Status Paper on

Solid Waste Management in Urban India

Engaged Citizens, Responsive City
Preface

Efficient basic urban services hold the key to achieve liveable cities. Improvement in solid waste management has a multi-dimensional direct and indirect impact on life in cities. Solid waste management services need to be made effective to realize four major Sustainable Development Goals (SDGs). Better management of waste will reduce the pollution of water, soil and air significantly leading to improved health outcomes for the citizens leading to achieve SDG 3: Ensure healthy lives and promote well-being for all at all ages. It has a great role in making cities and human settlements inclusive, safe, resilient and sustainable (SDG 11). Management of food waste and hazardous waste can contribute significantly towards SDG 12: Ensure sustainable consumption and production patterns, whereas effective management of plastic waste has a role to play towards SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

The landscape of waste management is having two sides- demand, the waste generators and supply, the waste management service providers including the urban local bodies. Both, the demand as well as supply side challenges have been continuously changing with changes in lifestyle, technology, policy approaches and other socio-economic aspects. The present status of service delivery is a reflection of above factors and gives a hint towards what needs to be done to achieve completely clean cities.

Under the European Union supported ‘Engaged Citizens Responsive City’ (ECRC) program which is running in three cities Ajmer (Rajasthan), Jhansi (Uttar Pradesh), and Muzaffarpur (Bihar), various aspects related to status of waste management services have been captured. This paper attempts to throw light on the existing status of solid waste management in these three cities, the three states and at the national level. It endeavours to draw meaningful conclusions to identify possible multi-stakeholder interventions for clean Indian cities of future.

Vivekanand Gupta
Consultant- Participatory Research in Asia (PRIA)
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<table>
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<th>Description</th>
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<tbody>
<tr>
<td>C&amp;D</td>
<td>Construction and Demolition</td>
</tr>
<tr>
<td>CF</td>
<td>Citizen Forum</td>
</tr>
<tr>
<td>CSE</td>
<td>Centre for Science and Environment</td>
</tr>
<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
</tr>
<tr>
<td>DPR</td>
<td>Detailed Project Report</td>
</tr>
<tr>
<td>ECRC</td>
<td>Engaged Citizens, Responsive City</td>
</tr>
<tr>
<td>EPR</td>
<td>Extended Producer Responsibility</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>JNNURM</td>
<td>Jawaharlal Nehru National Urban Renewal Mission</td>
</tr>
<tr>
<td>MIS</td>
<td>Management Information System</td>
</tr>
<tr>
<td>MMC</td>
<td>Muzaffarpur Municipal Corporation</td>
</tr>
<tr>
<td>MoEF</td>
<td>Ministry of Environment &amp; Forests</td>
</tr>
<tr>
<td>MoHUA</td>
<td>Ministry of Housing and Urban Affairs</td>
</tr>
<tr>
<td>MSW</td>
<td>Municipal Solid Waste</td>
</tr>
<tr>
<td>MT</td>
<td>Metric Ton</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>NSSO</td>
<td>National Sample Survey Office</td>
</tr>
<tr>
<td>NUSP</td>
<td>National Urban Sanitation Policy</td>
</tr>
<tr>
<td>SBM</td>
<td>Swachh Bharat Mission</td>
</tr>
<tr>
<td>SHPC</td>
<td>State High Power Committee</td>
</tr>
<tr>
<td>SIC</td>
<td>Settlement Improvement Committee</td>
</tr>
<tr>
<td>SLB</td>
<td>Service Level Benchmarks</td>
</tr>
<tr>
<td>SWM</td>
<td>Solid Waste Management</td>
</tr>
<tr>
<td>UIDSSMT</td>
<td>Urban Infrastructure Development Scheme for Small and Medium Towns</td>
</tr>
<tr>
<td>ULB</td>
<td>Urban Local Body</td>
</tr>
<tr>
<td>UT</td>
<td>Union Territory</td>
</tr>
</tbody>
</table>
1. Introduction

1.1 Solid Waste Management: The Need and Changing Paradigm

Solid waste management is considered to be one of the most important urban environmental services, having direct linkage with the environment and health of the citizens. The rapidly changing lifestyle has caused an increase in the amount of solid waste being generated. Urban areas are thus embraced with increasing volume of waste, along with the historically deposited piles of mixed dumping. Electronic waste and packaging waste have seen a major spurt in the wake of growth of e-commerce and digitalisation. Burning of solid waste, emissions from open dumping and seepage of leachate have been often cited as causes of air, water and soil pollution in urban areas. Within the cities, availability of services to the residents of informal settlements remains a cause of concern. There is no denial from the fact that better management of garbage has a tremendous role in improving liveability in cities of all scales.

1.2 About the Paper

This paper attempts to do a quick assessment of the current status of solid waste management in cities of India. The paper looks at the central and state levels with analysis of the three states of Rajasthan, Uttar Pradesh and Bihar. It takes a deeper dive into city level status through data from three cities, one from each of the above mentioned states—Ajmer, Jhansi and Muzaffarpur. The paper tries to study the level of services and facilities in three cities and identify the micro-level challenges faced in these regions. The study attempts to analyse the key enablers of an effective waste management system, as a focal point of the paper:

- Role of citizens, citizen organisations and representatives elected by citizens
- Human resources engaged in delivery of services

The paper draws some strategic ways forward to improve the situation of waste management in urban centres.

1.3 Objectives of the Paper

The key objective of study is to check the status of solid waste management service at central, state and city levels. Other objectives of the study are:

- To identify key areas of concern in urban solid waste management
- To bring out stories of change and good initiatives from the study cities
- To examine the role of citizen and community engagement in effective waste management services
- To highlight the issues related to sanitation workforce especially women
- To draw meaningful conclusions and strategic options for improved waste management services in urban areas

1.4 Methodology and Limitations

The methodology adopted for this study is a combination of primary and secondary research techniques. The paper presents the status of solid waste management at two levels—macro and micro. At the macro
level, it investigates into the situation at country and state level under broad indicators related to service levels. At the micro level, the situation of solid waste management has been analysed at city level for more localised and citizen-centric indicators. The synthesis of analysis of issues have been prepared and presented in the last chapter. The report draws heavily from the primary surveys on sanitation status conducted in these three cities. The surveys were undertaken at Ajmer and Jhansi during December 2016–May 2017. It was conducted at Muzaffarpur during March–June 2018. The secondary data on provisioning of waste management services collected from ULBs of these three cities was used in preparing this analysis. Discussions with key informants in these three cities were conducted to capture the shades of processes, issues and institutional mechanisms related to provisioning of waste management services. Key secondary sources of data for the paper were taken from the Census of India and Swachh Bharat Mission (Urban) website (MIS).

The paper analyses data at macro (national and state) level more from an infrastructure delivery perspective, while at micro (city level), the study focuses on availability of services to the citizens through data collected from citizens. The data of formal and informal settlement has been presented and analysed separately to see the gaps. Though correlations within the state and the city data are difficult to draw due to difference in timelines and indicators, the paper attempts to establish the need of capturing granular data systematically to feed the programme elements at the state and Central levels. The paper does not cover the financial progress of the missions and process/achievements in detail.
2. Policy and programmatic landscape for provisioning for solid waste management in urban areas

2.1 Evolution of Solid Waste Management Policy and Programmes

A major momentum in policy and regulation on solid waste management was induced by a public interest litigation filed in the Supreme Court in 1996. In 2000, the MoEF issued Municipal Solid Waste (Management and Handling) Rules, 2000 under the Environment Protection Act, 1986. These rules defined the steps to be adopted by all ULBs for solid waste management[1]. Solid waste management was one of the eligible sectors for assistance under JNNURM.

Figure 1: Timeline of major regulatory, policy and programmatic initiatives for solid waste management

Solid Waste Management Rules 2016, which replaced Solid Waste (Management and Handling) Rules 2000 were notified on 8th April, 2016. In addition, Swachh Survekshan was launched in 2016, with solid waste management as a key component for ranking. Guidelines for community engagement covered aspects of solid waste management. Followed by the launch of Swachh Bharat Mission (Urban) in 2014, many advisory and technical documents were launched by MoHUA. Some of these include (see Table 1):

Table 1: Major advisories and technical documents on solid waste management under SBM (Urban)

<table>
<thead>
<tr>
<th>Municipal Solid Waste Management Manual</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft Model Municipal Solid Waste (Management &amp; Handling), Cleanliness and Sanitation RULES / BYE-LAWS</td>
<td>2016</td>
</tr>
<tr>
<td>Standard Operating Procedures for Swachh (Neighbourhood, clubs, hospitals, offices, parks, railway stations, roads, RWAs, schools, volunteering)</td>
<td>-</td>
</tr>
<tr>
<td>Advisory on On-Site and Decentralised Composting of Municipal Organic Waste</td>
<td>2018</td>
</tr>
<tr>
<td>C&amp;D waste ready reckoner</td>
<td>2018</td>
</tr>
<tr>
<td>Guidelines on usage of Refuse Derived Fuel in various industries</td>
<td>2018</td>
</tr>
<tr>
<td>Star ratings for garbage free cities</td>
<td>2018</td>
</tr>
</tbody>
</table>

Source: Website of SBM (Urban)
2.2 Solid Waste Management under Swachh Bharat Mission (Urban)

2.2.1 Programme structure

Solid waste management is one of the six mission components of the SBM (Urban).

Coverage

All statutory towns are covered under components of SBM (Urban) including solid waste management.

Benefit structure

For solid waste management, the Central government’s incentives are capped at 35%, whereas the state’s contribution has been defined as 23.3%. The balance funds are expected to be generated through various means like private sector participation, additional state/ULB resources, user charges, CSR, Swachh Bharat Kosh, borrowings from market and other externals sources etc. There is a provision of reimbursement of cost towards preparing the DPR [2].

Implementation structure

ULBs, the nodal agency for solid waste management projects, are required to prepare the detailed project reports in consultation with state governments. The mission guideline provides for all approvals and implementation guidance for solid waste management projects at the state level except the release of Central funds. A state high power committee (SHPC) is provisioned that will scrutinise and approve proposals of SWM. There is a provision of availing funds through approving detailed project reports (DPRs).

Eligibility conditions

All ULBs covered under SBM (Urban) are eligible for funding for solid waste management projects.

Convergence

Solid waste management component in SBM (Urban) has converging aspects with other urban missions like Smart Cities Mission and DAY-NULM. The guidelines for convergence with DAY-NULM have been prepared by the MoHUA, primarily aiming to promote livelihood options for informal workers engaged in sanitation [3].

2.2.2 Progress under SBM (Urban)

As per the SBM (Urban) data of January 2019, in India 89% of the wards have been covered with 100% door-to-door collection of solid waste, while the percentage of wards with 100% source segregation remains at 61%, while 51.2% of the total waste is being processed¹.

The high-performing states include Chhattisgarh, Chandigarh UT, Daman and Diu, Kerala, etc.

https://gfcstarrating.org/User/GFCStarResult
A spatial presentation of status is presented in maps in the next pages.

### 2.2.3 Certifications under SBM (Urban)

Star ratings for garbage fee cities was launched in 2018 for ranking cities and towns on the basis of 12 key parameters related to various aspects of solid waste management. The objective of this rating system is to help cities assess their position and get motivated towards an improved rating [4]. Till now 56 cities has been awarded ratings under SBM (Urban). Cities like Ambikapur, Indore and Mysore has been awarded 5 star rating, while another 53 cities, located across 10 states, have been awarded 3-star ratings².

² [https://gfcsarrating.org/User/GFCStarResult](https://gfcsarrating.org/User/GFCStarResult)
Figure 3: Maps showing status of implementation of SWM under SBM (Urban) and location of star rated garbage free towns and cities.

Percentage of wards with 100% door to door collection

Legend
% of wards having 100% door-to-door collection
- 21 - 59
- 60 - 84
- 85 - 93
- 94 - 100
Percentage of total waste processing

Legend
Percentage of total waste processing
- 0 - 20
- 21 - 45
- 46 - 61
- 62 - 87
Star rated garbage free towns and cities

Legend
- 3_Star Garbage_Free_Cities
- 5_Star Garbage_Free_Cities

Source of base maps: Survey of India [https://india maps.gov.in/soiapp/]


Source of data for Figure on star rated garbage free towns and cities: [https://gfcstarrating.org/User/GFCStarResult]
3. Status of Solid Waste Management Services

3.1 Status of Solid Waste Management in Three States

Among three states, Rajasthan is leading in the door-to-door collection and source segregation. Processing of waste remains low across all three states, with less than 58% waste being processed. The total waste processing in some of the large states like Chhattisgarh, Madhya Pradesh and Telangana is above 70%.

Figure 4: Status of Implementation of SWM in 3 states

![Bar chart showing the status of solid waste management in three states.]


Figure 5: Percentage of wards with 100% door to door collection in 3 states and India

![Line chart showing the percentage of wards with 100% door to door collection.]

Source: Compiled from 'State-wise Status of Implementation of Various Components under SBM up to Feb 2018, July 2018 and January 2019 from web site of SBM (Urban)
A timeline data on the percentage of wards with 100% door-to-door collection shows a significant progress across all states during the past one year with the highest change in scenario in Uttar Pradesh.

![Figure 6: Percentage of waste processing in 3 states and India](chart)

*Source: Compiled from ‘State-wise Status of Implementation of Various Components under SBM up to Feb 2018, July 2018 and January 2019 from web site of SBM (Urban)*

The past one-year trend on total waste processing percentage shows a rapid increase across three states, with Rajasthan and Uttar Pradesh having crossed the national average by processing more than 50% of the waste generated. For Bihar, the waste processing percentage increased to 48% from 3%, slightly lower than the national average of 51.2%.

### 3.2 Status of Solid Waste Management in Three Cities

The data from primary surveys conducted in the three cities during 2017-2018, shows a varying picture of various stages of collection and segregation of solid waste services from accessibility and availability perspective. The analysis on key aspects for formal and informal areas of three cities is mentioned below:
3.2.1 Status of availability of services to citizen

**Figure 7: Availability of household waste collection facility in 3 cities**

![Bar chart showing availability of household waste collection facility in Ajmer, Jhansi, and Muzaffarpur.](image)

**Collection**

It is clear from the bar chart above that the percentage of households having a waste collection facility is varying from 63% to 79% in formal areas. While the gap between formal areas and informal settlements is the highest in Ajmer, Jhansi displays a higher percentage of households with waste collection facilities in informal settlements.

**Figure 8: Households having street sweeping services on daily basis in 3 cities**

![Bar chart showing street sweeping services in Ajmer, Jhansi, and Muzaffarpur.](image)

**Street sweeping**

The households whose access streets are swept on a daily basis range between 63% and 69% across the three cities under survey. The level of street sweeping is better in informal settlements of Ajmer and Jhansi. Though Muzaffarpur has a higher percentage of households receiving street sweepings on a daily basis, the gap of service provisioning in formal areas and informal settlements are considerably broader.
Segregation at source

Lack of segregation at the source remains a major concern in these three cities and the situation in informal settlements is worse. The highest segregation at source among the three cities was found in Muzaffarpur, which may be attributed to the ‘Swachhta Swasthya Samridhi’ initiative started in 2016 with the support of ITC and CSE. The lower segregation at source in Jhansi, despite the presence of processing facilities indicates the need for behavioural change and an improvement in waste transport infrastructure.

Location of collection bins

It was observed that the percentage of households, from which the distance of dustbin/waste collection centre is equal or higher than 100m, is the highest in Ajmer, followed by Jhansi and Muzaffarpur. The least percentage of such households in Muzaffarpur may be attributed to the higher population density of MMC area, which is almost 3-5 times greater than the other two cities.
### Table 2: Percentage of households who filed complaint at least once

<table>
<thead>
<tr>
<th>Aspect/City</th>
<th>Ajmer</th>
<th>Jhansi</th>
<th>Muzaffarpur</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of households filed complaints, at least once</td>
<td>% of households filed complaints, at least once</td>
<td>% of households filed complaints, at least once</td>
</tr>
<tr>
<td>Formal areas</td>
<td>6%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>Informal settlements</td>
<td>11%</td>
<td>3%</td>
<td>13%</td>
</tr>
</tbody>
</table>

*Source: Primary Survey by PRIA in 3 cities*

#### Grievance redressal

The primary surveys in these three cities revealed that the percentage of households making complaints related to solid waste management services is very low in formal as well as informal settlements. In Ajmer and Muzaffarpur, the percentage is higher in informal settlements, while in Jhansi, it is lower in informal settlements. The complaints in most of the cases were about street sweeping facility. The lower percentage of complaints may be attributed to many factors like:

i. Lack of a robust system of grievance redressal at ULB level with high response time

ii. Inconvenience caused while lodging the complaints

iii. Reasonable level of satisfaction in citizens

Among the above factors, first two seem to be more prevalent. The underlying reason behind the third factors may be their perception about sanitation that primarily seems to be limited to the visible cleanliness of neighbourhoods. The mode for making complaints for majority of the complains were through ward councillor.

#### 3.2.2 Status of infrastructure and human resources provisioning

##### Waste processing infrastructure

**Organic waste** - Among the three cities, except Ajmer, the other two cities have some kind of system in place for processing of organic waste. As per the SLB data of Jhansi Municipal Corporation, Jhansi is having treatment facility of approximately 500 MT/month\(^3\), which is sufficient to cater close to 15% of the estimated organic waste generated. Muzaffarpur initiated the project of decentralised solid waste management in 2016. In Muzaffarpur, composting facilities at two places has been set up having over 100 pits [5].

**Plastic waste** - Jhansi has accomplished significant work towards management of plastic waste by establishing plastic waste collection and processing facilities. In Muzaffarpur, segregated plastic waste is stored at composting centres and sent for processing periodically. In Ajmer, any organised initiative is yet to take place.

**Construction waste, e-waste and other special waste** - No organised system to handle construction waste, e-waste and other special types of waste was seen during the study in any of the three cities.

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\(^3\) Source: Service level benchmarking under 14th Finance Commission, 2018: Jhansi Nagar Nigam
Status of landfills:

Table 3: Major landfill sites in 3 cities

<table>
<thead>
<tr>
<th>City</th>
<th>Location of major landfill sites</th>
<th>Approx. areas of major landfill sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajmer</td>
<td>Makhupura, Nasirabad Road</td>
<td>280 acres (700 bigha)</td>
</tr>
<tr>
<td>Jhansi</td>
<td>Kallan Shah, Near Ras Bahar Colony and Panchwati</td>
<td>Kallan Shah, Near Ras Bahar Colony, Panchwati</td>
</tr>
<tr>
<td>Muzaffarpur</td>
<td>Rautiniya</td>
<td>22 acre</td>
</tr>
</tbody>
</table>

*Source: Municipal Corporation of respective cities, 2018*

All landfill sites in the three cities are open dumping grounds and not scientifically designed. Recently Jhansi Municipal Corporation has initiated efforts for scientific closure of the existing dumpsite at Masihaganj. The tender in this regard was issued in August 2018.

Human resources

The approximate total strength of sanitation staff in the three cities is given in Table 4 below:

Table 4: Human resources for solid waste management in 3 cities

<table>
<thead>
<tr>
<th>City</th>
<th>Health Officer</th>
<th>Chief Sanitary Inspector &amp; Sanitary Inspector</th>
<th>Jamadar</th>
<th>Sanitation workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajmer</td>
<td>1</td>
<td>7</td>
<td>66</td>
<td>1,527</td>
</tr>
<tr>
<td>Jhansi</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>49</td>
</tr>
<tr>
<td>Muzaffarpur</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>900</td>
</tr>
</tbody>
</table>

*Source: Municipal Corporation of respective cities, 2018*

*Note: The above-mentioned data highlights the approx. number of staff (permanent, contractual and outsourced) engaged in all sanitation services. A major part of staff is deployed for solid waste management activities in these three cities.*
Table 5 below depicts the approximate number of women in the sanitation staff in these cities. Numbers in brackets are percentage in the total staff of the particular type.

**Table 5: Women in workforce for solid waste management in 3 cities**

<table>
<thead>
<tr>
<th></th>
<th>Ajmer</th>
<th>Jhansi</th>
<th>Muzaffarpur</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health Officer</strong></td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td><strong>Chief Sanitary Inspector &amp; Sanitary Inspector</strong></td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td><strong>Jamadar</strong></td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>10 (20%)</td>
</tr>
<tr>
<td><strong>Sanitation workers</strong></td>
<td>581 (38%)</td>
<td>477 (39%)</td>
<td>225 (25%)</td>
</tr>
</tbody>
</table>

**Source:** Municipal Corporation of respective cities, 2018 and PRIA (2018), ‘Dusting the Dawn’

It is clear from the above data that a significant portion of frontline sanitation workers are women. However, their workplaces were not found to have adequate facilities for women workers. Other issues related to women sanitation workers emerged from PRIA’s engagement under the ECRC programme, are social security, employment benefits, working conditions, skill gaps, etc.

### 3.2.3 Status of engagement with key stakeholders

#### Informal economy of recyclables and rag pickers

Ajmer, Jhansi and Muzaffarpur, like most Indian cities, have various informal waste recycling traders (*kabadi wala*). As per rough estimates around 385, 900 and 200 waste-pickers are active in Ajmer, Jhansi and Muzaffarpur, respectively. In Jhansi, around 30 waste exchange centres (portable cabins) are placed at locations planned under plastic waste management programme to cover the complete municipal area. The idea is to provide centres that collect and store all kinds of plastic waste in an organised way and further send the same for processing at the plant [6]. Around 200 waste-pickers have been engaged in the collection of plastic waste in Jhansi. In Ajmer and Muzaffarpur, the ULBs are still to initiate significant efforts to organise waste-pickers or engage them in an improvised manner.

#### Citizen engagement and community participation

Out of the three cities under survey, Jhansi is having citizen groups, focusing on sanitation or waste management, named as *Swachh Vatavaran Protsahan Samitis* (see Box 1). Under the ECRC programme, PRIA facilitated formation of citizen groups focusing on sanitation in the three cities. **Citizen Forums** are multi-stakeholder groups consisting members of a variety of areas like RWAs, trade and market associations, voluntary youth groups, department heads and principals of universities/colleges, representatives of inner wheel/ lions club, members of CBOs/NGOs, waste collection/processing operators, professional groups, etc. **Settlement Improvements Committees (SICs)** aim at organising dwellers of informal settlements around the issue of sanitation with the leadership of youth and women. About 250 organisations of the
urban poor called Settlement Improvement Committees (SICs) with 3,210 members of SICs (with 53% women members) have been formed. City level Forums of SICs have also been created.

### 3.3 Good Practices and Stories of Change from Cities

**Box 1: Swachh Vatavaran Protsahan Samitis**

*Swachh Vatavaran Protsahan Samitis in Jhansi (Clean Atmosphere Promotion Committees):*

In 2017, the state government of Uttar Pradesh issued a notification on formation of Swachh Vatavaran Protsahan Samiti in each ward. Each committee has 7-15 members, from different domains of the society, e.g. senior citizens, women active in social works, senior sanitation workers etc. Major objectives of the committees include encouraging citizens for waste segregation, to supervise sanitation situation in ward, inducing behavioural change, providing inputs for ward level plans, etc. [7]. In Jhansi, these committees played an important role in improving the sanitation facilities. There were some concerns faced by these committees, but the initiative possesses potential of replication with some fine-tuning.

**Box 2: Underground bins in Ajmer with CSR funds**

*Underground bins in Ajmer with CSR funds:*

Jagriti Foundation, an Ajmer-based NGO, took an initiative to install improved community bins and revive the spots around it. For funding of initiatives in Ajmer, Jagriti Foundation mobilised funds from affluent individuals of the city. The bins were imported from Finland. The major storage portion of bin is in the form of a large bag that can be lifted when it is filled and the waste stored can directly be put into the waste transporting vehicle. The places selected to set up used to be very filthy places with open bins and spilled waste around it. As a part of initiative, clean platforms around the underground bin with chairs around have been constructed, to give a message that the waste storage places can also be pleasant and clean.

**Box 3: Decentralised waste processing facilities in Muzaffarpur**

*Decentralised waste processing facilities in Muzaffarpur*

‘Swachhta Swasthya Samridhi’, an initiative focusing on decentralised solid waste management was started in 2016 through a tripartite agreement at Muzaffarpur. It is supported by ITC Ltd under their CSR initiative called ‘Well-being out of Waste’. The Centre for Science and Environment (CSE) is also part of the initiative. Volunteers were deployed to educate residents on segregation of solid waste at source. Low-value plastics and multi-layered packaging waste is being collected at the processing facility located at MRDA. Two aerobic composting facilities have been developed at MRDA and Chandwara. All major cities of Bihar are expected to adopt the Muzaffarpur model of decentralised waste management[5].
4. Conclusion and Way Ahead

Need of greater emphasis on processing than on collection

It is evident from the analysis that door-to-door collection of waste is very good in most of the states and the three cities depict greater emphasis on improving collection and transportation of waste during the past few years. As per state-level data, 12 states and UTs out of total 35 covered under SBM (Urban) have all wards covered under 100% door-to-door collection. The status in the three cities shows that facility of waste collection is still to reach to all households in the cities.

Though rapid increase in the percentage of waste processed during past one year suggests improvement in waste processing, a dedicated focus on waste processing is required. This may be in the form of submission or state-level missions. A programmatic intervention is required to bring waste processing to the centre stage of sanitation policy.

Lack of segregation due to ineffective citizen engagement

Source segregation of waste is one area is clearly lagging behind. Since source segregation is directly linked with the behavioural change, engagement with citizens plays a very important role. Interaction with multi-stakeholder citizen forums under the ECRC programme suggests that behavioural changes through engagement are not sustainable in absence of appropriate mechanism of service delivery from the ULB side. For example, absence of waste transportation vehicles equipped to carry segregated waste and the staffs, which are not trained to collect segregated waste, is a strongly de-motivating point for the households segregating waste.

Community preparedness for decentralised systems

Decentralised systems are very useful especially for smaller cities in developing countries. Some of the good initiatives are already taking place in Muzaffarpur and Jhansi. However, they still remain ULB-driven and are struggling to win people participation, whereas a programme in the lines of ALM can enable citizens to take up processing of waste in their own premises or neighbourhoods. Nevertheless, for such a model, a two-way approach is required through CSOs. One is to train waste pickers (and sanitation workers) for collection of segregated waste and processing. Second would be making the citizen groups aware about their responsibility towards waste, benefits of decentralised processing and hand holding them in pursuing the initiatives. The citizens can be engaged and mobilised by forming groups like Settlement Improvement Committees (SIC) and Citizen Forums (CF) in a similar fashion of the EU-supported ECRC programme.

Building human capital for improved waste management

Human resources are the most critical elements of waste management system in cities that are often ignored. In Ajmer, Jhansi and Muzaffarpur, their expertise and perception of work is limited to collection and transportation of the waste with hardly any appreciation or knowledge of waste processing. There is a need to roll out a comprehensive capacity building of solid waste management staff in the ULBs. Issues specific to women sanitation workers need to be addressed with sensitivity on gender dimension at the workplace. These cities need to organise waste pickers and integrate them in the formal system in accordance with the Solid Waste Management Rules, 2016.

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4 Advance Local Area Management (ALM) program initiated by Brihanmumbai Municipal Corporation in 1997. Details at [8]
Waste reduction to be the priority

Waste reduction should be given more importance by monitoring and incentivising. The three-tier waste reduction strategy should be in place:

I. At individual household and premise level: reducing waste through change in lifestyle and home composting of organic waste

II. At ward level: reducing waste by undertaking decentralised processing

III. At city level: reducing waste to be landfilled by maximising city-level processing and sending waste for co-processing

Box 4: Citizen Action & monitoring tools for improved waste management

Citizen action and monitoring tools has been developed as an illustrative checklist of aspects, which are central to waste management and need to be monitored by citizen and citizen groups. These aspects are further grouped in 3:

(i) where citizen groups can initiate action in their own organisational capacity
(ii) where they can persuade/inform ULB for action
(iii) where they monitor and initiate action in their individual capacity

Such a monitoring and action tool, in the very first place, sensitises the citizen and group on having a holistic view on waste management, which includes the not-so-visible aspects for a common citizen like status of landfills.

The aspect of ‘reduction in waste reaching to landfill’ should be made one of the parameters to be monitored as a key component at the state and the national level. A massive awareness campaign is required to induce behavioural changes aiming at reducing waste through changes in lifestyle.

More action on EPR

For effective solution to waste management issues, the role of all stakeholders, especially in the industry is very critical. Plastic Waste Management Rules, 2016 clearly spell out the responsibilities of the producers, importers and other brand owners termed as Extended Producer Responsibilities (EPR). The producers’ responsibilities of collection of plastic waste created of their products should be implemented effectively [9].

The waste audits conducted in a few Indian cities demonstrate one of the ways to progress on handling plastic waste by engaging the industry [10]. Waste audits conducted in a participatory manner have a potential to bring a new dimension of looking towards plastic waste.

Effective planning and implementation of bans

Though plastic carry bags and some forms of plastics have been banned in most of states including Uttar Pradesh and Bihar, the implementation has been a matter of concern [11]. For an effective implementation, a ‘phased ban’ instead of a ‘blanket ban’ is needed. The whole ecosystem should be given time to get itself prepared for the alternatives. The processing arrangements are required to be in place so as to dispose of
the plastic gathered as a result of penal actions before banning. The industry should be encouraged to explore and use alternatives to plastics.

**Grievance redressal mechanism**

A robust grievance redressal mechanism is missing for solid waste management services in the cities. Since, it was observed in the three cities that ward councillors are the most opted option for registering grievances; the ward councillor should be integrated in such systems. A system with an app-based citizen interface and receiving interface for municipal councillors and officials should be developed with replicable features across cities.

**Box 5: Engaging elected representatives for efficient waste management services**

**Engaging elected representatives for efficient waste management services**

Under the ECRC programme, an orientation training module for elected representatives of ULBs have been developed. The module uses two specially designed modules—basic and advance, each of 3-4 hours duration. The pedagogy designed for councillors covers card-based games, participatory assessment of waste flow through diagram and group activity on planning for ward-level service delivery through citizen engagement. For rolling out the orientation training programmes, a cluster-based approach was adopted. The venue for ULBs falling in one district or division was kept at the district/division headquarters.

**Increased attention on old dump site remediation**

Out of the three study cities, Jhansi has initiated a scientific closure and bio-remediation of the existing landfill site. There are many examples of landfill recovery projects, with South Korea having some leading cases [12]. Tracking of such initiatives at the state and the Central level should be undertaken along with collection, segregation and processing after adding bio-remediation and scientific closure as an element in the Centre and state missions.

**Special waste and C&D waste still to get attention**

The need of managing special types of waste like sanitary pads and non-recyclable, non-plastic wastes are still to be acknowledged by the many mid and small-sized ULBs.

**Role of elected representatives**

Being the elected representative of people at the smallest electoral constituency of ward, councillors have a very important role to play in the delivery of civic services as well as motivating citizens’ actions and changing perceptions. They are an important link in the service provisioning chain and act as a bridge between the executive part of the local government and the people. Councillors are the most often used mode for resolving complaints in the three cities, especially for informal settlement dwellers. However, it was observed that their capacity in terms of technical know-how of sanitation systems, relevant laws and ways of community engagement is limited. A module-based capacity building programme using experiential learning and participatory pedagogy would be the way forward [13]. See Box 5.
Mobilising funds and pooling voluntary resources

Mobilising funds from voluntary sources and other non-conventional means like advertising and naming rights, etc., may be the way ahead for raising funds required to undertake waste management initiatives in cities. Ajmer has one of the examples of setting up community bins with CSR funds (see Box 2). Some of the areas where community resources can be utilised are community composting facilities, material recovery centres, increasing awareness on waste reduction etc.

A long-term vision of circular economy

In order to address waste-related issues with a long-term vision aiming widespread changes, changes in the economic landscape are necessary. These may cover national manufacturing policies, packaging industry regulations and industry-specific guidelines focusing on recycling etc. New business models in manufacturing capital goods as well as consumer goods are required with service orientation having a provision of taking back the goods after completion of product-life and using the recycled components in the production process.
5. References


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