



Municipal Solid Waste Management in Aurangabad Region: An Overview

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DOI- 10.5281/zenodo.15162346

Abstract:

The proper management of waste becomes a crucial issue for all developing countries. India is also facing this issue. The Ministry of Environment, Forest and Climate Change has formulated some acts to manage municipal solid waste. The Solid Waste Management Rule 2016 is one of those. Maharashtra State is successfully implementing this act. As per the act, Aurangabad region making efforts to manage waste. The expansion of urbanization leads to an increase in waste generation. As per the information provided by MPCB, the average waste generation in the Aurangabad region from 2015 to 2022 was 969.0638 MT/D, and the average of waste treated from 2015 to 2022 was 802.6851 MT/D. It is necessary to develop more technology to create energy from waste.

Keywords: Municipal Solid Waste Management, ULBs, Waste Generation, Waste Treatment.

Introduction:

India is taking the initiative to become a developed nation. However, India is facing issues like population growth, unemployment, poverty, excess use of resources, etc. These issues raise one more major problem i.e. waste generation. In the current scenario, urbanization is taking place in development. This increasing urbanization puts more burden on natural resources. It creates a lack of these resources. To overcome their needs human beings, find various alternatives. Those alternatives are made into industries. It contains many components which need to be disposed of after its use. It is called waste.

Solid waste means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste, other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture, and dairy waste, treated biomedical waste, excluding industrial waste, biomedical waste and e-waste, radioactive waste generated in the area under the local bodies and other entities. (Ministry of Environment, 2015)

According to the report published by the Central Pollution Control Board (2020-21), the total

quantity of solid waste generated in the country during 2020-21 is 160038.9 (Metric Ton/Day) MT/D. Out of this 152749.5 TPD of waste is collected. Out of this collected waste 50% of waste is treated, 18.4% of waste is landfilled, and 31.7% of the total waste generated remains un-accounted. With concern to Maharashtra state, the report published by the Maharashtra Pollution Control Board (2020-21) states that the total waste generation in Maharashtra during 2020-21 is 22632.71 Metric Ton/ Day (MT/D). out of this 99.78% of waste is collected by various Urban Local Bodies of Maharashtra state. Out of this collected waste, 66.52% of waste was scientifically treated in facilities, 6.00% of waste was disposed of by landfilling, and 27.49% of waste was disposed of unscientifically.

This article takes an overview of municipal solid waste management of the Aurangabad Region which is also known as Marathwada Region. Aurangabad region is one of the most important divisions of Maharashtra state. Aurangabad region consists of 8 districts such as Aurangabad, Jalna, Osmanabad, Parbhani, Beed, Latur, Nanded, and Hingoli. The objective of this article is to present the scenario of municipal solid waste management in the Aurangabad region from 2015-16 to 2022-23.



Figure 1 Map of Aurangabad Region

Classification of MSW

Municipal solid waste can be classified as follows (IOCL, 2017)

1. **Residential** – Food waste, paper, cardboard, plastics, textiles, leather, yard waste, wood, glass, metals, ashes, and E-waste.
2. **Industrial** – Housekeeping wastes, packaging food wastes, construction and demolition materials, hazardous waste, and special wastes.
3. **Commercial** – Paper, cardboard, plastic, wood and food wastes, glass, metals, special wastes, hazardous wastes, E-waste.
4. **Municipal Services** – Street sweepings, landscape and tree trimmings, general wastes from parks, beaches, 7 other recreational areas, sludge.
5. **Construction and Demolition** – Wood, steel, concrete, dirt, bricks, tiles.
6. **Medical Wastes** – Infectious wastes, hazardous wastes, radioactive waste from cancer therapies, pharmaceutical wastes.
7. **Agricultural** – Spoiled food wastes, agricultural wastes like rice husks, cotton stalks, coconut shells, coffee waste, and hazardous wastes like pesticides.

Processes included in Waste Management:

Waste Management includes some processes such as Collection of Waste, Segregation

or Sorting of Waste, Recycling and Reuse of Waste, and Disposal of Waste. Every state in India has Urban Local Bodies which are working on various levels. These ULBs are working to manage all the waste generated by the generators. The first process of waste management is the Collection of waste. Maharashtra has successfully implemented the MSW Management Act 2016. As per the Act, every waste generator should segregate waste and then it has to be handed over to the municipal workers or authorized waste picker. Municipal workers collect all waste from waste generators such as households, institutional, agricultural, etc. This waste is transported for processing. Some of the waste that can be reused is sent for recycling and the waste that is not possible to reuse is sent for disposal. Every ULB has to go through this process.

Total Number of ULBs:

As per the municipal solid waste management rule 2016, the Ministry of Environment, Forest and Climate Change published some guidelines for it. The Aurangabad region has 80+1 ULBs (MPCB 2022) which consist of 4 Municipal Corporations, 4 Municipal Councils of Class “A”, 14 Municipal Councils of Class “B”, 32 Municipal Councils of Class “C”, 26 Nagar Panchayat, and 1 Cantonment Board. Each ULB has a separate manpower for this work.

Number of ULB's during 2015-2022						
Year	Municipal Corp.	MC Class “A”	MC Class “B”	MC Class “C”	NP/CB	Total
2015	4	2	7	41	3	57
2016	4	2	7	41	3	57
2017	4	2	7	41	5	59
2018	4	4	14	32	26	80
2019	4	5	12	33	26	80
2020	4	5	12	33	26	80
2021	4	5	12	33	26	80
2022	4	4	14	32	27	81

Table 1 No. of ULB's during 2015-2022 (Source: Annual Report of MPCB, 2015-2022)

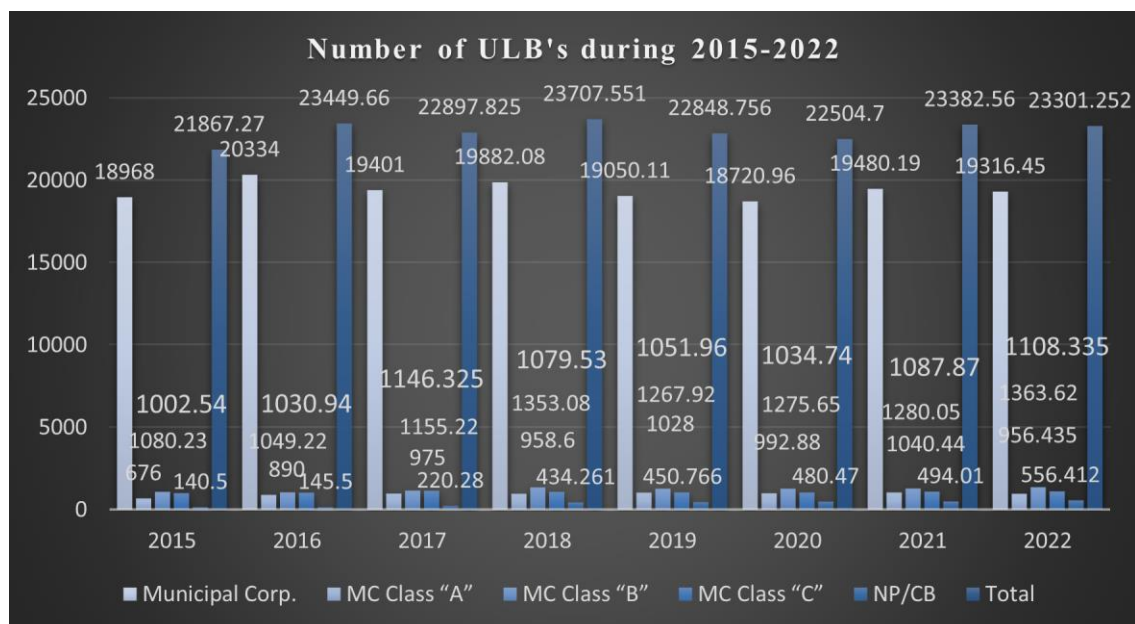


Figure 2 Number of ULBs During 2015-2022

Table 1 shows the total number of year-wise numbers of ULBs in the Aurangabad region.

Figure 2 graphically shows the number of ULBs. The total number of ULBs established in 2015 was 57, which consists of the higher number of MC of Class "C". As shown in figure 2 the no. of Nagar Panchayat is continuously increasing. The highest ULBs are established in 2022 i.e. 81. The Constitution (Seventy-fourth) Amendment Act, 1992 (CAA) which came into effect on 1 June 1993, introduced Part IXA (the Municipalities). The Act provided constitutional status to Urban Local Bodies (ULBs). Article 243W of the CAA authorized the State Legislature to enact laws to endow local bodies with powers and authority as may be necessary to enable them to function as institutions of self-government and make provisions for the

devolution of powers and responsibilities. (India, 2022) .

Waste Generation in Aurangabad Region:

As per the Solid Waste Management Rule 2016, there are several duties have been decided for waste generators. According to these duties, every waste generator has to segregate waste and hand it over to municipal workers or authorized waste pickers. This collected waste should be recycled or disposed of in a scientific way. Table 2 shows the total volume of waste generation in Aurangabad region from 2015 to 2022. The volume of waste generation is measured in Metric Tons/Day. Likewise, table 3 shows the total waste generation of Maharashtra from 2015 to 2022. In 2015 the proportion of waste generation in the Aurangabad region was 6.83% of the overall waste generation in Maharashtra which increased by 7.52% in 2022.

Municipal Solid Waste Generation During 2015-2022 (MT/Day)						
Year	Municipal Corp.	MC Class "A"	MC Class "B"	MC Class "C"	NP/CB	Total
2015	935	96	152.5	303.23	6	1492.73
2016	915	177	154.5	303.03	6	1492.73
2017	948	188	158.03	308.41	21.5	1623.94
2018	991	197	199.86	230.29	110.91	1729.06
2019	990	256	157.1	247.44	101.52	1752.06
2020	988.51	248	181.5	220.02	110.6	1748.63
2021	1000	228	180.88	246.8	110.4	1766.08
2022	985	229	209.64	220.632	108.1	1752.372

Table 2(Source: Annual Report of MPCB during 2015-2022)

Total Waste Generation of Maharashtra During 2015-2022 (MT/Day)						
Year	Municipal Corp.	MC Class “A”	MC Class “B”	MC Class “C”	NP/CB	Total
2015	18968	676	1080.23	1002.54	140.5	21867.27
2016	20334	890	1049.22	1030.94	145.5	23449.66
2017	19401	975	1155.22	1146.325	220.28	22897.83
2018	19882.08	958.6	1353.08	1079.53	434.261	23707.55
2019	19050.11	1028	1267.92	1051.96	450.766	22848.76
2020	18720.96	992.88	1275.65	1034.74	480.47	22504.7
2021	19480.19	1040.44	1280.05	1087.87	494.01	23382.56
2022	19316.45	956.435	1363.62	1108.335	556.412	23301.25

Table 3(Source: Annual Report of MPCB during 2015-2022)

Figure 3 Graphically illustrates Table 3. As per the data shown in Figure 3, the year 2018 shows the

highest rate of waste generation in Maharashtra, and the lowest rate of waste generation was in 2015.

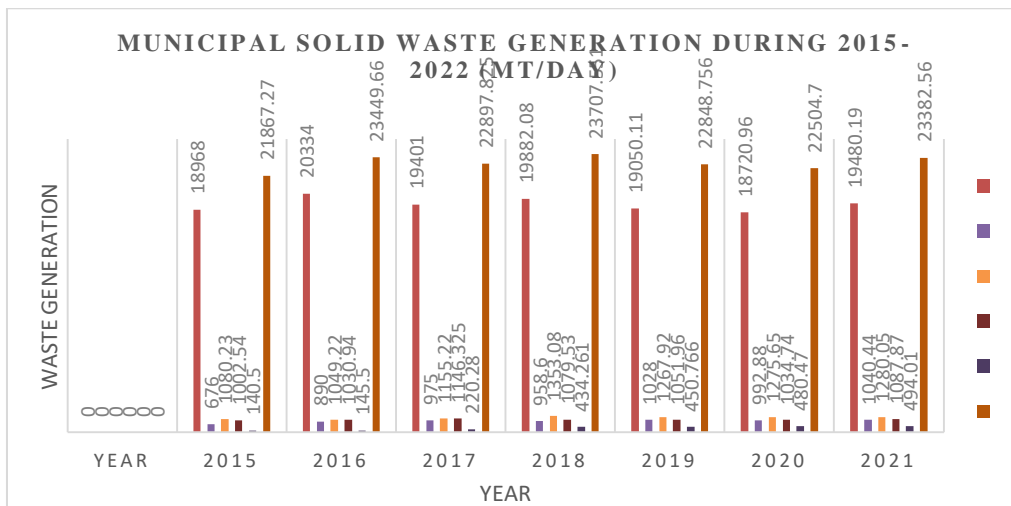


Figure 3 Waste Generation in Maharashtra

Figure 4 shows the waste generation of the Municipal Corporation in the Aurangabad region. As per the graph, the waste generation rate has continuously increased since 2016. A Municipal Corporation is a local body established for the urban area where the population is more than 1 million. Aurangabad region has 4 Municipal Corporations. Which generates higher waste as compared to municipal councils and nagar panchayat. If we take an average of the waste generation, it is 969.0638 MT/D. the increasing rate of waste generation from 2016 to 2018 is very high. After 2018 the increasing rate became a little bit stable. The highest waste generation reported in 2021, is 1000 MT/D. if we compare the rate of waste generation in Municipal Councils of Class “A” (as shown in Figure 5) it is lesser than waste generated in Municipal corporations. Figure 7 shows that the waste generation is gradually declining as the total number of ULB of MC class “C” declines (As per the data given in Table 1). As per Figure 8 from 2017 to 2018 the rate of increase in waste generation is very high. It was 21.5MT/D in 2017 which increased by 110.91 MT/D in 2018. It happens due to an increase in the number of Nagar Panchayat (As per the data given in Table 1).

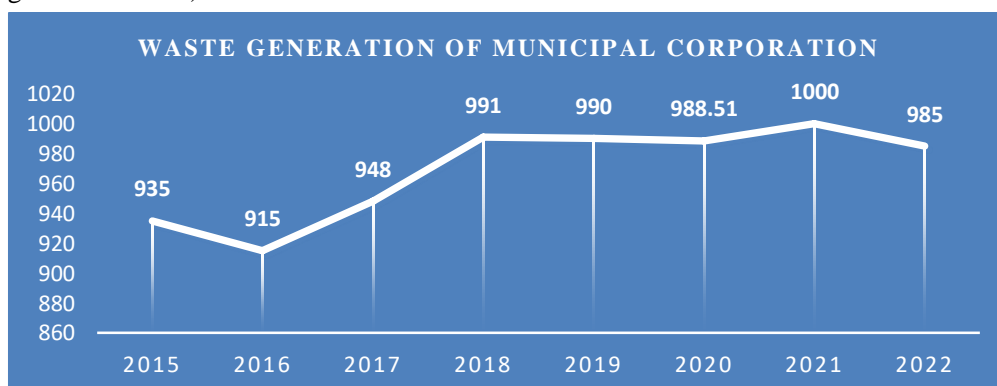


Figure 4Waste Generation of Municipal Corporation

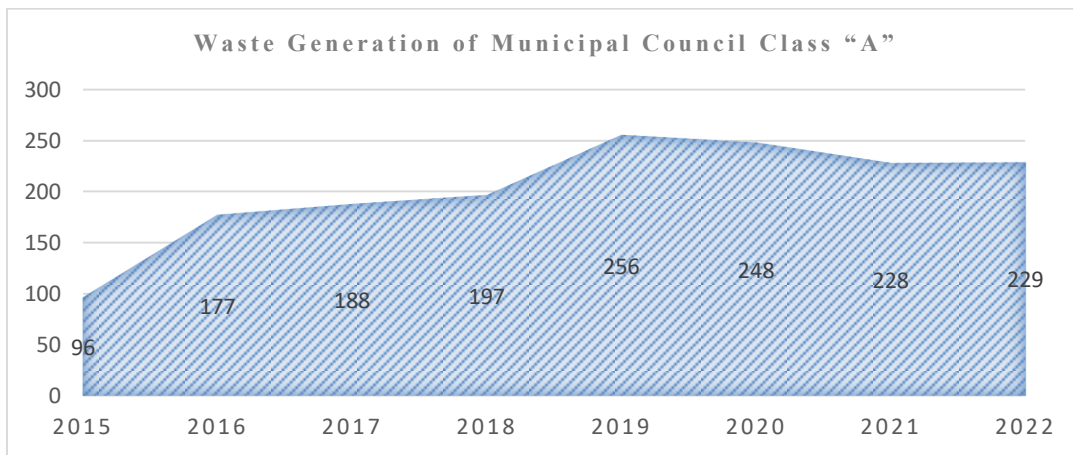


Figure 5 Waste Generation of MC Class "A"

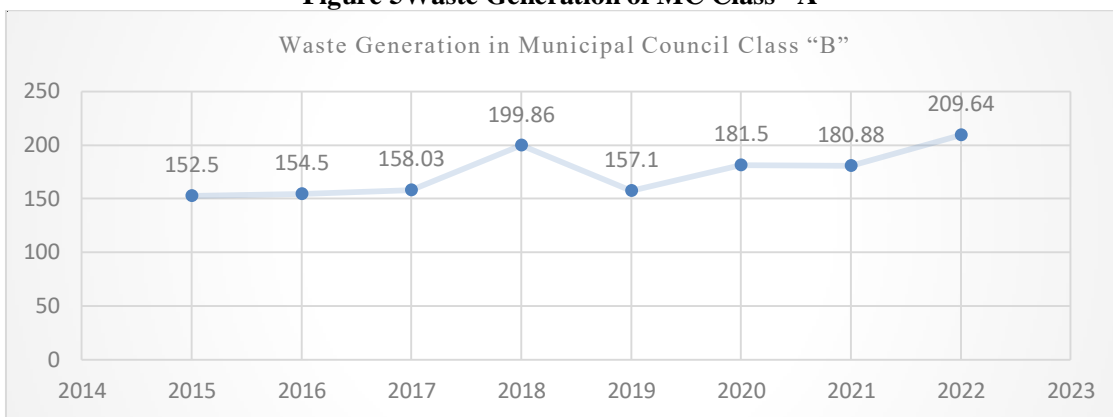


Figure 6 Waste Generation in MC Class "B"

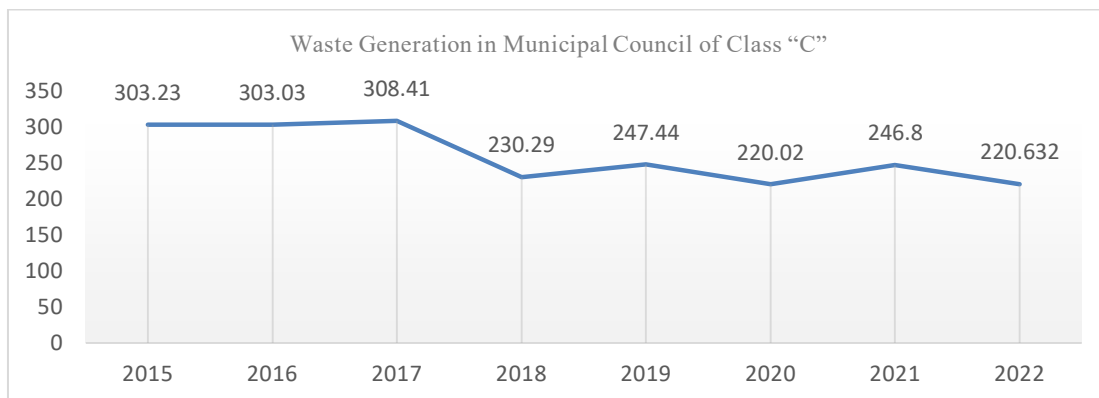


Figure 7 Waste Generation In MC Class "C"

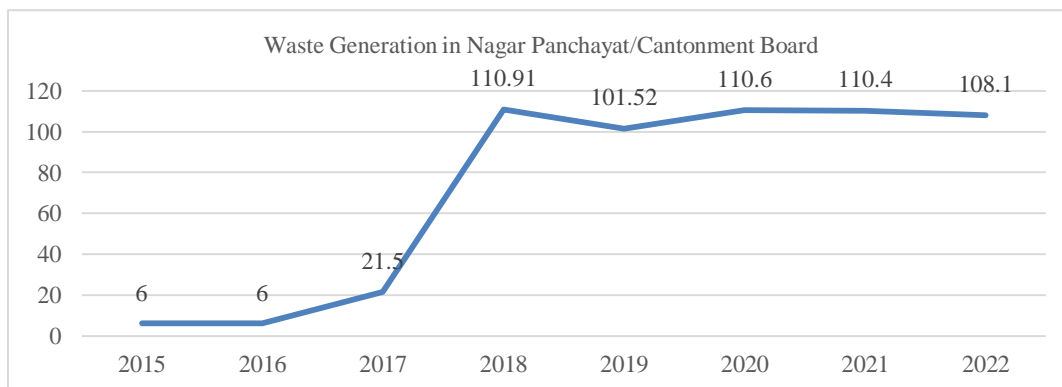


Figure 8 Waste Generation in NP/CB

Waste Treated/ Processed in Aurangabad Region:

Treatment of waste includes scientific treatment of waste i.e. composting, wormy composting, reuse and recycling of waste, and unscientific manner which includes dumping and landfilling of waste. Table 4 shows the total waste treated/ processed out of total waste generation and Figure 9 is a graphical illustration of table 4. As per

the data given in Table 4, we can see there is a huge gap between waste generation and waste treatment. In 2015 the rate of waste treated scientifically is only 32.17% of the total waste generated. Figure 9 shows that this rate is continuously increasing with technological advancement. The highest rate of treated waste is recorded in 2021, which is 84.91% of total waste generated.

Year	Total Waste Generation	Total Waste Treated/ Processed
2015	21867.27	6968.2
2016	23449.66	7543.1
2017	22897.83	7945.544
2018	23707.55	12571
2019	22848.76	16037
2020	22504.7	15056.1
2021	23382.56	19980.22
2022	23301.25	18725.2

Table 4 Waste Generation and Treated in Maharashtra (Source: Annual Report of MPCB 2015-2022)

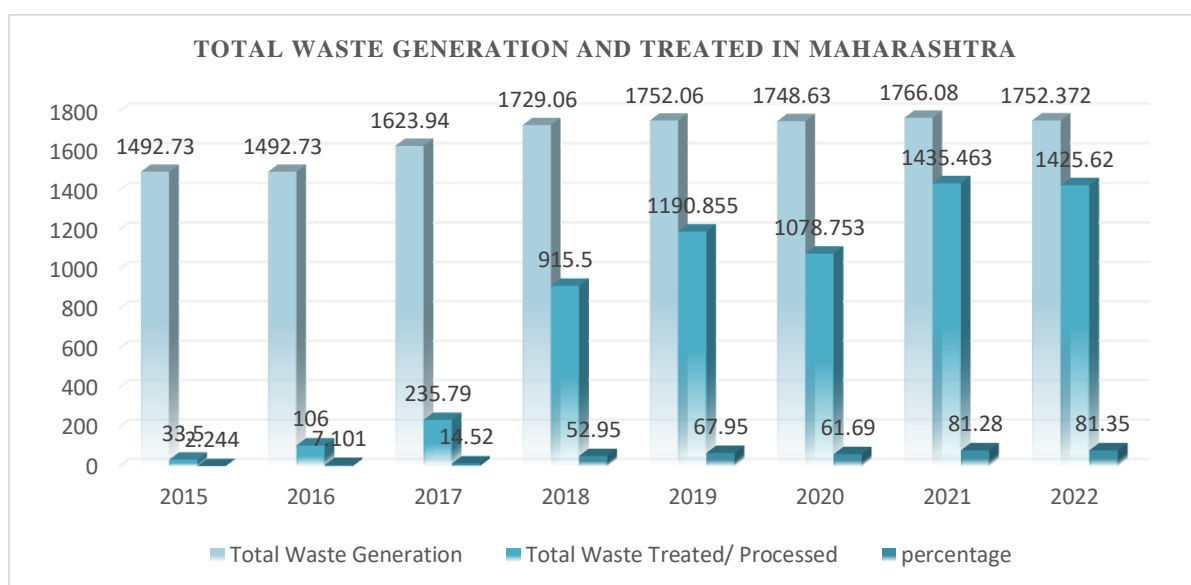


Figure 9 Waste Generation and Treated in Maharashtra

The waste that remains from the treatment was disposed of by dumping and landfilling in an unscientific manner. Before 2018 this rate was very

high, but after 2018 due to technological advancement treatment of waste becomes easier.

Year	Total Waste Generation	Total Waste Treated/ Processed
2015	1492.73	33.5
2016	1492.73	106
2017	1623.94	235.79
2018	1729.06	915.5
2019	1752.06	1190.855
2020	1748.63	1078.753
2021	1766.08	1435.463
2022	1752.372	1425.62

Table 5 Waste Generation and Treated in Aurangabad Region (Source: Annual Report of MPCB 2015-2022)

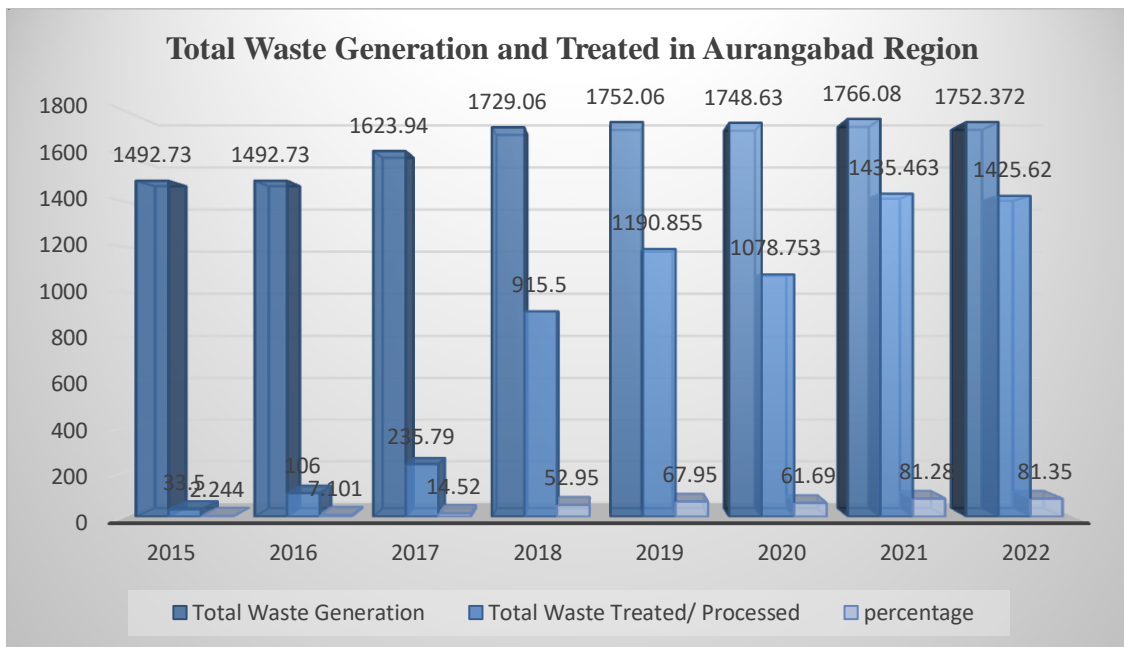


Figure 10 Waste Generation and Treated in Aurangabad Region

Table 5 shows the total quantity of waste generation and waste treatment in the Aurangabad region, and Figure 10 explains this data graphically. In 2015 the rate of waste treated in Aurangabad region in only 2.244% of total waste generated. Before 2017 this rate remained lower, but after 2017 the rate of waste treatment started growing. The highest rate of waste treatment was recorded in 2022 i.e. 81.35% of total waste generation.

Conclusion:

- This research article finds that the waste generation rate is increasing with the expansion of urbanization.
- The rate of waste generation is higher in highly populated areas such as areas covered under Municipal Corporations.
- The average quantity of waste generation in Municipal Corporation from 2015 to 2022 is 969.0638 MT/D. Which is greater than other ULBs in the Aurangabad region.
- The average quantity of waste treatment in the Aurangabad region from 2015 to 2022 is 802.6851 MT/D.
- We found in this research that due to modern technological advancement it is possible to create energy from waste.

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