SOLID WASTE MANAGEMENT BY BULK WASTE GENERATORS IN GURUGRAM

AN ASSESSMENT

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Production: **Rakesh Shrivastava and Gundhar Das**

Norwegian Embassy
New Delhi

We are grateful to the Norwegian Ministry of Foreign Affairs for its support.

We acknowledge with thanks the insight and information we received from the following:
Officials of Municipal Corporation of Gurugram, Monika Khanna Gulati, Rahul Khera and team, Dinesh Shandilya, R P Sharma, Hema Sharma, Navin Chand Rao, Vasu Sashti, Arun Yadav, Aakash Jain, Raushan Kundliya, Jagdish Chand, Anand Singh, Bharat Bhusan Upoadhyay and Saurabh Vardhan.

Maps used in this document are not to scale.

CITATION: Atin Biswas, Mou Sengupta and Kaifee Jawed, *Solid Waste Management by Bulk Waste Generators in Gurugram: An Assessment, 2023,* Centre for Science and Environment, New Delhi

Published by
Centre for Science and Environment
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Website: www.cseindia.org

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Bulk Waste Generators pose a big challange; but they also offer an opportunity. Controlling their waste generation can lead to substantial gains in overall solid waste management

The Solid Waste Management Rules, 2016 mandates BWGs to carry out certain waste management functions themselves

This report evaluates current practices followed by BWGs in Gurugram and challenges assosiated with them; it also offers recommendations for sustainable and scientific management of waste by BWGs and the Municipal Corporation

INTRODUCTION

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India faces a challenge of managing its solid waste; the unpredictable nature of urban growth in the country complicates matters further

Emerging and developing economies today are characterised by rapid urbanisation, high rates of population growth, and changing lifestyles and consumption patterns. This has many ramifications, one of which is the generation of enormous quantities of waste. India, today, faces a mammoth development challenge with respect to the management of solid waste, which is going to get further complicated due to the unpredictable nature of urban growth.

ORGANIC WASTE ACCOUNTS FOR 40 TO 60 PER CENT OF TOTAL URBAN MUNICIPAL SOLID WASTE GENERATED IN INDIA

Studies have suggested that a significant fraction of the waste generated across cities in India is organic – and hence biodegradable – in nature. According to the *Swachh Bharat Mission – Urban 2.0 Operational Guidelines 2021*, the organic fraction accounts for approximately 40 to 60 per cent of the total urban municipal solid waste generated in India.[1] This stream of waste, if mishandled or left untreated, leads to contamination of soil, water and air, and therefore, requires greater attention.

SOLID WASTE MANAGEMENT RULES, 2016 DEFINE A BULK WASTE GENERATOR AS "HAVING AN AVERAGE WASTE GENERATION RATE EXCEEDING 100 KGS PER DAY"

The best way to manage organic waste is at the source of generation or as close to the source as possible. In the value chain of solid waste management, for effective treatment of organic waste and subsequent resource recovery, Bulk Waste Generators (BWGs) pose a key challenge – but they also offer an opportunity. According to the *Ministry of Housing and Urban Affairs - Bulk Waste Generator Guidelines 2017*, bulk generators contribute significantly to waste generation: about 30 to 40 per cent of the total waste generated per day in any city.[2]

Bulk generators, as the name suggests, are entities generating a substantial amount of waste on a daily basis. The Solid Waste Management Rules, 2016, define a bulk waste generator as *"having an average waste generation rate exceeding 100 kg per day (of all waste streams put together)"* and includes *"buildings occupied by the Central Government Departments or Undertakings, State Government Departments or Undertakings, Local Bodies, Public Sector Undertakings or Private Companies, Hospitals, Nursing Homes, Schools, Colleges, Universities, other Educational Institutions, Hostels, Hotels, Commercial Establishments, Markets, Places of Worship, Stadia and Sports Complexes etc."*

The rules advise the cities to adopt a community-based waste management system and emphasise on on-site or decentralised management of segregated organic waste. They also mandate bulk generators

1. Swachh Bharat Mission-Urban 2.0 operational guidelines, Ministry of Housing and Urban Affairs Government of India, available at https://sbmurban.org/storage/app/media/pdf/swachh-bharat-2.pdf
2. Bulk solid waste generators guidelines, Ministry of Housing and Urban Affairs Government of India available at https://sbmurban.org/storage/app/media/pdf/Bulk%20Waste%20Generator%20Book.pdf

URBAN LOCAL BODIES ARE REQUIRED TO IDENTIFY ALL BULK WASTE GENERATORS WITHIN THEIR JURISDICTION

to carry out certain waste management functions themselves, including segregation, handling and disposing of organic waste through composting or bio-methanation within their premises as far as possible; developing a system for reusing the products of processing such as compost, biogas etc; and handing over dry and other recyclable wastes to the corporation or to authorised agencies stipulated by the local body.

Urban local bodies (ULBs) must identify all bulk generators within their jurisdiction through a detailed survey. Based on the survey results, a ULB has to publish a public notification mentioning the guidelines to be followed by all BWGs under their jurisdiction (see *Table 1: Steps to implement compliance of BWGs as per CPHEEO guidelines*). Along with this public notice, individual notices are given as well, to which the BWGs need to respond with a self-declaration format within 20 days of receiving the notice. The local body conducts another round of field inspections for verification of the claims made by the BWGs. An acknowledgement certificate is given to them after that.

There is also a provision for delisting of the claimant BWG if it is found after three inspections that the BWG is not generating the amount of waste the city has defined as the minimum criterion to be a BWG.

On-site management of waste by BWGs where the quantity may be ranging from a few quintals to a couple of tonnes, can be efficiently managed using natural composting or semi-mechanised composting methods. If the management of organic waste is

Table 1: Steps to implement compliance of BWGs as per CPHEEO guidelines

Tasks	Who will do this	Timeline	Content
Prepare and notify the bye-law	Urban Local Body (ULB)	Within one year of the SWM Rules 2016 taking effect	The bye-laws should contain adequate provisions for SWM for BWGs, their roles, user charges, penalties etc
Identification of BWGs, issue public/individual notices, conduct surveys	ULB	Onsite management facility to be installed within 60 days of the notification; self-declaration to be sent back within 20 days from the issuance of the notice	ULB will conduct a survey – on the basis of its result, it will identify BWGs under its jurisdiction
Identification and verification process	ULB	Within a month of the notification. Random inspection to continue. Periodic verification of all targeted premises to continue at least once in every six to 12 months	Monitoring committee will be constituted by the ULB chaired by the head of the SWM department. The committee will be authorised to enter and inspect the premises; based on its report, delisting can be done (in case the BWG is not generating the specified amount of waste). The committee should continue the periodic visits every six to 12 months
Handholding the BWGs	ULB	Before setting up the processing unit; should be a continuous process	ULB will extend all technical support to the BWGs (except any financial assistance) for establishing decentralised organic waste management system
Establishing onsite waste treatment facility	BWGs	Within 60 days of the notification	

Source: Compiled by CSE from the CPHEEO guidelines on Bulk Waste Generators

improved, the overall burden of municipal solid waste on the cities will be reduced considerably; besides, it will also lower the requirements for capital expenditure (apex) and operational expenditure (opex).

This report evaluates the current practices followed by BWGs in Gurugram for management of organic waste and the challenges associated with it. It also provides recommendations for the municipal corporation to deal with BWGs institutionally in a more sustainable and scientific manner, so that it reduces the burden on the local government, and yet can manage the waste efficiently.

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The city administration says Gurugram has 614 BWGs

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GURUGRAM: A CITY PROFILE

Bulk Waste Generators (BWGs) are entities generating a substantial amount of waste every day – they include government buildings, institutions, commercial complexes, hotels, religious places etc. As per the Ministry of Housing and Urban Affairs, about 30-40 per cent waste of a city is contributed by BWGs.

Gurugram is a city of multi-stories, malls and commercial complexes on one hand (New Gurugram), and a rural ecosystem on the other (Old Gurugram). This rural-urban dichotomy has led to lop-sided development and urbanisation.

The diverse and complex structure of the city has given birth to multiple BWGs. According to the city administration, Gurugram has 614 BWGs.

GURUGRAM: A CITY PROFILE

Map 1: Gurugram — the wards and zones

Gurugram city – vital statistics

Population (2011 Census)	1.5 million
Current population (2022 estimate)	2.2 million (approximation)
Total area	232 sq km
Number of wards	35
Number of zones	4 (Zones 1 and 2 under Old Gurugram, 3 and 4 under New Gurugram)
Total number of residential establishments	4,78,224
Total number of commercial establishments	1,04,876
Total number of institutional establishments	8,514
Total number of industrial establishments	11,373
Total number of places of worship	1,213
Total number of identified Bulk Waste Generators	614

Source: Census 2011; Municipal Corporation of Gurugram (MCG)

A MUNICIPAL CORPORATION OF GURUGRAM SURVEY SAYS THE CITY HAS A POPULATION OF 2.2 MILLION

Gurugram is a satellite city strategically located in the state of Haryana; it is a part of the National Capital Region (NCR) of India. It lies between 280 53' north of latitude and 750 35' east of longitude, about 32 kilometres away from the National Capital Territory (NCT) of Delhi on the Delhi-Jaipur highway (National Highway 8) and the Delhi-Bikaner railway. The Yamuna river is about 17 km away.

Over the past decades, the city has experienced phenomenal growth – emerging from a primarily rural-agrarian economy to becoming one of largest urban centres in Haryana. Transforming Gurugram into a 'Millennium City' has been a singular focus of the local and municipal governments. The city's reorientation into one of India's leading industrial and financial centres has accelerated dramatically amidst trends in globalisation leading to massive real estate development, spike in spending, and influx of multinational corporations.

The 2011 Census had pegged Gurugram's population at 1.5 million. In 2022, the Municipal Corporation of Gurugram (MCG) conducted a door-to-door survey to calculate the population of the city. As per the survey results, the current estimation is close to 2.2 million. However, this does not include the staggering number of floating population that uses the municipal infrastructure and services of the city on a daily basis, as well as the population of the two new zones, recently approved and added by the Department of Township. Nonetheless, on the basis of the aforementioned figures, the average

annual population growth rate can be estimated to be approximately 4 to 5 per cent. Factors such as tourism, trade, foreign investment, and migration of labour, especially rural to urban migration, have contributed significantly to this population growth and have also fuelled the city's economy.

OLD GURUGRAM VS NEW GURUGRAM: A RURAL-URBAN DICHOTOMY

Gurugram is spread over an area of about 232 sq km. This second largest city of Haryana is divided into two parts: Old Gurugram – the unplanned part of the city – and New Gurugram – which is better planned. This divide is shaped by a rural-urban dichotomy

While an array of new projects are coming up in new Gurugrsm, resident of old Gurugram (such as this locality in the picture) are choosing to relocate in search of better prospects

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that marks a lop-sided picture of development and urbanisation.

THE TOTAL GEOGRAPHICAL AREA OF GURUGRAM WILL BE EXPANDED BY ADDING TWO MORE ZONES AND RE-DISTRIBUTION OF EXISTING MUNICIPAL WARDS

New Gurugram is characterised by malls, multiplexes, multinational corporations, housing societies, and high-rise residential and commercial properties. As one enters the Old Gurugram region, one is led into a labyrinth of villages, marketplaces, sectors and colonies. New Gurugram boasts of highways and underpasses, whereas Old Gurgaon is characterised by poor drainage, damaged, congested and waterlogged roads, rickety infrastructure and a shortage of electricity and water supply. The streets are unplanned, unnamed and, in many cases, unnavigable. While an array of projects in the real estate market and entertainment sector are coming up in New Gurugram, residents living in Old Gurugram are choosing to relocate in search of better prospects.

Following a delimitation process, the total geographical area of Gurugram is going to be expanded by adding two more zones (Zones 5 and 6) and re-distribution of existing municipal wards for ease of operations and providing civic services, including sanitation. The addition of two more zones has already been approved by the Department of Township, Government of Haryana, but is yet to be officially notified.

Organic waste accounts for the highest fraction of waste in Gurugram

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SOLID WASTE MANAGEMENT IN GURUGRAM

Gurugram generates an average of 1,200 tonne per day (TPD) of waste across its four zones. Zone 1, with the highest population, generates the maximum quantum of waste.

Food or 'green waste' accounts for the highest fraction of waste in the city — about 40.66 per cent. This is followed by plastic materials (26.75 per cent).

In Gurugram, the MCG is the apex body responsible for solid waste management. The overall responsibility of end-to-end waste management is assigned to a single concessionaire. This agency is also authorised to collect user fees from waste generators.

There is evidence of door-to-door collection by an informal network in about 21 per cent of the total area under the jurisdiction of the MCG.

SOLID WASTE MANAGEMENT IN GURUGRAM

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The informal sector plays a crucial role in collection of waste in the city

GURUGRAM'S WASTE PROFILE

WASTE GENERATION

As per data received from the Bandhwari dumpsite which is under the Municipal Corporation of Gurugram (MCG), about 1,200 tonne per day (TPD) of waste is being collected by the city's concessionaire, Ecogreen. The Delhi-based Shriram Institute for Industrial Research did a comprehensive study in 2020 on the composition of waste from different waste collection points in Gurugram – such as Rajeev Chowk, the Bandhwari sanitary landfill, Khandsa

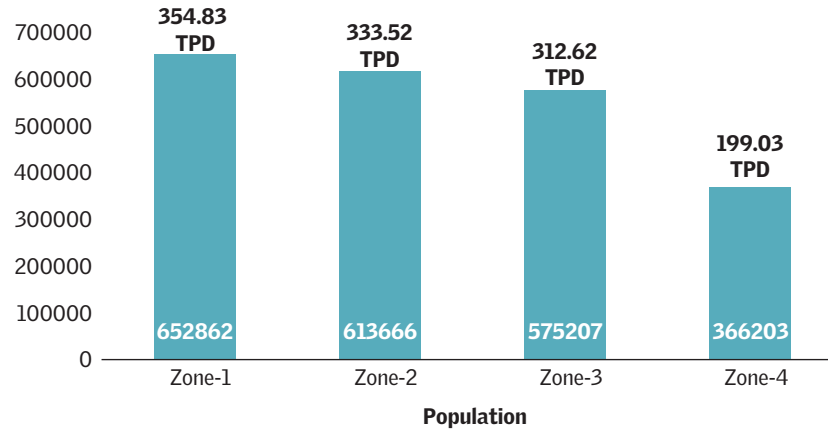
Khatta site under the Haryana State Industrial and Infrastructure Development Corporation (HSIIDC), etc. The study revealed wet waste and dry waste generation to be about 487.92 TPD (40.66 per cent of the total) and 543.84 TPD (45.32 per cent of the total), respectively. Inert materials accounted for about 168.24 TPD (14.02 per cent) (*see Table 2: Quantum of waste generated in Gurugram and Graph 1: Zone-wise waste generation vs population*).

Table 2: Quantum of waste generated in Gurugram

Parameters	
Number of wards	35
Total waste generation	1,200 TPD
Total wet waste generation	487.92 TPD
Total dry waste generation	543.84 TPD
Total inerts	168.24 TPD

Source: MCG; Note: TPD = tonne per day

Graph 1: Zone-wise waste generation vs population in Gurugram



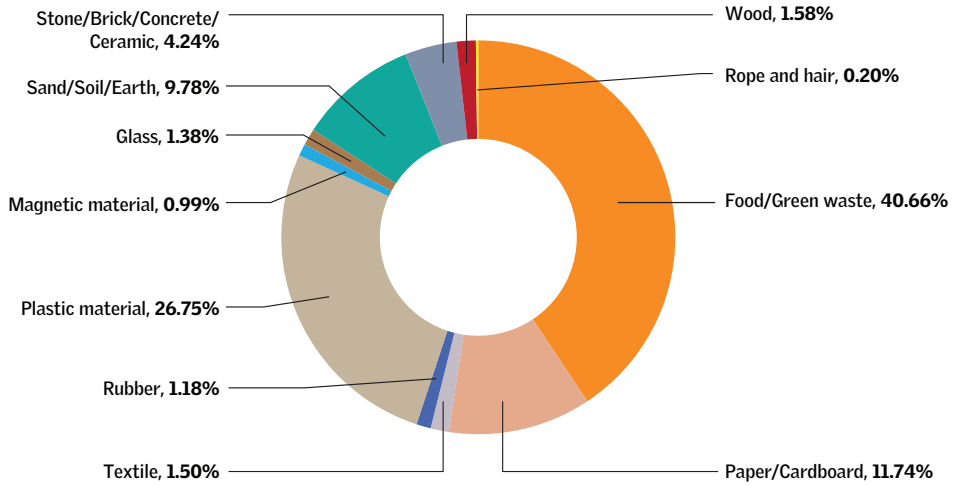
Source: MCG

SOLID WASTE MANAGEMENT IN GURUGRAM

WASTE COMPOSITION AND CHARACTERISATION

Municipal solid waste (MSW) is classified into three broad categories: organic, recyclable and inert. These categories are further sub-divided into a range of components such as food and garden wastes, discarded packaging material, clothing and textiles, consumer electronics, appliances, street sweepings, and so on. As per the result of the tests conducted by the Shriram Institute for Industrial Research in 2020, of all the components in the waste produced by the city of Gurugram, food or green waste accounts for the highest fraction: about 40.66 per cent. This is followed by plastic materials, about 26.75 per cent, and paper or cardboard, about 11.74 per cent. Magnetic material, rope and hair account for the lowest fraction of about 0.99 per cent and 0.20 per cent, respectively.

Graph 2: Physical composition of municipal solid waste in Gurugram



Source: Data derived from MCG and Shriram Institute for Industrial Research

WASTE MANAGEMENT

The Solid Waste Management Rules, 2016 state that it is the duty of the local authorities to arrange for door-to-door collection of segregated solid waste from all residential, commercial and institutional establishments. In addition, the local authorities must also direct waste generators to hand over waste to authorised waste collectors and refrain from practicing open dumping and burning of waste.

IN GURUGRAM, THE CONCESSIONAIRE IS AUTHORISED TO COLLECT A USER FEE FOR ITS DOOR-TO-DOOR COLLECTION SERVICE

In Gurugram, the MCG is the apex body responsible for solid waste management. Since 2017, a private concessionaire called Ecogreen has been entrusted with the task of collection (primary and secondary), transportation, processing and disposal of municipal solid waste. The agreement with Ecogreen will be valid for a tenure of 22 years.

While waste collection service is provided by Ecogreen for the record, there is evidence of door-to-door collection by an informal network in about 21 per cent of the total area under the jurisdiction of the MCG. The primary and secondary waste collected from the city is transferred to the Bandhwari landfill site for further processing and disposal. The concessionaire is also responsible to undertake awareness and sensitisation programmes with citizens using appropriate IEC /BCC tools to influence behaviour change towards sustainable waste management practices. The concessionaire is authorised to collect a user fee from every establishment against the door-to-door collection service as per the agreement with the ULB.

Over 200 BWGs in Gurugram are managing their wet waste *in-situ*

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BULK WASTE GENERATORS

The Municipal Corporation of Gurugram (MCG) has redefined BWGs in Gurugram as entities generating 50 kg waste per day (instead of 100 kg as defined in the SWM Rules).

In Gurugram, its Citizen's Monitoring Committee has played a crucial role in strengthening BWG compliance, initiating a survey to map BWGs in the city, and helping the MCG maintain transparency of data about BWGs.

BWGs in the city have been divided into five categories. Over 60 per cent of the identified BWGs in Gurugram fall under the commercial category.

Out of the 614 identified BWGs, 205 are managing their wet waste *in situ* and handing over their dry waste to authorised collectors.

The city needs to do much more to identify more BWGs and make them comply.

THE LEGAL FRAMEWORK FOR BWGS IN INDIA

Bulk waste generators (BWGs) are entities with an average waste generation rate greater than 100 kg per day. BWGs play an essential role in improving municipal services by adopting a decentralised waste management system. According to the guidelines released by the Ministry of Housing and Urban Affairs (MoHUA), these generators contribute significantly to the overall quantity of waste generated – accounting for roughly 30 to 40 per cent of the daily waste, about 50 per cent of which is biodegradable.[3]

According to the law, the biodegradable waste generated by the BWGs does not need to be collected by the city government and should be treated on-site by the generators themselves. This will not only reduce the physical and financial burden on the cities, but also help the environment by reducing emissions.

To summarise, the legal mandate is to hold the BWGs accountable for the biodegradable waste they generate. Apart from the mandate under the SWM Rules of 2016, municipal bodies are empowered with legal instruments by the 74th amendment of the Indian Constitution to modify the definition of BWG as per local needs and priorities and get them reflected in their municipal bye-laws.

MUNICIPAL BODIES CAN LEGALLY MODIFY THE DEFINITION OF BWG AS PER LOCAL NEEDS AND PRIORITIES

According to the SWM Rules 2016, different entities are classified into various broad groups of bulk waste generators (see *Table 3: Categories of BWGs*).

3. Bulk solid waste generators guidelines, Ministry of Housing and Urban Affairs Government of India available at https://sbmurban.org/storage/app/media/pdf/Bulk%20Waste%20Generator%20Book.pdf

Table 3: Categories of BWGs

Category	Details
Residential	• Cooperative group housing societies with more than 300 flats and markets; • Central government residential colonies; • resident's welfare associations (RWAs)
Commercial	• Restaurants with more than 200 seating capacity; all four- and five-star hotels; shopping complexes/malls with built-up areas of over 5,000 sq m
Government, public sector or private bodies	• Central and state government ministries, departments and undertakings; public sector undertakings, offices, complexes and buildings; local bodies
Social infrastructure	• All hospitals/nursing homes with more than 200 beds; religious places; stadia and sport complexes; marriage halls; recreational/entertainment complexes; railway and bus stations, airports etc
Educational institutes	• Schools/colleges, universities and educational training Institutions having more than 500 students; hostels having more than 500 students for accommodation

Source: Bulk Waste Generator Guidelines, MoHUA, 2017

PROVISIONS FOR BWGS AND LOCAL BODIES UNDER THE SOLID WASTE MANAGEMENT RULES, 2016

According to the SWM Rules 2016, for decentralised management of biodegradable waste, the duties and responsibilities of entities categorised as bulk waste generators are as follows:

- Segregate waste into three separate streams – biodegradable, non-biodegradable, and domestic hazardous wastes, and hand over segregated wastes to authorised waste pickers or waste collectors as directed or notified by local authorities from time to time.
- Biodegradable waste shall be processed, treated and disposed of within the premises as much as possible through composting or bio-methanation. The residual waste must be delivered to the waste collectors or agency designated by the local body.
- All resident welfare and market associations,

BWGs NEED TO DEVELOP A SYSTEM TO REUSE THE PRODUCTS OF COMPOSTING (THE COMPOST) OR BIO-METHANATION PROCESSING (BIOGAS)

apartment buildings and educational institutions with more than 5,000 sq m area and all hotels and restaurants should ensure waste segregation and in-situ processing of biodegradable waste through composting or bio-methanation in collaboration with the local body.

- Develop a system to reuse the products of composting (the compost) or bio-methanation processing (biogas).
- Wrap securely all used sanitary waste like diapers, sanitary pads etc in pouches provided by the brand owners of these products or in a suitable wrapping material as instructed by the local authority (such as newspaper, paper etc).
- Store horticultural waste and garden waste generated from the premises separately on the premises and carry out composting in compost pits within the premises. In the absence of available land, waste can be disposed of as per the instructions issued by the local authority from time to time.
- Store separately all construction and demolition waste generated in own premises and dispose of as per the C&D Waste Management Rules, 2016.
- Do not mix e-waste – it should be separately stored as and when generated and should be handed over to the recycling chain.

Under Clause 15: Duties of local authorities

- Collect waste from vendors and markets of vegetables, fruits, meat, poultry, fish and flowers daily and promote setting up decentralised compost or bio-methanation plants at suitable locations in the vicinity of markets to ensure

hygienic conditions.

- Involve communities in waste management and promotion of home composting and biogas generation at a community level.
- Give preference to decentralised organic waste treatment and processing and facilitate construction, operation, maintenance and associated infrastructure development independently or with private sector partnerships or private agencies.

PROFILE OF BWGS IN GURUGRAM

The Solid Waste Management Rules, 2016, defines BWGs as entities having an average waste generation rate exceeding 100 kg per day (of all waste streams put together). At the same time, the 74th amendment to the Indian Constitution delegates the power and authority to ULBs for any local-level decision making – hence, they can declare and re-define BWGs as per local requirements and the quantum of waste generated by them.

The SWM Rules, 2016 have also given responsibilities to ULBs to secure *in situ* composting, as far as possible, by the BWGs.

In 2018, the then Commissioner of the Municipal Corporation of Gurugram, Dr Yashpal Yadav, decided to use this discretional power and changed the definition of a BWG in Gurugram – from an entity which generates 100 kg per day to one which generates 50 kg a day. The assumption was that this would help incorporate small communities or markets that contribute significantly to the total

MUNICIPAL BODIES CAN LEGALLY MODIFY THE DEFINITION OF BWG AS PER LOCAL NEEDS AND PRIORITIES

GURUGRAM SET UP A CITIZEN'S MONITORING COMMITTEE IN 2018 TO GUIDE THE MUNICIPAL ADMINISTRATION IN IMPROVING THE ECOSYSTEM OF SOLID WASTE MANAGEMENT IN THE CITY

quantum of waste generated in the city but do not fall into the category of 100 kg per day. But ambiguity remained about the specific number of BWGs under the MCG's jurisdiction, since no inventory of these generators was done by the city. **Between July and August 2023, following a series of discussion in workshops organized by CSE to deliberate on the interim findings, MCG initiated the task to map and re-validate the BWGs in the city through a fresh survey. The report and key findings of the survey has been submitted to the Commissioner, Municipal Corporation Gurugram. Upon completion of the administrative process MCG is expected to start notifying the BWGs for compliance.**

THE CITIZENS' MONITORING COMMITTEE

A Citizens' Monitoring Committee (CMC) was constituted in February 2018 under the chairmanship of the then commissioner of Gurugram, V Umashankar. The committee had representatives from among retired government officials, ward councillors, MCG officials, local NGOs, and RWAs in the city. It held a series of meetings with the MCG to support various initiatives to improve the ecosystem for solid waste management in Gurugram. During these discussions, it was found that Gurugram did not have a database of BWGs. It was felt that there was a need to empanel competent private agencies which could partner with BWGs to manage their wet waste.

Based on the feedback received from the members of the CMC in 2021, it was decided that a thorough survey will be done to identify existing BWGs zone-wise. Real-time survey data will be uploaded in a

google form and the report must be submitted to the committee by December 31, 2021. It was further decided that the inactive empanelled agencies for BWGs will be called for an explanation and subsequently de-listed.

Findings of the survey

The survey for identification of BWGs has been carried out intermittently by the city – finally, in 2022, Gurugram declared that there are 614 bulk waste generators across all its wards. However, this data is still going through a process of triangulation. **Between July and August 2023, MCG has completed mapping and re-validation of BWGs in the city under leadership of the current Joint Commissioner and the SBM Unit and about to initiate process of notification to the BWGs and institute a mechanism within MCG to engage and support the BWGs for compliance of the legal mandate.**

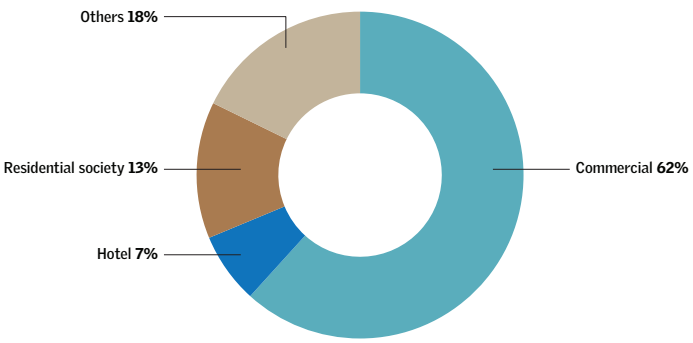
Gurugram has witnessed a colossal growth in terms of infrastructural development, industrialisation and urbanisation which came with rapid increases in the number of large housing societies, malls, commercial hubs etc. The number of BWGs is also growing at a similar frantic pace. The municipal body is trying to keep track of the new BWGs, but is hamstrung in the absence of a proper inventory and a strong monitoring system. As a result, the quantum of waste generated by BWGs continues to be a challenge for the city government.

AROUND 62 PER CENT OF GURUGRAM'S BWGS ARE COMMERCIAL ESTABLISHMENTS; RESIDENTIAL SOCIETIES MAKE UP ANOTHER 13 PER CENT OF THE TOTAL

From the break-up of types of BWGs, it is clear that the largest share of bulk generators in Gurugram is that of commercial establishments, which is a testimony to

the economic and consumeristic growth and prowess of the city (see *Graph 3: Types of BWGs in Gurugram*). According to the MCG, around 62 per cent of the total BWGs are commercials, and include malls, industries, trade centres, IT hubs, corporate parks, markets and private companies. The second major share are 'others' (18 per cent) which consists of hospitals, various phases of Udyog Vihar etc. The third key category is the residential societies (13 per cent) and hotels (7 per cent).

Graph 3: Types of BWGs in Gurugram



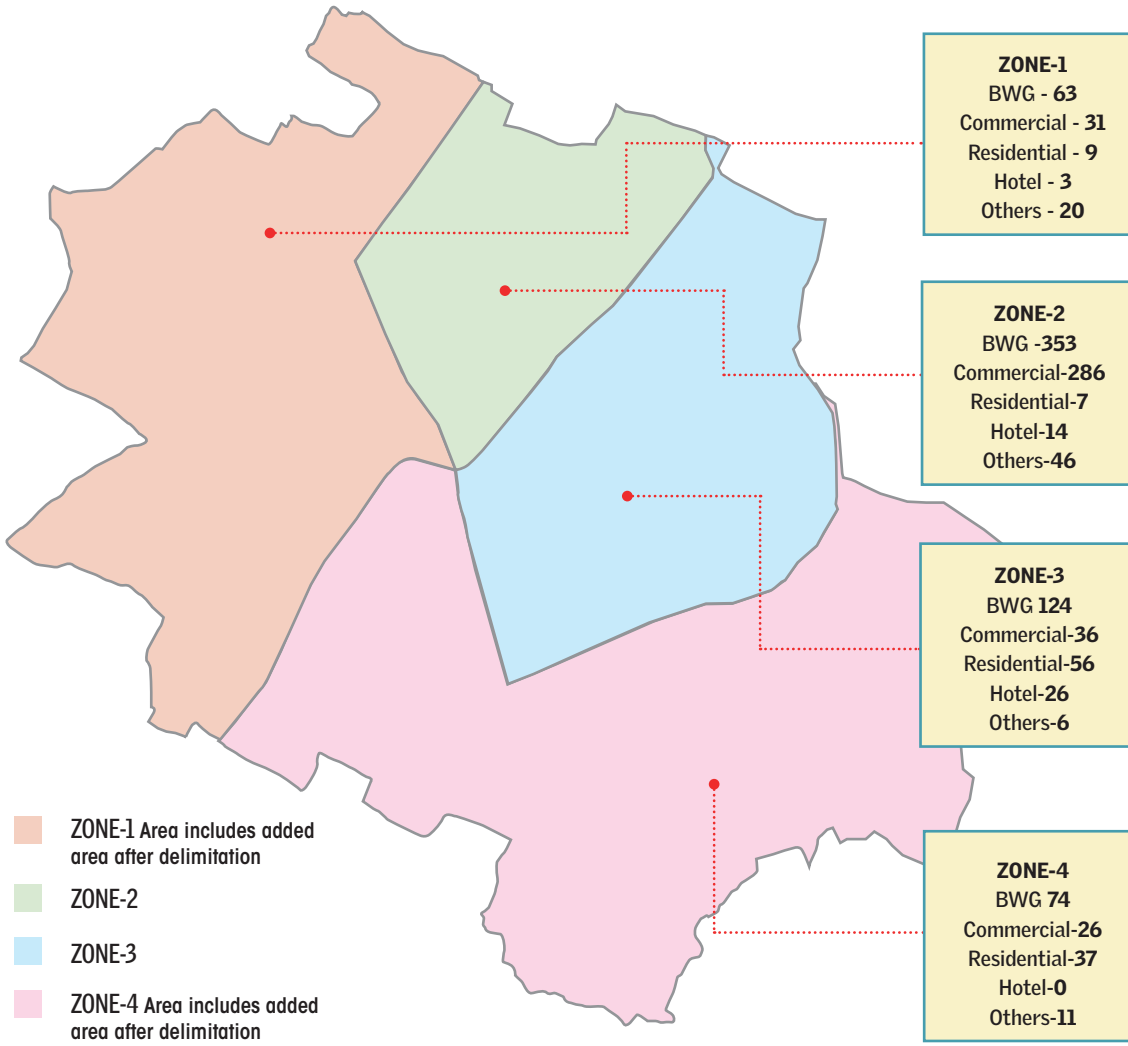
Source: MCG (analysis done by CSE)

DISTRIBUTION OF BWGS

The current distribution of BWGs in Gurugram clearly shows that Zone 2 has the highest number of BWGs – 353 – followed by Zones 3 and 4 with 124 and 74 BWGs, respectively (see *Map 2: Zone-wise BWG distribution*). Zone 1 has the least number of BWGs: 63.

However, observations from the field-level study by CSE do not corroborate the current database. According to the findings of the CSE research team, Zones 3 and 4 largely include the new Gurugram area that is bursting at the seams with malls, multiplexes

Map 2: Zone-wise BWG distribution in Gurugram

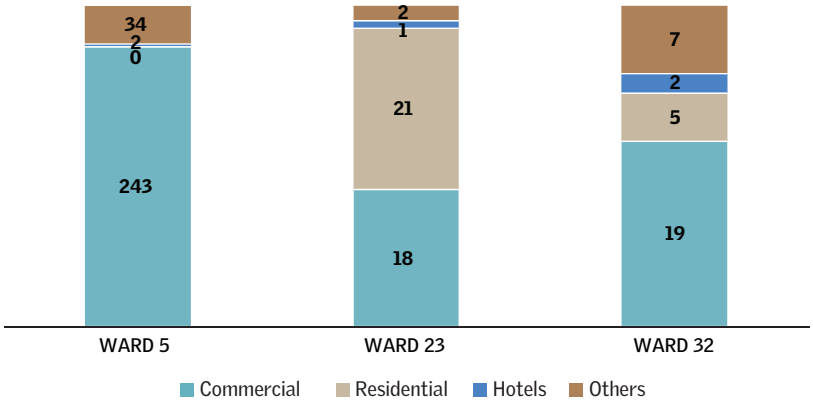


Source: MCG

and multinational companies. Keeping this in mind, the number of BWGs should be relatively higher in these two zones as compared to the other two that are part of old Gurugram. CSE's intensive field visit also justifies this statement. The initial data, therefore, needs to be re-examined for validation.

If we follow the current generation of waste – 1,200 TPD – and apply the formula recommended by the

Graph 4: The wards with the maximum number of BWGs



Source: Based on MCG data as analysed by CSE

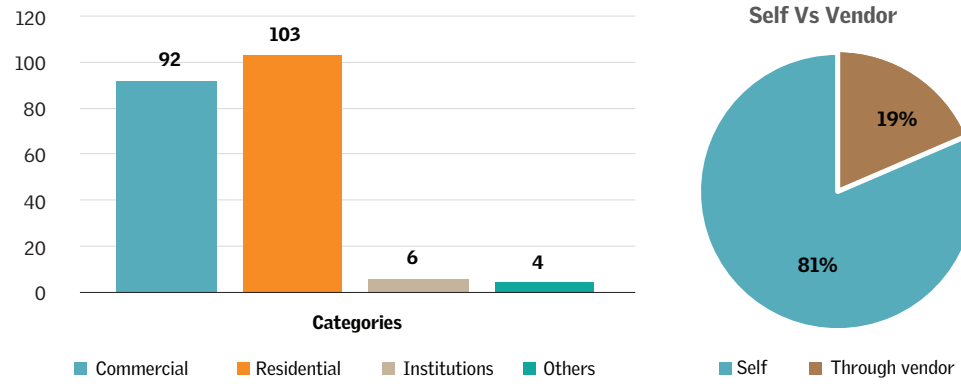
MoHUA guidelines of 2017, the contribution of BWGs in total waste generation of Gurugram should be 360-480 TPD (30-40 per cent of the total waste generated in the city). This implies that the actual number of BWGs should be much higher than the 614 – if the BWGs are generating above 50 kg of waste per day, as defined by the MCG in its notification.

In terms of ward-wise break-up, there is a significant concentration of BWGs in three wards – 5, 23 and 32; these generators fall under various categories like 'commercial', 'residential', 'hotels' and 'others' (see *Graph 4: The wards with the maximum number of BWGs*). In ward 5, where the number of BWGs are the highest, no residential society has been identified as a BWG, which undoubtedly manifests the need of vivid inspection by the civil body to map and identify the same if any.

DECENTRALISED MANAGEMENT OF ORGANIC WASTE BY BWGS

BWGs in any city can play a pivotal role in localised management of waste by securing source segregation, *in situ* processing of organic waste either through

Graph 5: Compliant BWGs and their categories



Source: Based on MCG data as analysed by CSE

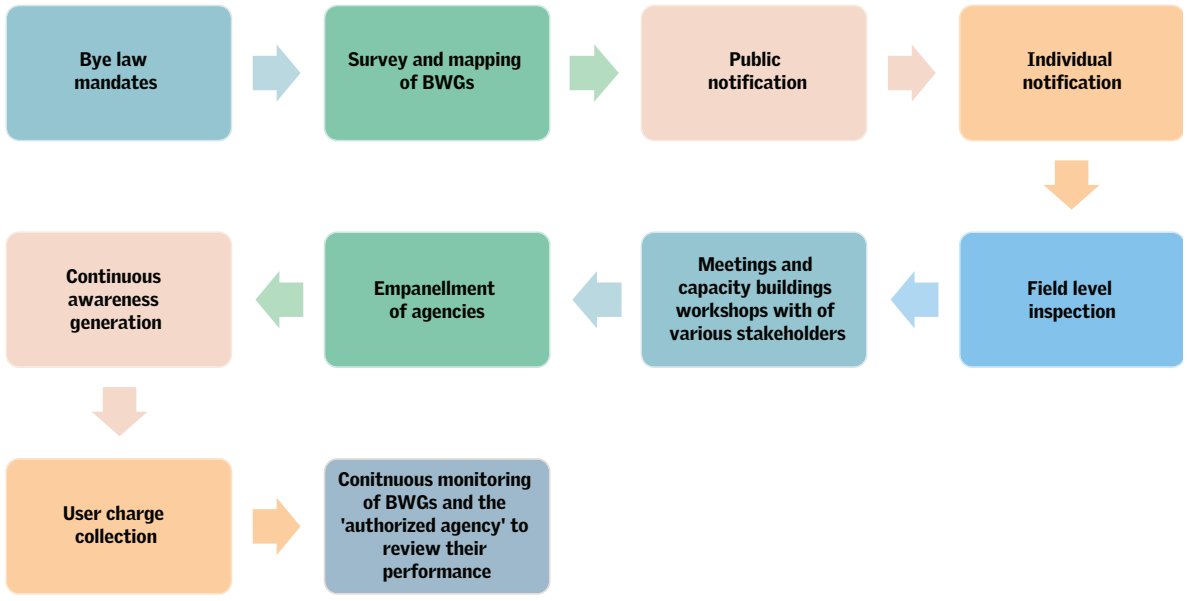
composting or bio-methanation, and proper disposal of dry waste. This can lessen the economic burden upon the ULBs by reducing the cost of collection and transportation, and can also reduce emissions and lower the burden on landfills.

In Gurugram, out of the 614 identified BWGs, only 205 have a provision for *in situ* management of their wet waste (see *Graph 5: Compliant BWGs and their categories*). Among them, two BWGs – Hotel Ibis and Hotel Le Meridian – are doing bio-methanation, while the rest are doing composting. Of the 205 compliant BWGs, 92 are commercial, 103 residential, six are institutes, and four are under the 'others' category. Also, 38 of the compliant BWGs – most of which are residential societies – manage their waste themselves, while 167 are assisted by private agencies.

INITIATIVES UNDERTAKEN BY MCG FOR MANAGEMENT OF ORGANIC WASTE BY BWGS

The MCG has undertaken some measures for ensuring compliance of BWGs (see *Figure 1 on next page*). However, its efforts have had some

Figure 1: Initiatives being taken by Municipal Corporation of Gurugram for ensuring compliance of BWGs



shortcomings, which is why the process of compliance has not been accomplished fully – as a result, there remains some obscurity in terms of the numbers of BWGs, the quantum of waste generated by them, and their compliance status.

- A survey covering every area, followed by an inventory of the number of BWGs existing in the municipal area with a proper mapping is a must. The MCG had initiated the survey after being prodded by the Citizens' Monitoring Committee. In 2022, a draft version of the survey findings was prepared – but as per the ULB officials, the survey is still underway and the local body is yet to come up with a consolidated number of BWGs.

- In 2018, the MCG declared that those who are generating 50 kg or more solid waste per day shall be termed as Bulk Waste Generators (BWGs).

These include premises occupied by Central/ state government departments or undertakings or private companies, hospitals, nursing homes, schools, colleges, universities, other educational institutions, hostels, hotels, commercial establishments, markets, private societies, gated communities, places of worship, stadiums, sports complexes etc.

- Under the Public Notice Order dated September 17, 2018, the MCG notified that if any BWG is found to be not complying with the notification after 60 days (October 22, 2018), it shall be liable to pay a penalty ranging from Rs 25,000 to 50,000 per instance of non-compliance.

- The MCG has included the provisions for BWGs in its draft municipal bye-laws, but has not finalised and notified these bye-laws. Periodically, public notifications have been issued on BWGs – as was done in 2018, 2020, 2021 and 2022 – instructing bulk generators to comply with the norms and describing the consequences of non-compliance.

- The corporation has also conducted workshops across all zones to make the BWGs aware about their roles and responsibilities and to facilitate effective on-site management of organic waste. However, there is no data on how many workshops were conducted, how many BWGs attended and what was the outcome.

- Between August 2020 and February 2022, the MCG issued challans worth Rs 4,070,000 to 190 BWGs,

THE GURUGRAM MUNICIPALITY HAS INCLUDED PROVISIONS FOR BWGS IN ITS DRAFT MUNICIPAL BYE-LAWS, BUT HAS NOT FINALISED AND NOTIFIED THESE BYE-LAWS YET

BULK WASTE GENERATORS

बल्क वेस्ट जनरेटरों के लिए ठोस कचरा प्रबंधन नियम की पालना अनिवार्य : डा. विजयपाल यादव

(०९-०५-२०१२)

ब्यूरो/गुड़गांव मेल

गुड़गांव, 8 अप्रैल। नगर निगम गुरूग्राम की सीमा में स्थित सभी बल्क वेस्ट जनरेटरों को ठोस कचरा प्रबंधन नियम-2016 की पालना करना अनिवार्य है। नियमों के तहत बल्क वेस्ट जनरेटर को उनके यहां प्रतिदिन उत्पन्न होने वाले कचरे के निस्तारण की व्यवस्था स्वयं के स्तर पर ही अपने परिसर में करना जरूरी है।

उक्त विचार बुधवार को नगर निगम गुरूग्राम के संयुक्त आयुक्त (मुख्यालय) डा. विजयपाल यादव ने व्यक्त किए। वे सुखराली स्थित सामुदायिक केन्द्र में जोन-1 व जोन-2 क्षेत्र के बल्क वेस्ट जनरेटरों के लिए आयोजित एक दिवसीय कार्यशाला में उपस्थित बल्क वेस्ट जनरेटरों को संबोधित कर रहे थे। नगर निगम गुरूग्राम के जोन-1 व जोन-2 क्षेत्र में 194 बल्क वेस्ट जनरेटर हैं, जिन्हें ठोस कचरा प्रबंधन-2016 की पालना सुनिश्चित करने के लिए नगर निगम गुरूग्राम द्वारा नोटिस जारी किए गए हैं।

कार्यशाला में उपस्थित बल्क वेस्ट जनरेटरों को संबोधित करते हुए डा.यादव ने कहा कि ठोस कचरा प्रबंधन नियम-2016 के तहत प्रतिदिन 50 किलोग्राम या इससे अधिक कचरा उत्पादन करने वालों को बल्क वेस्ट जनरेटर की श्रेणी में रखा गया है। इन्हें स्वयं के स्तर पर अपने परिसर में ही कचरे के निस्तारण की व्यवस्था करना अनिवार्य है। नगर निगम पार्षद अनूप सिंह ने उनके वार्ड में इस प्रकार की कार्यशाला का आयोजन करने का स्वागत किया तथा सभी बल्क वेस्ट जनरेटरों से आह्वान किया कि वे गुरूग्राम को स्वच्छ, सुंदर एवं बेहतरीन बनाने में अपना योगदान दें क्योंकि नियम की पालना के साथ-साथ यह हम सभी की नैतिक जिम्मेदारी भी है। कंसल्टेंट अमित फलसवाल ने भी अपने विचार रखें। मंच का सफल संचालन प्रोग्राम कोर्डिनेटर कुलदीप सिंह द्वारा किया गया। उन्होंने प्लास्टिक मुक्त गुरूग्राम अभियान के बारे में सभी को जानकारी दी तथा पॉलीथीन एवं सिंगल यूज प्लास्टिक का उपयोग नहीं करने के बारे में जागरूक किया।

अपने स्तर पर कूड़े का निपटान नहीं किया तो काट दिए जाएंगे पानी-सीवर कनेक्शन

(१७-०५-२०१२)

जागरण संवाददाता, गुरुग्राम: नगर निगम गुरुग्राम द्वारा सोमवार को सेक्टर-27 स्थित सामुदायिक केन्द्र में ठोस कचरा प्रबंधन नियम-2016 के तहत निगम क्षेत्र के बल्क वेस्ट जनरेटरों के लिए एक दिवसीय कार्यशाला का आयोजन किया गया। इस कार्यशाला में विभिन्न रिहायशी सोसायटियों के आरडब्ल्यूए प्रतिनिधि, होटल, मोटल, ढाबा सहित विभिन्न कंपनियों के प्रतिनिधि उपस्थित हुए। कार्यशाला में, नगर निगम गुरुग्राम के अतिरिक्त आयुक्त जयदीप कुमार ने कहा कि ठोस कचरा प्रबंधन नियम-2016 के तहत हम सभी की यह जिम्मेदारी है कि उस कचरे का सही से निष्पादन करने में अपना योगदान दें।

गुरुग्राम के सेक्टर-27 स्थित सामुदायिक केन्द्र में आयोजित एक दिवसीय कार्यशाला को संबोधित करते नगर निगम के संयुक्त आयुक्त (मुख्यालय) डा. विजयपाल यादव ● जागरण

वल्क वेस्ट जनरेटरों को निगम ने दी चेतावनी, वल्क वेस्ट जनरेटरों के लिए एक दिवसीय कार्यशाला आयोजित

बल्क वेस्ट जनरेटर की श्रेणी में आता है। निगम के तहत इन्हें अपने परिसर में ही कचरे का निस्तारण करने के लिए प्लांट का होना जरूरी है। प्लांट के संचालन संबंधी प्रशिक्षण में नगर निगम गुरुग्राम सहायता करेगा।

नगर निगम ने शहर के 194 बल्क वेस्ट जनरेटरों को भेजे नोटिस

(०९-०५-२०१२)

जागरण संवाददाता, गुरुग्राम: बल्क वेस्ट जनरेटरों को अपने स्तर पर ही कूड़ा निस्तारण करना होगा। ठोस कचरा प्रबंधन नियम-2016 का पालन नहीं करने वाले 194 बल्क वेस्ट जनरेटरों को नगर निगम ने नोटिस जारी किए हैं। सुखराली स्थित सामुदायिक केंद्र में जोन एक और जोन दो क्षेत्र के बल्क वेस्ट जनरेटरों के लिए एक दिवसीय कार्यशाला का आयोजन किया गया, जिसमें गुरुग्राम नगर निगम के संयुक्त आयुक्त (मुख्यालय) डा. विजयपाल यादव ने बल्क वेस्ट जनरेटरों को कंपोस्टिंग यूनिट लगाने और नियमों के प्रति जागरूक किया।

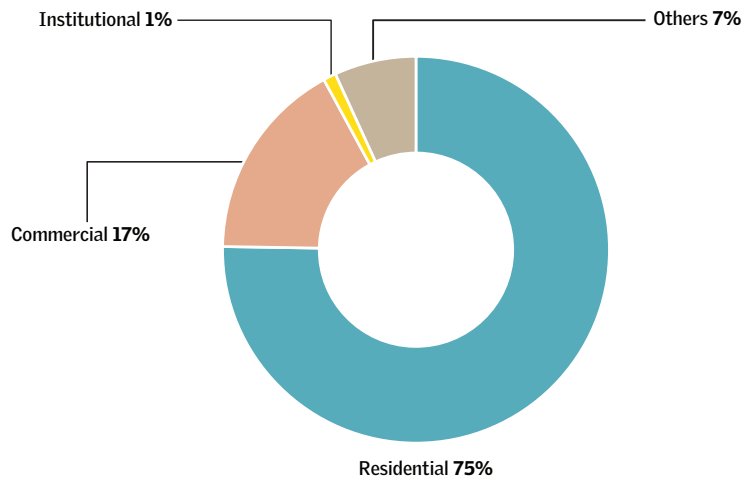
डा. विजयपाल यादव ने कहा कि ठोस कचरा प्रबंधन नियम-2016 के तहत प्रतिदिन 50 किलोग्राम या इससे अधिक कचरा उत्पादन करने वालों को बल्क वेस्ट जनरेटर की श्रेणी में रखा गया है। इन्हें स्वयं के स्तर पर अपने परिसर में ही कचरे के निस्तारण की व्यवस्था करना अनिवार्य है। नगर निगम गुरुग्राम द्वारा बल्क वेस्ट जनरेटरों को तकनीकी सहायता उपलब्ध करवाने के लिए एजेंसियां एम्पैनल की हुई हैं। गीले, सूखे, घरेलू हानिकारक व बायोमेडिकल कचरे को अलग-अलग करके उसका नियम के तहत निस्तारण करना सुनिश्चित करें।

कार्यशाला को संबोधित करते गुरुग्राम नगर निगम के संयुक्त आयुक्त (मुख्यालय) डा. विजयपाल यादव ● सौ. जागरण प्रतिनिधि

लगेगा जुर्माना, होगी कार्रवाई : ठोस कचरा प्रबंधन नियम-2016 का पालन नहीं करने वालों पर जुर्माना और अन्य नियमानुसार कार्रवाई किए जाने का प्रविधान किया गया है। पालन सुनिश्चित करवाने के लिए विशेष टीमें बनाई हुई हैं। ये टीमें अपने-अपने आवंटित क्षेत्रों में स्थित बल्क वेस्ट जनरेटरों के यहां दौरा कर जांच कर रही हैं। निगम पार्षद अनूप सिंह ने उनके वार्ड में इस प्रकार की कार्यशाला का आयोजन करने का स्वागत किया। प्रोग्राम कोआर्डिनेटर कुलदीप सिंह ने प्लास्टिक मुक्त अभियान के बारे में जानकारी दी।

As per the newspaper notices, the local body has used its discretionary power to define BWGs as entities that generate 50 kg or more waste per day. It has also instructed BWGs to start source segregation and *in situ* processing of organic waste within one month of the issuance of this order

Graph 6: BWGs that were issued challans



Source: Based on MCG data analysed by CSE

most of which were residential associations and commercial complexes – however, there is no information on the amount recovered.

- Following the MCG action, some of the non-compliant BWGs started managing their wet waste on their premises and handing over the dry waste to authorised vendors or to informal waste pickers. Some resorted to selling the recyclable dry waste themselves. However, there were many BWGs still that were not abiding with the norms. So, between July and September 2022, 50 such non-complying BWGs were identified and issued the notice again; additionally, it was decided that they would have to comply within 15 days of the issuance of the notice.

BULK WASTE GENERATORS

VIKAS CHOUDHARY / CSE

The MCG has exempted BWGs practicing on-site management of organic waste from paying user charges

- Of the 50 BWGs, 26 – mostly RWAs – were found to be generating 1,500 kg of waste every day. Sanitary inspectors and field staff have been deployed to identify and verify cases of non-compliance. BWGs have been warned that if they are found violating the norms, their amenities like electricity, water supply or sewerage might be affected.

- To initiate the provision of technical support to BWGs that are managing their organic waste on-site, the MCG has notified and published a list in 2018 of 11 agencies that can be empanelled as vendors/suppliers. Equipped with technical know-how, these agencies have been authorised to assist willing BWGs to adapt various technologies.

Table 4: Agencies that were empanelled (and dis-empanelled later) by the MCG

S. No.	Name of the agency
1	M/s Green Bandhu
2	M/s Vulture Innovation Private Limited
3	M/s Organic Solutions
4	M/s Balancing Bits
5	M/s Bijson Innovations Pvt. Ltd
6	M/s Alfa Therm Limited
7	M/s Eswachh Integrated Solutions Pvt Ltd
8	M/s Green Motive Facilities
9	M/s Green Karma and Associates LLP
10	M/s Eco Santulan Renewable Energy LLP
11	Gurgaon Waste Management System Pvt Ltd

Source: MCG

- Through its notification MCG/2017/50091, dated September 5, 2017, the MCG has also said that BWGs practicing on-site management of organic waste will be exempted from paying user charges fixed by the competent authority.

- In January 2023, the MCG de-empanelled the 11 enlisted agencies – the reason cited was these agencies were not properly partnering with BWGs in composting organic waste; rather they were either throwing the waste indiscriminately or handing it over to unauthorised waste collectors from whom it was eventually going to the Bandhwari landfill. Following the de-empanelment, BWGs are now free to take technical help from any agency of their choice.

Education has played a crucial role in behavioural manifestation of citizens in Gurugram—many of them have been practicing *in-situ* management of organic waste even before the SWM Rules came into force

VIKAS CHOUDHARY / CSE

5

GOOD PRACTICES

CASE STUDIES OF SOME BWGS IN GURUGRAM

Education plays a crucial role in behavioural manifestation of citizens – this is evident in Gurugram.

The Citizens' Monitoring Committee has been a catalyst in ensuring compliance by BWGs by not only monitoring the situation, offering suggestions and influencing other BWGs, but also by helping the city government identify and map such entities and collect and document data in a transparent manner.

The CSE team has selected BWG sites to understand their on-site management of organic waste. The selection of sites was done on the basis of factors such as the quantum of waste generated, technology deployed utilisation of the compost produced etc.

VIKAS CHOUDHARY / CSE

CASE STUDY 1

BESTECH PARK VIEW SPA

Name of the BWG	**Bestech Park View Spa**
Zone	**4**
Ward	**29**
Total number of households/flats	**500**
Technology adopted	**AAGA tub composting**
Total wet waste generated per day (kg)	**300**
Per day wet waste processing capacity of the plant (kg)	**500**

THE STORY SO FAR

The society come to know about its duties as a bulk waste generator through a notification from the MCG. A waste management facility was established and commissioned in November 2017 with technical support from an MCG-empanelled agency. The agency began its work of managing the society's waste from February 2022.

Residents follow two-way segregation – the society takes care to constantly exhort the residents and make them aware through physical meetings, posts in whatsapp groups, and even through strong measures such as refusal to collect waste if it is mixed. The society has already reached 95 per cent segregation efficiency. The 5 per cent that gets left

VIKAS CHOUDHARY / CSE

At Bestech Park View Spa, the input material for composting is collected in a segregated manner by the house keeping staff

THE SOCIETY HAS PLANNED A FOUR-WAY SEGREGATION OF WASTE – WET, DRY, SANITARY AND HAZARDOUS

over is due to the newcomers among the households who need time to develop these habits and practices.

The society is now going for four-way segregation of waste – wet, dry, sanitary and hazardous. In addition to this, e-waste is collected by a private company; the society gets a certificate in lieu of the e-waste it hands over. It also does leaf composting on the campus.

HOW THE SYSTEM WORKS

The input material for composting consists of kitchen waste generated from the residential area and the garden – this is collected in a segregated manner by the housekeeping staff. The collected waste is mixed with coco peat (carbon-rich wet biodegradable waste) in an appropriate ratio and is fed into the AAGA composter. After 40 days, the processed compost is emptied for drying in the sun and maturation, after which it is ready for end use.

The compost that is generated every day is used up in the society's park and garden, as well as distributed among the residents. The leachate that is collected from the bottom of the drum is also used *in-situ*.

VIKAS CHOUDHARY / CSE

CASE STUDY 2

COMBINED FACILITY FOR FIVE SOCIETIES

Name of the BWG	**Combined composting with five CGHS***
Zone	**3**
Ward no	**34**
Total number of households/flats	**319**
Technology adopted	**Aerated bin composting**
Total wet waste generated per day (kg)	**260**
Per day wet waste processing capacity (kg)	**300**

CGHS — co-operative group housing societies; AMNS CGHS or Sanskriti Apartments, Surya CGHS, Jeevan Tara CGHS, Shreeji CGHS and Tarika CGHS

THE STORY SO FAR

The AMNS cooperative group housing society (CGHS) or Sanskriti Apartments has been practising segregation and composting since 2010. In 2018, the society, along with four other similar CGHSs, came to know about their role as BWGs through an MCG notification.

Since only Sanskriti had enough space, the five apartment complexes decided to join hands to manage their waste together. The residents formed volunteer groups, trained the housekeeping staff and other residents, organised events to spread the message of source segregation and sealed the garbage chutes. All residents were asked to hand over their segregated waste to in-house collection staff only.

Once source segregation into three categories – wet, dry and sanitary – was secured as a practice, the five societies appealed to the MCG for land. A piece of land was granted to them by the Gurugram Metropolitan Development Authority; the common facility, built at a cost of Rs 6 lakh, came into being on July 6, 2019.

Today, an authorised agency is treating wet waste from 319 apartments of these societies every day – the major share of 100 flats is from Sanskriti. The societies claim to treat 200 metric tonne of organic waste. The O&M cost is borne by the residents. A specially designed trolly collects the segregated waste; the agency picks up the organic waste from the gates of all the four societies and carries it to the common plant for composting. The dry waste, including segregated sanitary waste, is handed over

THE COMBINED FACILITY REPORTEDLY TREATS 200 METRIC TONNE OF ORGANIC WASTE

to another private agency which charges Rs 3,000 a month for the collection service. The segregated e-waste is also collected every month by the same agency.

An estate manager has been recruited and charged with the task of monitoring to ensure source segregation and regular door-to-door collection; new tenants are given an orientation. These societies have been awarded the 'Gurugram Green Award', and have inspired many RWAs to establish their own waste treatment facilities within their premises.

VIKAS CHOUDHARY / CSE

Compost is ready to use at 'Sanskriti' combined facility

HOW THE SYSTEM WORKS

At the outset, the food waste is shredded and dewatered to reduce the moisture content. The homogeneous output is then mixed with bio-culture or microbes fed into composting bins. After maintaining adequate temperature, aeration and moisture through turning, the final compost is ready after 30 days. The cumulative daily generation of wet waste from these societies is 300 kg.

VIKAS CHOUDHARY / CSE

CASE STUDY 3

CROWNE PLAZA, GURGAON

Name of the BWG	**Crowne Plaza, Gurgaon**
Zone	**3**
Ward	**34**
Total occupancy	**234**
Technology adopted	**OWC**
Total wet waste generated per day (kg)	**100**
Per day wet waste processing capacity of the plant (kg)	**400**

THE STORY SO FAR

Hotel Crowne Plaza is one of the biggest hotels in Gurugram. It has a big wet waste processing facility in place with the capacity of processing 400 kg a day. In 2018, the hotel had borrowed an OWC machine from it's Okhla branch and started composting within its premises. Later, when total wet waste generation increased, the hotel bought a new composter and installed – the cost came to Rs 12 lakh. The monthly O&M cost is Rs 14,000. Currently, the plant produces 10-20 kg of compost a day depending on the waste feed.

The hotel trains its housekeeping staff to segregate waste in each floor into three main categories – wet, dry and sanitary waste. Segregated horticulture waste is also used for composting to supplement the carbon need. The hotel generates 600-700 kg of dry waste per month, which is handed over to an MCG-authorised vendor with stipulated user charges. To bring down its waste generation, the hotel has started using products packaged with recyclable materials. The hotel says it has not received any kind of incentives from the municipal corporation for complying.

HOW THE SYSTEM WORKS

The incoming wet waste and microbes feed into the 400-kg capacity OWC, in which consecutive composting process takes place through the in-built mechanism of shredding; the vessel is lined with coils for heating. The complete process takes eight days (one day of composting followed by seven days for maturation). The compost coming out from the system is utilised by the hotel's green areas.

TO BRING DOWN ITS WASTE GENERATION, THE HOTEL USES PRODUCTS PACKAGED IN RECYCLABLE MATERIALS

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CASE STUDY 4

IBIS HOTEL, GURUGRAM

Name of the BWG	**IBIS Hotel, Gurugram**
Zone	**3**
Ward	**32**
Total occupancy	**214**
Technology adopted	**Bio-gas**
Total wet waste generated per day (kg)	**35-75**
Per day wet waste processing capacity of the plant (kg)	**100**

THE STORY SO FAR

Hotel IBIS in Gurugram's sector 53 is part of a chain of hotels. The wet waste generated every day varies (from 35 to 75 kg) based on occupancy and seasonal factors. In November 2018, the hotel installed a bio-gas system to utilise this waste. The plant produces nearly 8 to 12 scm (standard cubic meter) of bio-gas, sufficient to cook food for the staff or rice (one time) for the guests. It has helped reduce gas (LPG) consumption by 10 per cent every day (if an average of 30 to 35 kg of feedstock is loaded every day).

Other than this, the manure and slurry generated as by-products from the plant are used in gardening within the hotel campus.

Before this system was instituted, the hotel's wet waste including food waste was either sent to 'goshalas' (cow shelters) for animal feeding or handed over to the city government's authorised vendor in a mixed form. The MCG notification on BWG compliances and the workshops conducted by the Corporation helped the hotel rethink its practices.

Moreover, IBIS also was a participant in a programme called Planet 21 – an initiative of its parent company, the Accor Group – under which it was evaluated on seven parameters, including its contribution to sustainability and promoting the 3R principles.

THE IBIS USES A BIO-GAS SYSTEM TO UTILISE ITS WET WASTE. THE SYSTEM HAS HELPED REDUCE LPG CONSUMPTION BY 10 PER CENT EVERY DAY

The hotel has initiated some activities not only to promote source segregation among employees and

guests, but also to contribute towards sustainable living:

- Notices on source segregation have been displayed for the benefit of the guests.
- All staff have been trained on source segregation and collection of segregated waste from the rooms – the hotel has introduced trolleys with separate compartments for dry, wet and sanitary wastes on all floors.
- Environment day is celebrated by involving eminent guests in plantation drives.
- Two days in a week are declared 'zero bins' days in the hotel's cafeteria and restaurants.
- A metro card facility has been introduced for

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The hotel uses trolleys with separate compartments for different streams of waste

guests who would like to cut down on fuel consumption. In June 2022, 200-250 guests availed of this service. The hotel also organises awareness drives to promote car pools.

- 'Kabad Jugad' competition has been organised for the staff to encourage using scrap and waste to make creative items of value.
- Bio-degradable products are given to guests; products made from single-use plastics are avoided.

THE HOTEL PROVIDES BIO-DEGRADABLE PRODUCTS TO ITS GUESTS, AND AVOIDS PRODUCTS MADE FROM SINGLE-USE PLASTICS

The bio-gas plant cost Rs 5.5 lakh; Rs 2.5 lakh is spent every year on O&M costs, which includes salaries of the maintenance staff. The challenges that the hotel faces during maintenance of the plant is storing the daily wet waste in a temperature of 4°C and the varying quantities of the waste generated.

HOW THE SYSTEM WORKS

The hotel has 214 rooms. The daily wet waste generation varies from 35-75 kg depending on seasonal or ceremonial events. The operation and maintenance of the hotel's bio-gas plant is carried by a dedicated technical staff.

The waste is pulverised and the slurry that is prepared is fed into the digester. Bio-methanation takes place in the digester. The hydraulic retention time is 30-40 days in which bio-gas is produced. The gas is used up in the pantry.

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CASE STUDY 5

NIRVANA COUNTRY, BLOCK D, SECTOR 50

Name of the BWG	**Nirvana Country**
Zone	**4**
Ward number	**26**
Total number of households/flats	**1,000**
Technology adopted	**Rotary drum and aerated tub composting**
Total wet waste generated per day (kg)	**450**
Per day wet waste processing capacity of the plant (kg)	**500**

THE STORY SO FAR

Residents of Nirvana Country woke up to the challenge in 2015 when they realised that the waste being collected from their campus was being burnt or dumped in the Bandhwari landfill site. In order to handle at least 60 per cent of their waste – primarily wet – the society spent about Rs 12 lakh to construct a captive waste processing plant. In 2015, a drum composting system was installed.

Regular orientation of residents and domestic helpers helps to overcome segregation-related problems, which were the main obstacles initially. The responsibility for ensuring segregated collection and processing is entrusted to the housekeeping personnel, who are also given access to necessary equipment such as compartment carts and PPE kits.

The society has successfully moved to four-way segregation from its initial two-way model – it now segregates waste into wet, dry, sanitary and domestic hazardous waste. For the last four years, Nirvana has been helping other BWGs of Gurugram to process their waste.

"As a society, it is our duty to adopt sustainable ways to manage the waste we generate. By doing so, we not only put an immediate end to overall environmental degradation, but also help improve the living conditions around us. Benefits of such sincere efforts would also be passed to coming generations."

Dinesh Shandilya, president, Nirvana Country RWA

HOW THE SYSTEM WORKS

The waste gets processed through aerobic composting in the rotary drum. The incoming waste gets shredded and mixed with bio-enzymes or readymade compost. The shredded and mixed waste is then fed into the drum for 12 days with regular turning being carried out for aeration – helps to provide oxygen to the microbes and maintains the moisture inside the drum. The final product is then transferred to a metal bin to further maturation for 20 days.

Approximately, 1,500 kg of compost is generated by Nirvana every month. It is primarily utilised in the garden and the park on campus. Some amount is also sold to residents at Rs 20 per kg.

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Waste preparation for composting at Nirvana Country, Gurugram

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CASE STUDY 6

ORCHID PETALS, SECTOR 49

Name of the BWG	**Orchid Petals**
Zone	**4**
Ward	**26**
Total number of households/flats	**1,450**
Technology adopted	**Tub composting**
Total wet waste generated per day (kg)	**1,000**
Per day wet waste processing capacity of the plant (kg)	**1,500**

THE STORY SO FAR

In 2018, when MCG stipulated the 50-kg daily waste generation norm for BWGs, Orchid Petals was served a challan for non-compliance. A massive awareness drive was started with the help of volunteers' group and Sahaas – a local non-profit – to do door-to-door campaigns, training of maids and house help etc.

Orchid Petals has 1,400 families living in 23 towers towers and 50 villas, generating about one tonne of waste a day. Complying with the source segregation directive was important but challenging – some of the residents considered it a dirty activity. Gradually, segregation started; the combined efforts of residents along with the fear of the law and the media's coverage of the issue propelled the society to reach the 90 per cent level within some months.

However, one of the challenges that came up was to find an agency that would help the society compost its waste – MCG did not have a comprehensive list for vendors yet. Another challenge was to find a suitable

"Knowledge, education, government services – all should work in sync; bureaucrats, politicians and think tanks should work together to bring changes in solid waste issues in this country. Whatever little has been achieved in Gurugram, is largely due to the active role played by the general public, activists and environmentalists and lastly, by the government."

Aakash Jain, former resident, Orchid Petals Society, Gurugram

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Compost is ready to use at Orchid Petals, Gurugram

piece of land to install the facility. Residents did not want it to be located close to their apartments.

Land was found, and in 2018, the facility was installed at a cost of Rs 6-7 lakh, and an agency hired. The compost is distributed among the residents and used for horticulture within the premises. The dry waste is handed over to an authorised agency; people also segregate and manage their e-waste.

Orchid Petals set an example and inspired 20 neighbouring RWAs.

HOW THE SYSTEM WORKS

Incoming segregated wet waste is first shredded and mixed with bio-culture. The homogenous mixture that emerges is then fed in the composting tub made of concrete. The process followed is regular aeration, turning and drying, followed finally by seiving. It takes 40 days to complete the full cycle. About 3,000 kg of compost is generated every month.

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CASE STUDY 7

RICHMOND PARK, DLF-IV

Name of the BWG	**Richmond Park**
Zone	**3**
Ward no	**33**
Total number of households/flats	**280**
Technology adopted	**Tub composting**
Total wet waste generated per day (kg)	**90-120**
Per day wet waste processing capacity of the plant (kg)	**150**

THE STORY SO FAR

Richmond Park is one of the older BWGs among the compliant generators. In 2014, before the SWM Rules of 2016 came into force, the residents opted for building a waste management facility within the premises and integrate it into the society's regular maintenance systems. A composting plant was established to process the organic and the dry waste; it is now being handed over to an MCG-empanelled agency.

The capital cost for putting up the facility was Rs 8.5 lakh; every month, the society spends Rs 30,000 for operations and maintenance.

Convincing the residents to segregate waste was a difficult task; awareness building initiatives helped. In 2017, the Ministry of Housing and Urban Affairs recognised the society as the 'Best RWA in Gurugram' for its compliance with the SWM Rules of 2016. From time to time, MCG provided support and monitoring services which motivated and influenced the society.

HOW THE SYSTEM WORKS

The processing of organic waste in the society involves the use of mesh container composting technology. Incoming waste is shredded and microbes added to the feed in the container. After regular aeration, turning and drying over 40 days, the compost is sieved and used in parks and gardens of the complex.

"We have minimised waste generation on-site, and this demonstrates our commitment to environmental preservation. To safeguard the environment, all citizens should begin to accept responsibility for waste reduction at source."

R P Sharma, estate manager, Richmond Park

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CASE STUDY 8

SUSHANT APARTMENTS, GURUGRAM

Name of the BWG	**Sushant Apartments**
Zone	**3**
Ward	**32**
Total number of households/flats	**202**
Technology adopted	**Aerobic tub composting**
Total wet waste generated per day (kg)	**100**
Per day wet waste processing capacity of the plant (kg)	**150**

THE STORY SO FAR

Residents of all the 202 flats in Sushant Apartment feel justifiable pride in the fact that they do not contribute to the environmental pollution in their city – since 2019, at least 150 kg of organic waste is stopped from reaching a dumpsite every day, as they have been managing it within their premises.

Before 2019, a management company had been taking care of the society's waste: but its functioning was erratic and inappropriate. Residents were used to dumping mixed waste through garbage chutes. The RWA took charge and an all-women committee was constituted.

The committee managed to persuade the residents to start segregating waste into three categories – wet, dry and sanitary. E-waste is also separated and collected once a month. The RWA has acquired a specially designed vehicle which had separate compartments for different types of wastes, which is collected door-to-door by the housekeeping staff. New tenants are properly oriented about the waste management policy and guidelines.

On August 15, 2021, the society inaugurated its compost plant, which is being run by an MCG-empanelled agency. Every month, the plant produces 105 kg of compost, most of which is used internally; some of it is also sold back to the agency. The plant cost around Rs 5-6 lakh, while the monthly O&M cost amounts to Rs 35,000. The facility has been designed to be able to ramp up its capacity to cater to any further increases in the waste generation in future.

THE SOCIETY'S COMPOST PLANT PRODUCES 105 KG OF COMPOST EVERY MONTH, MOST OF WHICH IS USED INTERNALLY

"We women are more sorted and experts in managing things. When we took over, we conducted workshops, sent mails to the residents; some volunteers came forward to do the awareness for source segregation. Apart from environmental benefits of in-situ composting, the professional hazards of the collection staff were discussed."

Hema Sharma,
president, RWA,
Sushant Apartments

The dry waste is again segregated into two sub-categories – glass and plastics. This is handed over to a non-governmental organisation as and when the waste accumulates; the NGO charges Rs 2,000 per month for collecting this waste. Sanitary waste is currently segregated and handed over to the hired agency, but the society is planning to invest in a small incinerator.

The residents are dissatisfied with the MCG-authorised agency's work. During the pandemic, the ULB had instructed the agency to collect the covid waste, but the service was completely inadequate and irregular. This is the reason the residents opted for a private agency when it came to dry waste collection.

HOW THE SYSTEM WORKS

The input material for composting consists of kitchen and garden wastes. The segregated collected waste is mixed in an appropriate ratio with crushed leaves and microbes. It is then fed into the pit gradually on a daily basis. Regular aeration is provided in the pit to maintain the appropriate oxygen levels. The process takes 30 days – this includes drying and sieving. About 10 kg of compost is generated every day which is used up in the society's parks and gardens.

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CASE STUDY 9

THE CLOSE SOUTH NIRVANA COUNTRY

Name of the BWG	**The Close South Nirvana Country**
Zone	**4**
Ward	**26**
Total number of households/flats	**600**
Technology adopted	**Aerobic tub composting**
Total wet waste generated per day (kg)	**400**
Per day wet waste processing capacity of the plant (kg)	**500**

THE STORY SO FAR

Close South Nirvana Country has 15 towers containing 40-45 apartments in each: the 600 apartments and 2,500 residents living in them generate 700-1,000 kg of waste every day. This includes wet (40 per cent), dry (50 per cent) and sanitary and domestic hazardous (10 per cent) waste.

The residents organised themselves into volunteer groups, and initiated their waste management practices with the help of Saahas (a non-profit). Different volunteer groups took charge of different tasks – training of residents and housekeeping staff, communication and awareness building, and implementation. Door-to-door collection of three-way segregated waste began; simultaneously, the first phase composting facility was established within the premises in 2019 at a cost of around Rs 10 lakh.

In 2022, the second phase was installed at a cost of another Rs 12 lakh. The facility produces nearly 6 tonne of compost every month, which is mainly consumed by the society itself. The operations and maintenance cost about Rs 35,000.

"I have always been keen to do something for sustainability and make this world a greener one for our future generations. So, I took this initiative as a responsible citizen with the help of some young energetic volunteers in my society."

Navin Rao, former secretary, Nirvana Close South RWA

The compost plant is run by an MCG-empanelled agency. The dry waste, collected every day, goes to another private vendor. Segregated e-waste is delivered to an authorised recycler.

THE MAIN CHALLENGE BEFORE THIS SOCIETY WAS HOW TO BRING ABOUT BEHAVIOUR CHANGE AMONG ITS RESIDENTS

The main challenges that the society has faced were how to bring about behaviour change among the residents, and devise and implement a communication strategy. Another concern was to train the maids and house helps. The society organised events and contests among the different towers to motivate the residents. It actively discourages use of plastic liners or bags inside bins – 80 per cent of the households do not use these liners and bags.

Residents contend that the MCG was not a big help – apart from an initial notification, attempts to inflict its choice of vendor on them, and a few irregular visits to the facility, no other support was received.

HOW THE SYSTEM WORKS

To begin with, the waste is segregated manually to remove small plastics or any other non-biodegradable material. It is then put in a dewatering system to remove excess water, followed by in composting tubs for a few weeks. After that, the waste is taken outside for sun drying for three days. Shredding and sieving takes place, and the compost is ready. The whole process take about 40 days.

About 150 kg of compost is generated every day. As the MCG has no provision to buy the compost back, it is used up in the parks and gardens of the society.

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CASE STUDY 10

THE WORLD SPA WEST, GURUGRAM

Name of the BWG	**The World Spa**
Zone	**2**
Ward	**19**
Total number of households/flats	**367**
Technology adopted	**AAGA tub composting**
Total wet waste generated per day (kg)	**200**
Per day wet waste processing capacity of the plant (kg)	**350-400**

THE STORY SO FAR

The World Spa, a high-rise society with 367 flats, has been managing its waste since 2014. Initially, an organic waste converter was installed to process the wet waste. Later, with the assistance of an MCG-empanelled agency, it was replaced – the society found that the system was not meeting its expectations. The society has also moved from its two-way segregation process to a four-way process. The dry waste and e-waste is also collected by respective agencies.

THE SOCIETY GENERATES 20 KG OF COMPOST A DAY AND USES IT IN ITS PARKS AND GARDENS

HOW THE SYSTEM WORKS

The input material for composting consists of kitchen waste generated from the residential area and horticulture waste from the gardens. To process this, AAGA composting technology with a capacity of 350-400 kg per day has been adopted by the society. The waste is mixed with cocopit and microbes for carrying out an aerobic process in the AAGA tubs. The final compost is readied after a 40-day process.

The society generates about 20 kg of compost every day, which is used in its parks and gardens.

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CASE STUDY 11

WESTEND HEIGHTS, GURUGRAM

Name of the BWG	**Westend Heights**
Zone	**3**
Ward	**32**
Total number of households/flats	**360**
Technology adopted	**Aero bin composting**
Total wet waste generated per day (kg)	**180**
Per day wet waste processing capacity of the plant (kg)	**400**

THE STORY SO FAR

In 2017, the society started waste management by using 500 sq feet of its area. Segregation was an initial challenge which has now been overcome by daily monitoring by in-house housekeeping staff who are responsible for collection of the waste. To ensure segregation, the two-bin system has been installed in every floor.

THE SOCIETY HAS OVERCOME ITS CHALLENGE OF SEGREGATION THROUGH DAILY MONITORING BY HOUSEKEEPING STAFF WHO COLLECT THE WASTE AND BY INSTALLING THE TWO-BIN SYSTEM ON EVERY FLOOR

Since technology selection is also key criteria to ensure sustainability of the system, at first, basket composting had been adopted by the society – this was later replaced by aerobic bin composting to enable more efficient processing and to cater to daily waste generation. The quarterly operation and maintenance cost of Rs 35,000 has been made a part of the regular maintenance charges that the society takes from its residents.

HOW THE SYSTEM WORKS

The input material for composting consists of kitchen and garden waste. Every day, about 250 kg of wet waste is received at the facility, and fed into the bin after shredding and addition of microbes. Regular aeration is carried out to maintain the optimum oxygen level in the bin. The complete process takes 45-50 days. The compost produced is used in the parks and gardens of the society, and the excess is distributed to individual households.

TESTING THE COMPOST SAMPLES

As per the SWM Rules, 2016 compost should be tested in a batch before it is used. However, during its field visits, the CSE research team found limited evidence of testing of compost by BWGs. In order to ascertain the quality of the compost being produced by the BWGs (listed in chapter on good practices), the team visited all the locations to collect compost samples for testing in CSE's environmental laboratory. Test parameters used for evaluating the results were based on the Organic Compost Standard FCO 2009 and FCO (PROM) 2013, which is mainly comprised of physical and chemical parameters such as organic carbon, pH, C/N ratio, moisture, colour, odour, particle size, conductivity and bulk density (see *Annexure for the results*).

Table 5: Interpretation of test results

S No	Sample details	Interpretation
1	World Spa, Sector 30, Gurugram	**Sample high in moisture and salmonella. Particle size and C/N ratio are also higher than desirable.** Presence of high moisture content (82.4 per cent) may be one reason for high concentration of pathogens (salmonella) in the sample. *Note: Aeration and sunlight exposure may solve the problem*
2	Nirvana Country, South, Gurugram	**Sample high in pH (more basic than desirable), particle size and pathogen (salmonella).** Alkalinity indicating either aeration is not done correctly or food waste basic in nature is used. The presence of high quantity of pathogens in the sample may be due to the composting process not attaining thermophilic stage. High particle size could be due to the fact that the compost is not sieved with a 4-mm sieve. *Note: Aeration, turning, sunlight exposure and proper digestion may solve the problem*
3	Westend Heights, Gurugram	**Sample conductivity and pH not within the limit (more basic than desirable); sample high in pathogen content (salmonella, EC and FC).** Presence of high numbers of pathogens in sample may be due to the composting process not attaining thermophilic stage. Alkalinity indicating either aeration is done correctly or food waste basic in nature is used. It also indicates that sawdust/ coco-peat is used in lesser quantities. *Note: Aeration, turning, sunlight exposure and proper digestion may solve the problem*

S No	Sample details	Interpretation
4	Richmond Park, Gurugram	**Sample pH not within the limit (more than desirable), sample high in moisture and pathogen content (salmonella, EC and FC).** Presence of high amounts of pathogens in sample may be due to contamination from source and high moisture content of the sample (42.8 per cent). Alkalinity indicates that either the aeration is being done correctly or basic food waste is being used. It also indicates that sawdust/coco-peat is used in lesser quantities. Presence of mercury in the sample may be due to contamination from source or in the treatment process during sun drying from soil or contamination by heavy metals during cultivation of vegetables. *Note: Proper source segregation, aeration, turning, sunlight exposure and proper digestion may solve the problem; might need a third round of testing to confirm the presence of heavy metals.*
5	Sushant Apartments, Gurugram	Sample pH not within the limit (more basic than desirable) Alkalinity indicating either aeration is being done correctly or basic food waste is being used. It also indicates that sawdust/coco-peat is used in lesser quantities. **Sample high in chromium content, moisture and pathogens (salmonella, EC and FC).** Presence of high amounts of pathogens in the sample may be due to contamination from source and presence of high moisture content (47.1 per cent). Presence of chromium and mercury in the sample may be due to contamination from source, or from the treatment process, or from the soil during sun drying, or contamination by heavy metals during cultivation of vegetables. *Note: Proper source segregation, aeration, turning, sunlight exposure and digestion may solve the problem; a third round of testing needed to confirm the presence of heavy metals.*

Source: CSE 2023

ANALYSIS OF COMPOST SAMPLES

- **Low and high pH:** This may be due to too many nitrogen-rich greens in the bin, such as grass cuttings, or due to a lack of aeration. If anaerobic decomposition occurs and the content starts to turn black, wet and smelly, it will become more acidic due to the production of organic acids.

  Compost becomes acidic when there is insufficient oxygen, and the microbial activity becomes anaerobic. Aerating or remixing the anaerobic material while including more "browns" or carbon-rich wet biodegradable waste should return the mixture to aerobic decomposition.

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Compost is ready to use at Nirvana Country, Gurugram

- **C:N (carbon-nitrogen) ratio:** In lower C:N ratios, excess nitrogen will be provided, resulting in production of ammonia. This has an unpleasant odour. At C:N ratios of over 30:1, there will not be enough nitrogen to support sufficient microbial growth. The microbe population will be too low to produce enough heat. Therefore, the decomposition process will be prolonged.

- **Moisture content:** Most food waste is wet and nitrogen-rich and will need to be mixed with carbon-rich material to provide the correct C:N ratio and absorb some of the excess moisture. When composting garden waste and uncooked kitchen waste, the compost becomes too wet.

Low moisture content results typically due to too many "browns" being added to the mix or due to hot climates.

Turning the composting material to mix the newly added browns aerates the compost and breaks up any compacted areas. Also, a leachate collection outlet must be provided to reduce the risk of excess moisture.

- **Pathogens:** The concentration of faecal coliform, *E coli,* and salmonella has been found to be significantly high in all the compost samples. The main reason for this could be the use of sewage treatment plant water in the composting units, which substantially increases the concentration

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Compost samples are being tested at CSE's Environment Monitoring Laboratory

of the pathogen in the compost sample. Faecal coliform is also found in the soil; hence, adding soil as a cover or substrate material to the composting unit could also be a reason for high pathogen concentration.

Also, generally, there are three phases in composting – mesophilic, thermophilic and maturation phases; one other reason for presence of pathogens could be the decomposition phase is not reaching the thermophilic stage where the maximum temperature is obtained. After that phase, during maturation, the decay of the microorganisms starts.

Hence, used/treated water should never be used to sprinkle over the compost pile to maintain moisture content; instead, freshwater should always be used.

- **Heavy metal contamination:** The mercury found in the compost could be due to mixing of household food waste with domestic hazardous waste. Mercury is found in various products such as fluorescent and other lights, batteries, electrical switches and relays, barometers, thermometers, etc. A small portion of mercury in the waste stream can contaminate the whole process. Hence, segregating the waste from the source without mixing it with any potentially hazardous substances could be the solution to avoid mercury contamination.

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Compost is internally consumed by the residential complexes in parks or gardens within their premises

There could be three possible reasons for chromium contamination – use of contaminated waste in agricultural activities, due to which the vegetables are being contaminated with chromium; contamination due to mixing other household waste with domestic hazardous waste; and drying of the compost being done in the soil.

Suppose the contamination is due to the second or third reasons, it can be avoided by not mixing the other household waste with domestic hazardous waste and drying the compost on a concrete surface. But if the contamination is happening for the first reason, then the source from which the contaminated vegetables are coming needs to be identified.

Ensuring source segregation by BWGs is a major challenge for any city administration

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6

CHALLENGES AND OPPORTUNITIES

Challenges are two-fold: those faced by the BWGs, and those encountered by the ULBs in managing the BWGs.

BWGs have concerns related to segregation at source, absence of leadership, lack of motivation, conflict with the authorised concessionaire, space constraints, dearth of compost quality testing facilities, and problems in using end products such as compost.

The challenges or limitations of the ULBs lie in issuing bye-laws and public notifications, identification of BWGs, quantifying waste generation, IEC, institutional arrangements and technical support, inability to integrate the informal sector, enforcement of the law and inefficient monitoring.

CHALLENGES AND OPPORTUNITIES

The challenges associated with managing BWGs and making them comply with guidelines in the SWM Rules 2016 are not restricted to Gurugram – these challenges exist for cities across the country.

CHALLENGES OF MANAGING BWGS IN GURUGRAM

NOTIFICATION OF BYE-LAWS

Bye-laws are regulatory frameworks notified by municipal authorities, based on various services provided by them, for legally enforcing a set of rules. The Solid Waste Management Rules, 2016 have mandated municipal authorities to frame bye-laws on solid waste management and notify them for all individual and institutional waste generators.

While the MCG is yet to notify its latest bye-law for Gurugram, it has sporadically issued various notifications for BWGs using its discretionary powers. It is imperative to finalise the bye-law with specific measures for BWGs and notify it.

IF THE MOHUA GUIDELINES ARE APPLIED – WHICH SAY 30-40 PER CENT OF THE WASTE GENERATED IN A CITY IS FROM BWGS – THE NUMBER OF BWGS IN GURUGRAM IS ANYTHING BUT 614 AS THE CITY PORTRAYS

IDENTIFICATION AND MAPPING OF BWGS

Any action around solid waste management can be planned and implemented successfully only if there is reliable data. The MCG is yet to complete its survey and come up with a consolidated number of BWGs in Gurugram. It is clear that if the MoHUA guidelines are applied – which say 30-40 per cent of the waste generated in a city is from BWGs – the number of BWGs in Gurugram is anything but 614 as the city portrays.

QUANTIFYING WASTE GENERATION BY BWGS

In addition to identification and mapping of BWGs, it is important to capture the exact quantity of waste being produced by each source. This information is largely missing in Gurugram, which has limited any planning that can be done to manage the waste. Such data would not only be beneficial to monitor the wet waste being treated by the respective sources, but also to finalise the tariffs for collection of other fractions in order to make the BWG management much more financially sustainable in the long run. In addition, such an inventory could be used to measure the quantity diverted from reaching the landfill to avoid GHG emissions.

IN ADDITION TO IDENTIFICATION AND MAPPING OF BWGS, IT IS EQUALLY IMPORTANT TO CAPTURE THE EXACT QUANTITY OF WASTE BEING PRODUCED BY EACH SOURCE. THIS INFORMATION IS LARGELY MISSING IN GURUGRAM

INFORMATION, EDUCATION AND COMMUNICATION (IEC)

Apart from some sporadic initiatives by the MCG, BWGs in Gurugram are yet to be reached out for a sensitisation drive with the help of some IEC tools. The good practices showcased in this report are largely the results of self-initiated endeavours – only 15 per cent of these have received some IEC message from the city government; the remaining 85 per cent have done everything themselves. The BWGs that have been able to institute good practices did run extensive IEC drives within their premises which continued till they attained a significant rate of source segregation to commission their *in-situ* wet waste management facility.

In addition to IEC, the MCG's other challenge is enforcement measures which may call for institutional re-arrangement in the Corporation either

to carry those measures out by itself or engage a competent agency that could reach all BWGs with IEC messages along with enforcement instruments.

INSTITUTIONAL ARRANGEMENTS AND TECHNICAL SUPPORT

In many areas, BWGs have installed on-site composting units that are not only energy-intensive (such as OWCs), but that also make use of expensive technologies, which increase the operational and maintenance costs and, as a result, have affected the sustainability of the units. These technologies also require trained resources at the ULB level to provide capacity building and handholding support to housekeeping staff who are currently managing the composting units. There remains a high possibility that these units may eventually become non-functional.

ROLE OF PRIVATE AGENCIES AND THE INFORMAL SECTOR

IN MANY AREAS, BWGS HAVE INSTALLED ON-SITE COMPOSTING UNITS THAT ARE NOT ONLY ENERGY-INTENSIVE (SUCH AS OWCS), BUT THAT ALSO MAKE USE OF EXPENSIVE TECHNOLOGIES

Gurugram has a number of informal waste pickers operating in the city – 21 per cent of the city's catchment is served by them with a door-to-door collection service. This number could have been an opportunity for the city for better handling of its waste, if this sector would have been formalised, organised and recognised.

Currently, a large chunk of BWGs and individual waste generators are handing over their waste to the informal sector. As this is being done without proper quantification and processing, this waste is going directly to the landfill or being dumped

indiscriminately once all materials of value have been extracted from it. As informal waste pickers are neither trained in waste handling nor are they interested in wet waste, eventually a heap of mixed waste finds its way to the Bandhwari landfill.

AS INFORMAL WASTE PICKERS ARE NEITHER TRAINED IN WASTE HANDLING NOR ARE THEY INTERESTED IN WET WASTE, EVENTUALLY A HEAP OF MIXED WASTE FINDS ITS WAY TO THE BANDHWARI LANDFILL

INTERNAL CHANGES IN CITY ADMINISTRATION

The city is going through recurrent alterations at its administrative levels. Ever since the National Green Tribunal (NGT) imposed a fine of Rs 100 crore in 'environmental compensation' on the Haryana government in September 2022 for mishandling un-remediated legacy waste lying in Bandhwari, the administration has gone into an overdrive: committees and sub-committees are being formed to address the issue, and officials are being rapidly replaced. However, the modus operandi of each batch of new officials is different, leading to varying instructions to citizens and sanitary workers at different times, sowing confusion.

ENFORCEMENT OF THE LAW

The Solid Waste Management Rules, 2016, followed by bye-laws on solid waste management, entitle cities to impose fines on any individual or institutional waste generators who do not comply with the law. This non-compliance includes open littering or dumping of waste, not managing organic waste (by BWGs), burning of waste, and throwing waste in stormwater drains, sewer lines etc.

The MCG has issued several notifications to BWGs for abiding by the norms; between November 2022 and January 2023, it has issued challans worth Rs

THE MCG HAS ISSUED SEVERAL NOTIFICATIONS TO BWGS FOR ABIDING BY THE NORMS; BETWEEN NOVEMBER 2022 AND JANUARY 2023, IT HAS ISSUED CHALLANS WORTH RS 6 LAKH

6 lakh. But this action can bear results only if the recovery rate is satisfactory – recoveries are short of the targets. What is clear is that the city lags behind in enforcing the law.

The MCG-drafted bye-law mentions that in case of repeated contraventions, the fine amount for every such default shall be levied on a daily or monthly basis. There are provisions for designating a special officer to oversee enforcement, a 5 per cent annual increase in the fine amount, and prosecution under the Environment Protection Act, 1986 and the Haryana Municipal Corporation Act, 1994 in case of non-payment of the fine. But the recovery rate of the penalty indicates the city has rarely acted on these provisions.

LIMITED MONITORING SYSTEMS

Various bye-laws in Haryana stipulate that ULBs in the state – including MCG – are supposed to set up a Bulk Waste Monitoring Cell headed by an officer deputed by the commissioner or chief officer of the solid waste management department of the ULB. This monitoring cell is assigned to do field surveys and carry out BWG mapping within the city. Based on the survey findings, the ULB is supposed to issue public/individual notices to BWGs, which would be given a provision for self-declaration in case they claim they do not fall in the category of BWGs.

CSE's study and discussions with MCG officials shows a robust monitoring system is largely missing in the systems instituted by the Corporation. One of the pre-requisites is to set up a dedicated monitoring and

management cell to identify, manage and keep a tab on the BWGs in this fast-growing city.

CHALLENGES FACED BY BWGS

There are thousands of residential societies in Gurugram. Many of the 614 societies which have been identified by the MCG as bulk waste generators are not yet aware about their roles and responsibilities as BWGs. While 205 of these are compliant, all BWGs are facing various kinds of challenges. Some lack good leadership, while some have space constraints; there are others that are unsure about the quality of the service provider, especially after the MCG de-listed the authorised vendors. The MCG needs to listen to their problems and find solutions.

PROPER FUNCTIONING OF RWAS AND LEADERSHIP

The field-level assessment by CSE reveals that RWAs that have a strong leadership are the ones which have been most successful in implementing the norms meant for BWGs in Gurugram. Willingness among the initiators is a crucial factor for its success. In many cases, it has been observed that people are reluctant to take ownership in planning and commissioning of the on-site waste processing plant.

THE FIELD-LEVEL ASSESSMENT BY CSE REVEALS THAT RWAS THAT HAVE A STRONG LEADERSHIP ARE THE ONES WHICH HAVE BEEN MOST SUCCESSFUL IN IMPLEMENTING THE NORMS MEANT FOR BWGS IN GURUGRAM

SEGREGATION AT SOURCE

Even though many residents of Gurugram are highly educated, aware and responsible citizens, segregation remains a key challenge here. Popular perception, and hence distaste for this task, varies from the belief that handling waste is a dirty job to handling waste is the government's responsibility since people are

paying taxes. Behaviour change, therefore, remains a big hurdle to cross and the city needs to demonstrate much more intense and continuous efforts to overcome this.

SPACE CONSTRAINTS

Many BWGs like residential societies, hotels, restaurants, hostels etc have little or no space for setting up *in-situ* composting units – this leads to the waste being collected and transported to another site for dumping. This not only adds to the additional transportation costs, but also increases the burden on the landfill site, besides hiking up the pollution load on the city. Such BWGs have received limited support from the MCG to get their waste managed through some other means.

ROLE OF AUTHORISED AGENCIES

The MCG has only one authorised concessionaire for end-to-end support, starting form collection to processing to disposal. Almost 100 per cent of the households and other sources interviewed during the process of the study reported inconsistency in the quality and quantity of services received from the agency. There have been reports where waste segregated at source have been later mixed by the collection personnel from the agency. Some of the BWGs have reported that they have not been allowed to choose their own private collection agency. Such situations have contributed to the trust deficit between the MCG and the BWGs.

BEHAVIOUR CHANGE, THEREFORE, REMAINS A BIG HURDLE TO CROSS AND THE CITY NEEDS TO DEMONSTRATE MUCH MORE INTENSE AND CONTINUOUS EFFORTS TO OVERCOME THIS

BUFFER ZONE

Some of the compost plants visited during the study

were found to be having no buffer beyond their capacity – partly because of budgetary or space constraints, or because they lacked the vision that in future if the number of residents increased, the quantum of waste generation would also go up. Field information suggests that this might not be a problem for high-rises; however, it could be a concern for community-based individual resident's societies where people have built more storeys to accommodate greater numbers – more people would mean more waste being generated.

THE COMPOST GENERATED BY THE BWGS IS LARGELY BEING CONSUMED INTERNALLY. BUT IF A BWG WISHES TO SELL ITS COMPOST OR USE IT FOR CULTIVATION AT A LARGER SCALE, THE QUALITY OF THE COMPOST MUST BE TESTED AND VALIDATED

FACILITIES FOR QUALITY TESTING OF COMPOST

The compost generated by the BWGs is largely being consumed internally. But if a BWG wishes to sell its compost or use it for cultivation at a larger scale, the quality of the compost must be tested and validated as it is directly linked to the human food chain. For example, one empanelled agency gives technical support to 80 RWAs in Gurugram. The agency does organic farming with the compost it gets from these RWAs in a kitchen-to-kitchen approach – the crops that are grown are sold to the same RWAs. In such cases, testing of the compost quality is a must.

END PRODUCT UTILITY

If a BWG produces surplus compost or bio-gas/bio-CNG, a proper end product utility plan is a must. RWAs can look for potential buyers like farmers or gardeners. For example, in Sushant Apartments, the vendor buys the surplus compost from the RWA at the rate of Rs 5 per kg.

VIKAS CHOUDHARY / CSE

Bio-methanation is one of the recommended technologies for the BWGs to process their organic waste

RECOMMENDATIONS

What is needed: Survey and mapping of BWGs, awareness-buiding exercises, training programmes to build capacity, adaption of new technologies, periodic monitoring, revival of the citizens' monitoring committee, empanelled vendors, integration of informal sector, technical support to BWGs, compost testing facilities and market access, strong penalty provisions and incentives, data transparency and community participation.

RECOMMENDATIONS

INITIATE MAPPING AND SURVEY

An exhaustive survey using proper tools is needed for mapping the BWGs efficiently. To kickstart the process, the MCG may consider using its property tax database which contains information on built area and number of households. Once the BWGs are identified, the local body can get a clearer picture and collect credible data on the quantum of waste generated, treated and disposed of by the bulk generators. Post identification, the civic body must also periodically monitor the existing BWGs – their waste management practices– as well as identify new bulk generator sites.

BEGIN A CONTINUOUS AND NEED-BASED AWARENESS DRIVE

After the initial survey is done and the city has mapped the number of BWGs, their categories and quantum of waste generated by them, the first task of the ULB is to inform and make the stakeholders aware about their roles and responsibilities. There is always a need for a thorough and continuous information dissemination and behaviour change communication (IEC-BCC) drive for the citizens. Behaviour change is a long-term process and achieving proper segregation of waste at source needs to target the behaviour pattern of the waste generators. Without this, no meaningful processing of the waste can be done and the burden of managing bulk wastes will fall on the ULB. So, the city must develop a strategy for regular IEC and BCC for securing source segregation.

THERE IS ALWAYS A NEED FOR A THOROUGH AND CONTINUOUS INFORMATION DISSEMINATION AND BEHAVIOUR CHANGE COMMUNICATION (IEC-BCC) DRIVE FOR THE CITIZENS

An MCG capacity building meeting in progress

VIKAS CHOUDHARY / CSE

BUILD CAPACITY

To achieve success in *in-situ* management of wet waste, capacity of all stakeholders needs to be built up about the various categories of waste, how to segregate them, and how to establish and manage the processing unit. These stakeholders range from heads of the institutions, waste handlers like housekeeping staff in RWAs, ground-level workers, cleaners in big hotels or malls, the corporation staff, waste collectors of the 'authorised agency', the collection vehicle drivers, and ULB officials. The city of Gurugram should put in place a plan to initiate capacity building exercises.

RECOMMENDATIONS

ENCOURAGE ADOPTION OF NEW TECHNOLOGIES LIKE BIO-GAS OR BIO-CNG

CSE's field visits found that only two BWGs had established bio-gas plants – though bio-gas is a proven method for processing wet waste and extracting methane for energy. BWGs that have a land constraint and that are generating more than 100 kg of wet waste can consider bio-gas generation as a potential option to process wet waste *in-situ*.

The government has subsidised and promoted bio-gas through GOBARDhan, a scheme under which Rs 10,000 crore has been allocated in the FY 2023-24 budget; Rs 600 crore has also been allocated to the waste-to-energy programme under the Ministry of New and Renewable Energy (2021-22 to 2025-26).

The ULB should, therefore, encourage BWGs to take advantage of the government subsidies and schemes, provided the capacities of their plants suit the criterion. The city officials are also recommended to provide the BWGs with necessary technical support for smooth running of the units.

INSTITUTE A MONITORING CELL AND PERIODIC INSPECTIONS IN THE FIELD

ONLY TWO BWGS IN GURUGRAM HAVE SET UP BIO-GAS PLANTS. BIO-GAS CAN BE AN OPTION FOR BWGS THAT HAVE LAND CONSTRAINTS

As mentioned before in this report, Gurugram needs to establish a proper monitoring cell for BWGs. The cell can do a comprehensive survey to identify and map the BWGS, and inspect the sites after receiving self-declarations from them. The cell should also develop a periodic inspection plan and conduct field visits to ensure compliance.

If the claims noted in the self-declaration form are found to be true, an acknowledgement certificate can be issued which would also serve as an exemption certificate. The certificate can be deemed valid until the site becomes a bulk generator.

GURUGRAM CITIZENS HAVE CALLED FOR A REVIVAL OF THE CITIZEN'S MONITORING COMMITTEE

The monitoring should be a concurrent and regular affair and should be evaluated properly for further actions.

REVIEW THE DECISION OF DE-EMPANELMENT OF THE AGENCIES AND REJUVENATE THE CITIZENS' MONITORING COMMITTEE

The city was benefitted in the past with the participation of the citizens by forming a citizen's monitoring committee (CMC) in 2018. And with their advice they issued a list of empanelled vendors who will provide technical support to the BWGs.

But in the post-pandemic period CMC was defunct; recently, the empanelment was cancelled. Now the demand from the citizens from MCG is to revive CMC and conduct regular meetings with them and performance appraisal of the vendors should take place to revise the decision of de-empanelment.

INTEGRATE THE INFORMAL SECTOR

The SWM Rules of 2016 have mandated state governments to take up policies for formalising and organising informal waste pickers and bring them into the mainstream waste management system.

Gurugram has had a contract with an agency called 'Eco Green' for 22 years: this agency has been delegated the authority to collect dry and recyclable wastes from BWGs and collect a user charge from them. But the truth is that a large proportion of the dry waste is collected directly by the informal sector. The MCG needs to recognise this and authorise the informal sector as well to collect dry waste. Informal waste pickers could be provided with identity cards, uniforms and safety gear. Like some other cities in India are doing, the MCG should mention this in its bye-laws and make it an obligatory duty for the ULB.

PROVIDE TECHNICAL SUPPORT TO BWGS, ESPECIALLY TO THOSE WHO ARE MANAGING INDEPENDENTLY

The MCG has a responsibility to provide technical training and regular technical support to those BWGs which are managing composting units on their own (without any involvement of an external agency) within their premises.

ESTABLISH MECHANISM FOR COMPOST TESTING AND MARKET LINKAGE

AS PER SWM 2016 RULE, FOR SAFE APPLICATION, COMPOST SHOULD BE TESTED AND COMPLY WITH GIVEN FERTILIZER CONTROL ORDER 2009 SPECIFICATIONS

As per SWM 2016 rule, for the safe application, compost should be tested and comply with given Fertilizer Control Order 2009 specification. The city government should take initiatives to establish network between nearby laboratory and BWG in the city. In this way, the surplus compost produced in various BWGs can be tested and marketed or utilized other than inhouse consumption i.e Agriculture, city green area development etc.

REGULARISE USER CHARGE COLLECTION

The SWM Rules say that BWGs should hand over their dry waste to 'authorised' waste pickers only. But a number of BWGs in Gurugram reportedly hand over their dry waste to informal unauthorised waste pickers, paying them collection charges, while some sell the recyclables themselves. As a result, the city is unable to recover the user charges that it has calculated. Moreover, there is a possibility of mishandling of the waste by the informal collectors.

PENAL PROVISIONS MUST BE STRENGTHENED. IN GURUGRAM, LOW RECOVERY RATES INDICATE THAT RULES RELATED TO PENALTIES FOR NON-COMPLIANCE ARE NOT BEING EXECUTED

STRENGTHEN PENAL PROVISIONS

The law empowers the city administration to penalise non-compliance; not only this, the fine amount can be increased yearly and if a violator fails to deposit the fine within the stipulated timeframe, the fine plus 12 per cent annual interest can be added to the property tax and recovered.

Given the fact that there has been a zero per cent recovery rate in the last quarter of FY 2022-23, it is evident that none of these rules have been properly executed in the field by the ULB. Stringent implementation of these rules and their monitoring is the need of the day.

INCENTIVISE

The bye-law of Gurugram (not yet notified) has a provision for periodic incentivisation of the complying BWGs and other waste generators to create models for others and increase the rate of compliance. This could be done through certificate distribution, publishing of names in the website, or arranging small community-based programmes to felicitate

SOLID WASTE MANAGEMENT IS A SHARED RESPONSIBILITY: CITIZENS SHOULD UNDERSTAND THAT THE WASTE IS THEIRS AND THEY ARE ACCOUNTABLE FOR IT

them. The ULB can also waive off or provide rebate on the land and house tax, water tax or reduce the user charges for dry waste collection.

ENSURE TRANSPARENCY OF DATA

A good number of bye-laws across Indian cities talk about establishing a citizens' resource point where data related to SWM will be analysed and uploaded in the city's website to make it available to all citizens. The city of Gurugram should also maintain a dataset containing all the relevant data about the BWGs and make it available on its website for transparency and proper monitoring.

ENHANCE COMMUNITY PARTICIPATION

The SWM Rules, 2016 mandate local governments to involve the community in solid waste management and promote localised processing of waste, including home composting, bio-methanation etc.

As solid waste management is a shared responsibility, people should understand that it is their waste and their responsibility. The ULB should take initiatives to make its endeavours participatory and flexible. The challenges faced by existing BWGs should be taken care of and proper institutional arrangements should be provided to them.

A CONCLUDING NOTE

The city of Gurugram needs urgent and strong intervention at the administrative and political levels to improve conditions in terms of BWG compliance and SWM in general. It is not an impossible task – cities with a strong and just policy, proper enforcement of the law, integrated SWM plan, participation of all stakeholders, and an effective monitoring and evaluation system have been known to show the desired results.

The MCG's actions have not encouraged much confidence in this regard. An instance is the way the Corporation suddenly de-listed all the empanelled agencies which it had authorised earlier to collect and manage waste. It has now said that the BWGs are free to take assistance from any vendors for managing their on-site processing systems – without bothering to offer a list of such vendors.

The MCG should behave in a transparent manner with its citizens. It should take strong steps for effective implementation of laws, especially the notification of bye-laws; for identification and mapping of BWGs and preparing an inventory; and for regularising user charge collection provisions.

It can adopt a carrot-and-stick approach by incentivising law-abiding citizens and enforcing penal provisions wherever necessary to ensure compliance from BWGs in the city.

A CONCLUDING NOTE

Gurugram has a very strong resource pool of well-educated, aware and environmentally conscious citizens – the MCG can explore the possibility of capitalising on this resource and involving these citizens in its work on managing the BWGs.

ANNEXURES

Compost quality report prepared by CSE environment monitoring laboratory

PHYSICAL PARAMETERS

S .No.	Sample details	Technology	Lat, long	Operator	Waste	Rounds of testing	Test Parameters Found (Organic compost FCO 2013)						
							pH	Conductivity	Odour	Colour	Bulk density (g/cm3)	Particle size	Moisture % by weight
							(6.5-7.5)	NMT 4.0 ds/m		Dark brown to black	<1.0	Minimum 90% material should pass	Maximum 15.0- 25.0
1	World Spa, Sec-30, Gurugram, HR	AAGA: Aerobic Composting in pots	28.460541, 77.057816	GWMS	Compost, Kitchen waste	1st	6.49	1.1	Absence of foul odour	Black	0.52	80%	82.4
						2nd	8.24	4.62	Foul odour absence	Dark Brown	0.55	0.98	63.46
2	Nirvana county, south, Gurugram, HR	Aerobic Composting tub	28.410719, 77.067721	Balancing BITS	Compost, Kitchen & Horticulture waste	1st	9.11	1.39	Absence of foul odour	Dark Brown	0.35	85%	16.3
						2nd	9.17	2.84	Foul odour absence	Dark Brown	0.4	95%	45.42
3	Westend heights, Gurugram, HR	Aerobic Composting tub	28.449767, 77.093584	Green karma and associates LLP	Compost, Kitchen waste with cocopeat	1st	8.4	5.33	Absence of foul odour	Dark Brown	0.57	95%	20.4
						2nd	7.51	16.61	Foul odour absence	Dark Brown	0.56	95%	17.01
4	Richmond park, Gurugram, HR	Aerobic Composting tub	28.458640, 77.089367	Green Bandhu	Compost, Kitchen & garden waste	1st	7.83	1.94	Absence of foul odour	Dark Brown	0.47	90%	42.8
						2nd	6.8	8.14	Foul odour absence	Dark Brown	0.49	95%	25.79
5	Sushant Apartment, Gurugram, HR	Aerobic Composting tub	28.450068, 77.079659	Green Bandhu	Compost, Kitchen waste	1st	8.73	3.4	Absence of foul odour	Dark Brown	0.42	90%	47.1
						2nd	8.97	5.93	Foul odour absence	Dark Brown	0.45	90%	11.87

S .No.	Sample details	Technology	Lat, long	Operator	Waste	Rounds of testing	Test Parameters Found (Organic compost FCO 2013)						
							pH	Conductivity	Odour	Colour	Bulk density (g/cm3)	Particle size	Moisture % by weight
							(6.5-7.5)	NMT 4.0 ds/m		Dark brown to black	<1.0	Minimum 90% material should pass	Maximum 15.0- 25.0
	Sushant Apartment, Gurugram, HR	Aerobic Composting tub	28.450068, 77.079659	Green Bandhu	Compost, Flower waste	1st	8.69	3.88	Absence of foul odour	Dark Brown	0.49	90%	32.6
6	Bestech park spa view, Gurugram, HR	AAGA, Aerobic Composting	28.426761, 77.052334	M/S green karma	Compost, Kitchen waste	1st round of testing	7.74	3.72	Absence of foul odour	Black	0.46	95%	74.7
						2nd round of testing	8.25	5.69	Foul odour absence	Dark Brown	0.45	95%	68.08

CHEMICAL PARAMETERS

Sr .No.	Sample Details	Technology	Lat, long	Operator	Waste	Rounds of testing	Test Parameters Found (Organic compost FCO 2013)					
							Total organic carbon, percent by weight, min. (12)	Total Carbon, percent by weight	Total Nitrogen (as N), percent by weight, min. (0.8)	C:N ratio (20:01)	Total Phosphates (asP205), percent by weight, min.(0.4)	Total Potash (as K20), percent by weight, min.(0.4)
1	World Spa, Sec-30, Gurugram, HR	AAGA: Aerobic Composting in pots	28.460541, 77.057816	GWMS	Compost, Kitchen waste	1st	23.29	40.15	0.95	25	0.64	2.3
						2nd	13.11	22.6	4.45	03:01	2.29	2.12

Sr .No.	Sample Details	Technology	Lat, long	Operator	Waste	Rounds of testing	Test Parameters Found (Organic compost FCO 2013)					
							Total organic carbon, percent by weight, min. (12)	Total Carbon, percent by weight	Total Nitrogen (as N), percent by weight, min. (0.8)	C:N ratio (20:01)	Total Phosphates (asP205), percent by weight, min.(0.4)	Total Potash (as K20), percent by weight, min.(0.4)
2	Nirvana county, south, Gurugram, HR	Aerobic Composting tub	28.410719, 77.067721	Balancing BITS	Compost, Kitchen & Horticulture waste	1st	16.91	29.16	2.14	08:01	1.44	1.49
						2nd	14.68	25.3	4.85	03:01	1.26	2.38
3	Westend heights, Gurugram, HR	Aerobic Composting tub	28.449767, 77.093584	Green karma and associates LLP	Compost, Kitchen waste with cocopeat	1st	19.84	34.2	3.01	07:01	1.51	2.3
						2nd	20.65	35.6	5.61	04:01	1.91	2.98
4	Richmond park, Gurugram, HR	Aerobic Composting tub	28.458640, 77.089367	Green Bandhu	Compost, Kitchen & garden waste	1st	10.49	18.08	1.38	08:01	0.99	1.64
						2nd	10.03	17.3	4.07	02:01	0.71	2.32
5	Sushant Apartment, Gurugram, HR	Aerobic Composting tub	28.450068, 77.079659	Green Bandhu	Compost, Kitchen waste	1st	15.06	25.96	2.11	07:01	0.99	2.15
						2nd	13.98	24.1	4.66	03:01	0.96	2.44
	Sushant Apartment, Gurugram, HR	Aerobic Composting tub	28.450068, 77.079659	Green Bandhu	Compost, Flower waste	1st	13.18	22.73	1.74	08:01	0.86	1.8
6	Bestech park spa view, Gurugram, HR	AAGA, Aerobic Composting	28.426761, 77.052334	M/S green karma	Compost, Kitchen waste	1st	20.08	34.61	2.7	07:01	1.83	1.99
						2nd	19.66	33.9	5.44	04:01	1.89	1.87

HEAVY METALS

Sr. No.	Sample Details	Technology	Lat, long	Operator	Waste	Rounds of testing	Test Parameters Found (Organic compost FCO 2013)							
							Arsenic (mg/kg) max. 10.001	Mercury (mg/kg) max 0.15	Cadmium (mg/kg) max. 5	Chromium (mg/kg) max. 50	Copper (mg/kg) max. 300	Nickel (mg/kg) max. 50	Lead (mg/kg) max. 100	Zinc (mg/kg) max. 1000
1	World Spa, Sec-30, Gurugram, HR	AAGA: Aerobic Composting in pots	28.460541, 77.057816	GWMS	Compost, Kitchen waste	1st	0.265	NIL	0.5367	9.187	23.01	3.909	7.712	105.9
						2nd	1.434	0.056	1.026	28.84	24.19	11.74	12.23	98.73
2	Nirvana county, south, Gurugram, HR	Aerobic Composting tub	28.410719, 77.067721	Balancing BITS	Compost, Kitchen & Horticulture waste	1st	0.846	0.063	1.003	22.74	23.02	7.779	11.93	150.4
						2nd	1.361	0.148	1.08	28.78	25.56	10.48	15.42	96.89
3	Westend heights, Gurugram, HR	Aerobic Composting tub	28.449767, 77.093584	Green karma and associates LLP	Compost, Kitchen waste with cocopeat	1st	0.836	NIL	0.6127	13.44	21.92	7.594	5.994	131.8
						2nd	0.385	0.0031	0.5978	19.94	28.97	8.669	6.252	88.58
4	Richmond Park, Gurugram, HR	Aerobic Composting tub	28.458640, 77.089367	Green Bandhu	Compost, Kitchen & garden waste	1st	3.465	NIL	1.029	33.84	32.58	14.7	15.38	153.8
						2nd	2.316	1.459	0.9322	224.5	27.89	18.52	15.62	78.59
5	Sushant Apartment, Gurugram, HR	Aerobic Composting tub	28.450068, 77.079659	Green Bandhu	Compost, Kitchen waste	1st	1.161	0.104	0.8751	325.3	70.52	10.12	14.79	140.9
						2nd	1.2	0.2985	0.9173	25.94	34.24	8.799	15.89	78.62
	Sushant Apartment, Gurugram, HR	Aerobic Composting tub	28.450068, 77.079659	Green Bandhu	Compost, Flower waste	1st	1.399	0.11	0.8911	24.46	35.24	9.759	14.22	147.7
6	Bestech park spa view, Gurugram, HR	AAGA, Aerobic Composting	28.426761, 77.052334	M/S green karma	Compost, Kitchen waste	1st	0.91	NIL	0.8457	21.75	26.68	8.053	7.47	205.5
						2nd	0.428	Nil	0.7892	19.68	34.46	8.227	8.977	112

PATHOGENS

Sr. No.	Sample Details	Technology	Lat, long	Operator	Waste	Rounds of testing	Test Parameters Found (Organic compost FCO 2013)		
							Fecal coliforms	E. coli	Salmonella spp.
1	World Spa, Sec-30, Gurugram, HR	AAGA: Aerobic Composting in pots	28.460541, 77.057816	GWMS	Compost, Kitchen waste	1st	245	245	54631
						2nd	2518	985	2625107
2	Nirvana county, south, Gurugram, HR	Aerobic Composting tub	28.410719, 77.067721	Balancing BITS	Compost, Kitchen & Horticulture waste	1st	514	179	1817
						2nd	439717	170390	1757404
3	Westend heights, Gurugram, HR	Aerobic Composting tub	28.449767, 77.093584	Green karma and associates LLP	Compost, Kitchen waste with cocopeat	1st	26375	9420	1507
						2nd	11206	361	29208
4	Richmond park, Gurugram, HR	Aerobic Composting tub	28.458640, 77.089367	Green Bandhu	Compost, Kitchen & garden waste	1st	40231	6297	1679
						2nd	28299	10107	1292613
5	Sushant Apartment, Gurugram, HR	Aerobic Composting tub	28.450068, 77.079659	Green Bandhu	Compost, Kitchen waste	1st	28346	6803	1814
						2nd	124816	10553	1088396
	Sushant Apartment, Gurugram, HR	Aerobic Composting tub	28.450068, 77.079659	Green Bandhu	Compost, Flower waste	1st	43020	13796	65
6	Bestech park spa view, Gurugram, HR	AAGA, Aerobic Composting	28.426761, 77.052334	M/S green karma	Compost, Kitchen waste	1st	8315	4356	380124
						2nd	144092	940	3004626

CHECKLIST FOR PERIODIC VERIFICATION OF PREMISES OF BULK WASTE GENERATORS BY URBAN LOCAL BODY

S No	Activities	Yes / No
1.	Is bulk waste generator segregating the municipal solid waste as per SWM Rules, 2016	
2.	Are all the Segregated wastes being stored in separate bins, containers or bags etc.?	
3.	Has the bulk waste generator demarcated a separate space for the segregation, storage and decentralized processing of municipal solid waste in society, RWA, gated community, market association, etc.?	
4.	Is the bulk waste generator storing separately the Construction and Demolition waste?	
5.	Is the bulk waste generator storing the Garden and Horticulture waste separately?	
6.	Is the bulk waste generator burning any waste?	
7.	Is the bulk waste generator burying any waste?	
8.	Is the bulk waste generator paying user fee/charges for solid waste management	
9.	Is the bulk waste generator intimating the urban local body / authority in case of organizing an event or gathering of more than 100 persons at any of unlicensed premises?	
10.	Is the bulk waste generator handing over recyclable waste to the authorised waste picker or recycler?	
11.	Is the bulk waste generator processing bio-degradable (wet) waste in own premises?	
12.	If so, what is the process – composting or bio-methanation or any other? Please mention.	
13.	Is the bulk waste generator handing over the residual waste from process to the waste collector or agency designated by Urban local authority?	
14.	Is the waste collection organized by RWA, Association?	
15.	If so, is the waste collector an informal rag picker / waste collector?	
16.	Is the Payment to the waste collector made by the association or by the waste generators/premises owners directly?	
17.	Whether the association/complex is using waste collection personnel provided by the Urban local body?	
18.	Is the RWA /Association organizing IEC activities for proper management of municipal solid waste?	
19.	Has the bulk waste generator tied up for authorized agency for collection of segregated waste?	

Like all emerging cities in India, the Millennium City of Gurugram bears an unwholsesome burden – that of the huge mountains of solid waste it generates, much of which is organic or wet waste. Almost 30-40 per cent of this waste comes from what are known as Bulk Waste Generators (BWGs) – residential and gated societies, offices, hotels, institutional campuses etc that produce, on an average, 50 kg or more of all kinds waste every day.

The Solid Waste Management Rules, 2016 advise cities to adopt a community-based waste management system and emphasise on on-site or decentralised management of segregated organic waste. They also mandate BWGs to carry out certain waste management functions themselves – such as segregation, handling and disposing of organic waste through composting or bio-methanation within their premises; developing a system for reusing the products of processing such as compost, biogas etc; and handing over dry and other recyclable wastes to the corporation or to authorised agencies.

How are Gurugram BWGs faring when it comes to fulfilling this mandate? How far has the Municipal Corporation of Gurugram succeeded in living up to its part of the responsibility? This ground-level assessment by Centre for Science and Environment's Solid Waste Management team tries to dig deep to find the answers.

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