

District Environment Plan



Prepared By



Environment Department, Government of Maharashtra



Maharashtra Pollution Control Board

Raigad

1.0 Preamble

Hon'ble National Green Tribunal vide order dated 26/09/2019 in O.A. No. 360 of 2018 filed by Shree Nath Sharma Vs Union of India and Others directed that CPCB shall facilitate the District Magistrates in preparation of District Environmental Plan by placing Model plan on its website. This model plan may be adopted as per local requirements by all Districts under supervision of District Magistrate.

The said Order also directs that Department of Environment in respective States / UTs should collect district plans to prepare State Environment Plan, which shall be monitored by respective Chief Secretaries of State/UT by 15/12/2019.

Based on State Environmental plans, CPCB and Ministry of Environment, Forest & Climate Change shall prepare National Environmental Plan, under the supervision of Secretary, MoEF&CC and Chairman, CPCB by 31/01/2020. The National Action Plan needs to be submitted before Hon'ble NGT 15/02/2020.

In compliance to above directions, CPCB has prepared a model District Environment Plan (DEP) that covers following thematic areas;

In compliance to above directions and as per the model DEP prepared by CPCB, Environment Action plan for Raigad District is prepared.

2.0 Introduction

Raigad District is a district in the state of Maharashtra, India. Formerly called the Kolaba district, the district was renamed Raigad, after the fort that was the first capital of the former Maratha Empire, which in turn was renamed from its earlier name - Rairi. The fort is located in the interior regions of the district, in dense forests on a west-facing spur of the Western Ghats of Sahyadri Range.

General Raigad district profile is presented in the **Table 1** and location is shown in **Figure 1**.

Table 1 Raigad District Profile

Description	Details
Geographical Location	It lies between 18.5158° North Latitude and 73.1822° East Longitude. The district is bounded by Mumbai Harbour to the northwest, Thane district to the north, Pune district to the east, Ratnagiri district to the south, and the Arabian Sea to the west. It includes the large natural harbour of Pen-Mandwa, which is immediately south of Mumbai harbour, and forming a single landform with it.
Area	7152 Sq. km.
Boundaries	The district is bounded by Mumbai Harbour to the northwest, Thane

Description	Details
	district to the north, Pune district to the east, Ratnagiri district to the south, and the Arabian Sea to the west.
Languages Spoken	Marathi, Hindi, English are major languages but all Indian languages are spoken
Population	Total: 2,634,200; Male: 1,344,345 Female: 1,289,855 [According to 2011 Census Report]
Population Density	368 Per Sq. km.
Literacy Rate	83.14
Rivers	Kundalika, Savitri, Patalganga, and Panvel Creek
ULBs	15 Numbers + 1 Municipal Corporations
Municipal Corporations	1 Numbers 1. Panvel Municipal Corporation
Sub districts	8 Numbers
Villages	1909 Numbers
Statutory Towns	11 Numbers
Tahsils	15 Numbers Uran, Panvel, Karjat, Khalapur, Pen, Alibag, Murud, Roha, Sudhagad, Mangaon, Tala, Shrivardhan, Mhadla, Mahad and Poladpur
Pin code	402107

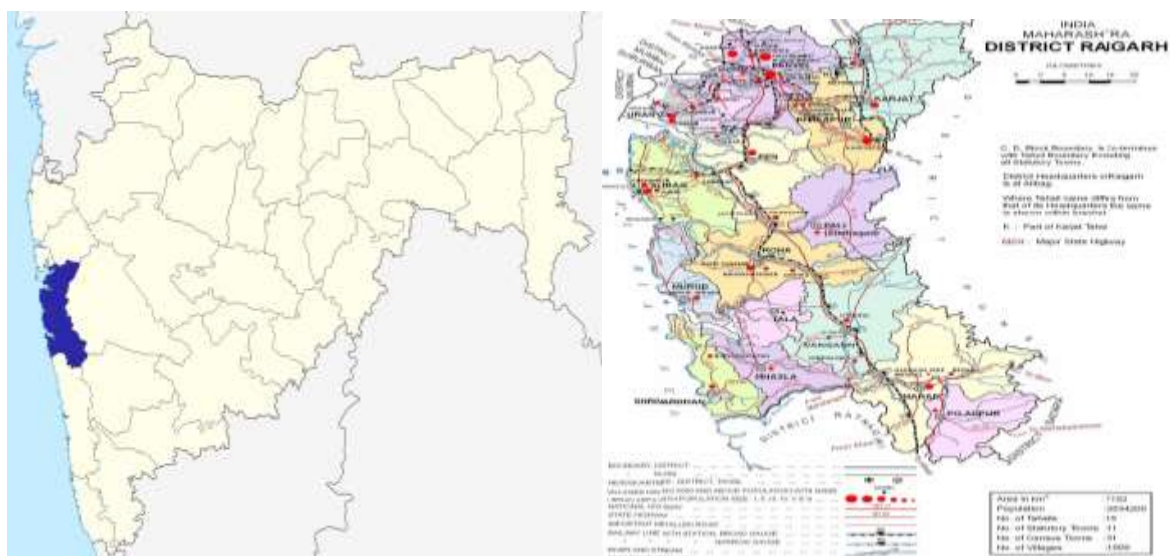


Figure 1 Location of Raigad District

3.1 Domestic Solid Waste Management Plan

Raigad district is having 15 ULBs with 165 Wards. Municipal Solid Waste (Dry & Wet) generated from each ULBs is given in the **Figure 2** and details of Other Types of Waste is presented in **Figure 3** due to its less quantity and for easy representation. As per collected data, total solid waste generation of Raigad district is 547.51MTD. wherein, Dry Waste generation is 220.056MTD and Wet waste is 321.73MTD.

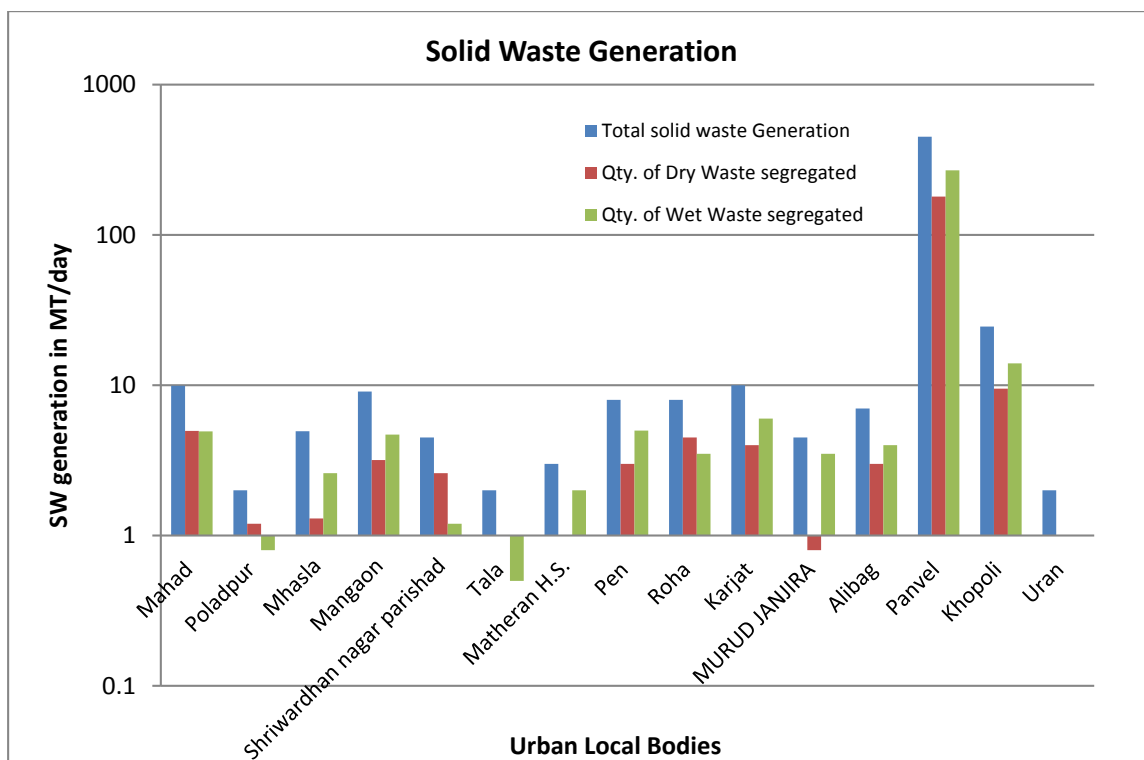


Figure 2 Solid Waste Generation of Raigad District

It seems that Wet waste comprises of approximately 58.76% of total waste generated of the district and Dry waste contributes 40.19%. Panvel Municipal Corporation stands on top with the highest quantity i.e. 450MTD out of which dry waste is 180MTD and wet waste is 269MTD. Tala, Matheran H.S. Municipal Council and Urban Municipal corporation generates lowest quantity i.e. 2MTD each. It is observed that quantity of solid waste generation is in line with the respective population of ULBs.

As per the data presented in the **Figure 3**, details of other types of waste generation are presented as below;

Street Sweeping Waste: Raigad district generates 6.603MTD of Street Sweeping Waste. Maximum quantity of Street Sweeping Waste is generated by Panvel Municipal Corporation with total quantity of 3MTD followed by Poladpur, Tala, Pen and Alibagh Municipal Corporation. [Waste for 4 ULBs is not estimated]

Drain Silt Waste: Total quantity of Drain Silt Waste generated is 3.6002MTD. It seems that maximum quantity of Drain Silt Waste is generated by Karjat Municipal Corporation with total quantity of 1MTD followed by Poladpur with 0.6MTD. Waste generation for Tala is given as 0MTD which is not feasible. [Waste for 4 ULBs is not estimated]

Domestic Hazardous Waste (DHW): Total DHW quantity generated is 1.6381MTD. Maximum quantity of DHW is generated by Pen Municipal Corporation with total quantity of 0.5MTD and Shriwardhan Nagar Parishad stands lowest with 0.01MTD. Data for Urban Municipal Corporation is 0MTd which is not feasible.

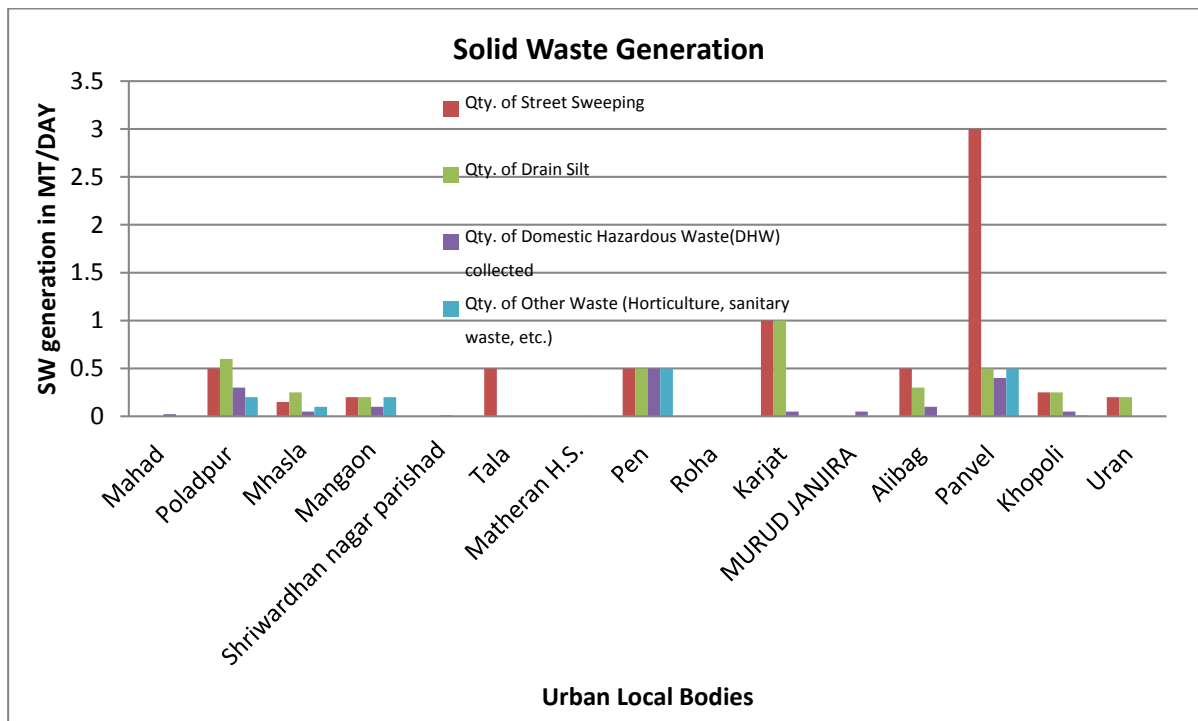


Figure 3 Other Waste Generation of Raigad District

Other Waste (Horticulture, sanitary waste, etc.): Total Quantity of Horticulture, Sanitary and other waste is 1.5101MTD. Maximum quantity of Other Waste is generated by Pen and Panvel Municipal Corporation with total quantity of 0.5MTD each and Roha Municipal Council generates lowest quantity i.e. 0.0001MTD. Data is not available for 6 Urban Local Bodies.

Bulk Waste Generator: Raigad district is having 30 bulk Waste Generator and 26 onsite facility provided for treatment of wet waste is 327.17MTD [Inventory for Bulk Waste generator is not done for 8ULBs]

C&D Waste: Total 9.273MTD of C&D waste is generated in which Panvel Municipal corporation generates highest quantity of waste i.e 5MTD whereas the minimum waste generation is done by Roha Municipal Corporation i.e 0.003MTD

3.1.1 Compliance in Segregated Waste Collection

Total Waste generation from Raigad district is 547.51MTD and almost all waste is being segregated.

A] Waste Management Operations

Out of 15 ULBs, 12 of them have provided 100% door to door collection facility. Alibagh Municipal Council, Pen Municipal Council and Poladpur provide 1% door to door collection facility. [Data for above mentioned 3 ULBs need to be verified] Cantonment Board and Jejuri Municipal Council has provided 80% and 90% door to door collection facility respectively. 15 ULBs have implemented Manual Road Sweeping. Segregation of waste is done at 11 ULBs, the rest 5 ULBs segregate particular amount of waste. Out of 185 ULBs, only 6 ULBs have installed digester with biomethanation production at 100%, 8ULBs have not installed the Biomethanation plant and 1ULB is carrying out 35% of activity.

The Composting activity is carried out by 9 ULBs whereas the 6 ULBs have not installed activity.

Out of 15 ULBs, 8 ULBs is using Multi Re Use Facility to separate and prepare recyclable material whereas 7 ULBs have not installed URF facility. Out of 15 ULBs, 11 ULBs have provision of Sanitary Landfill [but as per the data only 6 sanitary landfills available, need to check]

3.1.2 Adequacy of Infrastructure

Availability of infrastructure to handle the waste generated from the Raigad district is presented in **Figure 4**.

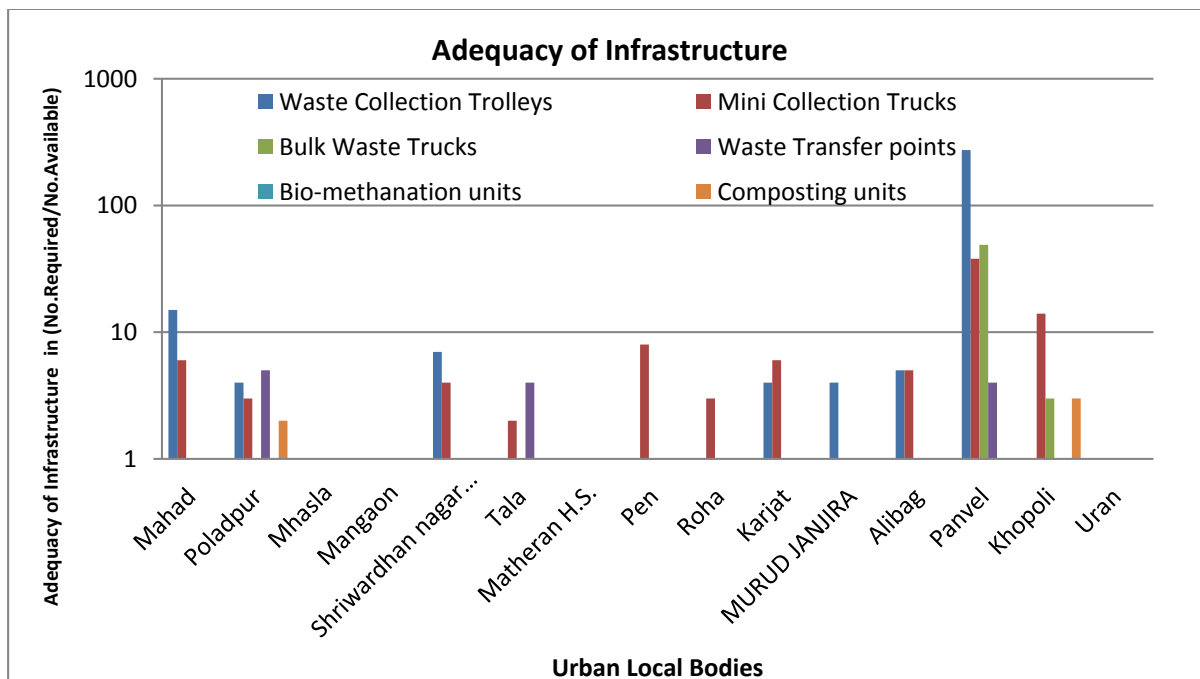


Figure 4 Adequacy of SW Infrastructure

It is observed that There are total 19 waste Transfer points in Raigad district with waste trolley of 345, and Bulk transport trucks 56. Total number of Bio-Methanation units are 6. Composting units available to treat wet waste are 14.

3.2 C&D Waste Management Plan

The Construction and Demolition Waste [C&D Waste] generated by Raigad district is about 672.2MT/Y. C&D Waste generated by each ULBs is presented in **Figure 5**.

Urban Municipal Council contribute maximum share of C&D waste to the tune of 2000Kg/Day. Least C&D waste is generated by Matheran H.S.Municipal Council with the quantity of 10Kg/Day [The ULB wise quantity need to be checked again]. Non availability of data will not help in preparing ingenious and executable plan for waste management of the district hence local bodies must ensure proper sampling and factual measurement of the various types of waste being generated.

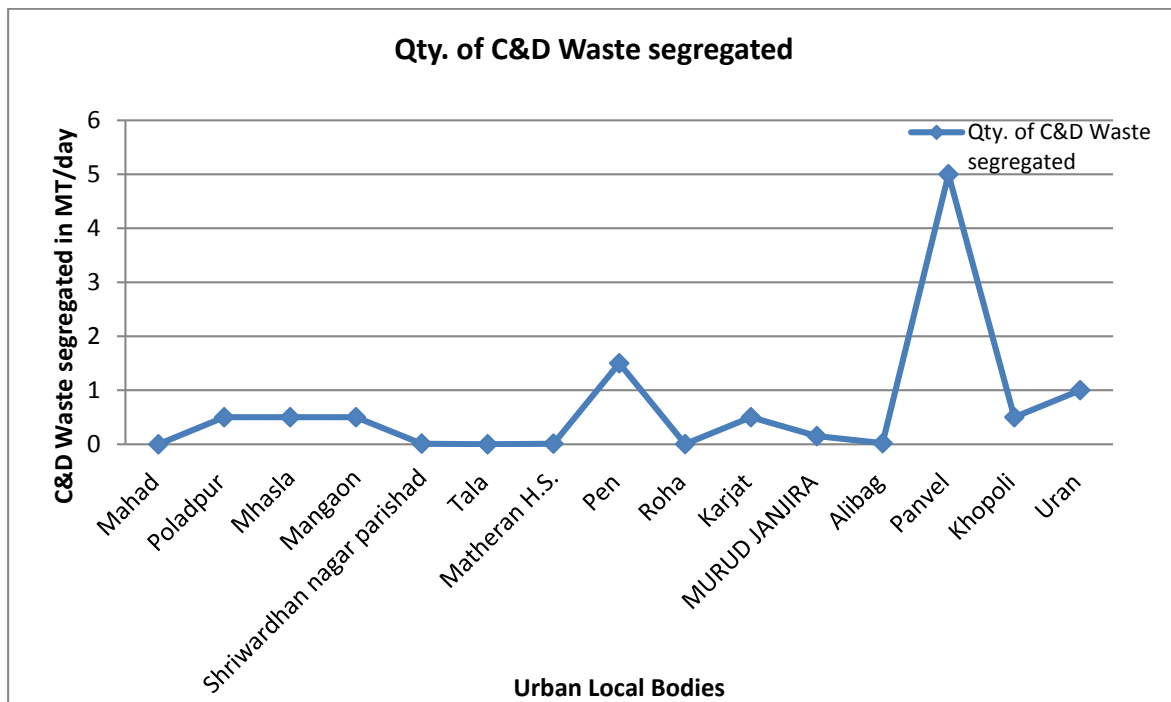


Figure 5 C&D Waste Generation of Raigad District

3.3 Plastic Waste Management

Total Plastic waste generated by Raigad district is 6.2MTD. With 1.5MTD quantity at Alibagh Municipal Council is the highest plastic waste generator and Murud Janjira Municipal Council generates 0.03MTD of plastic waste. [Data of 3ULBs is not provided]

In almost all ULBs, door to door collection and segregation system is implemented with 25 Plastic Waste Collection Centre. Collection centre is not established at 5 ULBs. There are 15

Plastic Waste Pickers with the authorization for waste collection. The entire district has 8 plastic Recycler. PW Management Rules, 2016 is implemented in all the ULBs.

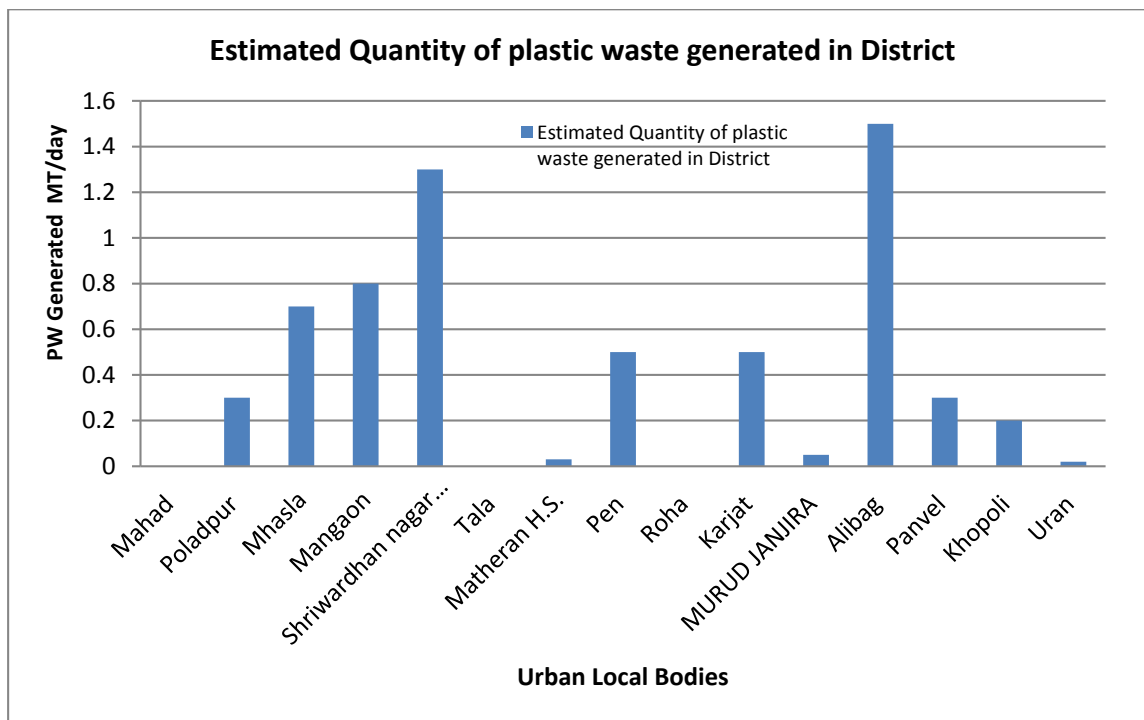


Figure 6 Details of Plastic Solid Waste Generation

3.4 Biomedical Waste Management

2941 hospitals are present in the Raigad district. Bedded hospital are 323 numbers, out of which only 328 HCF have taken authorization. 738 are non-bedded hospitals and 814 Non bedded HCFs. 738 Clinics and 97 Pathlabs. Total BMW generation from all above mentioned sources are to the tune of 2.44 MT. 50Kg/Day of waste is lifted from Urban

Municipal Council [Data of only 1 ULB is provided]

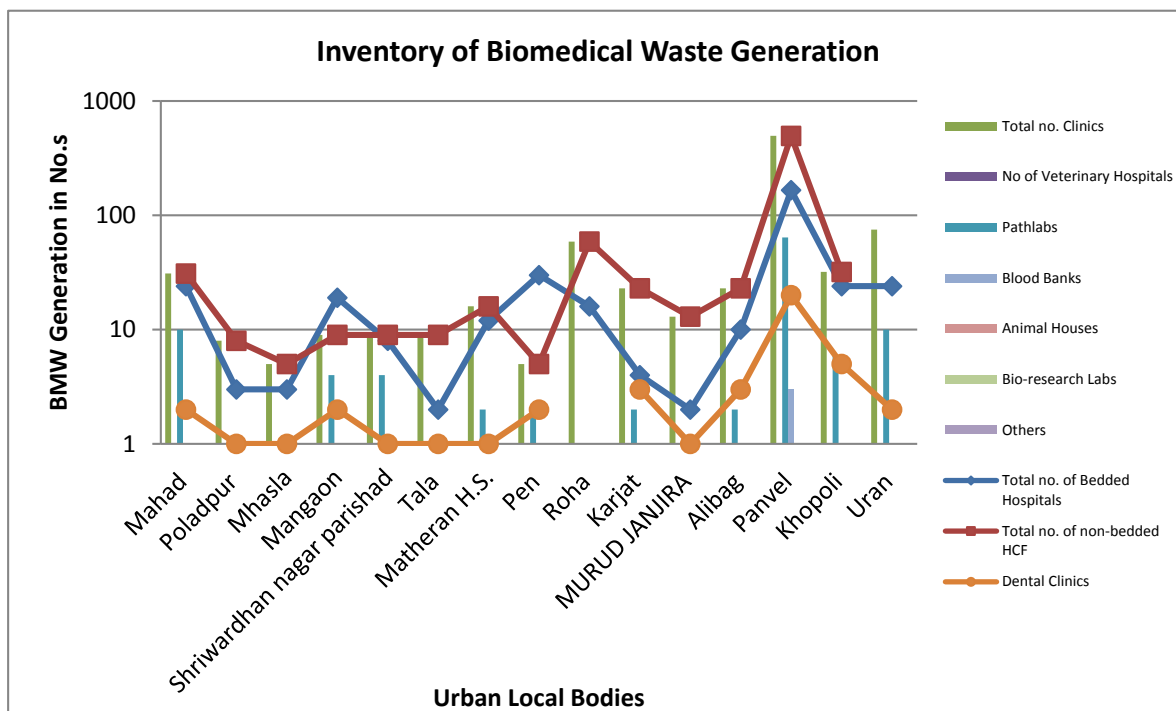


Figure 7 Details of Bio Medical Solid Generation

No Common Facility available for treatment and disposal of BMW and average BW taken by these facilities are 2443 kg/day. There is requirement of at least one CBWTF in each ULB. Inventory of BMW generating units are mentioned in the **Figure 7**.

3.5 Hazardous Waste Management

104 Number of industry is established generating 10764.73MT/Annually out of which 2921.24MT/Annum is Incinerable 5922.29MT/Annum is of land fillable and 1921.2MT/Annum to Recyclable HW. Generated waste is disposed to Common Treatment Storage and all industries are members of CHWTDSF. [Need to check the exact number of industries present as the count goes to 598

3.6 E Waste Management

No Collection Centres are established by ULBs and 2 are established by Producer under EPR scheme. There are 10 number of authorized E-Waste recyclers / Dismantler and 8 numbers are Authorized E-Waste collectors. District Administrative has conducted Awareness Campaigns whereas Producers and PROs and District Administrator has conducted Awareness Campaigns.

3.7 Action Plan

As per the above mentioned observation, it seems that almost all ULBs are handling solid waste generated as per the Municipal Solid Waste Management Rules, however there are certain issues that needs to be addressed for 100% implementation of the rules as mentioned in **Table 3**.

Table 3 Action Plan for Solid Waste Management

Sectors	Gaps	Action Points	Priority
Domestic Solid Waste			
Quantification	<ul style="list-style-type: none"> ▪ Methodology for solid waste quantification should be ascertained ▪ Quantification based on Income group, culture affluence and technology to be considered 	<ul style="list-style-type: none"> ▪ Mechanism for graded weighing system either through intermediate transfer station or at the common receiving station to be created. Usually one weigh bridge at any treatment / disposal location required ▪ Quadrate sampling methodology to be adopted in order to reduce quantity as well as quality 	Immediate
Collection System & Transport System	<ul style="list-style-type: none"> ▪ Some of the places, efficiency of the collection system is not up to the mark ▪ With respect to the waste generated additional Waste Collection Trolley, Mini Collection Truck are required 	<ul style="list-style-type: none"> ▪ Ideally most proven method of SWM is 3 Tier System with door to door, community and transfer station approach ▪ 100% efficiency to be achieved ▪ Intermediate ▪ Approximately 109 Ghanta Gadi would be required ▪ Waste Collection Trolley, Mini Collection Truck shall be provided 	Short to Mid Term
Infrastructure	<ul style="list-style-type: none"> ▪ Mostly composting is the main treatment methodology with about 80% coverage ▪ MRF facility is also available but limited to 	<ul style="list-style-type: none"> ▪ Intermediate / Transfer station based decentralized waste treatment facility to be evaluated ▪ Additional bio-Methanation can be explored ▪ Sanitary landfill data should be 	

Sectors	Gaps	Action Points	Priority
	<p>few</p> <ul style="list-style-type: none"> ▪ Waste to energy unit shall be installed ▪ Proper data for Sanitary landfill is required as at one location 365000 number of sanitary landfill are shown 	<p>made properly available for each ULB</p> <ul style="list-style-type: none"> ▪ Waste to energy unit required 	
Plastic Waste	<ul style="list-style-type: none"> ▪ Lack of SOP for not only quantification but also life cycle analysis [LCA] ▪ Limited understanding / interpretation of EPR / PRO ▪ Only two ULBs lacking implementation of PW notification 	<ul style="list-style-type: none"> ▪ Strengthening surveillance of life cycle assessment for type and quantity of Plastic Waste ▪ Effective EPR Policy ▪ Initiation of 100% compliance to PW Rules at the earliest 	High & Immediate
C&D Waste	<ul style="list-style-type: none"> ▪ Quantification of total number of C&D waste that is likely to be generated 	<ul style="list-style-type: none"> ▪ Estimate quantity of C&D waste ▪ Minimum 1 such facility at each of the ULB to be established ▪ System for utilization of recovered material and processed C&D waste to be effectively implemented and monitored 	High
Biomedical Waste	<ul style="list-style-type: none"> ▪ Rooting and effective collection within 48hrs from the time of generation to be effectively handled ▪ Treatment facility lacks implementation of 2016 Notification in line with CPCB 	<ul style="list-style-type: none"> ▪ Regular Inventorization through automatic / digital platform to be developed ▪ Up-gradation of existing facility to meet 2016 CPCB norms ▪ Additional facilities to cover the of umbrella zone along with increasing burden on the existing coverage area to be planned 	Very High & Immediate

Sectors	Gaps	Action Points	Priority
	<p>audited report</p> <ul style="list-style-type: none"> ▪ Limited Inventorization 	<ul style="list-style-type: none"> ▪ Collection mechanism to be strengthen with additional vehicles to cover vast area and scattered HCF [miniscule quantity] 	
Hazardous Waste	<ul style="list-style-type: none"> ▪ Domestic HW being mixed with solid waste posing threat ▪ No separate handling of domestic HW ▪ Not effective segregation at source 	<ul style="list-style-type: none"> ▪ Either decentralized 4 - 5 step segregation practices to be initiated or at least advisory for intermittent storage and collection of domestic HW to be initiated ▪ Inventory to be initiated and maintained 	Very High & Immediate
E Waste	<ul style="list-style-type: none"> ▪ Lack of inventory ▪ Limited understanding of E waste rule and management ▪ Neither segregation nor separate transfer / handling facility ▪ Quantification of waste generated in each and every unit 	<ul style="list-style-type: none"> ▪ Detailed inventory for domestic e waste under 26 different categories ▪ Mass awareness campaign ▪ Every ULB to have at least one E waste management centre and minimum one collection / drop centre in a radius of 25-30km ▪ At least one e-waste processing unit in a district 	Very High & Immediate

4.0 Water Quality Management Plan

There is 1 River in Raigad district with 40km in length. With respect to the data collated about 11 MLD of untreated /partially treated sewage flows in to the riverine length thereby posing challenge for attaining clean water in the river.

The 15 ULBs generate about 400.99 MLD of sewage with an existing capacity of 251.7 MLD. Most of the deficit is accounted due to lack of sewage conveyance system of Sewer Network which is 1078km. However, it is also many a time the deficit as a representative of treatment capacity / capability.

90.7MLD of Industrial waste is generated from 634 industries and this waste is treated in 4 numbers of CETP. Currently out of total industries 41 are not meeting discharge standards.

The average pH of rivers flowing in Raigad is 7.09. Whereas the average DO and BOD of these surface bodies is 5.78 and 6.04 respectively. The Kundalika river at Roha bridge shows highest number of MPN Count i.e. 122MPN/100ml. and lowest 13MPN/100ml in Savitri river Jackwell at Upsa kendre river.

Detailed Issue based management action plan is provided in **Table 4**.

Table 4 Action Plan for Water Quality Management

Sectors	Gaps	Action Points	Priority
Water Resources	<ul style="list-style-type: none"> ▪ Limited information available on mapping of surface water resources in terms of quantity ▪ Limited Inventorization of quantity, usage, availability exploitation etc. ▪ Limited Rejuvenation / remediation of water bodies 	<ul style="list-style-type: none"> ▪ Thorough Mapping of resources to be taken up ▪ Extensive assessment of quality to be done ▪ Criticality indicators to be established for each water body/resource ▪ Extend water quality monitoring network to include representativeness ▪ Based on the criticality initiate Rejuvenation / remediation ▪ Online Monitoring system for surface water bodies to be established 	
Domestic	<ul style="list-style-type: none"> ▪ Surveillance /Inventorization in cradle to grave approach absolutely never applied ▪ Limited collection system and treatment facility especially in remote area ▪ Often polluting water resources ▪ No established reuse options / reuse network 	<ul style="list-style-type: none"> ▪ Digital Platform to accommodate water budgeting / reuse potential ▪ Approximately 150 MLD STP capacity are required to be built. ▪ Strengthen the sewage collection network to cover 100% Population ▪ Policy for reuse / recycle of treated wastewater 	Very high & Immediate

Industrial	<ul style="list-style-type: none"> ▪ Limited information of industries discharging wastewater in to the river ▪ Almost 41 number of industries Non-compliance of in terms of meeting discharge standards 	<ul style="list-style-type: none"> ▪ CETP performance to be more effective in line with various orders of regulatory bodies / courts ▪ Digital compliance methodology to be developed ▪ Disposal system to be under constant surveillance 	
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5.0 Air Quality Management

As it is Raigad district being one of the most vibrant and outgrowing areas in Maharashtra, Air quality assessment and sectoral management needs are ought to be essentially planned and executed. Both CPCB & MPCB through their NAMP & SAMP programme has set up 7 no CAAQM stations are set across the district.

It seems that PM₁₀ is Ambient Air is one of the prime reason of the concern and historically Raigad has been in the centre of controversy with regards its air quality management. An exceedance factor reveals as per the monitored data that needs immediate attention as is the case in most of the areas of India. In view of the same the prima facia of every ULB shall be to establish at least one such Ambient Air Monitoring Station and coordinate / collaborate with other monitoring organisation to provide for advisory to general public towards health associations and risk of exposure.

Inventory and policy formulation action plan is stated in **Table 5**.

Table 5 Action Plan for Air Quality Management

Sectors	Gaps	Action Points	Priority
Air	<ul style="list-style-type: none"> ▪ Limited CAAQMS to establish / corroborate inferences ▪ Sectoral action plans not effectively established 	<ul style="list-style-type: none"> ▪ Emission inventory and source apportionment supported with dispersion and health based iterative process for science based AQM strategy to be established ▪ Each ULB to have at least one urban and one rural CAAQMS or 	

		<p>three manual stations at least to include criteria pollutants with minimum one location to include parameters of 2009 CPCB notification and meteorological data including cloud cover</p> <ul style="list-style-type: none"> ▪ Fugitive emission control system for hot spot emission control to be installed ▪ Green barriers / Photo catalyst options to be evaluated ▪ Capacity building to be enhanced 	
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6.0 Mining Activity Management plan

Being directly under the promissory control of District Collector, the total lease land and the mining in Raigad district is 613.89Hectares. It is important to mention that the total Bauxite mining is 7 and stone mining in Raigad is 53, Bauxite is 493.89Hectare and Stone Lease is 120Hectare with the due permission from respective authorities of MPCB and State Environment Department. Recently enough 11 numbers of non-complying units have been served in last 1 year.

7.0 Noise Action Plan

Other than event base monitoring and special projects related / orders monitoring, MPCB carries out annual noise monitoring at 4 locations. Noise quality reveals mainly source specific non-compliance such as traffic related in most of the kerb side analysis. Though zoning categories and regulations therein are particularly specified, in limitation of noise regulations has always been challenge to the regulatory authority. **Table 6** spells potential management plan that could be taken up on priority by each of the ULBs.

Table 6 Noise Action Plan

Sectors	Gaps	Action Points	Priority
Noise	<ul style="list-style-type: none"> ▪ Most of the source related noise areas show exposure beyond compliance ▪ Excessive exposure during noise generating potential events/ festivals 	<ul style="list-style-type: none"> ▪ Noise mapping to be carried out for zonation purposes ▪ At source control using physical or natural attenuation methods to be adopted ▪ In the path noise control methodologies using noise absorbers creating zone of inhibition / silence zone to be done ▪ End of the pipe measures such as PEs acoustic enclosures etc. to be adopted ▪ Event based noise control policy to be effectively implemented 	

8.0 Conclusion

There seems to be vast data gaps and a detailed exercise to collate and validate data gathered through this process needs to be urgently taken up in addition to the adopting a holistic & inclusive consultative process of gathering information, collating & converging it in order to be able to device strategies of future. Also, it is equally important that projection for at least next 20 years be done in order to evaluate management plans for futuristic view to meet the objective of such vast exercise. Digital data availability needs to be one of the prime tasks of government & methods of its validation be created with scope for improvement in near future. The practise needs to be a continual one to be updated regularly in order to monitor progress and effectiveness of this process & shall be linked with financial allocations being designed to be promoted by government of the day. With regards to action plans, the priorities shall be aligned based on sustainability objectives.