



# A Study and Analysis of an effective waste management and its disposal in Ghaziabad region.

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**Abstract**— “Solid waste management is a critical issue for cities, especially those experiencing rapid growth, such as Ghaziabad, a city in Uttar Pradesh, India. This paper provides an overview of the current state of solid waste management in Ghaziabad and explores the strategies implemented to manage the problem. The city generates approximately 1,200 tons of solid waste per day, and this is expected to increase significantly in the coming years. Today, municipal waste is responsible for solid waste management and has implemented several initiatives to address this problem. These initiatives include establishing waste collection centers, using modern waste collection vehicles, and establishing landfill sites.”

## Introduction:

Solid waste is the discarded materials generated from human activities, such as households, industries, and commercial establishments. This waste can come in various forms, such as garbage, rubbish, debris, and ashes. Solid waste can also be classified based on its source, such as residential, industrial, commercial, or construction waste. Various activities like food habits, living standards and earning capacity of people create more solid waste in Indian villages. Now transport facility is easily available to the rural people, hence the living standard of the urban people is affected by the rural people as they are well connected to the urban areas. Rapid urbanization and changing lifestyles have increased the waste load and thereby increased pollution. Uncontrolled and alarming amounts of stress on the urban environment. The existing waste dumping sites are full beyond capacity and unsanitary conditions lead to pollution of water sources, spread of infectious disease vectors, stench and odour, toxic metabolites, uncomfortable environment, and eyesores. Hard to get a new one. Dumping yard. Land availability, dense population, environmental fragility, and expectations for solid waste management depend on an overly centralized approach. Effortless Use

Solid waste, which in the past was primarily made up of biodegradable materials, did not cause the community too many problems because the majority of it was either recycled or repurposed as fertilizer or the local environment. Suburban rural regions receive biodegradable garbage from metropolitan center for composting in the agricultural sector. Farmers rapidly began to reject municipal garbage as the amount of plastic and non-biodegradable packing materials increased. As a result, the excessive buildup of solid waste in metropolitan areas has become a severe hazard. The spread of infectious disease vectors, stink and odour, toxic metabolites, unpleasant surroundings, and eyesores are all examples of

environmental pollution. Hard to get a new one. Dumping yard. An unduly centralized system is required by the lack of land, the density of the people, the fragility of the environment, and expectations for solid waste management.

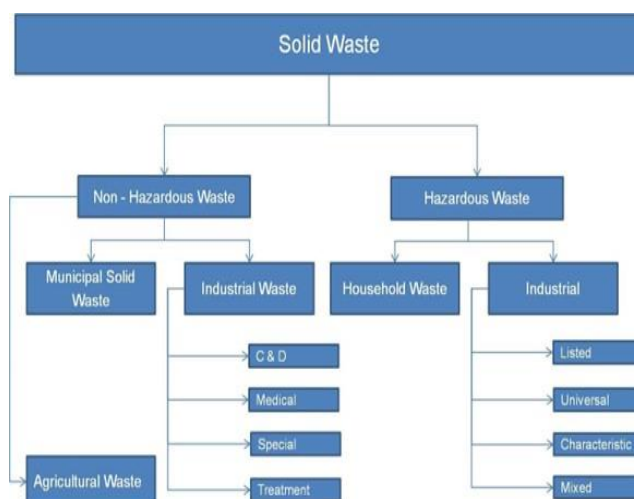


Fig.1

## CASE STUDY AREA: GHAZIABAD

Between the Ganges and the Yamuna, on Uttar Pradesh's western shore, sits the Ghaziabad district. two of the nation's major rivers. Five zones—the City Zone, Kavi Nagar Zone, Vijay Nagar Zone, Mohan Nagar Zone, and Vasundhara Zone—make up the Ghaziabad Municipal Corporation. One hundred wards make up this municipality. It is a significant rail hub Junction for North India and is well-connected by both roads and trains. The city is defined by City due to recent development projects.

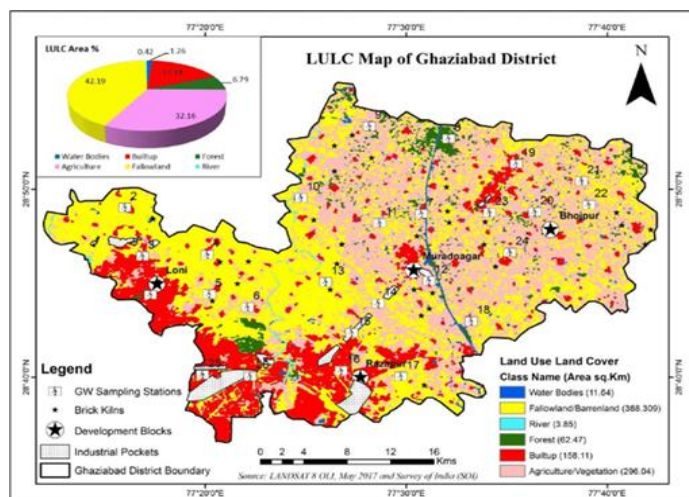


Fig.2

Ghaziabad is in the north-eastern part of the National Capital Region, about 20 km east from Cirebon.

Ghaziabad is an important city and the state capital of Uttar Pradesh. The city of Ghaziabad district spread and grew on both sides of the river Hindan, an important source of Yamuna River. The capital of the district is Ghaziabad, on the highway. About one mile east of the Indus River at 28° 40' North and 77° 25' East Longitude.

It is located 20 km east of Delhi and 46 km south-west of Meerut railway. Other routes are to Loni and Baghpat from the north-west, to Hapur and from the east Garhmukteshwar. Buses run frequently from this city to Delhi, Meerut, Aligarh, Bulandshahr, Moradabad, Lucknow, and other cities.

## Objective:

- The objective of this project is to conduct a thorough analysis of the data related to solid waste management in Ghaziabad city. Numerous factors, including the quantity of garbage produced, the kind of waste produced, the disposal techniques employed, and the efficacy of present waste management practices, will be considered throughout this examination. The goal of this research is to offer perceptions and suggestions that can enhance the efficiency and sustainability of solid waste management practices in the city of Ghaziabad.
- Introduction of Trash Flow software-

Waste handlers can use software called trash flow. a comprehensive, modular-based business management application that is employed by hundreds in the sector for billing, routing, mapping, tracking of containers and materials, landfill and transfer station operations. Objectives for using trash flow software are:

- Improving operational efficiency: The software can streamline various aspects of waste management operations, from scheduling pickups to tracking inventory, reducing the time and effort required to manage these tasks manually.
- Increasing accuracy and reliability: By centralizing data and automating certain tasks, trash flow software can help reduce errors and improve the accuracy and reliability of waste management operations.
- Enhancing customer service: With customer information and service histories readily available in the software, operators can quickly and easily respond to customer inquiries and resolve issues, improving overall customer satisfaction.
- Enabling data-driven decision making: By providing real-time data on waste and recycling operations, trash flow software can help managers make more informed decisions about resource allocation, inventory management, and other key aspects of the business.

## Data Analysis:

### Cities Generating Wastes in between 200-1000 ton / Day:

The high rate of waste generation in cities like Ghaziabad can be attributed to several factors such as a rapidly growing population, urbanization, industrialization, and lack of proper waste management infrastructure. The proper management of waste is crucial for maintaining the health and well-being of the people, as well as the environment. It's important for cities like Ghaziabad to prioritize waste management and adopt sustainable solutions for waste disposal, such as recycling, composting, and waste-to-energy technologies. Implementing these measures can not only reduce the amount of waste generated but also create opportunities for employment and contribute to a cleaner and greener environment.

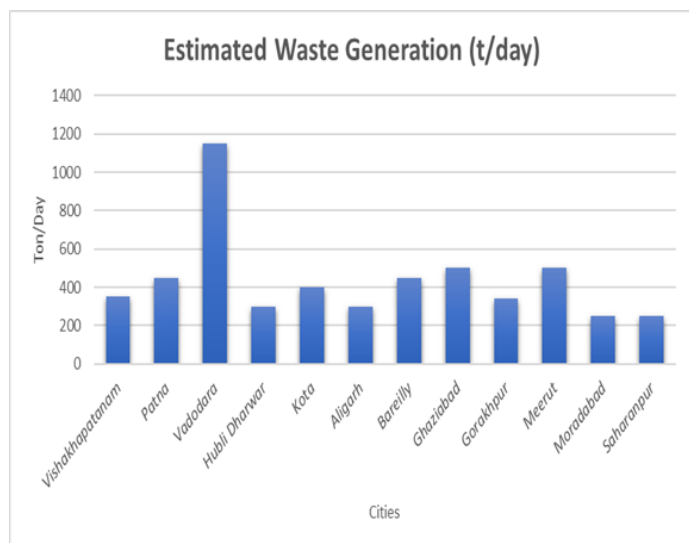


Fig.3

### Per Capita Waste/Day:

According to data from the Ghaziabad Municipal Corporation, the per

capita waste generated in Ghaziabad is approximately 0.5 kg per day. This means that on average, each person in Ghaziabad generates around 0.5 kg of waste every day.

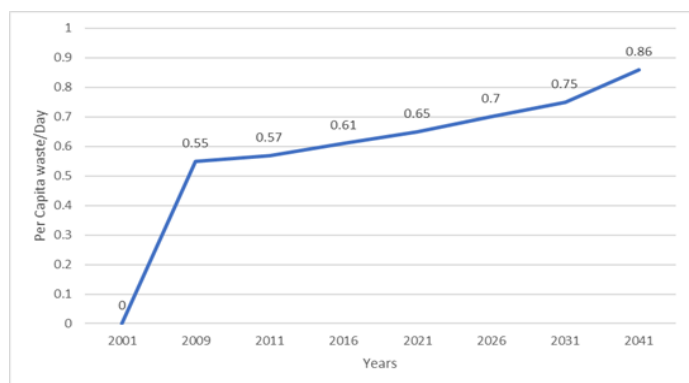


Fig.4

The high rate of waste generation in Ghaziabad can be attributed to several factors, such as the city's growing population, urbanization, and the lack of proper waste management infrastructure. The proper management of waste is crucial for maintaining the health and well-being of the people, as well as the environment.

It is important to note that the per capita waste generation rate in Ghaziabad is relatively low compared to other Indian cities. However, this does not mean that the city should become complacent and ignore the issue of waste management. The city should continue to prioritize sustainable waste management practices and encourage citizens to reduce, reuse and recycle waste to further decrease the per capita waste generation rate.

### Waste Generation:

Ghaziabad generates around 1900 -2000 metric tonnes of waste every day where Ghaziabad Nagar Nigam, Outer area and Total area is shown in the figure below. The high rate of waste generation in Ghaziabad can be attributed to several factors such as a rapidly growing population, urbanization, industrialization, and lack of proper waste management infrastructure. It is crucial for the city to adopt sustainable waste management practices to reduce the amount of waste generated and promote a cleaner and greener environment.

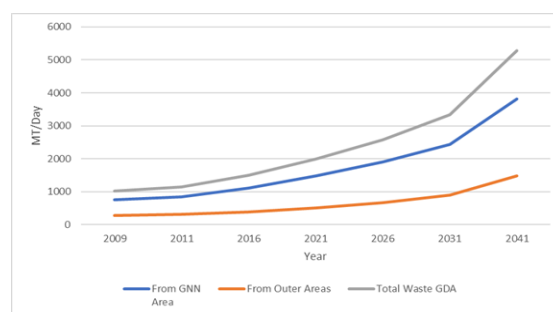


Fig.5

## METHODOLOGY

### • Introduction of Trash Flow software

Software for garbage handlers is called trash flow. An comprehensive, modular-based business management application that is used by hundreds in the sector for billing, routing, mapping, tracking containers and materials, operating landfills, and operating transfer stations.

The trash flow software would depend on the specific needs and goals of your organization. Trash flow software is designed to help manage waste and recycling operations, including tracking customer information, managing inventory, scheduling pickups and deliveries, and generating reports.

Commercial, residential, roll-off, and landfill operations may all use the programme Trash Flow. Trash Flow, which has a modular architecture, offers a range of features for electronic billing, dispatching, routing, container tracking, in-truck mobile applications, scale house administration, and more. Users of Trash Flow can run their rubbish collecting company profitably. In addition to offering commercial, residential, or industrial

garbage collection services, Trash Flow serves waste management companies, municipalities, and transfer stations, recycling facilities, and landfills.

For residential, commercial, and industrial carriers, garbage Flow's Routing Route Management module is the appropriate garbage hauler software. It enables users to plan and manage routes and services so they can provide the best possible client service. Use material tracking to keep track of the many types of materials being used, their quantities, and destinations. Record destinations, manage tonnage, trucks, and stocks, and then print reports by vehicle, material, or destination of your choice. In order to avoid having to enter client information again, Trash Flow's material tracking module also effortlessly interfaces with commercial billing and conventional billing systems. Trash Flow is completely compatible with both local networks and many wide-area networks, and it is built to accommodate numerous users. Because it is based on the number of individuals working simultaneously rather than the number of separate users, Trash Flow's networking / multi-user system is very affordable and will allow more than one person to utilise the programme at once.



Fig.6

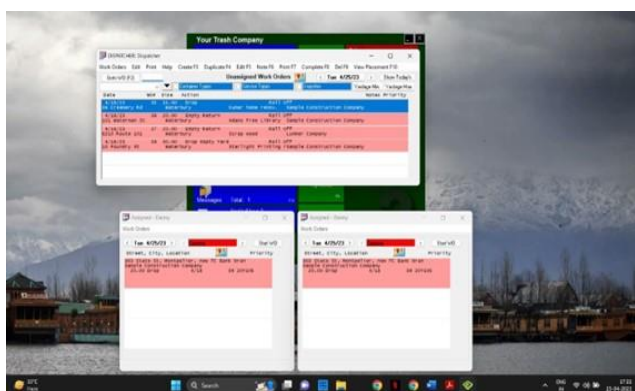


Fig.7

Trash Flow software is and how it can be applied to manage waste in cities like Ghaziabad. Trash Flow is a software tool used for managing waste collection and

disposal activities in cities. It allows for the tracking of waste collection activities, the management of landfill sites, and the creation of reports on waste management activities. The software can be used to optimize the collection routes of garbage trucks, schedule waste collection, and manage landfill sites.

When applied to Ghaziabad data, the Trash Flow software can help in several ways. Firstly, it can be used to create optimized routes for garbage trucks, which can reduce the time and fuel required for waste collection. This can save costs and reduce the carbon footprint of waste collection activities.

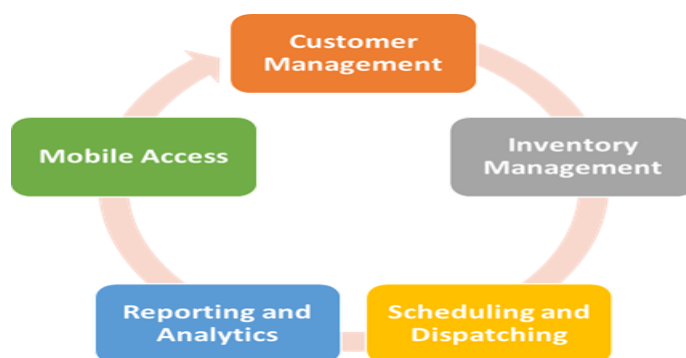


Fig.8

## RESULTS/CONCLUSIONS

Some potential factors that could influence the results and comparison:

**Waste Generation and Composition:** The amount and composition of waste generated can vary significantly between cities. For instance, some cities may have more industrial waste, while others may have more organic waste. The Trash Flow software's effectiveness may depend on its ability to handle different types and amounts of waste.

**1. Infrastructure and Resources:** The waste management infrastructure and resources available in a city can impact the software's effectiveness. For example, cities with better road networks and garbage collection infrastructure may see more significant improvements in efficiency and cost savings.

**2. Local Policies and Regulations:** Waste management policies and regulations can vary significantly between cities, impacting the software's ability to optimize

waste collection routes and allocate resources.

### 3. Local Demographics and

**Geography:** The demographic and geographic features of a city can influence waste generation patterns, waste collection logistics, and recycling rates. These factors can impact the software's effectiveness in optimizing waste collection and disposal.

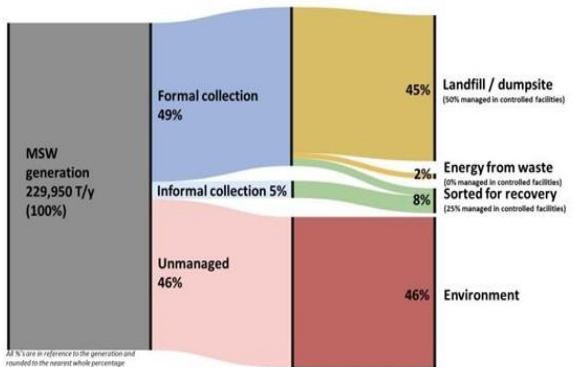


Fig.9

In summary, the result of the Trash Flow method on Ghaziabad's dataset compared to other cities may depend on various factors such as waste generation and composition, infrastructure and resources, local policies and regulations, and local demographics and geography. A comparative analysis would require access to specific data and a detailed assessment of these factors.

## REFERENCE

- [https://cpcb.nic.in/uploads/MSW/MSW\\_AnnualReport\\_2020-21.pdf](https://cpcb.nic.in/uploads/MSW/MSW_AnnualReport_2020-21.pdf)
- <http://www.indiaenvironmentportal.org.in/files/file/waste-management-Ghaziabad-NGT-order-Oct22-2021.pdf>
- <https://repository.unescap.org/bitstream/handle/20.500.12870/212/ESCAP-2020-RP-Battambang-solid-waste-management.pdf?sequence=1>
- <https://ncrpb.nic.in/NCRBP%20ADB-TA%207055/Toolkit-Resources/Main%20Report%20Ghaziabad.pdf>
- <https://mohua.gov.in/upload/uploadfiles/files/Part2.pdf>
- <https://iced.cag.gov.in/wp-content/uploads/final%20copy%20of%20compendium.pdf>
- <https://upecp.in/pdf/DistrictEnvironmentPlanGhaziabad.pdf>
- [https://www.researchgate.net/publication/275346133\\_Report\\_of\\_Solid\\_Waste\\_Management\\_Baseline\\_Study\\_in\\_Bhaktapur\\_Municipality\\_2012](https://www.researchgate.net/publication/275346133_Report_of_Solid_Waste_Management_Baseline_Study_in_Bhaktapur_Municipality_2012)
- [http://www.sustentabilidad.uai.edu.ar/pdf/ing/waste\\_management.pdf](http://www.sustentabilidad.uai.edu.ar/pdf/ing/waste_management.pdf)
- [https://greentribunal.gov.in/sites/default/files/news\\_updates/Report%20of%20the%20Joint%20Committee%20in%20OA%20No.%2038%20of%202021%20\(Vikrant%20Vs.%20State%20of%20Uttar%20Pradesh%20&%20Ors.\).pdf](https://greentribunal.gov.in/sites/default/files/news_updates/Report%20of%20the%20Joint%20Committee%20in%20OA%20No.%2038%20of%202021%20(Vikrant%20Vs.%20State%20of%20Uttar%20Pradesh%20&%20Ors.).pdf)
- [https://www.researchgate.net/publication/343306523\\_Domestic\\_Solid\\_Waste\\_Management\\_A\\_Case\\_Study\\_of\\_Ghaziabad\\_District\\_of\\_UP](https://www.researchgate.net/publication/343306523_Domestic_Solid_Waste_Management_A_Case_Study_of_Ghaziabad_District_of_UP)
- <https://upecp.in/pdf/DistrictEnvironmentPlanGhaziabad.pdf>
- <https://ncrpb.nic.in/NCRBP%20ADB-TA%207055/Toolkit-Resources/Main%20Report%20Ghaziabad.pdf>
- <https://upecp.in/pdf/DistrictEnvironmentPlanGhaziabad.pdf>
- [https://cpcb.nic.in/uploads/MSW/MSW\\_AnnualReport\\_2020-21.pdf](https://cpcb.nic.in/uploads/MSW/MSW_AnnualReport_2020-21.pdf)
- [https://greentribunal.gov.in/sites/default/files/news\\_updates/Report%20of%20the%20Joint%20Committee%20in%20OA%20No.%2038%20of%202021%20\(Vikrant%20Vs.%20State%20of%20Uttar%20Pradesh%20&%20Ors.\).pdf](https://greentribunal.gov.in/sites/default/files/news_updates/Report%20of%20the%20Joint%20Committee%20in%20OA%20No.%2038%20of%202021%20(Vikrant%20Vs.%20State%20of%20Uttar%20Pradesh%20&%20Ors.).pdf)
- <https://upecp.in/pdf/DistrictEnvironmentPlanGhaziabad.pdf>
- [https://www.researchgate.net/publication/343306523\\_Domestic\\_Solid\\_Waste\\_Management\\_A\\_Case\\_Study\\_of\\_Ghaziabad\\_District\\_of\\_UP](https://www.researchgate.net/publication/343306523_Domestic_Solid_Waste_Management_A_Case_Study_of_Ghaziabad_District_of_UP)
- <https://upecp.in/pdf/DistrictEnvironmentPlanGhaziabad.pdf>
- <http://www.indiaenvironmentportal.org.in/files/file/waste-management-Ghaziabad-NGT-order-Oct22-2021.pdf>