all districts. However, the magnitude of this expansion varies considerably, indicating diverse patterns of urban development within the region. Nagpur, Maharashtra; Kanker and Bastar in Chhattisgarh; Koraput, Malkangiri, and Nabrangpur in Odisha have witnessed major expansions, with maximum being in Bastar, followed by Nabrangpur. Further, Garhchiroli, Nanded, Osmanabad, and Washim in Maharashtra experienced negligible increase in the built-up area during this decade. This disparity in growth patterns indicates the heterogeneous nature of urban expansion within the Godavari River Basin.

2.2 Smart City Initiatives

The smart city initiative focuses on building sustainable, inclusive cities with efficient infrastructure and enhanced quality of life for its citizens. This aligns with the mission's focus on utilizing technology to improve urban living standards across selected Indian cities. In the GRB, there are six smart cities, i.e. Nagpur, Nashik, Chhatrapati Sambhaji Nagar (Aurangabad), Amravati, Karimnagar, and Warangal (by 2024). The objective is to provide core infrastructure, offer citizens a decent quality of life, ensure a clean and sustainable environment, and apply 'Smart' Solutions.

The Smart Cities Mission is meant to set examples that can be replicated both within and outside the Smart City, catalyzing the creation of similar Smart Cities in various regions and parts of the country. Some of the core infrastructure elements in a Smart City would include adequate water supply, assured electricity supply, sanitation, solid waste management, efficient urban mobility and public transport, affordable housing, especially for the poor, robust IT connectivity and digitalization, good governance, especially e-Governance and citizen participation, sustainable environment, safety and security of citizens, particularly women, children and the elderly, and health and education. (**Annexure II :** Smart City Initiatives in the GRB)

(Annexure III : Drinking Water Facilities in the GRB, districtwise)

3. Sewerage System

3.1 Wastewater treatment facilities

Both organic and inorganic materials are frequently found in the sewage, coming from commercial, residential or industrial wastes. Sewage can contaminate rivers and other water sources if not properly treated before being released into them. The Sewage treatment plants (STPs) clean this waste water so that it can be safely discharged into the environment, reused in agriculture, or redirected to homes as flush water. India’s rapidly growing population and expanding industrial infrastructure are driving an unprecedented increase in the country’s wastewater volume. The depletion of freshwater sources like rivers and wells is making the situation even worse.

STPs have been installed in Maharashtra, Telangana, Andhra Pradesh, Karnataka, and Chhattisgarh within the GRB. Odisha, Madhya Pradesh, and Puducherry do not have any STPs within the GRB.

In Maharashtra, the Total STP installed capacity is 1313 MLD, with a present utilization capacity of 1074.25 MLD. Telangana has an installed capacity of 379.1 MLD, with a utilization capacity of 270.4 MLD. Andhra Pradesh has an installed capacity of 30 MLD, which is fully utilized, with a utilization capacity of 30 MLD. Karnataka has an STP installed capacity of 47.52 MLD, with a current utilization capacity of 17 MLD. Chhattisgarh has an STP installed capacity of 25 MLD and a utilization capacity of 15.5 MLD (**Annexure IV :** Sewage Treatment Plants in the GRB)

Figure: 3 Separation of waste from sewage water

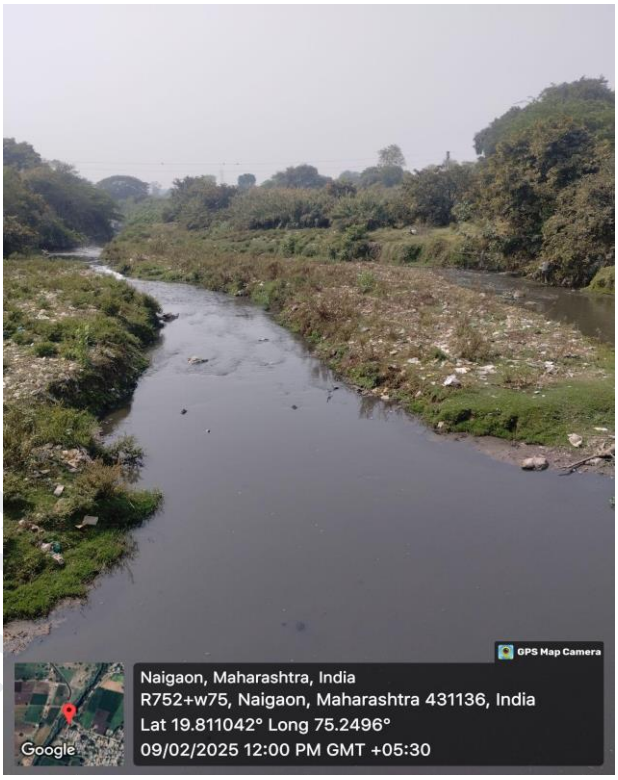

Figure: 4 Sewage water flow in Kham River

The figure 4 shows the image of Kham River, which flows through the city of Chhatrapati Sambhaji Nagar (Aurangabad). It often fluctuates from a torrent during monsoon season to barely a trickle during dry months. Years ago, the Kham provided drinking water to the city through a sophisticated system of stepwells and ancient aqueducts called *Neher* that stored clean water in the water-scarce city. But over the past few decades, population growth, unmanaged waste and unregulated sand mining has turned the river into a major dumping ground and public health hazard.

4. Sanitation plan

Using clean and safe toilets, keeping water sources clean, and disposing of garbage safely (Domestic, Industrial, Medical, Religious, etc.) constitute an essential part of public health and sanitation. The waste needs to be treated before disposing it off into the immediate environment and rivers, as discussed earlier. The GRB has 150+ cities with more than 15,000 population. As the cities are expanding at a fast pace, the maintenance of public cleanliness is becoming increasingly demanding. Consequently, waste management (solid, liquid) and the development of effluent treatment facilities (ETPs/STPs) need to be accentuated as a priority to handle the growing load.

As per the Central Pollution Control Board (CPCB), the release of *untreated sewage* from urban centres, industrial effluents, and toxic flows from irrigated agriculture constitute the major sources of water pollution in India. This risks the fragile aquatic ecosystems of plants, animals, aquatic life, birds, besides humans. The wastewater drains are often wrongly connected to the stormwater lines, instead of connecting them to the main sewage lines. This can lead to eutrophication in the rivers and the growth of unnecessary invasive species such as water hyacinths, ultimately killing the biodiversity apart from dirtying the precious water sources. Hence, stormwater drains and sewerage systems must be separated.

Regular operation and maintenance (O&M) of sewerage chambers to avoid leakage of huge quantities of sewage into the river Godavari should be executed. Conventional sewers and STPs are usually centralised and require very high O&M costs, especially uninterrupted power and trained manpower. Hence, decentralised wastewater treatment is recommended for multi-complex projects. Regular maintenance and upgradation of STPs should be carried out for effective treatment of wastewater, as mentioned earlier *(https://www.mpcb.gov.in/sites/default/files/focus-area-reports-documents/GodavariRiver_ComprehensiveStudyReport.pdf)*. Solid waste can be managed by segregation at source (dry/wet/e-waste/sanitary), landfilling, composting, incineration, pyrolysis, biomethanization, recycling/reuse of waste, etc.

In rural areas, the greywater or liquid waste from the bathrooms and kitchens flows in open gutters, percolates in the ground, evaporates, and the remainder joins natural streams. The situation worsens because solid waste, vegetable waste, leftover eatables and plastic materials are carelessly thrown in these gutters. The polluted wastewater then stagnates in many places breeding mosquitoes, threatening public health. “TWO PIT” Latrine system to avoid mixing human waste with grey water and well-constructed sullage absorption trenches are some measures that can be considered. *(https://wrd.maharashtra.gov.in/Site/Upload/PDF/Godawari-Khand2.pdf)*. Soak pits can be built for villages close to the river to avoid direct discharge of sewage into the river. Solid waste can be managed using compost trenches and biogas plants, generating manure and energy parallelly.

Climate change can further aggravate the challenges due to a higher likelihood of severe floods, cyclones, and droughts. This can be a major source of pollution and risk to human health (e.g. cholera outbreak) in both urban and rural areas. Some measures, such as completely undergrounding the drainage systems, recycle/reuse practices (e.g. zero liquid discharge), sanitation tax collection, and growing some special plants capable of greywater management, can be adopted besides the above mentioned. For small villages (population less than 1000) – *root zone technology* and *phytoremediation* techniques can be used. *(https://mpcb.gov.in/sites/default/files/river-polluted/action-plan-priority/priority_I_Godavari_28052019.pdf)*. Maintaining the E-flows in rivers helps achieve SDG 14 (Life below Water).

In terms of social aspects, sanitation is a human right (SDG 6). It protects everyone’s dignity and especially transforms the lives of *women and girls*. More investment and better governance of sanitation are critical for a fairer, more peaceful world *(https://www.un.org/en/observances/toilet-day)*. Lately, the government has taken steps to shift from the present practice of rural population to defecate in the open area towards the use of public/private toilets. Faecal matter may then be treated

either in a dry state (two pit latrines) or in septic tanks as digested semisolid waste. The 'Ecological Sanitation' (Eco-San) toilet is an innovative sanitation technology that uses negligible water in its operation, and human waste products are used as fertilizer. It helps provide sanitary hygiene in dry and arid regions.

The Swachh Bharat Mission (SBM) by the Government strives to achieve Open Defecation Free (ODF) status in all the ULBs in India, i.e. the termination of faecal-oral transmission. It also aims to construct toilets at personal and community level (such as schools, anganwadis), manage waste (solid and liquid) efficiently, bring awareness amongst the rural people on the need for sanitation through hygiene and health education, thereby improving the quality of their life.

It is also important to mention here, that as we strive to achieve the goal of providing clean cities and villages, we need to keep looking for alternative solutions to end the barbaric practice of manual scavenging. **Genrobotics** had launched the Robotic Scavenger 'Bandicoot' around 7 years ago. **Solinas Integrity**, a startup at IIT-Madras, recently developed robotic solutions to address water contamination, blockages, and leakages, and hopes to eradicate manual scavenging. The following sub-sections now elaborate on the community sanitation programs, waste management, and public toilets within the GRB.

4.1 Community Sanitation Programme:

4.1.1 National Level Community Sanitation Programme:

Some of the sanitation programs implemented by the central government to maintain community cleanliness and hygiene are as follows:

- Total Sanitation Campaign (TSC), launched on 1st April 1999,
- Nirmal Bharat Abhiyan Programme from April 2012 to October 2, 2014,
- Swachh Bharat Mission (Grameen) Phase -1 from October 20, 2014, concluded in 2020,
- National Faecal Sludge and Septage Management (NFSSM) Alliance since 2016,
- Atal Mission for Rejuvenation and Urban Transformation (AMRUT), launched on 25th June 2015,
- At present, Swachh Bharat Mission (Grameen) Phase-II from 2019 to 2025 is ongoing.

1. Total Sanitation Campaign (TSC)

Launched on 1st April 1999, TSC envisaged a pivotal role for the Panchayati Raj Institutions (PRIs) in achieving clean and healthy conditions in rural India. Nirmal Gram Puraskar was announced as an incentive scheme for the PRIs to honor, felicitate and encourage those Panchayati Raj Institutions which have attained the following criteria within their area of jurisdiction:

1. All houses have access to sanitary toilets,
2. All schools and anganwadis have access to toilet facility,
3. It is free from practice of open defecation,
4. Maintenance of a clean environment.

Table 1: Nirmal Gram Puraskar State Wise Achievements over the years

S.No.	State	No of PRIs 2005	No of PRIs 2006	No of PRIs 2007
01	Andhra Pradesh	•	10	143
02	Chhattisgarh	•	12	90
03	Madhya Pradesh	•	01	190
04	Maharashtra	13	38	1974
05	Karnataka	•	•	121
06	Odisha	•	08	33

SOURCE:https://jalshakti-ddws.gov.in/sites/default/files/Total%20Sanitation%20Campaign%20Sanitation%20for%20All%20-%202012.pdf

2. Nirmal Bharat Abhiyan:

Nirmal Bharat Abhiyan (NBA), which was previously the Total Sanitation Campaign (TSC), is a community-led total sanitation program initiated by the Government of India in 1999. It is a demand driven and people-centred sanitation program. It evolved from the limited achievements of the first structured programme for rural sanitation in India, the Central Rural Sanitation Programme (1986), which had minimal community participation.

3. Swachh Bharat Mission-Gramin (SBM): Phase I (2014-2019)

The Swachh Bharat Mission was launched on October 2, 2014, by the Hon'ble Prime Minister, with a focus on making India Open Defecation Free (ODF). This monumental endeavor mobilized millions, resulting in it becoming the largest mass movement and behavioral change programme in the world that led to the construction of over 100 million individual household toilets within five years, achieving 100% sanitation coverage by 2019.

The declaration of over 6 lakh villages as ODF by October 2019 marked a significant milestone, paying homage to Mahatma Gandhi on his 150th birth anniversary. Additionally, this achievement aligned with the SDG Target 6.2, effectively ending open defecation nationwide.

Impact of SBM Phase I

- SBM saves lives: WHO 2018 - 3 lakh diarrhea deaths avoided in 2019 compared to 2014.
- SBM improves nutrition and productivity: BMGF 2017 - 58% higher cases of wasting among children in non-ODF areas.

- Swachhata secures safety and dignity of women: UNICEF 2017 – 93% women feel safer after getting a toilet at home.
- SBM saves money for the family: UNICEF 2017 - INR 50,000 saved every year on average by a household in an ODF village due to health costs avoided.
- SBM saves the environment: UNICEF 2019 - 12.70 times less likelihood of groundwater contamination traceable to humans in ODF villages
- Sanitation as everyone's business: Other departments earmarked over INR 50,000 crores for sanitation in their respective sectors, e.g.: highways, petrol pumps, railways, schools, hospitals, etc.
- Swachh Iconic Places (SIP) - Cleaning of iconic places; corporate and private support leveraged for each site.

4. Swachh Bharat Mission - Gramin (SBM): Phase II (2019-2025)

Having achieved the ODF status, SBM-G Phase II was launched with the objective of achieving Sampoorn Swachhata, i.e., sustaining the ODF status and managing solid and liquid waste by 2024-25 and transforming all the villages from ODF to ODF Plus Model.
The key objective of SBM-G Phase II to:
Sustain the ODF status of villages,Improve the level of cleanliness in rural areas through solid and liquid waste management activities, making villages ODF Plus. This includes:

- ODF Sustainability
- Solid Waste Management
- Liquid Waste Management
- Visual Cleanliness

The total estimated outlay of SBM(G) Phase-II is Rs.1.40 lakh crores which is to be dovetailed through convergence between different verticals of financing and various schemes of central and state governments.
Source: Swachh Bharat Mission - Gramin, Department of Drinking Water and Sanitation

5. National Faecal Sludge and Septage Management (NFSSM)

The National Faecal Sludge and Septage Management (NFSSM) Alliance was formed in 2016 to address the need for collaborative action and a unified voice to influence national and state policies on FSSM. Supported by the Bill and Melinda Gates Foundation, the Alliance envisions that by 2030, all 7900+ Indian cities will safely manage human waste.

Bringing together over 35 diverse organizations, including NGOs, CSOs, academic institutions, and think tanks, the Alliance focuses on a few critical areas: Institutionalisation of Inclusive Sanitation, Urban Expansion of Sanitation Service Delivery, and Innovation & Technology in Sanitation. The Alliance is governed by a Steering Committee, which provides strategic direction and sets priorities for the group. Dasra, serving as the Secretariat, strengthens the Alliance's institutional structures, fosters collaboration among partners, and facilitates government engagement to influence policies. The Alliance also leads knowledge curation and insight-sharing, enabling cross-learning among sector experts, governments, and other stakeholders.

Over the past eight years, the Alliance has significantly advanced India's urban sanitation sector, championing inclusive, safe, and equitable sanitation approaches like faecal sludge management, spotlighting sanitation worker efforts, and centering climate resilience, ensuring human health, dignity, and the health of the urban ecosystem.

6. AMRUT

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) was launched on 25th June 2015 in 500 cities and towns across the country. The Mission focuses on development of basic infrastructure in the selected cities and towns, in the area of water supply, sewerage and septage management, storm water drainage, green spaces, parks and non-motorized urban transport. A set of Urban Reforms and Capacity Building have been included in the Mission. A GIS based Master Plan will be prepared for 461 AMRUT cities which will result in efficient urban governance through various layers such as property tax, water and sewage coverage etc. Final plans have been prepared for 148 towns and draft plans are ready for another 135 towns. To improve the capacities of States/cities in urban planning to promote land use efficiency and prevent urban sprawl, a pilot scheme on implementation of Local Area Planning and Town Planning Scheme (LAP/TPS) has been taken up in 25 cities.

Under AMRUT, priority is given to assured water supply by the State/UTs while selecting projects. To ensure quality of water the water supply component includes new, augmentation and rehabilitation of the water supply system; rejuvenation of water bodies for drinking water supply and special water supply arrangement for difficult areas, hills and coastal cities, including those having water quality problems.

The government has initiated the development of twenty-three AMRUT cities. The purpose of the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is to:
(i) ensure that every household has access to a tap with an assured supply of water and a sewerage connection.
(ii) increase the amenity value of cities by developing greenery and well maintained open spaces (e.g. parks).
(iii) reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling). All these outcomes are valued by citizens, particularly women, and indicators and standards have been prescribed by the Ministry of Urban Development (MoUD) in the form of Service Level Benchmarks (SLBs). However, the pursuit of better outcomes will not stop with the provision of taps and sewerage connections to all (universal coverage).

7. AMRUT 2.0

In addition, the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) - 2.0 scheme has been launched on 1st October, 2021 for the period of 5 years i.e. from the financial year 2021-22 to 2025-26. AMRUT 2.0 envisages to make all notified statutory towns & the cities of the country ‘water secure’. Sustainability of quality of water supply is an admissible component of the project. Also continuous (24x7) pressurized water supply systems with ‘Drink from Tap’ facilities shall prevent the contamination of drinking water in the pipelines and make the water fit for consumption. AMRUT 2.0 Mission promotes this (24x7) water supply with ‘Drink from tap’ facility in the selected

wards which will be evaluated on parameters of quality, accessibility and availability of water. Through Pey Jal Survekshan ULBs are being assessed for compliance of service level benchmarks with respect to quality, quantity and coverage. Further, the Mission will create awareness through community participation and Information, Education & Communication (IEC) activities with respect to quality. Concerted efforts will be made to train women to test water quality in all the cities and women Self Help Groups (SHGs) will also be involved in water quality testing.

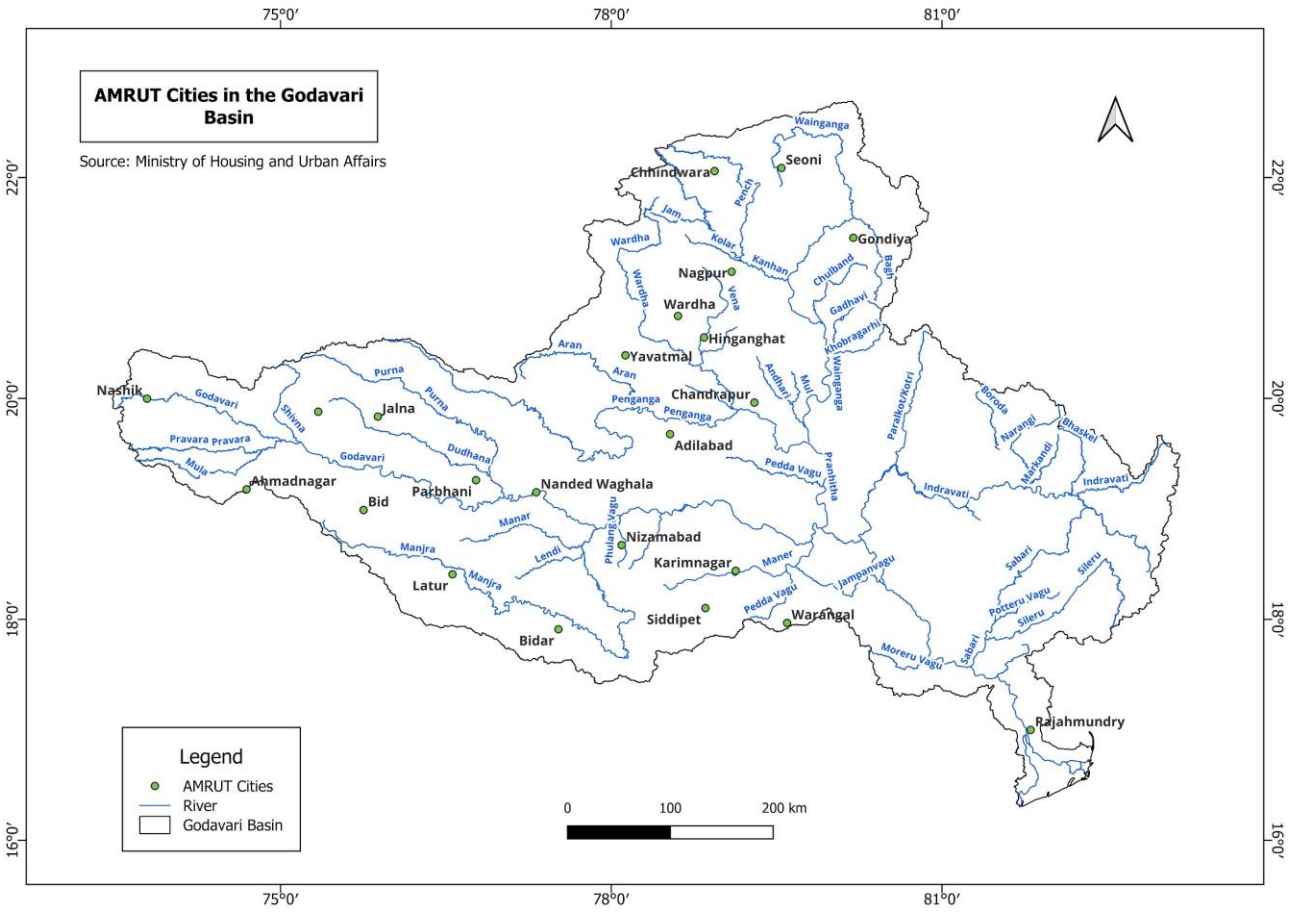

Figure: 5 Amrut cities in the Godavari river basin

4.1.2 State Level Community Sanitation Programme:

1.Maharashtra

The local governments in Maharashtra, supported by the State Government, have worked towards elevating the state's sanitation standards, aiming to achieve ODF++ status. Through a combination of training, workshops, and streamlined processes, the State Government has played a crucial role in guiding the efforts to create model cities and ensure the continued success of ODF+ and ODF++ initiatives across Maharashtra.

1. Sant Gadge Baba Abhiyan - Urban Sanitation Campaign

This campaign aims to improve sanitation conditions in urban areas of Maharashtra:

- Solid Waste Management: Collection, segregation, and disposal of waste.
- Sewerage and Drainage: Upgrading and maintenance of sewage systems.
- Public Toilet Construction and Maintenance: Providing access to clean and hygienic public toilets.
- Public Awareness Campaigns: Educating citizens on proper sanitation practices.

2. Sujal Nirmal Maharashtra Abhiyan (SNMA)

This campaign focuses on providing safe and adequate drinking water and sanitation facilities across Maharashtra. It likely encompasses:

- Rural Water Supply: Ensuring access to clean drinking water in rural areas.
- Rural Sanitation: Promoting the construction and use of toilets, and improving hygiene practices.
- Water Conservation: Implementing measures to conserve water resources.

3. Maharashtra Rural Water Supply and Sanitation Program

This program likely encompasses a wide range of activities related to rural water supply and sanitation in Maharashtra. It may include:

- Implementation of the National Rural Drinking Water Program (NRDWP): Ensuring access to safe drinking water in rural areas.
- Rural Sanitation Initiatives: Promoting the construction and use of toilets, and improving hygiene practices.
- Community-Based Approaches: Involving local communities in the planning and implementation of water and sanitation projects.

4. Vasantrao Naik Tanda / Basti Development Scheme

The scheme "Vasantrao Naik Tanda/Basti Development" is implemented by the Department of Social Justice & Special Assistance, Government of Maharashtra. The scheme provides essential amenities to the Tandas and Bastis of Vimukta Jatis and Nomadic Tribes. The scheme focuses on improving access to drinking water, electrification, latrines, drainage systems, and approach roads for these communities.

2. Telangana

Telangana Overall Situation:

The Latrine facilities are very poor in Telangana state. Overall, 52.5% households have latrine facilities within the household‟s premises. 47.5% of the household population does not have the facility. Urban areas households‟ population has excellent latrine facilities, it is above 90% and only 10% of householdss population does not have latrine facilities in their household‟s premises. It is different in rural and urban points of view. In rural areas, 30% of households have latrine facilities in the household premises.

Urban households have excellent latrine facilities (90%). If the government and other organizations put in efforts in these lacking areas, it will improve the situation. People hoping Telangana state's "Drinking water grid" project will fulfil this gap. Telangana government concentrated on the sanitation facilities and they fixed a target to achieve Open Defecation Free (ODF) state up to 2019. But recent data shows the availability of the latrine facilities is very poor across the state. The Telangana government launched the ODF project on October 2nd, 2015 and aiming to ensure one toilet to each household in rural areas is ODF followed by Nizamabad (165), Karimnagar (145), Warangal (106), Medak and Adilabad (102), Rangareddy (58), and Khammam (35). Khammam has the lowest ODF villages in the state.

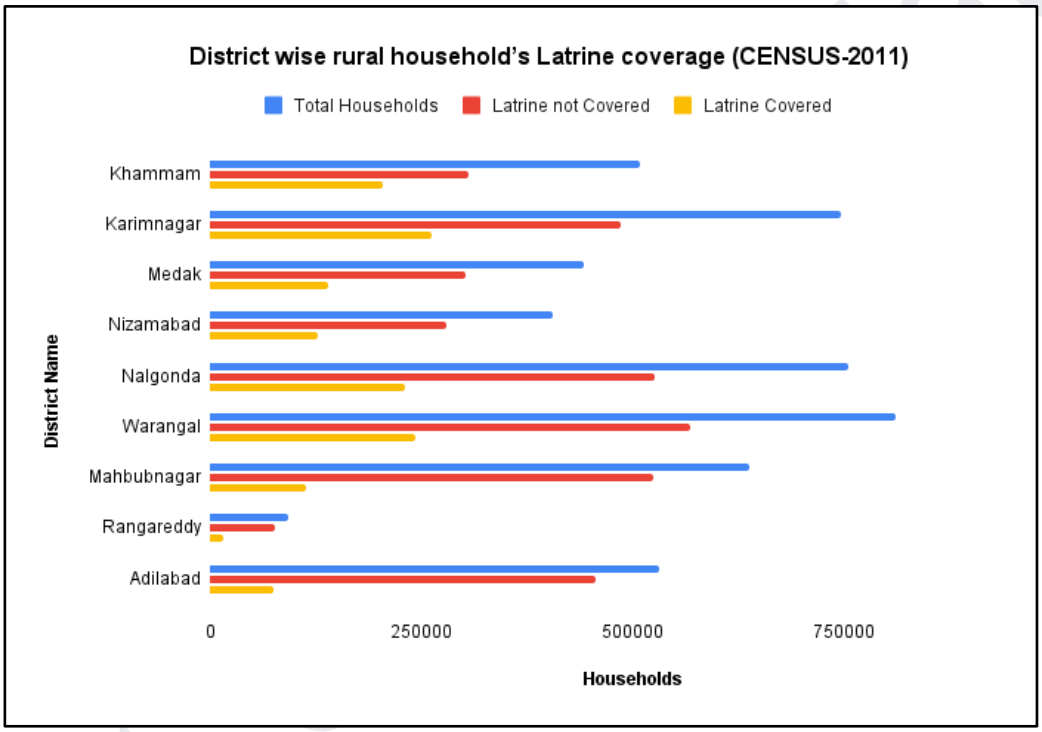

Figure: 6 District wise rural household's Latrine coverage (Census of India-2011)

Source: Rural Sanitation in India and Telangana State: A Special Reference to Rural Adilabad district

1. The Swachhata Trailblazer

As part of the Swachhata Hi Seva 2023 campaign, Telangana has so far conducted awareness drives in 1,874 schools and colleges and 2,048 ward-level programmes on sanitation. Till now, a total of 314 GVP (Garbage Vulnerable Point) points out of 380 have been cleared and a separate collection system in respective GVP areas to sustain cleanliness has also been arranged. The State has vowed to convert all these 314 GVP points as IEC points. Also, 117 public parks have also been sanitised apart from 1,072 spots around the community and public toilets have also been cleaned up with the help of NCC/NSS students and women SHG members. States are leaving no stone unturned to achieve the goal of garbage free cities by 2026 set under SBMU 2.0. The Jan Andolan for Swachhata is just going to gain momentum from here.

For the past nine years, the Swachh Bharat Mission has been able to draw mass public participation to realize the dream of a garbage free India. Prime Minister Narendra Modi's clarion call for Swachhata was well reciprocated by the common citizens, civic bodies, towns, gram panchayats and private agencies, who have taken the ownership to create a clean India. Hon'ble Prime Minister appealed to the countrymen urging them to join in the 'Ek Tareekh, Ek Ghanta, Ek Sath' mass cleanliness drive to be conducted at all kinds of public places scheduled to take place at 10 am on 1st October 2023. Over 13 crore citizens have already joined Swachhata Pakhwada – Swachhata Hi Seva 2023 and engaged in the fortnight long that started from the 1zing citizen movement for Swachhata.

Over 21 lakh citizens participated in the cleanliness drives across the State. The masses joined the Shramdaan and awareness activities at public institutions, public places, market places etc. These people were actively involved in collection of plastic waste in and around villages. At the same time, they spread awareness on Swachhata in rural and urban areas. They educated all about waste management, proper disposal of waste, source segregation and the principles of Refuse, Reduce and Reuse of single-use plastic and resort to its alternatives such as steel Bartan banks, and bags made of jute, cotton and cloth, thus contributing their bits to not only achieve swachhata but protecting the environment as well. Citizens also took Swachhata pledge, joined in Swachhata rallies, formed human chains as part of awareness activities on Swachhata.

SOURCE:Telangana: The Swachhata Trailblazer.

2. Telangana State Sanitation Strategy - Urban

Sanitation for the purpose of Telangana State Sanitation Strategy (TL-SSS) is defined as the safe management of human excreta, including its safe confinement treatment, disposal and associated hygiene-related practices. The Telangana SSS recognizes providing primacy to integral solutions that covers sub sectors of solid waste, waste water (including septage), storm water drainage and drinking water. The aspect of sustainability is at the core of the strategy by looking at the dimensions of capacity enhancement, finance, technology, inclusiveness, climate change responsiveness, institutional and governance strengthening.

2.1 Vision Of Telangana State Sanitation Strategy:

All cities and towns in Telangana to become totally clean, sanitized, healthy, livable, ensuring and sustaining good public health and environmental outcomes for all citizens, with a special focus on hygienic and affordable sanitation for the urban poor and women.

Source:Telangana State Sanitation Strategy - Urban

3. Pattana Pragathi

3.1 Pattana Pragathi - Toilet Monitoring System (PP-TMS) A unique ICT based system for monitoring public sanitation facilities.

The Municipal Administration and Urban Development (MA&UD) Department, Government of Telangana has taken several citizen-centric sanitation improvement initiatives for enhancing the quality of life and public health in urban local bodies. Towards this, the government envisioned providing gender-friendly public convenience (toilets) – 1 for 1000 population in all the Urban Local Bodies (ULBs). This first-of-its-kind initiative has become a national benchmark and a new norm under Swachh Bharat Mission. In response to this policy direction, ULBs have constructed public toilets, community toilets, exclusive toilets for women (SHE toilets) and mobile toilets in adequate numbers to meet service level standards.

To support towns in ensuring timely completion of public conveniences with quality standards and to ensure good operation and maintenance of these facilities, the Commissioner and Directorate of Municipal Administration (CDMA) in partnership with the Administrative Staff College of India (ASCI) has developed a real-time ICT based monitoring system called Pattana Pragathi - Toilet Monitoring System (PP-TMS). This mobile-based monitoring tool was launched on 2nd October 2020 by Honorable Minister of Municipal Administration and Urban Development, Shri K.T. Rama Rao Garu. This system aims to help the State Administrators, Additional Collectors and Municipal Commissioners to track the progress and to ensure the quality and sustainability of public sanitation facilities.

3.2 Promoting Circular Economy in Municipal Waste Management Floral Waste Management in Telangana at Scale

The floral waste generated by these places of worship, market areas and industries are disposed of along with the municipal solid waste causing land and water pollution. To ensure safe management of floral waste in Urban Local Bodies (ULBs) of Telangana, the Municipal Administration and Urban Development Department, Government of Telangana has signed an MOU on 2nd October, 2020 with Oorvi Sustainable Concepts Private Limited, a start-up incubated in Telangana, specialised in floral waste management.

The initiative named as ‘Holy Waste’ adopts a circular economy approach, and recycles floral waste into useful products such as charcoal-free incense, soaps, organic compost and a biodegradable packaging material. Oorvi uses innovative and environmentally sustainable technology and engages women self-help groups (SHGs)in their operations. This initiative not only is addressing solid waste disposal problems but also generating livelihood opportunities for women from marginalized communities.

3.3 Nagara Deepika

The municipality of Shamshabad has initiated a unique “Micro-Level Monitoring and Awareness Program” for the door to door collection and segregation of waste at source by engaging SHG women and named them as Nagara Deepika’s. These Nagara Deepikas are women who were trained on different aspects of solid waste management such as micro level monitoring of door to door collection, sensitization of households on source segregation, not littering on roads and open places and its negative effects (like garbage burning). These Nagara Deepikas follow the door to door collections, where they counsel and record the segregation waste category.

3.4 Salient features of the Program

Micro level monitoring on the door to door auto collection attendance to ensure 100% coverage of each household Each Nagara Deepika covers around 500 households Ensure segregation of waste at the household level Eliminate Garbage vulnerable points (GVPs) and roadside littering Sensitization households on SS2021 citizen feedback Ensure transportation of segregated dry waste to DRCC center Report issues related to drain overflow, littering

3.5 Public Spaces as Catalyst for Slum Upgrading Micropark Development in Warangal

Greater Warangal Municipal Corporation (GWMC) has successfully piloted a community micro park in Mysaiah Nagar as part of its slum upgrading initiative. Built in a 175 sq. yard open space using recycled materials, the park features a playground for children, sit-out areas for women and senior citizens, and gender-friendly toilets. The project, costing around ₹4.9 lakhs, promotes awareness on solid waste management, sanitation, and water conservation. Due to its success, GWMC plans to replicate and scale up similar projects across other local income settlement areas, making it a cost-effective and scalable solution for urban local bodies in Telangana.

3.6 Towards ODF ++ Towns at Scale Fecal Sludge Treatment Plants in Telangana

- Siddipet
  Capacity: 20 KLD FSTP
  Technology: Combined biological treatment with solar sludge drying and UV disinfection.
  Impacted population: 1,30,832
- Kamareddy
  Capacity: 30 KLD FSTP
  Technology: Combined biological treatment with solar sludge drying and decontamination technology.
  Impacted population: 1,17,152
- Nirmal
  Capacity: 30 KLD FSTP
  Technology: Bio-Treatment MBBR technology with upgraded clarified and thermal treatment.
  Impacted population: 1,06,548.

SOURCE: Pattana Pragathi

4. Swachh Bharat Mission (Grameen) 2.0 in Telangana

Telangana was ranked Number 1 among large states in Swachh Survekshan Gramin 2022. The year 2023 marks nine years of the Swachh Bharat Mission and India has achieved yet another major milestone with more than half of the total villages in the country achieving ODF Plus status under the Swachh Bharat Mission Gramin (SBM-G) Phase II, implemented from 2020-21 to 2024-25. As on August 07, 2023, over 3.95 lakh villages (67 percent) in the country achieved ODF Plus status. The achievement of 67% ODF Plus villages is a significant milestone for India as it is going beyond just construction and use of toilets towards complete and absolute cleanliness i.e., from ODF to ODF Plus.

The SBM-G programme has been instrumental in improving the health and well-being of millions of people across the country. Several reports in the past few years have exhibited the ground impact of the SBM-G programme.

- Telangana became the first state in the country to attain 100 percent status with all the 12,769 villages in the state becoming ODF plus through the support of the Government of India and actualizing the Prime Minister's vision of Swachh Bharat.
- Out of the 12,769 villages, 11,886 are ODF Plus Model villages and 879 are aspiring. An ODF Plus Model village is one which is sustaining its ODF status and has arrangements for both Solid Waste Management and Liquid Waste Management; observes visual cleanliness, i.e., minimal litter, minimal stagnant wastewater, and no plastic waste dump in public places; and displays ODF Plus Information, Education & Communication (IEC) messages.
- Over 31.20 lakh Individual Household Latrines (IHHL), 14,827 Waste Collection and Segregation sheds, and 6,588 Community Sanitary Complexes (as of August 07, 2023) have been constructed in Telangana.
- Telangana's 12 districts secured a spot on the list of high achievers in Swachh Survekshan Gramin 2023 with a 4-star rating and delta score of 300.
- Out of the total of 540 blocks in Telangana, 417 are ODF-Plus Model Blocks.
- Telangana was ranked Number 1 among large states in Swachh Survekshan Gramin 2022.

Source: Swachh Bharat Mission (Grameen) 2.0 in Telangana

3. Andhra Pradesh

1. Swachh Andhra Mission:

The Swachh Andhra Mission objectives, the Government of Andhra Pradesh set up the Swachh Andhra Corporation (SAC) in 2015 as the nodal agency. SAC collaborated with several international organizations and engineering companies as technical knowledge partners to effectively implement the mission objectives across the state. It played a key role in managing the rapid construction of Individual Household Toilets (IHHT), Community Toilets (CT) and Public Toilets (PT).

The Swachh Andhra Pradesh Mission in alignment with the Swachh Bharat Mission was launched by the Government of Andhra Pradesh to fulfill Mahatma Gandhi's vision of 'Swachh Bharat' by eliminating open defecation, eradicating manual scavenging and solid cum liquid waste management activities to maintain cleanliness and hygiene in urban spaces.

2. Area Sabha Sanitation Committee:

Sanitation for the purpose of Andhra Pradesh State Sanitation Strategy (AP SSS) is defined as safe management of human excreta, including its safe confinement treatment, disposal and associated hygiene-related practices. The AP SSS recognizes primacy to integral solutions that covers sub sectors of solid waste, waste water (including septage), storm water drainage and drinking water. The aspect of sustainability is at the core of the strategy by looking at the dimensions of capacity enhancement, finance, technology, inclusiveness, climate change responsiveness, institutional and governance strengthening.

The Andhra Pradesh State Sanitation Strategy aims to achieve a "Swachha Andhra" by ensuring all citizens have access to safe sanitation infrastructure, focusing on eliminating open defecation and promoting proper human excreta management through safe confinement, treatment, and disposal, while also considering aspects like solid waste, wastewater, storm water drainage, and drinking water as integral parts of the strategy; sustainability is a key element, incorporating capacity building, financial management, technology, inclusivity, climate change responsiveness, and institutional strengthenings.

Source : Andhra Pradesh State Sanitation Strategy

3. Strategies for Improved Sanitation in Rural Andhra Pradesh

The state of Andhra Pradesh has a total population of around 8.47 crore people. In 2001, nearly seventy three percent of the population lived in rural areas. As per most recent estimates, the state has nearly 72,000 rural habitations comprising 137 lac households, and 4162 municipal wards with 41.7 lac households. The state has diverse climates (GOAP, 2007). It has three regions, viz., coastal Andhra, Rayalaseema and Telangana. Coastal Andhra is a flood-prone region, while Rayalaseema is a dry region. Telangana, also being upland in the Deccan plateau, mostly remains as a rain shadow region. Coastal and Rayalaseema regions are exposed to modernization as they were exposed to British rule. Telangana region is also caught up with modernization during the past 50-60 years.

With a rural population of 5.63 crore and 1.37 crore rural households (Census 2011 provisional figures), providing rural sanitation is a formidable task for the state. According to official sources, it has already provided improved sanitation to around 74% of the total targeted rural households (TSC, Ministry of Drinking Water Supply and Sanitation, GOI).

Table 2: Percentage of Rural sanitation coverage in Andhra Pradesh from various sources

Sr. No	Source	Year	Rural Sanitation Coverage (%) in Andhra Pradesh	Remarks
1	TSC data, Ministry of Drinking Water Supply and Sanitation, GOI	2011	57.5	This is the percentage of the total rural households having improved toilets
2	National Sample Survey- 65th Round	2008-09	35.7	This survey covered only a total of 1,000 sample households
3	DLHS Report	2008	38.4	
4	Joint Monitoring Programme (2010) of UNICEF, and WHO	2008	31	This considered the total rural HHs doing open defecation, and therefore the actual number of households having toilets would be lesser, if we consider the fact that there is sharing

5	Social and Rural Research Institute (SRI) Report	2008	19	19.0% is the average for five districts: Anantapur, Chittoor, East Godavari, Medak and Nizamabad
6	National Family Health Survey-3	2005-06	27	-
7	TSC data, Ministry of Drinking Water Supply and Sanitation, GOI	2005-06	35	-
8	Census of India, 2011	2011	31	-

Source: (PDF) Strategies for Improved Sanitation in Rural Andhra Pradesh

4. MADHYA PRADESH

1. Swachh Bharat Mission (Grameen): Progress in Madhya Pradesh

The Objective of Swachh Bharat Mission (SBM) is to achieve a clean and Open Defecation Free (ODF) India by 2nd October 2019.

Madhya Pradesh is the second-largest state in the country by area. With over 75 million inhabitants, it is the fifth-largest state in India by population. Madhya Pradesh is the land of 46 scheduled tribes. Bhil (37.7 percent of the total tribal population) is the most populous tribe of the state followed by Gonds (35.6 percent of the total tribal population). Four other STs in the descending order are Kol, Korku, Sahariya and Baiga. Along with Bhil and Gond, the six tribes constitute 92.2 percent of the total ST population of the State.

74.97 lakh toilets and 17,776 Community Sanitary Complexes constructed in MP ODF Plus Villages: Up from 6% in 2022 to 89.5% in 2023 (Ministry of Jal Shakti).
Madhya Pradesh has demonstrated exceptional performance under the Swachh Bharat Mission - Gramin, showcasing outstanding achievements in improving sanitation and promoting cleanliness in rural areas. Through strategic planning and efficient implementation, the state has constructed over 74.97 lakh Individual Household Latrines (IHHL) and 17,776 Community Sanitary Complexes (as on July 13, 2023). The key highlights of the progress made by the State under Swachh Bharat Mission – Gramin are as follows (data as on July 14, 2023)

Through rigorous community involvement, the state has made remarkable progress in eliminating open defecation, and adopting hygienic practices. With an impressive record of having 45,068 ODF plus villages out of a total of 50,358 villages, Madhya Pradesh's remarkable success serves as a testament to bringing change at the grassroot level. Efforts made for creating Swachh Madhya Pradesh are bolstered by the adequate arrangement of liquid waste management in 41,510 villages and solid waste management in 28,786 villages.

Further, to boost implementation of Swachh Bharat Mission Gramin (SBM-G) Phase II, a mobile application called 'Swachh MP ODF Plus', a web-based system to address the challenges under the programme, was launched on August 8, 2022.

Other Major Achievements:

- Madhya Pradesh made remarkable progress by moving from 6% ODF Plus villages in 2022 to 89.5% villages on July 14, 2023.
- Madhya Pradesh ranked number 1 in the west zone under Swachh Survekshan Gramin 2022.
- Madhya Pradesh ranked number 1 under "Sujlam 1.0 campaign" and fourth in "Sujlam 2.0 campaign" of Swachh Bharat Mission Gramin.

SOURCE:Swachh Bharat Mission (Grameen): Progress in Madhya Pradesh

2. Madhya Pradesh Urban Sanitation and Environment Programme (MPUSEP):

This program focuses on improving sanitation in urban areas, including:

- Solid waste management: Collection, transportation, and disposal of solid waste.
- Sewage treatment: Construction and operation of sewage treatment plants.
- Stormwater drainage: Improving drainage systems to prevent flooding.

3. Rural Sanitation Programme:

Home toilets. Madhya Pradesh initiated the rural sanitation programme only in 1986-87. The poor coverage in home toilets is a manifestation of the continuing low priority attached to sanitation by planners as well as communities.

The Rural Sanitation Programme funded under the Centrally Sponsored Rural Sanitation Programme and the state MNP. While significant resources continue to be spent on developing new water supply facilities, the funds available for the rural sanitation programme continue to be very limited.

In 1994, the State Government set up the Rajiv Gandhi Mission for Control of Diarrhoea diseases, with the objective of reducing diarrhoea related mortality and morbidity. The Mission reports that the Case Fatality Rate due to diarrhoea has dropped from 2% in 1994 to 0.5% in 1997. To encourage preventive measures, the Mission carried out a safe water and health campaign in 1997, which focused on 11,000 villages with a high incidence of diarrhoea.

Two districts in the Godavari River Basin (Betul and Bastar) have been selected for piloting IEC activities. In the absence of adequate staffing of the IEC Cell, activities are yet to commence, and many villages, the Anganwadi Workers and Jan Swasth Rakshaks contribute to the promotion of hygiene.

SOURCE: Water Supply. Sanitation and Hygiene

4. Total Sanitation Campaign:

The national programme "Total Sanitation Campaign" (TSC) was introduced by Government of India (GOI) in April 1999 and implemented in all districts of Madhya Pradesh from the same date as a Centrally sponsored scheme after revamping the Central Rural Sanitation Programme. The TSC intended to promote sanitation in a project mode through demand creation for sanitation facilities in

rural-houses, schools and for a cleaner environment and alternate delivery mechanisms for supply of services and products. The programme was being implemented with focus on community-led and people centered initiatives. The revised approach in the programme emphasises more on Information, Education and Communication (IEC), Human Resource Development (HRD) and Capacity Development (CD) activities to increase awareness among the rural people. The programme, also intended to tap the potential of the children as the most persuasive advocates of good sanitation practices in their own households and in schools.

Source:
https://cag.gov.in/uploads/old_reports/local_bodies/Issued_State_Govt/MP/2005_2006/chap_3.pdf

5. Strategy And Approach Towards Developing A City Sanitation Plan

Implementing a City Sanitation Plan (CSP) is a challenging task that will require significant planning, initiative, innovation, prioritization, customization and leadership. Although the DMC will be primarily responsible for implementing the CSP, it will require the concerted efforts of many stakeholders to achieve this goal. Partnership arrangements with relevant government agencies, the private sector, civil society and citizens/households will need to be established and institutionalized for successful implementation of the CSP. The study of the sanitation situation in Dewas and the projection of demand for various sanitation services will define the level of deficiency in respect of sanitation in Dewas. The National Urban Policy, Integrated Urban Sanitation Programme of GoMP, and the National Rating and Award Scheme for Sanitation for Indian Cities, instituted by Government of India, provide a good framework for defining the steps to be taken for preparing the City Sanitation Plan and its implementation.

Source : City Sanitation Plan for Dewas, Madhya Pradesh, India Final Report

6. Drinking Water and Sanitation in Rural Madhya Pradesh: Recent Initiatives and Issues:

Since the observance of the International Drinking Water Supply and Sanitation Decade (IDWSSD) during 1981-90, there has been a growing awareness about and concern over the poor access to these basic services in most of rural India. So far as water for drinking and domestic purposes is concerned the conventional emphasis has been on the availability, quality and sustainability of freshwater. The major and persisting reasons for the crisis have been identified as the excessive demand for water coming up from a large, growing and often urban population; depleting groundwater levels due to mindless exploitation; causing contamination to or polluting water bodies; mismanaging waste water; neglect of protecting and/or promoting water harvesting systems; and poor policy and its implementation. A particularly disturbing aspect of statal intervention has been the presentation and compilation of utterly unrealistic and unreliable database on the nature and extent of coverage of rural habitations, which showed surprisingly massive achievements contrary to field reality
Source Drinking Water and Sanitation in Rural Madhya Pradesh

5. Karnataka

1. Rural Drinking Water And Sanitation Department (Rdw Sd)

Karnataka is India's 7th most urbanized state in the country. The total population of Karnataka according to the 2011 census was 6.11 crores, an increase from 5.29 crores in the 2001 census. The state accounts for 6.28% of the country's urban population.

The level of urbanisation in Karnataka increased by 4.58 per cent, from 33.99 per cent in the 2001 Census to 38.57 per cent in 2011, while the level of rural population declined from 66.01 per cent to 61.43 per cent.

Karnataka State resorts to nearly 45 percent Open Defecation (O.D) while the urban population has 10.7 percent O.D as per 2011 census. The percentage of households having pit latrines in the State is 13.6 percent while 48.8 percent do not have latrine facilities in the State (Census 2011). However, the percentage of urban households having pit latrines is 12 percent and no latrine is 15.1 percent. The total households having Septic tanks in the state is 13 percent while the urban households have 17 percent. Only 53.3 percent of the total urban areas have access to a piped sewer network (2011 census). Currently 59 towns have been implemented with UGD, 60 towns are under progress. (KUWS&DB).

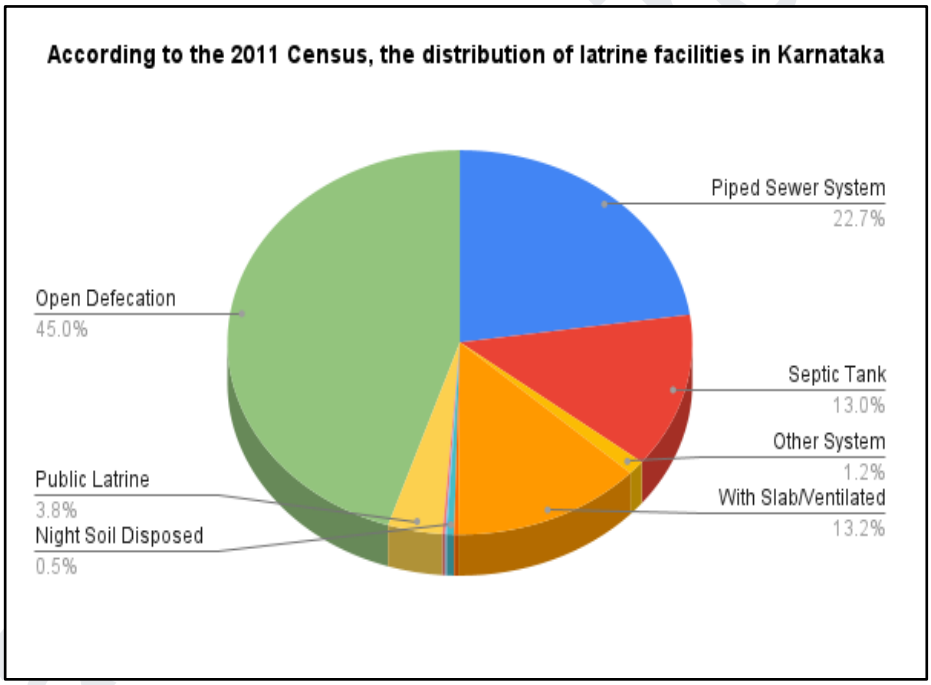

Figure :7 Status of All Types of Latrine Facilities (2011 census) Karnataka

Source:

http://www.kukanurtown.mrc.gov.in/sites/kukanurtown.mrc.gov.in/files/users/user3/4%20karnataka_state_sanitation_strategy_9.9.2017_shpc.pdf

2. Safaikaramchari Kavalu Samiti (SKKS):

In Karnataka, the NGO Thamate is transforming sanitation workers from being mere advocates to becoming empowered leaders. Through the Safaikaramchari Kavalu Samiti (SKKS), a community-based network, sanitation workers have been mobilizing for their rights, demanding accountability

from local authorities, and ensuring their voices are heard. This blog highlights how these sanitation workers are not only breaking down barriers but also paving the way for systemic change across the state with Thamate's support.

Source: October 2024 Catalysts for Change: Sanitation Workers' Grassroots Network in Karnataka

3.Rural sanitation in karnataka:

Open Defecation has been a common issue especially in rural India. Historically, it wasn't considered a shame or looked at from a sanitary perspective. Over the past few decades, Karnataka has seen the implementation of various sanitation projects under centrally sponsored schemes, externally aided programs and Government of Karnataka sponsored programs such as Nirmal Grama Yojane, Swachha Grama Yojane, etc. According to the Baseline Survey of 2012, out of 70.32 lakh rural households in Karnataka, 35% households had toilets, while the majority 65% were without toilets. To achieve the desired goal of accelerating sanitation coverage across rural India, "Swachh Bharat Mission" was launched on 2nd October 2014 by the Government of India. From 2nd October 2014 to 19th November 2018, 48 lakh Individual Household Latrines (IHHLs) were constructed across the state.

Source: Sanitation – RDW SD Karnataka

6. Odisha

The Odisha Rural Sanitation Policy 2020 provides a framework aligned to the 5T guiding principles (Teamwork, Technology, Transparency, Time leading to Transformation), as laid out by the Hon'ble Chief Minister of Odisha, with an overarching vision of achieving Swachha Odisha, Sustha Odisha. Accordingly, it sets out a course of action towards (i) sustaining toilet access, usage and hygiene practices, and (ii) safe management of solid and liquid wastes. Central to this approach is 'people's participation' for creating, managing and maintaining sanitation related assets and services. Guided by the 73rd Constitutional Amendment and the Odisha Gram Panchayat Act, 1964, Gram Panchayats (GPs) are the designated lead agencies for implementation of the Odisha Rural Sanitation Policy 2020. GPs, in partnership with the local communities, shall strive to achieve the desired outcomes within an equitable and inclusive framework, founded on the principle of decentralized governance. The Policy envisions sanitation secure villages, created through locally managed and owned interventions that shall provide an improved quality of life to its residents and drive development.

Source: Odisha Rural Sanitation Policy - CPR

1.Improving community sanitation in Odisha

Government of Odisha, India to improve sanitation and support villages to become open defecation free.

Community Led Total Sanitation (CLTS) uses community empowerment to raise awareness and change defecation practices with the goal of entire villages becoming ODF. In Odisha, one of the least developed states in the country with a population of 42 million, the 2011 census found only 22% of households have their own latrines. Following the change in national policy, the Government of Odisha (GoO) implemented an adapted CLTS approach to improve sanitation practices and achieve ODF status. This adapted approach, named Community Led Sanitation (CLS) draws on CLTS

methodologies of community empowerment, but also provides government subsidies and enables communities to access affordable and high quality materials for toilet construction.

A technical management and support team, led by Options, supported local NGOs to implement CLS in over 800 villages across five blocks of Odisha from high burden districts, identified by the State Government. CLS was implemented in stages between October 2014 and February 2016.

Following the intervention, more households have an improved sanitation facility, with the greatest increase among the most vulnerable groups.

The final 2016 survey found 44.1% of households had improved sanitation facilities (shared and unshared) compared with only 13.9% in the 2014 baseline survey.

Increased access to improved facilities has also progressed for scheduled tribe households, the social group with the lowest health and nutrition outcomes in the state. In 2014, just 3.7% had access to an improved facility, compared to 29.7% in 2016.

In terms of use, the 'gold standard' is that all household members usually use an improved, unshared sanitation facility. The evaluation results show this has increased considerably from 7.6% in 2014 to 31.7% in 2016.

Although more people had access to improved toilet facilities, more than half of households at the end of the programme did not yet own an improved sanitation facility. Lack of land for construction of household toilets and lack of water to sustain use of toilets are the two main factors that hinder achievement and sustainability of ODF status with poor people being most at risk.

SOURCE: Improving community sanitation in Odisha - Options

2.Integrated Water, Sanitation and Hygiene [WaSH] project in Rural Odisha

Feedback Foundation has partnered with JSW Foundation to deliver essential health and hygiene benefits to rural communities in Sambalpur and Jharsuguda districts in Odisha. The primary objective of the program is to enhance water supply, sanitation services, and hygiene practices. The program aims to engage the community towards collective behavior change by building natural leaders who emerge from collective local action and lead future community initiatives. The project also emphasizes on convergence with government departments, especially SBM-Gramin, MNREGA, and Jal Jeevan Mission, to ensure the efficient implementation of government schemes. Additionally, the program components also include construction of a Material Recovery Facility (MRF) for efficient solid waste management, and functionalizing of community toilets constructed by JSW with a sustainable O&M model. With these efforts, Feedback Foundation and JSW Foundation aim to improve the health and hygiene of rural communities and create a lasting impact beyond the project period.

3.Decentralised solid waste management through MCC & MRF: Waste to Wealth

Solid Waste Management is revolutionised and has set its roots in Urban Odisha. In an attempt to make Odisha, "Swachh Odisha Sustha Odisha", the Housing & Urban Development Department, Govt of Odisha has embarked upon Decentralised Solid Waste Management. This is being done through the installation of Wealth Centre (WCs) which is a blend of two waste processing facilities, namely Micro Composting Centre (MCC), and Material Recovery Facility (MRF). The former helps in processing wet waste and the latter processes dry waste giving a modern-day touch to solid waste management.

Out of 1850+ cities across the country, top two ULBs from Odisha got selected in Indian Swachhta League (ISL). Cuttack(MC) got the ISL award under 3 Lakh-10 Lakh population category and Pipili(N) got the ISL award under 15K-25K population category.
source: Decentralised solid waste management through MCC & MRF: Waste to Wealth

4.2 Waste Management

The management of an ever-increasing volume of waste has become a very organized, specialized and complex activity with the development of science and technology, mainly in the cities. Characteristics of the waste material has evolved in line with lifestyle changes, and the number of new chemical substances present in it has increased dramatically. The long-term health effects from exposure to such toxic substances become difficult to measure, especially when their concentrations are very small and when there are other exposure pathways (e.g. food, soil). Bioaccumulation at a particular trophic level and biomagnification up the trophic levels in a food chain are dangerous phenomena. Substances such as heavy metals, persistent organic pollutants (POPs), plastics, accumulate in the animal fats and tissues, polluting ecosystems for years. India is a signatory to Stockholm Convention on POPs.Leaching of chemicals from the landfills pollutes not only the soil but also groundwater. Well-publicized industrial accidents, often unrelated to the waste management activities, have produced a NIMBY (not in my backyard) syndrome that causes fierce opposition to the construction of landfills, incinerators, or other waste disposal facilities from the public. Import of toxic substances from other countries, such as through dumping of electronic wastes and dirty plastics is also a major environmental issue (India is a signatory to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal). Government and health authorities are under increasing pressure from the public to provide epidemiological evidence of potential adverse health effects produced by these activities. From the above discussion, it is imperative to develop proper waste management systems in the GRB. The following table 3 shows the potential sources of solid waste generation.

Table 3: Sources of Solid Waste Generation

Source	Facilities/Activities/Locations	Types of Solid Wastes
Residential	Single-family and multifamily dwellings; low-, medium-, and high-density apartments. Can be included in IC&I sector	Food wastes, paper, cardboard, plastics, textiles, yard wastes, wood, ashes, street leaves, special wastes (bulky items, consumer electronics, white goods, universal waste), household hazardous waste.
Commercial	Stores, restaurants, markets, office buildings, hotels, motels, print shops, service stations, auto repair shops	Paper, cardboard, plastics, wood, food wastes, glass, metal wastes, ashes, special wastes, hazardous wastes.
Institutional	Schools, universities, hospitals, prisons, governmental centers	Same as commercial, plus biomedical wastes.

Industrial (non-processed wastes)	Construction, fabrication, light and heavy manufacturing, refineries, chemical plants, power plants, demolition	Same as commercial.
Municipal Solid Waste	All of the preceding	All of the preceding.
Construction and Demolition	New construction sites, road repair, renovation sites, razing of buildings, broken pavement	Wood, steel, concrete, asphalt paving, asphalt roofing, gypsum board, rocks, and soils.
Industrial (construction)	Construction, fabrication, light and heavy manufacturing, refineries, chemical plants, power plants, demolition	Same as commercial, plus industrial process wastes, scrap materials.
Agricultural	Field and row crops, orchards, vineyards, dairies, feedlots, farms	Spoiled food, agricultural waste, hazardous waste.

(*Annual Report 2020-21 on Implementation of Plastic Waste Management Rules, 2016*)

Figure: 8 Religious waste disposal in Basar Ghat

Figure: 9 Collecting and Disposal of MSW by Municipal Authority

4.21 Municipal solid waste management

Municipal solid wastes (MSW) are often produced from residential and industrial (non-processed wastes), commercial, and institutional sources, except hazardous and universal wastes, construction and demolition wastes, and liquid wastes (water, wastewater, industrial processes). The table below shows the municipal solid waste generated and processed by each state (covering the districts that fall under the GRB) within the GRB, followed by the associated graph plot (Figure 10).

Table 4: Municipal solid waste management in the Godavari River basin

Municipal solid waste management in the Godavari River basin

S. No.	State	Waste Generation (MT/D)	Waste Processed (MT/D)	Waste Processing %
1	Andhra Pradesh	551.03	488.48	88.64%
2	Chhattisgarh	65.14	65.14	100%
3	Karnataka	59.06	25.52	43.21%
4	Madhya Pradesh	273.72	273.72	100%
5	Maharashtra	5157.05	5103.88	98.96%
6	Odisha	109.76	50.71	46%
7	Telangana	1183.8	867.93	73.31%
TOTAL		**7399.56**	**6875.38**	**92.91%**

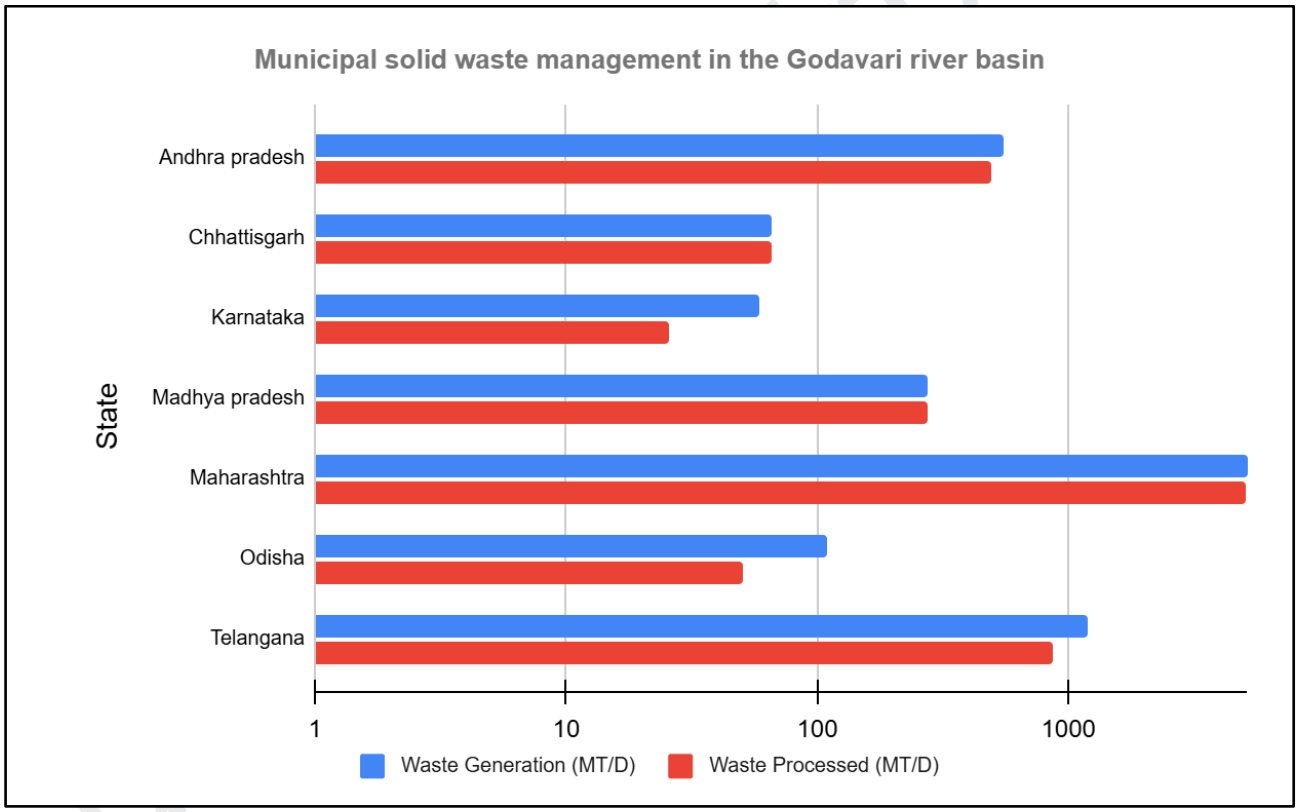

Figure: 10 Municipal Solid waste in the Godavari river Basin

SOURCE :Swachh Bharat Mission City-wise report of Municipal Solid Waste Management

It can be seen that the GRB districts in Chhattisgarh and Madhya Pradesh have 100% waste processing, followed by Maharashtra. Overall, the GRB have more than 90% waste processing.

4.22 Hazardous Waste Management

Hazardous wastes have the potential to harm humans or the environment, either now or in the future. They may include, biomedical, electrical, radioactive, pharmaceutical, and explosive wastes among

others. The hazardous waste generated in the Godavari River Basin, according to state-wise (covers districts that fall under the Godavari River Basin) distribution, is sent to landfills, incinerators, recycling, and utilization (Table 4, Figure 11). The total quantity of hazardous waste generated in the GRB in the year 2022-2023 is 539,861 metric tons, with Telangana generating the highest amount of hazardous waste in the GRB, followed by Andhra Pradesh.

Table 4: Quantity of Hazardous Waste generated as per Annual Return

Quantity of Hazardous Waste generated as per Annual Return (Metric Tonne) - (2022-2023)					
STATE	**Landfillable**	**Incinerable**	**Recyclable**	**Utilizable**	**Total Quantity**
MAHARASHTRA	29,122	56,634	39,026	77,201	201,986
TELANGANA	46320.246	1549.64	17497.177	163280.88	228646.74
ANDHRA PRADESH	7320.72	115.2	4320.23	81408.68	93164.82
CHHATTISGARH	0	2.78	260.68	12.55	275.999
MADHYA PRADESH	1277.06	0.01	234.06	1193.72	2704.83
ODISHA	17.78	13.119	360.607	1616.461	2007.967
KARNATAKA	1562.43	2337.699	6465.163	709	11074.292
TOTAL	**85,620**	**60,652**	**68,164**	**325,422**	**539,861**

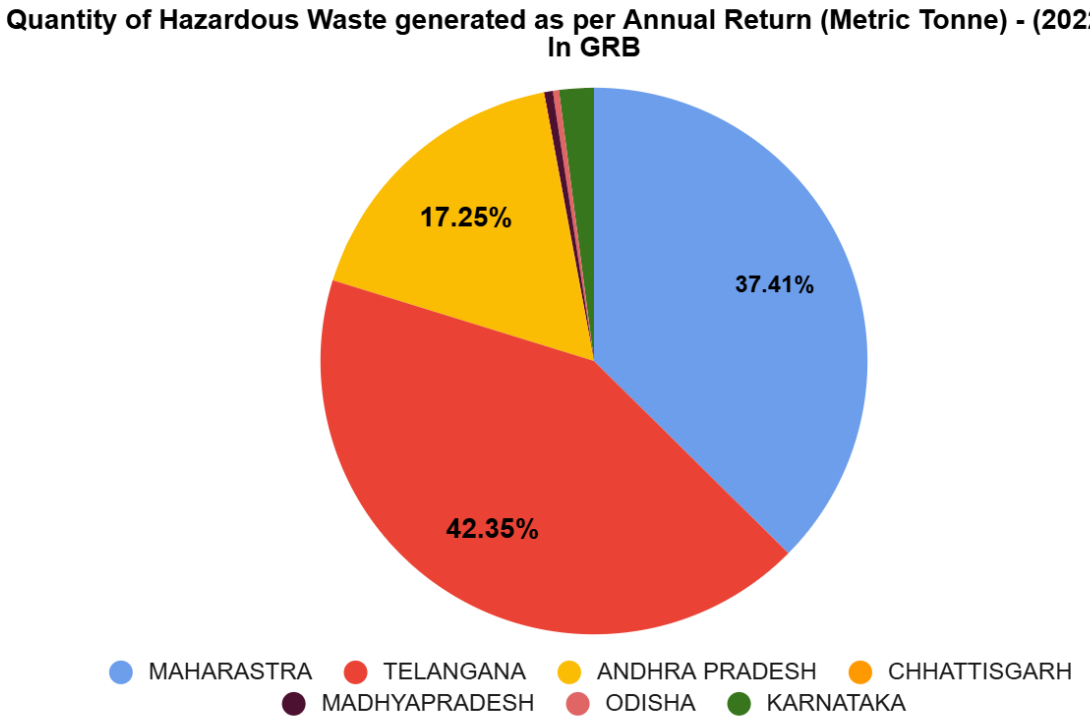

Figure: 11 Quantity of Hazardous Waste generated as per Annual Return

SOURCE: CPCB National Inventory on Generation and Management of Hazardous and Other Wastes (2022-23)

4.23 Plastic Waste Management

Plastic products have become an integral part in our daily life as a basic need. It is produced on a massive scale worldwide and its production crosses the 150 million tonnes per year globally. Considering that 70% of total plastic consumption is discarded as waste, approximately 5.6 million tons per annum (TPA) of plastic waste is generated in country, which is about 15342 tons per day (TPD). Its broad range of application is in packaging films, wrapping materials, shopping and garbage bags, fluid containers, clothing, toys, household and industrial products, and building materials. Conventional plastics don'tdegrade and remain in the environment for several years. The recycled plastics are more harmful to the environment than the virgin products due to mixing of colour, additives, stabilizers, flame retardants etc. Further, the recycling of virgin plastic material can be done 2-3 times only, because, after every recycling, the strength of plastic material is reduced due to thermal degradation.

The Municipal Authority sets up, operationalises and coordinates the waste management system:(i) to ensure safe collection, storage, segregation, transportation, processing and disposal of plastic waste; (ii) to ensure that no damage is caused to the environment during this process; (iii) to ensure setting up of collection centres for plastic waste involving manufacturers; (iv) to ensure its channelisation to recyclers; (v) to create awareness among all stakeholders about their responsibilities; (vi) to engage agencies or groups working in waste management including waste pickers, and (vii) to ensure that open burning of plastic waste is not permitted. Source segragation of plastics becomes an important responsibilty at the citizens' level for its efficient management. Table 5 shows the best practices adopted as per Plastic Waste Management Rules, 2016.

Table 5 : Best Practices adopted as per the Plastic Waste Management Rules, 2016

Name of the SPCB/PCC	Best Practices adopted as per the Plastic Waste Management Rules, 2016
Andhra Pradesh	• The ULBs are collecting and segregating the plastic waste and sending it to recyclers. Most of the Plastic waste is channelized through Kabadiwalas to recyclers. • The non-recyclable plastic waste generated from the municipalities and from bio mining operations is being sent to Cement plants and partly for road formations.
Chhattisgarh	• Material Recovery Centers have been established. • Plastic waste is being used in road construction and cement plants.
Madhya Pradesh	• 55183 MT of plastic waste co-processed in Cement kilns; 63400.651 MT processed by recyclers; 405 MT used in road construction.
Maharashtra	• Collection efficiency 81%; Recycling & processing – 55%.4 , • Pyrolysis & Road construction > 5000 TPA each
Odisha	• Plastic waste has been included in the Schedule of rate department for use of the same in construction of roads. • 283.132 TPA of plastic waste used for co-processing and 1452 TPA use for granules making
Pondicherry	• Usage of plastic in road construction and co-processing initiated

	• 3710 T plastic waste utilized in recycling & 943 MT used in co-processing.
Telangana	• 206 Dry Resource centers established in 139 ULBs.

As per the recent amendments, the Plastic Waste Management (Amendment) Rules, 2024 target microplastics and set stricter criteria for biodegradable plastics. Biodegradable plastics are capable of degradation by biological processes in specific environments like soil and landfill, without leaving any microplastics. Microplastics are defined as any solid plastic particle insoluble in water, with dimensions between 1 micron and 1,000 microns (1 micron is one-thousandth of a millimetre).
They are a major source of pollution affecting waterbodies, act as carriers for various chemicals, antibiotic-resistant bacteria, and pathogens, posing risks to aquatic life and human health if they bypass the water treatment process. *Currently, the minimum thickness of plastic carry bags allowed is 120 microns, and selected 19 single-use plastic items are banned in India.*

4.3 Public Toilets

Hygiene and sanitation are undoubtedly crucial aspects of modern urban infrastructure and ease-of-living.The lack of public infrastructure, basic amenities, and awareness amongt citizens was a challenge. One of the key focus areas under sanitation is the elimination of open defecation through the availability and maintenance of toilets. The objective was to provide toilets to all individuals, regardless of gender, class, caste, or community, and to raise awareness about their importance. The initiatives undertaken by the Ministry of Housing and Urban Affairs (MoHUA) under SBM proved to be a game-changer, as they mobilized widespread citizen participation and made conscious efforts to bring about the desired change in the overall sanitation landscape of urban India. The number of public toilets, community toilets, and urinals in urban local bodies (ULBs)/blocks with population exceeding 1 Lakh across different states is listed in the **Annexure V :** Public Toilets in the GRB (Swachh Bharat Mission Progress). Cities were consequently declared ODF, ODF+, and ODF++ under the Mission (**Annexure VI: District wise Status of Achieving ODF Plus in the GRB).**). **Toilets Constructed under Swachh Bharat Mission**

5. Riverfront Development Plan

Few i**nitiatives on riverbank protection and ecological restoration**

1. Since the beginning of civilization, rivers have played a major and important role in shaping and influencing the development of the nation and the culture of its people. Rapid development and urbanization all over the country including riverfront areas are causing the deterioration of the natural environment such as by flooding, pollution, and drought. These problems disturb economic growth and the activities of life and can result in the loss of property and lives. Riverbank protection involves the creation of sewerage treatment infrastructure, river-surface cleaning, industrial effluent monitoring, and afforestation (Trees have the ability to regulate the flow of water in rivers by reducing soil erosion, sedimentation, and increasing groundwater recharge, maintaining biodiversity).

EXPECTED OUTCOMES

A. Beautification of Riverfront areas of Godavari.
B. Clean and perineal flow of Godavari River.
C. Reduction in water-borne diseases, Epidemics around the banks of the river.
D. The Solution of Parking issues in the congested city area.

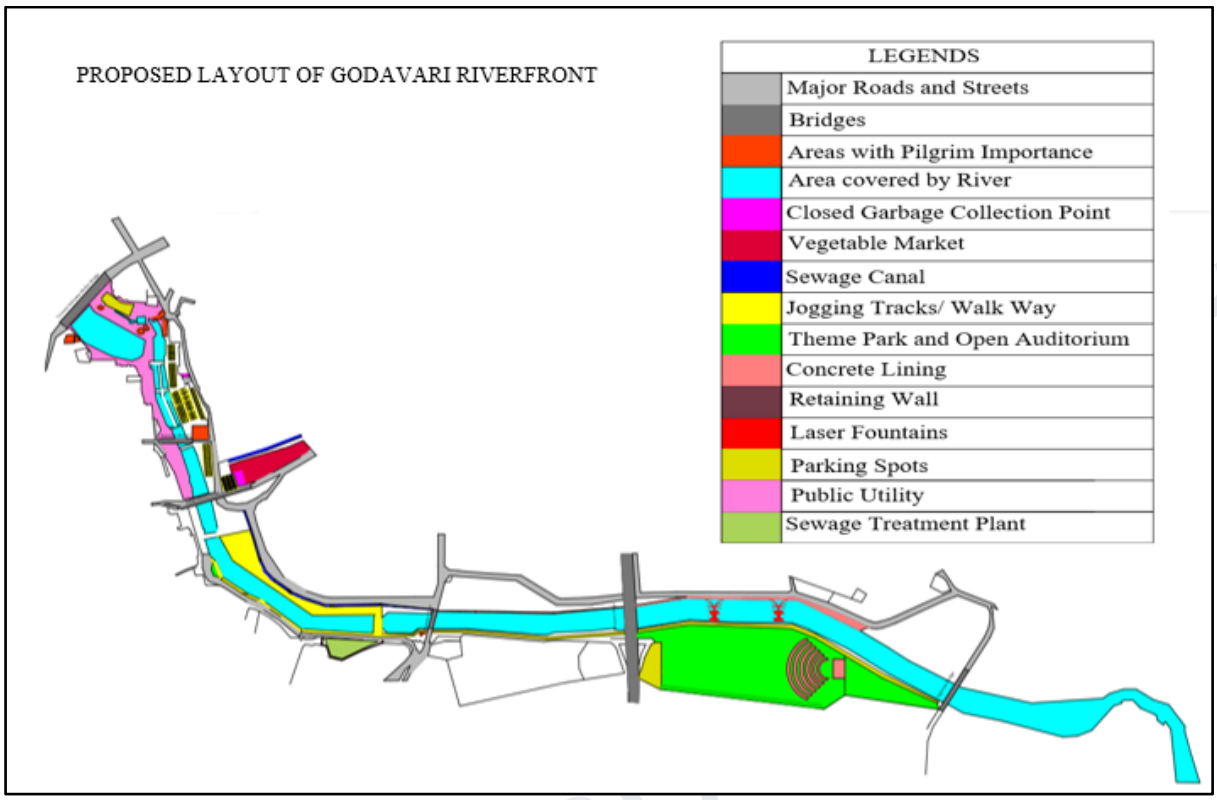

Figure: 12 (https://ijsrd.com/Article.php?manuscript=IJSRDV6I10220)

2. The project will include constructing new sewage lines, 6 STPs, replacing and upgrading existing ones to meet the norms of the Maharashtra Pollution Control Board (MPCB). Riverfront development, heritage beautification, and ghat development. The Namami Goda project introduced by the Nashik Municipal Corporation (NMC), the project aims to make the Godavari River pollution-free before the 2027 Kumbh Mela.
http://timesofindia.indiatimes.com/articleshow/113139784.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

3. **GODAVARI RIVERFRONT DEVELOPMENT INCLUDING BEAUTIFICATION AN**
FUNDING : SMART CITY FUND | PROJECT COST : INR 73.70 CR.

This is a marquee project under the Nashik Smart city initiative. The master planning of the area provides an excellent opportunity for rejuvenation of the area and its picturesque backdrop with the Godavari river front. Aim is to promote heritage and cultural tourism, which in turn is expected to boost the local economy. The main features of the project include:Beautification through cobble stone paving , stone benches, cycle track, sign board, tree plantation, heritage walks, jetty and floating fountain river desalting and cleaning. Boost tourism and local economyHighlight Nashik in Spiritual and heritage map of India Improved water quality Increase green cover of the city Reduced probability of flood.
https://nashiksmartcity.in/project/tenderinprogress

4. **Godavari River Bank Restoration, Nashik (River Bank Conservation)**

Need: To create a resilient Riverbank landscape that can battle with Floods, Restoration of religious & heritage Precinct.

The project is part of the Area Based Development Plan and comprises rejuvenation of the riverbank of the Godavari River in the Panchvati area, a religious & heritage precinct adorned with several temples, Kunds, and the sacred place where the Kumbh mela takes place. It comprises perhaps Maharashtra's largest mist zone and is perhaps the only project in the country or in the world which remains submerged for 15 days every year, which itself is the biggest challenge in its conservation & eco restoration. The design synchronises all the different zones but retains their distinctive features which can add to the curiosity and increase the interest of the visitors. Increase in water volume, use of Gabions, permeable surfaces, rainwater harvesting, Water-resistant lighting are a few measures taken to reduce the impact of floods and scouring of the banks. Use of geotextiles, vetiver grass, semi-permeable surfaces, and other bio design aspects will make this project one of its kind in sustainable river projects.

Outcome: Use of Nature-Based solutions overriding the infrastructure development, Creation of an interface between people & nature, Restoration of historic significance of the area, Creation of water sport activities.

https://aghdesign.co/godavari-riverfront-conservation-beautification/

5. Nanded: The primary objective of the riverfront development was to connect the city to the river, make it more accessible and usable by the residents. The abused river can be brought again to making use of the assets of the river itself and convert the abandoned land of riverbed and nuisances on the center of the metropolis into people's attraction, visitor's attraction, advent of infrastructure and recreational facilities and rework the city greater livable in phrases of Environmental improvement and inclusive development. The Master Plan focuses on regeneration of the river. The North Bank will be integrated with the existing urban fabric while the less developed South Bank is proposed as an eco-park. Amenities include organized market area, jogging track/walkway along river, parks, oxidation pond for treating wastewater, among others. Key components of the project include:

- Ghats, walking paths and promenades
- Buildings for social infrastructure
- Revival of natural drainage systems
- Revenue generation systems
- Parks, gardens, street planting and eco systems
- Lighting
- Street furniture, art, sculptures
- Reorganizing cremation activity
- Solid waste management

https://www.academia.edu/44245317/A_CASE_STUDY_OF_GODAVARI_RIVERFRONT_DEVELOPMENT_NANDED_CITY

6. To deal with differences between water availability and supply across different basins and states, four Inter-basin transfer links are proposed for river water transfer from the region of surplus to deficit areas, i.e., Inchampalli-Nagarjuna Sagar Link, Inchampalli–Pulichintala Link, Polavaram-

Vijayawada Link, and Mahanadi-Godavari Link (*https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1983759*). Further, GRB has National Waterway-4, a stretch of 171 km, between Bhadrachalam and Rajahmundry, and connects the Krishna-Godavari River basin (major offshore natural gas reserve).

6. **Identification of inefficiencies in current infrastructure and misalignment with urban growth, conclusion/solutions**

When the cities expand, a greater number of permanent roads, housing complexes, and other public infrastructures tend to increase the surface runoff and decrease infiltration to the soil. This is also accompanied by the reduced drainage towards local lakes and ponds, due to their encroachment. Post rainfall, the consequent overflow can cause urban floods which are quick and possibly devastating. Further, as per the UN-Habitat's World Cities Report 2024: Cities and Climate Action, cities are the largest contributors to greenhouse gas emissions (GHG), and face severe impacts of climate change such as frequent weather extremes and sea-level rise.

Hence, moving towards sustainable growth and sponge cities has become mandatory. AMRUT mission along with JJM(U) aims to provide every household an access to a tap with assured supply of water and a sewerage connection, to increase the greenery and well-maintained open spaces, parks, and reduce pollution by switching to public transport, constructing cycle tracks, etc. While execution, the schemes need to focus on nature-based solutions and a people-centric approach in methodology, empowering local bodies. To reduce GHG emissions, Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme II was enacted to provide incentives for Electric Vehicle manufacturers and buyers. India also supports the global EV30@30 campaign for at least 30% new vehicle sales to be electric by 2030.

The excessive concretisation of the Goda/Godavari Ghats by the Nashik Municipal Corporation (NMC) to accommodate the influx of pilgrims during the Kumbh Melas resulted in the channelisation of the natural course of the river. The preparation of the mela attracts huge funding from the state as well as the central government. This concretisation of the riverbanks and riverbed in Godavari Ghats changed its behaviour. Without anything being natural in the riverscape has caused frequent droughts and floods in the region. Therefore, religious festivities need to be conducted along the rivers without disturbing its purity and natural flow. (https://www.epw.in/engage/article/%E2%80%98fixing%E2%80%99-river-political-ecology-changing-water)

Interlinking of rivers can cause serious disturbance to the uniqueness of biodiversity by changing the depth, flow and turbidity of water, creating barriers to those species that migrate upstream to spawn encouraging the spread of alien invasive species. Invasive species can cause native species to become extinct. Apart from inundating ecologically sensitive areas, excessive damming and interlinking of rivers often displace many rural and tribal communities. The dam construction projects on rivers require approval from the river boards, since the activity disturbs the natural flow of water and affects the lowlands with backwaters as mentioned earlier. The dammed river creates a reservoir upstream from the dam that may spill water into the surrounding environment. As a result of the backwaters, the lowlands are affected with flooding that cause soil erosion. Potential flooding can create

disruption to the environment and affect the natural habitat. The flooding tends to displace and kill different organisms including wildlife, plants and even humans. The land may lose its fertility and the ability to grow crops for agriculture and industrial purposes (Majumdar 2018). Smaller projects are therefore suggested over larger ones to save the natural flow of the Godavari.

The largest share of groundwater usage is in the agriculture sector in India. Excessive extraction can lead to reduced base flows, groundwater contamination, land subsidence, apart from depleting another important water source. Some regions of Telangana, Karnataka, and Maharashtra suffer more in the GRB. PMKSY aims to increase water use efficiency and implement sustainable water conservation methods. 'Har khet ko paani', 'More crop per drop', and 'Watershed management' are the main components under this scheme. Incorporation of renewable energy in farmers' irrigation practices is being done under PM-KUSUM. It helps farmers gain access to solar water-pumps at subsidized rates and an avenue to utilize their barren lands by setting up solar power plants for energy generation.

While policymaking, it is essential to note that the responsibility of collecting and managing water to meet various household needs rests with Indian women. In addition to household uses, women's requirement of water in their role as cultivators is the same as men but is seldom recognised. They are forced to travel long distances or stand for hours in long queues because water is not easily accessible or available in both rural and urban areas. This leaves women with much less time for other important activities such as attending school (especially for young girls), childcare, farming, or other income-generating activities. It has also been seen, that some rural households resort to polygamy so that multiple women can fetch water in drier regions (https://www.indiatimes.com/news/india/water-wives-how-lack-of-water-in-this-maharashtra-village-led-to-polygamy-568090.html). Further, lack of access to/ownership of land is a major challenge to women's access to water and leads to greater poverty in female-headed households. Participation of females in water planning and management must be increased drastically from abysmally low (https://www.epw.in/engage/article/india-water-policy-gender-blind).

Annexures

Annexure I : The district-wise urban expansion in the Godavari River Basin

STATE	DISTRICT	URBAN BUILT-UP AREA (2005-2006)	URBAN BUILT-UP AREA (2015-2016)	URBAN AREA EXPANDED (Sq. Km)
MAHARASHTRA	Ahmednagar	83.64	122.83	39.19
	Akola	49.7	59.08	9.38
	Amravati	73.32	84.6	11.28

	Aurangabad	99.01	145.89	46.88
	Bhandara	30.02	42.25	12.23
	Bid	48.15	69.86	21.71
	Buldhana	45.55	64.16	18.61
	Chandrapur	128.5	131.63	3.13
	Garhchiroli	19.24	19.68	0.44
	Gondia	17.32	29.33	12.01
	Hingoli	17.07	20.64	3.57
	Jalgaon	93.73	125.6	31.87
	Jalna	23.15	37.7	14.55
	Latur	59.59	72.64	13.05
	Nagpur	243.34	354.36	111.02
	Nanded	67.67	68.83	1.16
	Nashik	223.56	281.75	58.19
	Osmanabad	33	34.73	1.73
	Parbhani	43.74	53.16	9.42
	Wardha	71.09	85.31	14.22
	Washim	16.03	17.76	1.73
	Yavatmal	65.32	73.49	8.17
TELANGANA	Adilabad	82.33	104.68	22.35
	Karimnagar	85.97	125.57	39.6

	Khammam	92.99	110.12	17.13
	Mahbubnagar	54.09	94.59	40.5
	Medak	95.15	151.85	56.7
	Nizamabad	46.15	61.79	15.64
	Rangareddy	677.83	759.86	82.03
	Warangal	94.98	118.94	23.96
ANDHRA PRADESH	East Godavari	138.76	162.03	23.27
	West Godavari	75.12	106.11	30.99
ODISHA	Kalahandi	17.06	86.29	69.23
	Koraput	21.58	172.62	151.04
	Malkangiri	6.47	142.29	135.82
	Nabarangpur	3.85	246.63	242.78
	Rayagada	12.24	20.41	8.17
MADHYA PRADESH	Balaghat	20.21	26.42	6.21
	Betul	26.88	36.67	9.79
	Chhindwara	29.48	46.39	16.91
	Mandla	13.09	15.77	2.68
	Seoni	8.98	16.14	7.16
CHHATTISGARH	Bastar	22.55	376.85	354.3
	Dhamtari	115.57	127.07	11.5
	Kanker	6.67	122.64	115.97
KARNATAKA	Bidar	40.23	55.2	14.97
	Kalaburagi	98.45	102.96	4.51
PONDICHERRY	Yanam	2.21	4.69	2.48

Annexure II : Smart City Initiatives in the GRB

STATE	CITY	S. No.	PROJECTS
MAHARASHTRA	NAGPUR		**Area Based Development (ABD)**
			RESILIENT AND SMART INFRASTRUCTURE AGENDA
		1	24x7 Water Supply for the PBP area
		2	Integrated WW and SWD project
		3	Utility Ducting
		4	Piped gas network
		5	Smart Electricity Grid (smart meters and SCADA system)
			SMART MOBILITY AGENDA
		6	Project Tender SURE (Road and NMT)
		7	MOVE PEOPLE initiative (e-buses)
		8	Smart Bus shelters
		9	Project "Share a Bike" (PBS)
		10	E-rickshaws
		11	Automated MLCP at Pardi
			SMART AND INCLUSIVE LIVING AGENDA - MODULE 1
		12	Project "HOME SWEETHOME"
		13	Project "SHIKSHIT and NIRAMAY PBP"
		14	Project "KAUSHAL PBP" (multi-skill development center)
		15	Project "ABHAY" (CCTV, police kiosk)
		16	Project "SURAKSHA APP
		17	Public market Places
			SMART AND INCLUSIVE LIVING AGENDA - MODULE 2
		18	Project "Attractive Public Realm" and public art installation
		19	Project "Nirmal Nag River"
		20	Five public gardens and Landscaping
			SMART ENVIRONMENT AGENDA

		21	Project "Zero Garbage Society"
		22	Smart trash bins
		23	Project "Green Light"
		24	Rainwater harvesting
		SMART GOVERNANCE AGENDA	
		25	Wi-Fi hubs
		26	Smart police kiosk
		27	ORANGE City Kiosk
		Pan City	
		DIGITAL GOVERNANCE AGENDA	
		28	Nagpur City Community Network (NCCN)
		29	Unified Operations and Command and Control Centre
		30	Smart Garbage Solution
MAHARASHTRA	**NASHIK**	**Area Based Development (ABD)**	
		Green Field	
		1	Project Goda - Riverfront Development
		2	Nashik Jeevan - Water Supply Improvement
		3	Nirmal Nashik - Sewerage & Drainage Network Improvement
		4	Project Rachana - Street scaping and beautification
		5	Project Urja-Underground Electrification
		6	Nashik Bhaskar - Solar Street Lighting
		7	Project Marg/ Path - Bridges and Roads
		Retro	
		8	Project Goda-Riverfront Development
		9	Project Puratan-Heritage Conservation
		10	Nashik Jeevan-Water Supply Improvement
		11	Nirmal Nashik- Sewerage & Drainage Network Improvement
		12	Project Rachana
		13	Project Swachh Nashik-Public Toilets
		14	Project Urja-Underground Electrification
		15	Nashik Bhaskar-Renewable Energy

		16	Project Parivahan-Transport, Parking & Traffic Management
		17	Kushal Nashik - Skill Development
		18	Project Niwas - Slum Redevelopment
		19	Project Marg/ Path - Road upgradation and construction
		Pan City	
		20	Project Puratan-Heritage Conservation
		21	Nashik Jeevan-Water Supply Improvement
		22	Project Rachana
		23	Surakshit Nashik-CCTV Cameras
		24	Project Parivahan-Transport, Parking and Traffic Management
		25	Project Marg/ Path - Traffic and Parking management
MAHARASHTRA	**AURANGABAD**	**Area Based Development (ABD)**	
		Infrastructure Development	
		1	Water Supply System
		2	Sewerage System
		3	Road Network incl. Cycle track
		4	Solid Waste Management
		5	Power
		6	Telecom and ICT infrastructure
		7	Open Space and Garden
		8	CCTV surveillance
		9	Solar Power
		Affordable Housing Development	
		10	EWS Housing
		11	LIG Housing
		12	MIG Housing
		Social Infrastructure Development	
		13	Fire & Disaster Management
		14	Police Station
		15	Government Health Facilities
		16	Govt. School
		Land Monetization Assets (Details Below)	

		Pan city	
		17	Smart & Safe Integrated Urban Mobility
		18	Smart Street Lighting & Surveillance
		19	Smart Mobility
		20	Smart Solutions for Solid Waste Mgmt.
		21	Command Center & ICT infrastructure
MAHARASHTRA	**AMRAVATI**	**Area Based Development (ABD)**	
		1	Detailed Master planning & preparation of Green building and sustainability norms
		2	Environment monitoring sensors and warning systems
		3	Automated water sprinkler system
		4	Public 6 Cycle docks with 20 smart cycles at each dock
		5	50 electric smart buses
		6	12 Smart bus stops incl. PIS, VMS
		7	Pedestrian Walkways incl. smart street furniture
		8	Flagship smart street infrastructure
		9	Smart Multi-level car park (2000 cars) with solar rooftop
		10	Bio retention ponds
		11	Bio park with active recreational facilities
		12	Canal front development
		13	Riverfront development
		14	Crafts Bazaar
		15	City squares
		16	3 retail centres
		17	Solar trees with charging, Wi-Fi
		18	Solar powered Intelligent street lighting
		19	CCTVs
		20	Smart drinking water taps (40 nos.)
		21	Underground dustbins
		22	1 Model PHC
		23	Bio toilets with accessibility for differently abled (40 nos.)
		24	Digital hoardings
		25	Performance Management portal
		26	People's precinct app

		27	Command and Control Center
		Pan city	
		28	Smart solar light pole with CCTV
		29	Smart electric buses with GPS
		30	Household smart meter connections
		31	Commercial and industrial smart meters
		32	Customer Survey
		33	Digitization of distribution network
		34	Bulk Metering at each zone (DMA)
		35	SCADA
		36	Mobile apps, IVR, website, and database
		37	Consumer Awareness
		38	Leak Detection sensors
		39	Flood Detection sensors
TELANGANA	**WARANGAL**	**Area Based Development (ABD)**	
		BHADRAKALI LAKE FRONT AND RECREATIONAL DISTRICT	
		1	Heritage Area and Lakefront Promenade Development
		2	Improvement of 1000 Pillar Temple Precinct
		3	Improvement of Padmakshi temple precinct
		4	Lakefront promenade development - Foreshore road
		5	Lakefront promenade development - Bhadrakali temple side Foreshore road
		6	Heritage and Cultural Tourism
		7	Heritage walk (total 5.08km including existing roads)
		8	Leisure park
		EXTENDED BUSINESS DISTRICT-LIVABLE NEIGHBOURHOODS	
		9	Housing for existing HHs living in Kachha & Semi Pucca houses in slum area
		10	Non-Slum Residential Areas Retrofitting
		11	Adequate Water Supply
		12	Sewerage Collection & Wastewater recycling
		13	Sanitation
		14	Solid Waste Management
		15	Storm Water Drainage

		16	Social and Community Development
		SMART MOBILITY	
		17	Public Transit Corridor Improvement
		18	Retrofitting other roads, 36.3 km
		19	NMT Corridor along Nala, 3 km
		20	TSRTC Bus Stand Redevelopment
		21	Multi-level Parking
		GREEN URBANISM	
		22	Solar Mission
		23	Waste to Energy
		ENVIRONMENTAL WATCH	
		24	Bhadrakali Lake Regeneration and cleaning
		25	Environmental quality monitoring Stations
		26	Rain Harvesting for all Govt. Owned Institution and Office Buildings
		27	Development of Open Spaces in Retrofitting Area
		SMART CENTRAL WARANGAL	
		28	Safe and Assured Electricity Supply
		29	Smart Safety, Surveillance & Monitoring
		Pan City	
		30	Integrated City Operations Center
		31	Intelligent Transit System
		32	Parking Management System
		33	Area Traffic Control System
		34	Safety & Security Platform
		35	City Communications Backbone
		36	Common City Payments & Service Platform
TELANGANA	**KARIMNAGAR**	**Area Based Development (ABD)**	
		1	Modernization of bus stand
		2	Modernization of market- Digital Vegetable Market
		3	Centers of Excellence
		4	MLCP (2 basements down) with 3-floor commercial complex (including sports complex & fruits market in one)
		5	Designated hawking/vendor zones

		6	Market yard redesign and modernization
		7	Labour Adda @ Tower Circle- (400 workers assemble every day)
		8	Manair Riverfront project
		9	Urban Park and Iconic Landscape for Karimnagar
		10	Redevelopment of museum
		11	Retrofitting of structures
		12	Tourist information centre at public places, kiosks & Street Painting, and street art and sculptures
		13	Development of Park
		14	Green Promenade
		15	Iconic building near Multipurpose school
		16	Integrated Road redesign - Arterial - 5.9 km
		17	Integrated Road redesign - Other Roads - 229.1 km
		18	Cycle Sharing System
		19	Open parking at 5 places
		20	Designated onsite parking for bikes/auto stands @ junctions
		21	Continuous Pressurized 24x7 Water Supply System
		22	Rainwater harvesting
		23	Waste Water
		24	Solid Waste Management
		25	Access to Toilets
		26	Slum rehabilitation
		27	Social Infrastructure- e-Education and toilets
		28	Health Care
		29	Sports Complex
		30	Energy distribution
		31	Smart energy
		32	Solar roof tops
		Pan City	
		33	City Bus System
		34	Road Signages
		35	Signalling
		36	Development of mobile based application including PIS

		37	Zebra crossings and ramps
		38	Cameras and Wi-Fi
		39	Air quality sensors
		40	E-learning in schools
		41	Smart Classrooms
		42	Health Care
		43	City governance + ICCC
		44	Kiosks for recharging smart cards
		45	24x7 water supply

Annexure III : Drinking Water Facilities in the GRB

Drinking Water Facilities					
S. No.	**Sub Basin**	**District**	**Wells**	**Tubewells**	**Handpumps**
1	Godavari Lower Sub Basin	Bastar	878	0	1224
2	Godavari Lower Sub Basin	Koraput	731	3	1751
3	Godavari Lower Sub Basin	West Godavari	388	182	412
4	Godavari Lower Sub Basin	East Godavari	678	177	757
5	Godavari Lower Sub Basin	Khammam	747	254	958
6	Godavari Lower Sub Basin	Karimnagar	797	149	956
7	Godavari Lower Sub Basin	Dantewada	373	28	818
8	Godavari Lower Sub Basin	Warangal	699	206	904
9	Godavari Lower Sub Basin	Yanam	0	0	0
10	Godavari Lower Sub Basin	Malkangiri	381	0	712
12	Godavari Middle Sub Basin	Ahmadnagar	1432	454	1310
13	Godavari Middle Sub Basin	Nanded	1188	383	1373
14	Godavari Middle Sub Basin	Washim	687	87	617
16	Godavari Middle Sub Basin	Aurangabad	1156	323	1017
17	Godavari Middle Sub Basin	Hingoli	506	168	625
18	Godavari Middle Sub Basin	Latur	0	0	0
19	Godavari Middle Sub Basin	Buldhana	1235	279	941
20	Godavari Middle Sub Basin	Bid	846	480	983
21	Godavari Middle Sub Basin	Adilabad	1186	178	1437
22	Godavari Middle Sub Basin	Jalna	808	181	902
23	Godavari Middle Sub Basin	Parbhani	527	155	749
24	Godavari Upper Sub Basin	Ahmadnagar	1432	454	1310
25	Godavari Upper Sub Basin	Pune	1712	647	1284
26	Godavari Upper Sub Basin	Thane	1623	492	1439
27	Godavari Upper Sub Basin	Aurangabad	1156	323	1017
28	Godavari Upper Sub Basin	Bid	846	480	983
29	Godavari Upper Sub Basin	Jalgaon	1326	456	895
30	Godavari Upper Sub Basin	Nashik	1732	549	1523
31	Indravati Sub Basin	Bastar	878	0	1224
32	Indravati Sub Basin	Dhamtari	447	91	565
33	Indravati Sub Basin	Gadchiroli	1391	123	1456
34	Indravati Sub Basin	Koraput	731	3	1751
35	Indravati Sub Basin	Rajnandgaon	1517	141	1526
36	Indravati Sub Basin	Durg	1389	406	1710
37	Indravati Sub Basin	Khammam	747	254	958
38	Indravati Sub Basin	Dantewada	373	28	818
39	Indravati Sub Basin	Kalahandi	1094	0	1532
40	Indravati Sub Basin	Kanker	661	48	739
41	Indravati Sub Basin	Nabarangpur	668	0	767

42	Indravati Sub Basin	Rayagada	729	3	1979
43	Manjra Sub Basin	Ahmadnagar	1432	454	1310
44	Manjra Sub Basin	Nanded	1188	383	1373
45	Manjra Sub Basin	Osmanabad	0	0	0
46	Manjra Sub Basin	Bidar	0	0	0
47	Manjra Sub Basin	Nizamabad	308	312	831
48	Manjra Sub Basin	Latur	0	0	0
49	Manjra Sub Basin	Bid	846	480	983
50	Manjra Sub Basin	Medak	384	651	1135
51	Manjra Sub Basin	Parbhani	527	155	749
52	Manjra Sub Basin	Gulbarga	0	0	0
53	Manjra Sub Basin	Rangareddy	0	0	0
54	Pranhita and others Sub Basin	Gadchiroli	1391	123	1456
55	Pranhita and others Sub Basin	Nanded	1188	383	1373
56	Pranhita and others Sub Basin	Chandrapur	1428	137	1307
57	Pranhita and others Sub Basin	Nizamabad	308	312	831
58	Pranhita and others Sub Basin	Karimnagar	797	149	956
59	Pranhita and others Sub Basin	Dantewada	373	28	818
60	Pranhita and others Sub Basin	Warangal	699	206	904
61	Pranhita and others Sub Basin	Adilabad	1186	178	1437
62	Pranhita and others Sub Basin	Medak	384	651	1135
63	Wardha Sub Basin	Nanded	1188	383	1373
64	Wardha Sub Basin	Washim	687	87	617
65	Wardha Sub Basin	Akola	719	209	726
66	Wardha Sub Basin	Amravati	1509	557	1227
67	Wardha Sub Basin	Chandrapur	1428	137	1307
68	Wardha Sub Basin	Nagpur	1539	283	1422
69	Wardha Sub Basin	Wardha	984	169	946
70	Wardha Sub Basin	Betul	1262	265	1270
71	Wardha Sub Basin	Chhindwara	1508	276	1646
72	Wardha Sub Basin	Hingoli	506	168	625
74	Wardha Sub Basin	Buldhana	1235	279	941
75	Wardha Sub Basin	Adilabad	1186	178	1437
76	Wardha Sub Basin	Jalna	808	181	902
77	Wainganga Sub Basin	Bhandara	767	55	758
78	Wainganga Sub Basin	Gadchiroli	1391	123	1456
79	Wainganga Sub Basin	Mandla	1065	61	1073
80	Wainganga Sub Basin	Balaghat	1204	18	1101
81	Wainganga Sub Basin	Chandrapur	1428	137	1307
82	Wainganga Sub Basin	Gondia	878	21	874
83	Wainganga Sub Basin	Nagpur	1539	283	1422

84	Wainganga Sub Basin	Rajnandgaon	1517	141	1526
85	Wainganga Sub Basin	Betul	1262	265	1270
86	Wainganga Sub Basin	Chhindwara	1508	276	1646
87	Wainganga Sub Basin	Seoni	1415	102	1430
88	Wainganga Sub Basin	Kanker	661	48	739
TOTAL			**77328**	**17489**	**87561**

Annexure IV : Sewage Treatment Plants in the GRB

Maharashtra:

S. No.	Name of the Town with no. of STPs	Location of the STP	STP Installed Capacity (MLD) STP wise	Status (Operational / Non-Operational / Under Construction)	Present capacity/ utilization (MLD)	Compliance Status (Comply/Non-Comply)
1	Amravati Municipal Corporation	STP-2-Lalkhadi	30.5	Operational	30.5	Non Comply
2	Amravati Municipal Corporation	STP-1 – Lalkhadi,	44	Operational	44	Non Comply
3	Chandrapur Municipal Corporation	Pathanpura	45	Operational	24	Non Comply
4	Chandrapur Municipal Corporation	Azad Garden	0.5	Operational	0.5	Non-Comply
5	Chandrapur Municipal Corporation	Rehmat Nagar	25	Operational	22	Comply
6	Chhatrapati Sambhajinagar Municipal Corporation	At Zalta,	35	Operational	7.5	Non-Comply
7	Chhatrapati Sambhaji Nagar Municipal Corporation	Chhatrapati Sambhaji Nagar	161	Operational	70	Non Comply
8	Chhatrapati Sambhaji Nagar Municipal Corporation	Padegaon	10	Operational	2.5	Non-Comply
9	Chhatrapati Sambhaji Nagar	Salim Ali Lake	5	-	0	Under Upgradation work

	Municipal Corporation					
10	Hinganghat Municipal Council	Pili Mazid Bhimnagar Ward, Hinganghat.	10 + 3.5	Operational	6.25	Comply
11	Nagpur Municipal corporation	Mokshadham	5	Operational	5	Comply
12	Nagpur Municipal corporation	Sonegaon (NIT)	0.3	Operational	0.3	Comply
13	Nagpur Municipal corporation	Dhaba(NIT)	5	Operational	5	Comply
14	Nagpur Municipal corporation	Bhandewadi	130	Operational	130	Non-Comply
15	Nagpur Municipal corporation	Kachimet (NIT)	1	Operational	1	Comply
16	Nagpur Municipal corporation	Hazari Pahad (NIT)	4	Operational	4	Comply
17	Nagpur Municipal corporation	Somalwada-1(Ongoing work by NIT)	20	Operational	20	Comply
18	Nagpur Municipal corporation	Bhandewadi	200	Operational	200	Non-Comply
19	Nagpur Municipal corporation	Mankapur	5	Operational	5	Non-Comply
20	Nanded Waghala Municipal Corporation	Elichpur	30	Operational	12	Non Comply
21	Nanded Waghala Municipal Corporation	Sangvi	15	Operational	10	Non Comply
22	Nanded Waghala Municipal Corporation	Bondar	87	Operational	35	Non Comply
23	Nashik Municipal Corporation	Chehedi STP	21	Operational	21	Comply
24	Nashik Municipal Corporation	Panchak	7.5	Operational	7.5	Comply

25	Nashik Municipal Corporation	Panchak	21	Operational	21	Comply
26	Nashik Municipal Corporation	Tapovan	78	Operational	78	Comply
27	Nashik Municipal Corporation	Agar Takali	40	Operational	40	Comply
28	Nashik Municipal Corporation	Chehedi STP	22	Operational	22	Comply
29	Nashik Municipal Corporation	Panchak	32	Operational	32	Comply
30	Nashik Municipal Corporation	Tapovan	52	Operational	52	Comply
31	Nashik Municipal Corporation	Agar Takali	70	Operational	70	Comply
32	Nashik Municipal Corporation	Municipal STP Gangapur	18	Operational	18	Comply
33	Nashik Municipal Corporation-	Municipal STP Pimpalgaon Baswant	32	Operational	32	Comply
34	Shirdi Nagar Panchayat	Shirdi, Tal--Rahata, Dist-Ahmednagar	16	Operational	4.2	Comply
35	Trimbakeshwar Municipal Council	Municipal Council Tryambak	1	Operational	1	Non-Comply
36	Washim Municipal Council	Opposite to Chamunda Devi Mandir, Nimazaga Washim	8	Operational	4	Non-Comply
TOTAL			**1313.8**		**1074.25**	

Telangana:

District	Location of STP	Installed capacity (MLD)	Operational capacity (MLD)	Compliance Status
Rangareddy	Nagole	172	172	Partially
	Nalla Cheruvu	30	30	Complying
	Nacharam	10	10	Complying
	Durgam Cheruvu	5	5	Complying
	Saroornagar	2.5	0.8	Complying
	Safilguda	0.6	0.6	Complying
	Nanakramguda	4.5	4	Complying
	Khajaguda	7	5.5	Partially
	Khazakunta	12	12	Complying
	Pragathi Nagar	2.5	2.5	Under Maintenance
	Rangadhamuni	5	4.5	Complying
	Noor Mohammed Kunta	4	4	Complying

	Patel Cheruvu	2.5	2.5	Complying
Vikarabad	Vikarabad Sakaliguda near Alampally	13	6	Complying
Karimnagar	Karimnagar Municipal Corporation	38	2	Complying
Nizamabad	Dubba, Nizamabad	31.5	6.5	Complying
	Yellammagutta	15	2.5	Complying
Peddapalli	River Godavari at Ramagundam	4	0	Not in operation
	Malkapur on River Godavari	14	0	Not in operation
Bhadrachalam	Bhadrachalam near River Godavari	2	0	Not in operation
Mancherial	River Godavari at Mancherial Reddy Colony	4	0	Not in operation
Total		**379.1**	**270.4**	

Karnataka:

S.no.	ULB	Implementing agency	Presently Maintained by	Address	Status	STP Installed Capacity (MLD)	Technology used	STP capacity utilization (MLD)	Status of Compliance
1	Bidar	KUIDFC	Concerned ULB	Gornalli B Village Bidar - 01 No. (KUIDFC)	Operational	17.26	Aerated Lagoon Type	6.5	Non-complying
2	Humnabad	KUIDFC	Concerned ULB	Dummanasoor village, Chinnakera Road, Near	Non-operational	6	WSP	0	NA
3	CMC. Bidar	KUWS &DB	Concerned ULB	Gornalli B Village Bidar - 01 No.	Operational	17.26	SBR type	7.5	Complying
4	CMC. Bidar	KUWS &DB	By KUWS & D B	Sy. No.107/1,107/2,108/2,1 08/3 of Naubad village of Bidar City	Operational	7	SBR type	3	Complying
Total						47.52		17	

Andhra Pradesh:

City / Town	Location of the Operational STP	Date of Commissioning	Existing STP Capacity (MLD)	Utilization capacity (MLD)	Compliance Status
Rajamahendravaram	Hukumpeta	01/2009	30	30	Complied

Chhattisgarh:

Location	Existing STP Capacity	Capacity Being Utilization	Operational Status of STP	Compliance Status of STP
Balikota (Jagdalpur)	25 MLD	15.5 MLD	Operational	Complied

Annexure V : Public Toilets in the GRB

ULB	Population	District	State	Community Toilets	Public Toilets	Urinals
Nagpur	2,405,665	Nagpur	Maharashtra	13	78	1
Warangal	615,998	Warangal Urban	Telangana	7	55	-
Nizamabad	311,152	Nizamabad	Telangana	-	43	-
Rajamahendravaram	341,831	East Godavari	Andhra Pradesh	19	31	5
Bidar	216,020	Bidar	Karnataka	20	25	-
Nashik	1,486,053	Nashik	Maharashtra	10	25	3
Karimnagar	261,185	Karimnagar	Telangana	2	23	-
Jagdalpur	125,463	Bastar	Chhattisgarh	-	19	-
Nanded	550,439	Nanded	Maharashtra	-	15	-
Chandrapur	320,379	Chandrapur	Maharashtra	16	13	-
Yavatmal	116,551	Yavatmal	Maharashtra	1	13	1
Chhindwara	138,291	Chhindwara	Madhya Pradesh	11	12	3
Latur	382,940	Latur	Maharashtra	-	11	-
Parbhani	307,170	Parbhani	Maharashtra	12	11	-
Udgir	103550	Latur	Maharashtra	9	11	-
Jagtial	103,930	Jagtial	Telangana	-	9	-
Adilabad	117,167	Adilabad	Telangana	1	9	-
Seoni	102,343	Seoni	Madhya Pradesh	2	8	-

Ramagundam	229,644	Peddapalli	Telangana	18	7	-
Gondia	132,813	Gondia	Maharashtra	-	4	-
Hinganghat	101,805	Wardha	Maharashtra	5	4	4
Jalna	285,577	Jalna	Maharashtra	10	3	-
Wardha	106,444	Wardha	Maharashtra	1	3	4
Chhatrapati Sambhaji Nagar	1,175,116	Chhatrapati Sambhaji Nagar	Maharashtra	-	-	-
Patancheru	159,191	Sangareddy	Telangana	-	-	-
Serilingampally	153,364	Sangareddy	Telangana	-	-	-

Annexure VI: District wise Status of Achieving ODF Plus in the GRB

District (LGD Code)	**Total Villages**	**Total ODF Plus Villages**		**ODF Plus Model Villages**		**ODF Plus Rising Villages**		**ODF Plus Aspiring Villages**	
		As on 1st April 2022	**As on 20-Feb-25**	**As on 1st April 2022**	**As on 20-Feb-25**	**As on 1st April 2022**	**As on 20-Feb-25**	**As on 1st April 2022**	**As on 20-Feb-25**
ADILABAD (501)	460	100	393	100	393	0	0	60	0
KARIMNAGAR (508)	198	156	192	55	192	0	0	107	0
MEDAK (513)	366	69	347	69	347	0	0	27	0
NIZAMABAD (516)	429	168	416	168	416	0	0	9	0
Ranga Reddy (518)	424	247	388	87	224	0	0	219	164
WARANGAL (522)	162	29	159	29	159	0	0	14	0
NIRMAL (680)	375	113	331	54	331	0	0	85	0
Jagtial (681)	280	77	275	37	275	0	0	59	0
PEDDAPALLI (682)	201	169	188	157	188	0	0	12	0
MANCHERIAL (684)	334	131	258	131	258	0	0	113	0
KAMAREDDY (685)	431	117	397	117	397	0	0	0	0
Jangaon (689)	173	48	170	48	170	0	0	34	0

Bhadradri Kothagudem (690)	317	63	243	32	210	0	0	54	33
SANGAREDDY (691)	545	132	522	131	522	0	0	41	0
SIDDIPET (692)	362	131	353	111	353	0	0	74	0
Komaram Bheem Asifabad (699)	383	71	276	66	276	0	0	49	0
MULUGU (720)	228	22	128	17	128	0	0	5	0
EAST GODAVARI (505)	258	13	258	8	60	0	16	5	182
WEST GODAVARI (523)	269	36	269	34	59	0	2	2	208
KAKINADA (746)	389	0	389	0	98	0	0	0	291
ELURU (748)	627	6	627	0	170	2	0	4	457
Bastar (374)	617	51	603	29	574	21	0	1	29
Dakshin Bastar Dantewada (376)	226	10	174	6	123	3	1	1	50
Uttar Bastar Kanker (381)	1066	18	1045	14	788	4	0	0	257
RAJNANDGAON (388)	662	86	662	5	662	17	0	64	0
BIJAPUR (636)	565	4	177	1	174	1	0	2	3
NARAYANPUR (637)	377	20	186	6	128	11	0	5	58
SUKMA (642)	390	3	132	1	123	0	1	2	8
KONDAGAON (643)	571	39	571	19	568	0	0	26	3
BALOD (646)	690	26	690	16	690	10	0	1	0
BIDAR (529)	595	20	595	0	26	0	0	20	569
BALAGHAT (392)	1246	101	1244	91	1244	1	0	9	0
BETUL (394)	1335	144	1335	99	1335	7	0	38	0
CHHINDWARA (399)	1896	120	1896	43	1896	0	0	79	0
MANDLA (415)	1211	105	1202	32	1202	6	0	68	0
SEONI (428)	1551	56	1550	22	1550	3	0	32	0

KALAHANDI (358)	1975	57	1906	57	1859	0	0	1	47
KORAPUT (363)	1907	253	1850	253	1602	0	1	1	247
MALKANGIRI (364)	965	32	897	32	876	0	0	0	21
Nabarangpur (366)	858	104	824	104	759	0	0	1	65
RAYAGADA (370)	2412	15	2222	15	2210	0	4	2	8
AHMEDNAGAR (466)	1575	24	1461	7	1427	13	3	4	31
AKOLA (467)	829	3	820	0	707	0	2	3	111
AMRAVATI (468)	1588	76	1449	60	1186	6	1	11	262
Chhatrapati Sambhaji Nagar (469)	1299	3	1294	2	1039	0	5	1	250
BEED (470)	1356	6	1166	1	681	0	3	5	482
BHANDARA (471)	765	6	713	2	461	3	8	1	244
BULDHANA (472)	1251	7	1155	2	734	0	1	5	420
CHANDRAPUR (473)	1401	33	1337	2	1054	0	4	31	279
GADCHIROLI (475)	1473	6	1461	0	1260	2	1	4	200
GONDIA (476)	868	12	834	5	697	0	2	7	135
HINGOLI (477)	655	2	602	2	330	0	0	0	272
JALGAON (478)	1486	0	1102	0	987	0	42	0	73
JALNA (479)	950	7	946	1	553	5	3	1	390
KOLHAPUR (480)	1190	52	1037	51	867	0	1	4	169
LATUR (481)	921	0	911	0	516	0	4	0	391
NAGPUR (484)	1503	29	1354	19	1138	0	0	10	216
NANDED (485)	1532	4	1264	0	888	0	11	4	365
NASHIK (487)	1911	24	1823	18	1540	0	1	6	282
PARBHANI (489)	825	0	665	0	422	0	1	0	242
WARDHA (498)	880	0	861	0	803	0	1	0	57

WASHIM (499)	680	13	676	2	443	1	0	10	233
YAVATMAL (500)	1786	2	1778	1	1287	0	1	1	490

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