



URBAN GOVERNANCE DIALOGUE

Transforming Urban Governance

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Solid Waste Management: Journey from Trash to Energy Case Studies from Praja's Urban Governance Study (Part 3)

As per the 74th Constitution Amendment, the **city government** is responsible for delivery of **18 functions listed in the 12th Schedule**, which include water supply, public health, sanitation, solid waste management, planning for economic and social development, vital statistics, public amenities, roads, and bridges. However, the functions performed by the city government are subject to state devolution.

[Praja's Urban Governance Index 2020](#) shows that **Solid Waste Management (SWM)** is the one function that is devolved to the city governments across states in India. Solid Waste Management is one of the most important components of the mission, and the **Swachh Bharat Mission (SBM) Guidelines** highlight the various strategies adopted to ensure the safe and scientific disposal of all kinds of waste.

The Central Government launched the [Swachh Bharat Mission](#) in 2014, focusing on target-based interventions, enabled sharing of good practices and induced competitiveness amongst the cities. The responsibility for implementing the Swachh Bharat Mission always rested with the city government. Solid Waste Management Rules, 2016 were notified by the Union Ministry of Environment, Forests and Climate Change (MoEF&CC) to the city governments. These rules primarily focused on providing guidelines for the **segregation, technology, and environmental aspects of solid waste management**.

With the function already decentralised, funds were devolved to city governments through state agencies. As a result, **the core elements of decentralised urban governance - funds, functions, and functionaries** - primarily rested with the city government, with partial involvement from the central government, while the state acted as a catalyst. This framework provided cities with the freedom to experiment and innovate in the areas of **waste collection, segregation, implementation, and financing of services**.

The results are evident in the Swachh Survekshan where **Indore (Madhya Pradesh)** tops the list and **has achieved 100% segregation of waste at the source of household and commercial areas**, while Gangtok (Sikkim) has been ranked eighth in Swachh Survekshan. In the pursuit of understanding efficiency in Solid Waste Management (SWM) at the grassroots level, one ward of **Dehradun has implemented commendable SWM methods and**

garnered several accolades for its outstanding practices. A city's cleanliness can be attributed to various factors that have been diligently implemented and maintained by the local administration and its residents.

In this newsletter, we will discuss **Waste Management** case studies of **Gangtok, Indore and Dehradun**.

Gangtok, Sikkim

Introduction

Gangtok is the capital city of the Indian state of **Sikkim**. The city is known for its natural beauty and is a popular tourist destination. Sikkim was in the top ten list of the [Swachh Survekshan](#) in 2016. In recent years, **Gangtok had been facing troubles in dealing with its solid waste management**, which resulted in down trailing the state to the thirteenth rank in 2021. However, in 2022, the state again moved up the rank ladder to take the **8th position**. The [Gangtok Municipal Corporation \(GMC\)](#) has initiated several measures to address the waste management issue and improve the **overall cleanliness of the city**.

The GMC identified the lack of proper waste disposal mechanisms such as **waste segregation**, as **the primary cause of the waste management problem in Gangtok**. The waste generated from households and commercial establishments was dumped in open spaces or on the streets. This led to the accumulation of waste and the creation of unhygienic conditions that posed a significant threat to public health and the environment. To address these gaps, GMC initiated several measures in their SWM.

Measures to deal with solid waste

To address the waste management problem, GMC initiated several measures, including:

- **Door-to-door collection:** GMC implemented a door-to-door collection system to collect waste from households and commercial establishments. GMC trucks collect the waste, and the segregated waste is then taken to the MRF.
- **Establishment of Material Recovery Facility (MRF):** GMC set up an MRF to segregate the waste into recyclable and non-recyclable waste. This facility ensures that recyclable waste is collected separately and sent for recycling, while the non-recyclable waste is processed and disposed of in a scientific manner.
- **Composting:** GMC introduced composting as a means of treating biodegradable waste. The city has several composting units, which have a total capacity of 8.5 metric tonnes per day. The composting units produce organic manure that is sold to farmers.
- **GMC has also set up a biogas plant** in collaboration with Bhabha Atomic Energy and Department of Science and Technology (Govt. of Sikkim) with a capacity of 700 kg at the landfill site. The waste is segregated at the household level into organic and inorganic waste, where in the organic waste is sent to the biogas plant for composting. Segregation was strictly started from 1st Dec 2022.
- Another **composting site** has been constructed in Lower MG Marg in collaboration with International Council for Local Environmental Initiative (ICLEI), South Asia.
- **Citizen awareness:** GMC conducted several awareness programs and campaigns to educate citizens about the importance of waste segregation and the need to keep the city clean. They also provided training to waste collectors to ensure that they were equipped with the necessary skills to collect and segregate waste properly.

The measures adopted by **GMC have had a significant impact on waste management in Gangtok**. The city is now cleaner, and the waste segregation system has resulted in the reduction of waste sent to landfills. The MRF has been able to recover around 50% of the recyclable waste generated in the city, and the composting units have

processed around 10% of the total waste generated. The compost produced by the units is being sold to farmers at a subsidised rate, and the revenue generated is used to maintain the composting units.

Learnings:

- Solid waste management is a function that requires assistance of the city government and the citizens at a vast amount. Awareness amongst the citizens has helped Gangtok deal with its waste at a faster rate since they consciously started segregating the waste at the source.
- Technology involvement is important to manage waste and cities need to learn from one another to incorporate the most efficient way to manage waste.

Challenges:

Despite the success of the measures adopted by GMC, several challenges remain. The city's topography and geography pose significant challenges to waste management, and the lack of suitable landfill sites makes it difficult to dispose of non-recyclable waste. The GMC also faces challenges in implementing the waste segregation system effectively, as many citizens are still unaware of the importance of waste segregation and tend to mix recyclable and non-recyclable waste.

Indore, Madhya Pradesh

Introduction

In the year 2015, [Indore Municipal Corporation \(IMC\)](#) undertook an initiative to draw a detailed systematic plan to create solid waste management awareness amongst the residents and administrators of Indore city. The leadership of **Mayor Malini Gaur** and **Municipal Commissioner Manish Singh** designed a programme to ignite a people's movement to address the Solid Waste Management (SWM) crisis in Indore. In 2015, a gap analysis was conducted by Indore Municipal Corporation (IMC) with the help of Non-Government Organisations (NGOs). One of the NGOs, the [Eco Pro, Environmental Services](#) collaborated with IMC from 2015-2019 to help them design a sustainable SWM model. During the gap analysis, city-wide surveys were conducted to map the status of service delivery by the IMC. The condition and positions of roads, service lanes, toilets, gardens, and garbage bins were geo-tagged.

Citizen Awareness

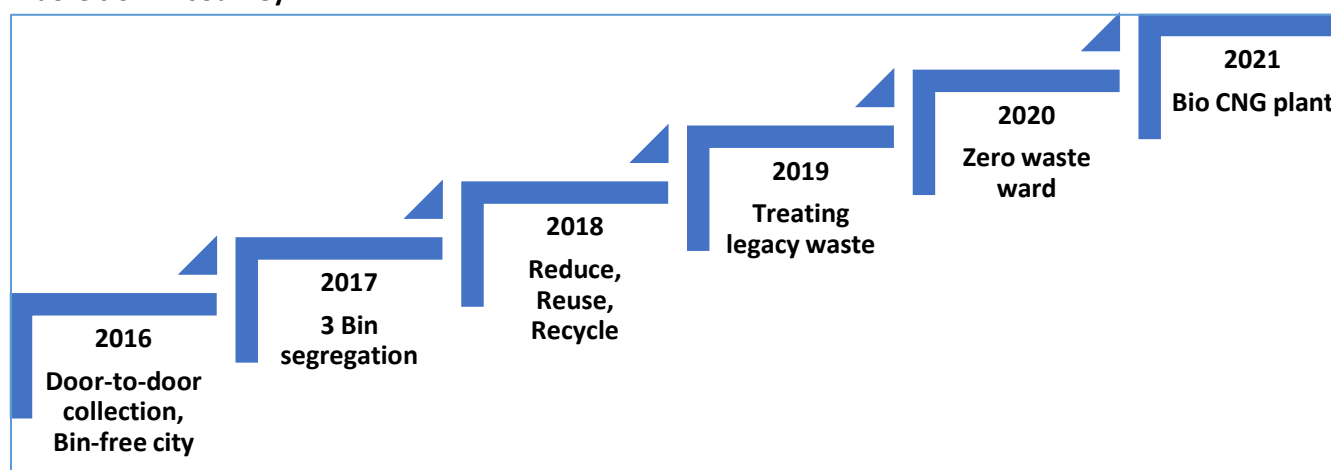
The necessary infrastructure for the SWM drive was generated through the **Corporate Social Responsibility (CSR) funds** and Union and State government grants. Until 2015, door-to-door garbage collection was outsourced to an agency without fruitful results. In 2016, a pilot campaign of **door-to-door SWM collection** was launched in Wards 2 and 10 of IMC. Various NGOs were associated with IMC during the campaign to bring about a **behavioural change** in the residents of Indore city. The NGO representatives accompanied the garbage collection trucks to educate the residents. A detailed schedule for the NGO representatives and the garbage collection trucks was designed to streamline the door-to-door collection.

Along with this, the NGO representatives surveyed the areas and located the problems of the residents with respect to roads, sewerage, drainage, et cetera. The issues and **gaps in service delivery** were identified to develop connect with city residents. The residents were educated by the representatives on the storage capacity of their garbage bins to avoid throwing of garbage by households and commercials in public bins or open spaces. A

comprehensive **Information, Education and Communication campaign** was designed by the city government and civil society groups.

The Municipal Commissioner instructed the IMC administration to address all the complaints within a timeframe of 15 days. Simultaneously, **311- the mayor's helpline** was launched to address citizen grievances. Further, the Municipal Commissioner embarked on making the **city bin free**. A mechanism of strict monitoring was adopted in the city to restrict public disposal of garbage. The collaboration between the NGO and administration significantly reduced dumping of garbage in public bins and streets. The Municipal Commissioner interacted with the worker's union, addressed their grievances and created a beat system to imbibe discipline in administration. The blend of constant **public support, political will and administrative support** ensured 100% door-to-door collection. In the year 2016, Indore achieved the status of bin free city.

Indore's SWM Journey



Waste Processing

In 2017, the municipal corporation targeted systematic segregation of the garbage collected. Initially, **3-bin segregation** was proposed to the residents. Within 6 months, 100% 3-bin segregation was achieved within the city limits. During the collection of segregated waste, the frequency of garbage collection vehicles was increased. In the 19 zones of the city, 10 **Garbage Transfer Stations (GTS)** were created. For instance, in the meat markets, 8 garbage collection vehicles were assigned to collect the wet waste generated. A **Bulk Waste Collection system** was developed wherein; multiple tax slabs were designed for waste generators above 10kg per day. The total garbage generated was weighed in intervals of 15 days, accordingly tax slabs were reassessed.

Simultaneously, **in-house wet waste processing** along with streamlined garbage collection and segregation was motivated by the municipal corporation. More than 30kg of wet waste generators had to process their waste on their premises. Indore city generated around 600 Tons of wet waste daily from these 192 tones was treated within the city by households and commercials. Since 2017, the municipal corporation embarked to **treat the legacy waste** of the city. The strategy of reduce, reuse, and recycle was implemented in 2018 as a step towards reducing the waste directly sent to the landfills. In 2019, the municipal corporation collaborated with NEPRA Engineering and Marketing Company to recycle the waste generated.

In 2020, the municipal corporation targeted to create **Zero Waste Ward** in Indore. In 2021, a **Biomass Compressed Natural Gas (CNG) plant of 550 thousand Metric Tonnes (TMT)** was installed to generate clean and sustainable fuel. The Atal city buses operating within the city are operated by the Bio CNG generated in this plant. The buses get a 50% GST exemption as they are under the green transportation initiative. The bio CNG has high methane content thus, increasing the mileage of the city buses. The SMART city Indore streamlined the procedure to **map the Carbon footprints** and sell the carbon credits earned in the carbon trading market. Until now, the **Indore SMART city** has earned a total of ₹10 crores from selling the carbon credits earned by Indore city. Currently, the SMART city is targeting to reduce the per capita waste generation in the city, explore the Plastic Credit markets and extended producer responsibility credit markets.

Steps towards the cause:

- **Confidence Buildings Measures-** The techniques of Information, Communication and Education (ICE) complimented with Behavioural Change Education brought about significant change in residents and administration. The streamlined collection, transportation and segregation increased resident participation in the initiative.
- **Continuous Engagement-** NGO representatives were accompanying the garbage collection trucks to establish communication with the residents. They provided community education on bin size and heard citizen grievances.
- **Integration of all IMC Departments-** The Municipal Commissioner integrated all the administrates of IMC to address the citizen grievances in a time-bound manner.
- **Constant Review-** The Municipal Commissioner conducted daily field drills to monitor the activities of garbage collection and transportation. The NGO representatives submitted daily report of grievances heard to the IMC. The Municipal Commissioner took constant follow-up of all the complaints brought in notice.
- **Administrative Training-** The IMC staff at different designations were provided customised training to suit their work profile in the SWM initiative.
- **Strengthening Service-delivery Mechanism-** The grievances of the residents were heard by the NGO representatives and the Municipal Commissioner took cognisance of all complaints.
- **Continuous Monitoring-** The Municipal commissioner along with the mayor and the administration conducted Prabhat Pheri to monitor door-to-door garbage collection.
- **Optimum use of Technology-** From the SMART city funds truck mounted road sweepers were operationalised on a rental model. A Biomass CNG plant of 550 TMT is functional in the city. The city buses get subsidised CNG from this plant. Material Recovery Facilities were operationalised in the city to ensure 100% waste collection.
- **Treating Legacy Waste-** With the efforts of bio mining and bioremediation the legacy waste of Indore city was sustainably treated.
- **Penalties & User Charges-** Following the norms mentioned in the Environmental Protection Act, 1986, the maximum penalty of ₹1 lakh was imposed on defaulters. The door-to-door collection user charges were carefully designed on the distinction of commercial spaces and households (slums, Middle Income Groups, Higher Income Groups).
- **Circular Economy Model-** The informal sector involved in waste segregation was integrated within the formal sector. The SWM infrastructure is enhanced and modernised from the funds collected through penalty and user charges. The SMART city is selling carbon credits earned by equipping modern technology contributing to overall revenue generation.
- **Self-Sustainability-** The waste collected is carefully segregated into seven types of waste and processed accordingly. Garden composting of waste is promoted amongst the residents. Wet waste produces of more than 30 kg were termed as Bulk Producers and asked to process their waste at source.

Dehradun, Uttarakhand

Introduction

In the pursuit of understanding efficiency in Solid Waste Management at the grassroots level, **Ward No. 100 in the [Dehradun Municipal Corporation](#) has implemented commendable SWM methods**, and garnered several accolades for its outstanding practices. The management and implementation of these methods are overseen by the NGO, [Feedback Foundation](#). As a dynamic and committed organisation, Feedback Foundation plays a pivotal role in promoting **sustainable waste management practices and empowering communities**. Through their expertise and collaborative efforts, they have successfully established an effective model that **prioritises community engagement and participation, fostering a cleaner and healthier environment**.

Feedback Foundation focuses on areas such as sanitation, waste management, health, and hygiene. The organisation's approach is rooted in community engagement and participation, ensuring that local voices are heard and incorporated into the decision-making process. With a strong emphasis on empowering individuals and building capacity at the grassroots level. Feedback Foundation works closely with various stakeholders, including government bodies, civil society organisations, and citizens, to implement innovative and sustainable solutions. By leveraging its expertise and experience, Feedback Foundation has successfully implemented numerous projects and initiatives across India, making a significant impact on improving the quality of life for communities and promoting sustainable practices.

Decentralised Waste Management

Nathuwala Ward 100 of Dehradun is led by Mrs. Swati Dobhal, a dedicated councillor who has generously provided land on lease to the Feedback Foundation for their operations. The foundation operates four vehicles, each responsible for collecting waste from 800 households in the area.

To promote effective source segregation, the Feedback Foundation initially employed a unique approach by involving children in their awareness campaigns. Recognizing the influential role children play in shaping household habits, the foundation educated them about Solid Waste Management (SWM) segregation practices. Equipped with knowledge and understanding, the children were encouraged to actively discuss SWM segregation within their homes, communities, schools, and families.

By engaging children in the dialogue and empowering them as change agents, the Feedback Foundation aimed to create a ripple effect of awareness and action. Children, being natural conduits of information, could effectively disseminate their learnings and advocate for proper waste segregation practices among their peers and family members. Through this grassroots approach, the foundation sought to foster a culture of responsible waste management from an early age, instilling values of sustainability and environmental stewardship.

It's noteworthy that the Feedback Foundation is the sole organisation working on solid waste management in the entire Dehradun district of Uttarakhand. The foundation took the initiative to address this critical issue and was assigned the Nathuwala ward by the Nagar Nigam (Municipal Corporation).



To streamline the waste management process, the Feedback Foundation has implemented a meticulous categorisation system. They have classified the waste into 28 distinct categories, including thermocol, plastic waste, and glass waste. The foundation has set up 10 pits, known as Nadi Pits, for vermicomposting and waste segregation. The waste composition consists of 60% wet waste and 40% solid dry waste.

The waste undergoes a decomposition process, where it is left to form semi-compost. Subsequently, worms are introduced to aid in the transformation of the waste into organic manure. The waste within the pits is initially turned every 15 days, followed by three turns per week. The duration for the formation of the manure varies depending on the weather conditions, typically taking 40-60 days in the summer and 90 days during the rainy season.

The efforts undertaken by the Feedback Foundation and the women councillor, Mrs. Swati Dobhal, have resulted in an efficient and sustainable waste management system in Nathuwala. By implementing innovative practices and investing in community engagement, they have successfully transformed waste into a valuable resource, contributing to a cleaner and healthier environment for the residents. It is noteworthy that within the premises of the MRF, there is a taekwondo lawn and a garden for children to play.

Challenges faced in SWM in Dehradun

During our exploration, we encountered the **Shishambara Plant, a centralised facility responsible for waste management in 69 wards of the city.** However, it became apparent that there are still 31 wards that remain uncovered by the plant. Established in 2017, the plant has encountered various challenges, including public opposition. The waste management issues have been further compounded by the addition of 40 wards (consisting of 72 villages) in 2018.

To address the gaps in waste management, the Municipal Corporation has initiated a decentralised approach as a pilot project in the Nathuwala ward of Dehradun. This particular ward, which is not covered by the Shishambara Plant, has been designated as a "sanitation park" and entrusted to the expertise of the Feedback Foundation.

What sets the Feedback Foundation apart is its commitment to the **"No Open Waste" system**. Unlike traditional methods that involve open dumping or burning of waste, the foundation emphasises the proper processing and management of solid waste. By adhering to stringent waste processing practices, the Feedback Foundation ensures that **no waste is left exposed or openly disposed of**, thereby **minimizing environmental pollution and health hazards**.



The involvement of the Feedback Foundation in establishing the **"sanitation park" in Nathuwala** showcases their expertise in sustainable waste management. By **implementing innovative techniques and promoting responsible waste disposal practices**, the foundation aims to create a cleaner and healthier environment for the residents while setting an example for other areas to follow.

Although **challenges persist in waste management within Dehradun**, the pilot project in Nathuwala, led by the Feedback Foundation, serves as a stepping stone toward decentralized waste management and the adoption of environmentally friendly practices throughout the city.

Importance:

- Solid waste management is crucial for preventing risks and hazards within households caused by improper handling of waste materials.
- Municipalities and concerned authorities have a responsibility to ensure sustainable practices that do not compromise the environment.
- Efficient solid waste management relies on source segregation, enabling appropriate treatment such as recycling, reusing, and recovery of waste.
- Creating more waste management opportunities benefits both neighbourhoods and their residents.

Challenges:

- Land availability poses a significant challenge in the Doon Valley.
- Lack of machinery and equipment provided to upcoming foundations or NGOs hampers their smooth functioning.
- Insufficient funding from Nagar Nigam and other subsidiary authorities.
- Limited promotion and recognition of organisations working on waste management, discouraging their efforts.

Effective waste management is a pressing challenge that requires coordinated efforts from the Indian government, local authorities, and strategic partnerships. To tackle this issue, it is crucial to **encourage source separation among citizens, promoting the segregation of recyclable materials** from the general waste stream. Additionally, initiatives should be undertaken to **increase recycling rates** and establish facilities that can efficiently process recyclable materials. Furthermore, there is a need to focus on **producing high-quality compost from organic waste, promoting sustainable practices and reducing the burden on landfills.**

However, addressing **non-recyclable waste** is equally vital. State governments should **proactively implement plans to maximize resource efficiency** by exploring alternative methods of waste disposal, such as **waste-to-energy technologies** or **safe disposal mechanisms for hazardous waste**. A comprehensive approach is required to manage the ongoing and future generation of waste effectively, encompassing various strategies and actions that account for the diverse waste streams produced across the country. By embracing **sustainable waste management practices**, India can move towards a greener, more environmentally responsible future, conserving resources and preserving the natural environment for generations to come.

Other Links:

[Case Studies from Praja's Urban Governance Study \(Part 1\)](#)

[Case Studies from Praja's Urban Governance Study \(Part 2\)](#)



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We would like to know your views and feedbacks based on the above information shared. Feel free to reach us at info@praja.org

Kind Regards,

A handwritten signature in blue ink, appearing to read 'Nitai Mehta'.

Nitai Mehta

Managing Trustee, Praja Foundation

A handwritten signature in blue ink, appearing to read 'Milind Mhaske'.

Milind Mhaske

CEO, Praja Foundation