Ministry of Housing and Urban Affairs
Government of India

स्वच्छ भारत
एक कदम स्वच्छता की ओर

TRANSFORMING URBAN LANDSCAPES OF INDIA

Success Stories in Solid Waste Management

SWACHH BHARAT MISSION (URBAN)

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BMC

PREFACE

Hon'ble Prime Minister of India, Shri. Narendra Modi launched the Swachh Bharat Mission on 2nd October 2014. The cleanliness mission was launched to fulfill two objectives

- Achieving an open defecation free India
- 100 % scientific management of solid waste

Right from its inception, the Swachh Bharat Mission has seen some very inspiring stories among cities, civil society organizations, large establishments and individuals. In our endeavor to bring inspiring stories to people, we are releasing the book, '**Transforming urban landscapes of India**', which focusses on the best practices followed by cities in the area of Solid waste management. In our first series, we have covered 9 cities in three population categories, namely, Less than 5 Lakh, 5 to 15 Lakhs and more than 15 Lakhs.

In the first population category, Ambikapur, Durg and Leh have been selected. Ambikapur does not only segregate the waste at source but has also set up secondary and tertiary segregation centers, which segregate dry waste in 158 categories. Durg is one of the few zero landfill cities of the country. Beating the altitude and weather, Leh has recently set up the first waste segregation center of the town.

In the second population category, Mysuru, Navi Mumbai and Visakhapatnam have been selected. Mysuru has set up zero garbage centers, which cater to half of the total waste generated by the city. Through an aggressive behaviour change campaign, Navi Mumbai has ensured segregation of waste at source in 85% of its households and commercial establishments. Visakhapatnam has successfully eliminated 221 garbage vulnerable points of the city.

In the third population category, Bengaluru, Indore and Pune have been selected. Bengaluru has set up a strong system backed by technology to address the problem of waste generated by bulk waste generators. Indore through its successful behaviour change campaign has ensured segregation of waste at source in 100% of its households. Pune Municipal Corporation has effectively and formally engaged 2900 rag pickers in the main system, thereby providing an alternate source of livelihood to them.

We are sure, there are more such stories which need to be brought forward, due to which, Transforming urban landscapes of India will be a continuous series from the Ministry of Housing and Urban Affairs. The series in its next edition will cover more cities to enable emulation of these good practices all over the country.

We hope this book will not just bring laurels to these lighthouse cities but will also be a guiding document for others to follow.

FOREWORD

HARDEEP S. PURI
Hon'ble Minister of State (Independent Charge),
Ministry of Housing & Urban Affairs

The Swachh Bharat Mission, which aims to make India a clean nation by October 2019, is now well on its way to achieve its intended objective.

Right from the inception of the mission, it has seen some exemplary stories of inspiration from all over the country. The increased participation from citizens, be it as part of thematic drives, or voluntary 'swachhata' activities from inspired individuals and organizations, is slowly but surely pushing the Mission towards becoming a 'people's movement. In the quest to score maximum on the Swachhata parameters, the ULBs have also not left any stone unturned. The above collaboration has resulted in formation of many best practices across the country. To highlight these practices, my ministry is releasing a book titled '**Transforming urban landscapes of India**'.

Further, for Swachh Bharat Mission to be a continuing success, solid waste management will have to be one of the major focus areas for us. It is important that we look at waste as a resource and not as garbage that should be discarded at the landfill site. Overflowing landfill sites are leading to air, land and water pollution in addition to loss of valuable wealth that could have been extracted from the waste.

Taking this motto forward, some Indian cities have done exceptional work in revolutionizing the management of solid waste. Hence, the first edition of this book focusses on best practices in solid waste management.

I hope this book will serve as a guiding document for all cities and our country will continue to see many more best practices.

FOREWORD

DURGA SHANKER MISHRA
Secretary, Ministry of Housing & Urban Affairs

With Swachh Bharat Mission having completed a journey of 3 years, it becomes imperative for us to expedite efforts towards making our urban areas clean, healthy and liveable. Under the Mission, substantial progress has been made, especially when it comes to making our cities open defecation free. Nonetheless, public perception continues to be slightly skeptical, given that our urban public places continue to suffer from littering and dumping.

However, there are some ULBs which have done exemplary work in managing the solid waste of their cities. In our attempt to collate and put forward these successful stories in front of the citizens of India, the Ministry of Housing and Urban Affairs is releasing the book '**Transforming urban landscapes of India**'. The book in its current edition will focus on the torch bearers of effective solid waste management. The cities chosen for this edition are Ambikapur, Durg, Leh, Mysuru, Navi Mumbai, Visakhapatnam, Bengaluru, Indore and Pune.

Transforming urban landscapes of India will be a continuous series from the Ministry of Housing and Urban Affairs focusing on best practices in several areas of Swachh Bharat Mission. I am hopeful that this book will be a guiding factor for all cities that will attempt to follow some models of effective management of solid waste.

ACKNOWLEDGEMENT

'**Transforming urban landscapes of India**' is an attempt to highlight success stories in solid waste management that have emerged during the course of Swachh Bharat Mission (Urban). The book is a result of concerted effort put in by my team with support from various stakeholders of the mission. I would like to express my gratitude for the support extended by the following officers:

- Dr. Lav Kush Singhrol, Commissioner, Ambikapur Municipal Corporation
- Manjunatha Prasad, Commissioner, Bruhat Bengaluru Mahanagara Palike
- Sudesh Kumar Sundrani, Commissioner, Durg Municipal Corporation
- Manish Singh, Commissioner, Indore Municipal Corporation
- Avny Lavasa, Deputy Commissioner, Leh
- G Jagadeesha, Deputy Commissioner Commissioner, Mysuru City Corporation
- Dr. N. Ramaswami, Commissioner, Navi Mumbai Municipal Corporation
- Kunal Kumar, Commissioner, Pune Municipal Corporation
- M Hari Narayanan, Commissioner, Greater Visakhapatnam Municipal Corporation

This book would not have been possible without the talented and dedicated teams of the respective Urban Local Bodies. I would like to thank them for their contribution to the book.

Name	City	Designation
Nitesh Sharma	Ambikapur	Member, State PMU
Dr. Sandhya	Bengaluru	MOH, Yelahanka Zone
N S Ramakanth	Bengaluru	Member, SWMRT
Amit Dubey	Indore	Member, City PIU
Rigzin Spalgon	Leh	Administrator, Municipal Committee
Tsering Paldan	Leh	ACD
Dr. D.G Nagaraju	Mysuru	Health Officer, City Corporation
Dr. K.S. Nagapathi	Mysuru	SWM Consultant
Harisha M.R.	Mysuru	Plant Manager, IL&FS
Suresh Jagtap	Pune	Joint Municipal Commissioner
Harshad Barde	Pune	Member, SWaCH
Shivani Naik	Navi Member	Member, City PIU
Dr. A. Hemant	Visakhapatnam	CMO

V. K. Jindal

VINOD KUMAR JINDAL

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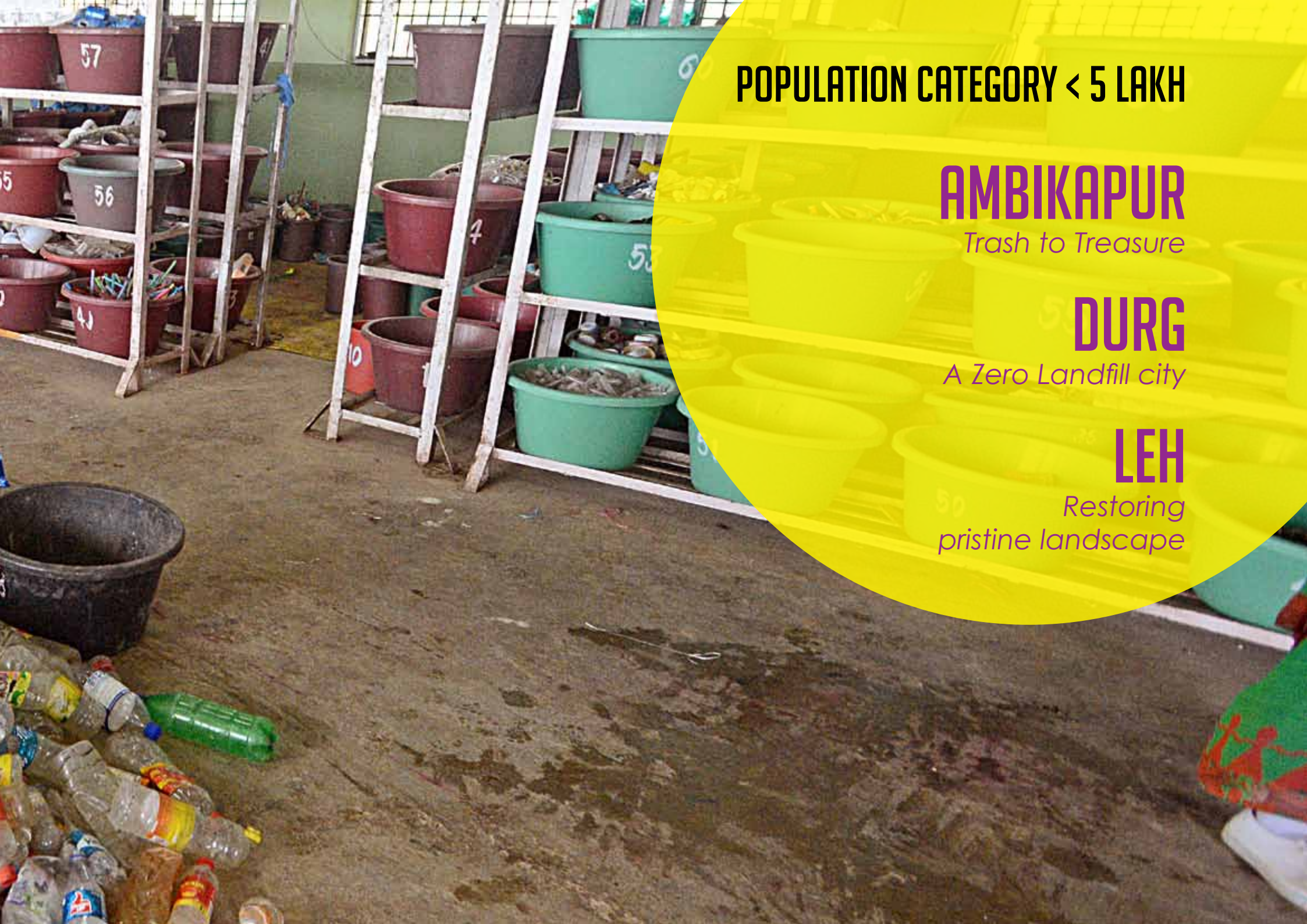


POPULATION CATEGORY < 5 LAKH

AMBIKAPUR

Trash to Treasure

DURG

A Zero Landfill city

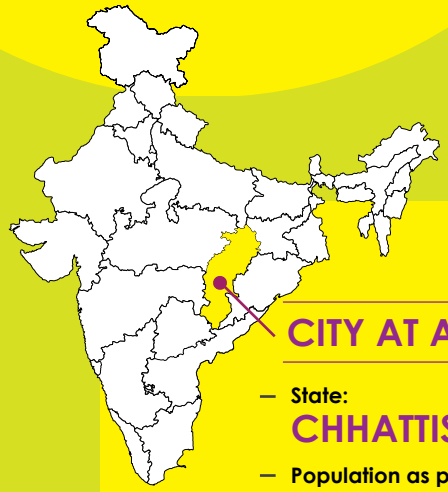
LEH

Restoring pristine landscape

AMBIKAPUR

Trash to Treasure

Ambikapur is a small town set in the northern hills of Chhattisgarh. It is the headquarters of the district Sarguja. Ambikapur town has a large number of settlers, mostly traders coming from various States. The municipal area of the city is divided into 48 wards.



CITY AT A GLANCE

- State:
  CHHATTISGARH
- Population as per Census 2011:
  1,21,071
- Size:
  40 SQ. KM
- Number of Households:
  24,080
- Waste Generation/ day:
  51 MT
- Segregation Level:
  100% HOUSEHOLDS

Waste in Ambikapur is collected and transported in segregated e-rickshaws

An e-rickshaw parked outside an SLRM center

BACKGROUND

This case study of effective management of solid waste covers Ambikapur's journey to becoming a landfill free city. The model adopted by Ambikapur is of scientific, sustainable and cost effective nature. Through sustained efforts the city is now successfully converting its trash to treasure. The SLRM model has also generated hundreds of green jobs without putting a financial burden on the state treasury.

Ambikapur's SLRM model is an excellent example of how we can protect our environment and generate livelihood opportunities with proper management and efficient use of resources.

Ambikapur, like any other town in India faced the challenge of proper segregation, collection and disposal of solid waste. Waste disposal largely meant dumping waste on land, occasionally, the waste was also burnt on streets, either way, creating major environmental hazard.

Ambikapur has become a role model for all the urban local bodies (ULBs) in Chhattisgarh for its successful solid liquid resource management (SLRM). The landscape of the city has changed drastically in the last three years after the implementation of the project due to combined efforts from the government and the residents. The city has successfully become one of the few landfill free cities of India. Through the SLRM model, the city has also generated livelihood opportunities for 623 members of Self- help groups. Through sustained efforts, Ambikapur has now achieved 100% segregation of waste at source.

HIGHLIGHTS OF THE MODEL

623 women
SHG members comprising 500 workers and 123 supervisors have been involved in the process

15 Day training programme
The SHG members were imparted a 15-day SLRM Master Trainers' Training Programme (MTTP) before execution of the waste management project

48 wards
of Ambikapur city are divided into 17 modules, each comprising 600 households and a few commercial establishments

17 SLRM
centers have been established in the city

156 Categories
A tertiary waste segregation center has also been set up which further segregates the waste into 156 categories

1 Treasury
Make-shift warehouses, called as the treasury, has also been set up to sell recyclables

SHG workers outside the Tertiary segregation center in Ambikapur

SHG workers facilitating door to door collection process of waste

DOOR TO DOOR COLLECTION

- The waste is collected in uniformly designed e-rickshaws
- Each rickshaw has two compartments for storage of dry and wet waste separately
- The principle for D2D collection is not to wait for a full-load to pile up, but to collect the 'resource' before it degenerates into 'waste'
- Every day, two calls are made at every door for waste collection

SOLID AND LIQUID MANAGEMENT CENTER

- There are 17 SLRM centers in the city with standardized design to ensure uniformity
- Each center is built on an area of 4000-5000 sq mt.
- One SLRM center is allotted 2 e-rickshaws to collect waste from around 600 household
- At the SLRM sheds, recyclable, organic and non-recyclable items are packed separately after segregation.

SHG workers at a SLRM center

TERTIARY SEGREGATION CENTER

- From the SLRM center the recyclable waste is taken to a Tertiary segregation center where it is further classified
- At this center, the waste is further classified into 156 categories
- Organic waste like leftovers are fed to cattle, ducks and hens at the center while other remains are used in bio gas digester or are composted

SHG workers segregate waste in 156 categories at the Tertiary segregation center of the city

TREASURY AND SELLING OF WASTE

- The various resources recovered by the SLRM Centers and the Tertiary segregation center are deposited in a make-shift warehouse, called as the 'Treasury'
- Periodically, when the resource has grown into a substantial volume, it is sold off through a transparent process
- Each worker receives a share of the revenue according to its contribution to the resource quantity that was sold.

Treasury- A make shift warehouse for sale of recovered recyclables

SHG workers at the Tertiary segregation center

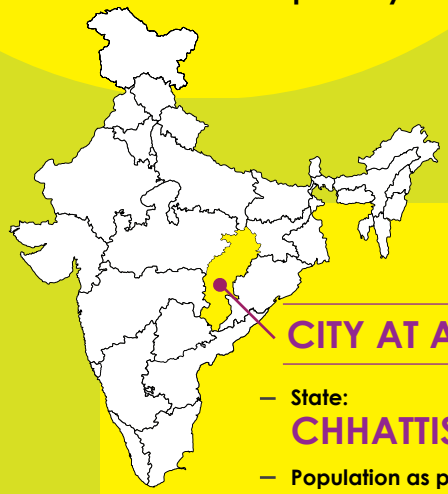
LEARNINGS

- Through sustained efforts, the city has become free of dustbins, dumping yards and landfills.
- The Municipal Corporation has achieved success in collecting user fees from 100% households and commercial spaces by delivering services of excellent quality
- AMC has also successfully reduced its cost of land acquisition by reclaiming encroached land worth Rs 25 Cr.
- As a result of segregation at source, the corporation has earned Rs. 84.81 Lakhs from sale of recycled waste
- The SLRM model has also generated 623 green jobs without putting a financial burden on the state treasury.
- Two sources of income for SHG members. In addition to Rs. 5000 paid by AMC, the SHG members also get the money from the sale of recyclables
- As a result of decentralizing the waste management process, the transportation cost has gone down to Rs. 2.1 Lakhs (Oct 2017) from Rs. 7.32 Lakhs (June 2015)

DURG

A Zero Landfill city

Durg is a major city of Chhattisgarh state, east of the Seonath River and is part of the Durg-Bhilai urban agglomeration. It is the headquarters of Durg District. The total municipal waste generated from households and commercial establishments in Durg is estimated to be at 110 MT per day.



CITY AT A GLANCE

- State:
  CHHATTISGARH
- Population as per Census 2011:
  2,68,000
- Size:
  182 Sq. Km
- Waste Generation/ day:
  110 MT
- Segregation Level:
  100% Households

A zero waste SLRM center in Durg

SHG Workers segregating dry waste at a segregation center in Durg

BACKGROUND

This case study covers Durg's journey to becoming a city free of landfill. After exploring several options, the Nagar Palika Nigam, Durg, decided to enforce segregation of waste at source. The Durg model of waste management has not only made the city a zero waste city but has also given the members of SHGs an opportunity to earn additional income

Like many cities in India, Durg was also struggling with improper management of waste. The city was generating close to 110 MT of waste but was unable to carry on proper collection and processing. Durg faced the challenge of proper segregation, collection and disposal of this waste. The municipality was also not able to charge user fees from the residents as the services of door to door collection provided by the Corporation were not regular. Another problem area was large quantities of waste generated by the bulk waste generators, which was getting difficult for the Corporation to manage.

The Corporation explored several options, but ultimately realized that segregation of waste at source is the key to effective management of solid waste. Therefore the corporation decided to do massive awareness campaign for propagating segregation of waste at source. To ensure this, the Corporation also built necessary infrastructure.

HIGHLIGHTS OF THE MODEL

600 SHG Members
are engaged in the collection and processing process of solid waste in Durg

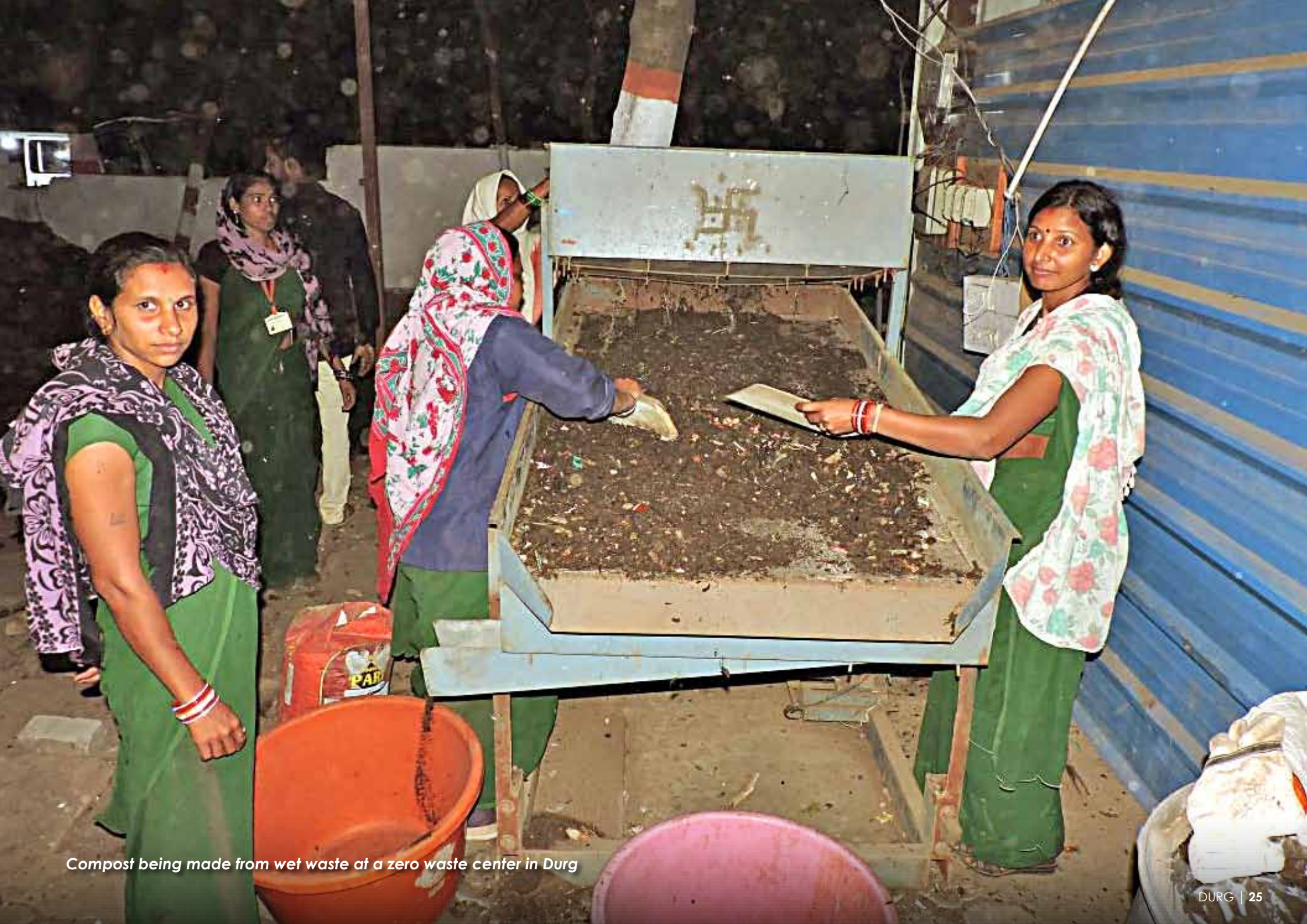
346 Cycle Rickshaws
and 40 Auto rickshaws have been deployed by the Nigam for door to door collection service.

200 Households
are covered by each rickshaw in a day

10 SLRM Centers
cater to the waste brought in by all vehicles. Wet waste is composted and dry waste is further segregated into various components here.

10 Compost and recyclable sale counters
situated outside all SLRM centers. The SHG members keep the money earned from the sale of compost and recyclables

SHG workers collecting waste from households in a segregated vehicle



Compost being made from wet waste at a zero waste center in Durg

DOOR TO DOOR COLLECTION

- Municipal Corporation Durg covers 100% households with the door to door collection service
- They have deployed 346 cycle rickshaws for D2D collection service. In faraway colonies, the corporation gives the service of D2D collection of waste in 40 auto rickshaws
- Each rickshaw covers around 200 households per day
- The auto and cycle rickshaws are either compartmentalized or have two separate bins painted Blue and Green for collection and transportation of segregated waste.
- ULB collects INR 300 from households and between INR 3000 to 12000 from Bulk waste generators as user fees

SHG workers carrying on door to door collection of waste in the city

SHG member facilitating door to door collection process in segregated cycle rickshaws

SOLID AND LIQUID MANAGEMENT CENTER

- The Municipal Corporation of Durg has set up 10 Solid and Liquid Resource Management centers across the city to cater to the waste produced
- As maximum households treat their wet waste at home, the SLRM centers get very less quantity of wet waste. Of the total wet waste received, each center feeds a part of it to the cattle in nearby areas and the remaining is composted in the pits present at each center
- The dry waste received is further segregated into multiple fractions and then sold to recyclers

RECYCLABLE AND COMPOST SALE CENTERS

- Each SLRM center has sale counters situated right outside the center. The two separate counters sell compost and recyclables
- Compost is generally purchased by farmers at approximately INR 3-4 per kg
- Money from compost and dry waste sale is collected by SHG members

Compost manufactured, is packaged and sold outside the segregation center

Through sustained efforts, the city has achieved segregation in 100% households

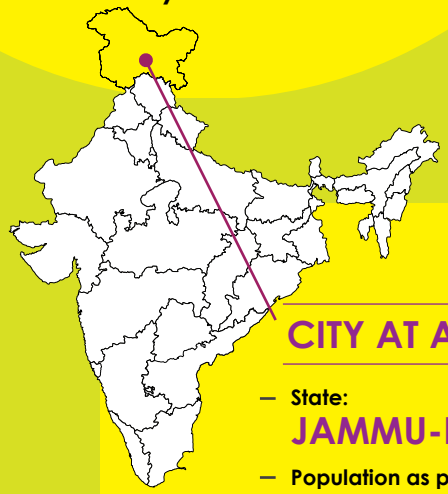
LEARNINGS

- Through sustained and holistic efforts, the city has become free of dustbins, dump yards and landfills
- Nagar Nigam has achieved success in collecting user fees from 100% households and commercial spaces by delivering services of excellent quality
- Through aggressive IEC campaign, majority of households in the city have started composting waste within the premises
- The current model of waste management by Durg has created 600 Green jobs in the city
- The corporation's expenses have also reduced to 51.5 Lakhs from 110.2 Lakhs in the span of 3 years
- It is essential for the corporation to get in place all infrastructure before enforcing segregation of waste.

LEH

Restoring pristine landscape

Leh district has a population of 1.33 lakh (2011 Census). The district is famous for its rich culture and heritage, along with its scenic beauty. It is popularly known as land of monks and monasteries. Ladakh's most celebrated town, Leh, also draws multitudes of visitors from across the country and the world.



CITY AT A GLANCE

- State:
  JAMMU-KASHMIR
- Population as per Census 2011:
  30,870
- Size:
  9 SQ. KM
- Waste Generation/ day:
  4 MT
- Segregation Level:
  35% Households

Leh's first segregation center operational in Choglamsar

At the segregation center, the dry waste is further segregated into 15-16 categories

BACKGROUND

The district of Leh has begun a waste revolution to cater to the problem of improper solid waste management. The administration of Leh, has successfully started a pilot project, namely, 'Tsangda' (meaning cleanliness in Ladakhi language), with the purpose of segregation of solid waste at primary & secondary levels.

The objective of this initiative is also to reduce generation of waste and reuse as much as possible.

The first pilot center for the above campaign was established in Choglamsar in December 2017.

As a part of the above campaign, the administration of Leh has started door to door collection of segregated waste, set up a sorting center and is also looking after reuse, processing and disposal of the collected waste.

Leh town has a population of 31,000 and like any other growing towns of the country, it is facing challenges of rapid urbanization. Ladakh's most celebrated town, Leh, draws multitudes of visitors from across the country and the world, who are eager to experience its inimitable culture and breathtaking mountainous landscape. Over last 10 years, Leh has seen an exponential rise in its tourists, the number has risen from 30,000 to 2.7 Lakhs per year.

HIGHLIGHTS OF THE MODEL

Project Tsangda
has been launched in the district to improve its waste management scenario

D2D Collection of waste
of segregated waste in all households

Segregation Center
The first pilot center for the above campaign was established in Choglamsar in December 2017

Secondary Segregation
At the segregation center, dry waste is further segregated into 15 categories

Dry Waste
Dry waste is sold to scrap dealers, NGOs, and the Rural development department

Wet waste
Wet waste is fed to cattle in nearby villages

Door to door collection of segregated vehicles in Leh

Vehicle off loading dry waste at the collection center

DOOR TO DOOR COLLECTION

- The door to door collection of segregated waste has also been initiated by the authorities from 400 households and commercial establishments
- The administration distributed blue and green coloured bins to households and commercial establishments and conducted intensive awareness and training programme to facilitate segregation at source
- The officers accompany the waste collection vehicles to strictly enforce segregation of waste
- Those not segregating waste, have been identified and retrained. There is also a provision for imposing monetary penalty on the defaulters

Door to door collection of waste in commercial areas

A segregation center in Leh

SOLID AND LIQUID MANAGEMENT CENTER

- Battling with difficult terrain and harsh climate, the administration has set up a segregation center in Choglamsar village that is part of the urban sprawl of Leh
- At the center, the waste is further segregated into 15 categories
- Due to extreme winter weather, the consumption of wet waste in the town is very less, whatever little is produced is fed to the cattle in nearby villages
- Along with the employees, the center also invites local volunteers to participate
- Due to extremely cold weather, the administration has provided heating facilities in the center

S. NO.	CATEGORY	PURCHASED BY	USE	RESALE PRICE
1	Card board	NGO- Pagir	Recycled products	Rs 3/ Kg
2	Paper	NGO- Pagir & scrap dealers	Recycled products	Rs 2/ Kg
3	Polythene (Plain)	Rural Development dept.	As construction material	
4	Printed Polythene	Rural Development dept.	As construction material	
5	Metal coated polythene	Rural Development dept.	As construction material	
6	Plastic Bottles	Scrap dealers		Rs 3/ Kg
7	Mineral water bottles	Scrap dealers		Rs 4/ Kg
8	Glass Bottles	Rural Development dept.	As construction material	
9	Bone China	Rural Development dept.	As construction material	
10	Tins	Scrap dealers		Rs 9/ Kg
11	Thermacol	Rural Development dept.	As construction material for insulation	
12	Synthetics	To be determined		
13	Batteries	To be determined		
14	Cotton Cloth	NGO- Pagir	Recycled products	Rs 4/ Kg
15	Plastic	Scrap dealers		Rs 4/ Kg

Volunteers being educated on the importance of segregation of waste

Volunteers being educated on the importance of segregation of waste

LEARNINGS

The administration of Leh with people's support, has successfully started a pilot project with the purpose of segregation of solid waste at primary & secondary levels

The objective of this project is not just effective segregation of waste but is also to ensure the enforcement of 3R principle (Resue, Reduce & Recycle)

After a month of sustained efforts and operations, the centre has collected 1660 kg of dry waste which has been segregated into 15 categories, out of 1660 kg, 170 kg has been sold to scrap dealers, approximately, 800 kg has been sold at a subsidized rate to an NGO, Pagir

The future plan under the project, is to extend Project Tsangda to the Nubra valley, and subsequently to other parts of Leh district with the objective of leading the way and making the highest district of the country the cleanest one as well

POPULATION CATEGORY 5-15 LAKH

MYSURU

Pioneering Zero Garbage Centers

NAVI MUMBAI

Har Din, Do Bin

VISAKHAPATNAM

Technology enabled elimination of garbage vulnerable points

MYSURU

Pioneering Zero Garbage Centers

The historic settlement of Mysuru, is one of south India's most enchanting cities, famed for its glittering royal heritage and magnificent monuments and buildings. Mysuru is noted for its heritage structures and palaces, including the Mysuru Palace, and for the festivities that take place during the Dasara festival when the city receives a large number of tourists from around the world.

CITY AT A GLANCE

- State:
  KARNATAKA
- Population as per Census 2011:
  9,14,919
- Size:
  129 SQ. KM
- Number of Households:
  2,06,372
- Waste Generation/ day:
  400 MT
- Segregation Level:
  80% HOUSEHOLDS

A zero waste management unit in Mysuru

An employee of MCC segregating dry waste into further categories

BACKGROUND

The city of Mysuru has been covered in this book for being one of the pioneering cities in providing sustainable solutions for waste management.

The corporation has set up 9 Zero waste management units and 47 material recovery facilities in the city, which cater to 200 MT of waste generated, whereas the remaining 200 MT goes to a centralized waste treatment facility, which has a waste to compost plant for treating wet waste and a material recovery facility for recovery of recyclables.

With rapid urbanization and increase in tourism, Mysuru witnessed a surge in consumption which led to improper management of solid waste. From 280 MT per day a decade ago, the waste generation has now increased to 400 MT a day. The city had set up a waste to compost facility, way back in 2001, but the plant was not receiving segregated waste then. Unsegregated waste at source resulted in higher costs and inferior quality compost. To combat this problem, Mysuru started the campaign to segregate waste at source in a big way. This campaign also resulted in formation of Zero waste management units and Material recovery facilities in the city.

HIGHLIGHTS OF THE MODEL

User Fees
MCC charges solid waste management cess, alongside property tax from the residents of the city

D2D Collection of waste
The Corporation's D2D collection services currently cover 100 % wards

Segregation
The city has achieved segregation at source in over 80% households

Pourakarmikas
MCC currently has 2211 employees engaged in the process of waste management

Zero waste management unit
MCC has set up 9 such units catering to 30 wards and managing 50% of the total waste generated

Centralized treatment facility
MCC has set up a centralized W2C plant to cater to the remaining 50% waste generated

MCC employees working a zero waste management unit in Mysuru

Employees segregating dry waste at a zero waste management unit

A ZERO WASTE MANAGEMENT UNIT IN MYSURU

There are 9 Zero waste management units in Mysuru, which together manage 50% (200 MT) of the waste generated in the city

All centers have been set up by the City Corporation, but are operated by regional RWAs, NGOs, Colleges etc.

EACH ZERO WASTE MANAGEMENT UNIT CATERS TO 3-4 WARDS AND 10,000 HOUSEHOLDS (APPROX.)

CARRIES OUT activities of D2D collection, composting and segregation

RECEIVES
18-20 MT of waste daily

EMPLOYS
55-60 Pourakarmikas

GENERATES
an additional revenue of INR 30,000-35,000 for the workers

PRODUCES
65-66 MT of compost, and gives it for free to farmers

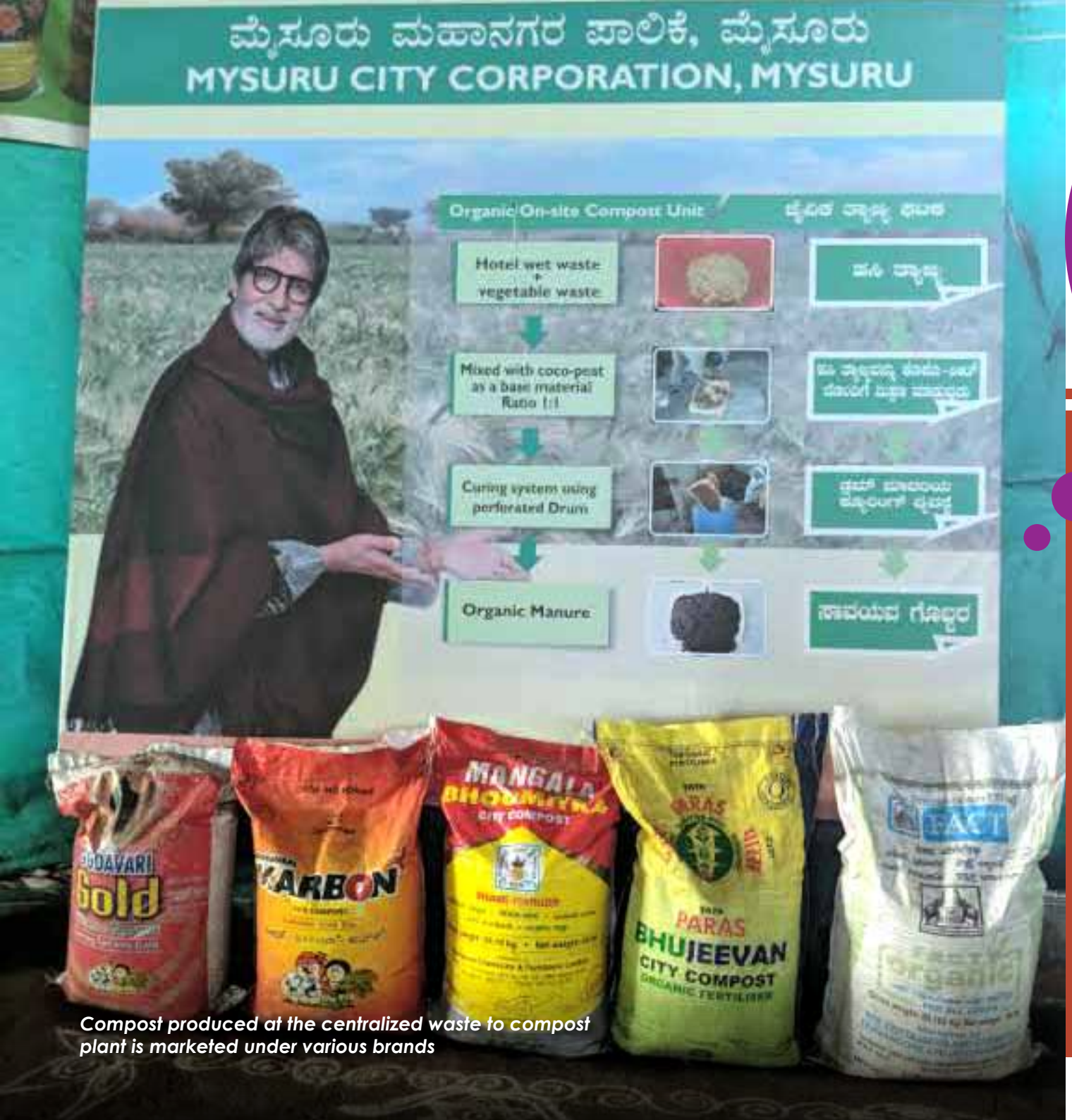
SEGREGATES
dry waste into 25-27 categories

CATERS TO
3-4 Wards or 10,000 households

NON-BIO-DEGRADABLE ITEMS

Items	Rs. per kg
Beer Bottle	2.00
Plastic Bags	3.00
Bulbs	3.00
Milk Cover	16.00
Oil Cover	8.00
Glass Pieces	1.00
Footwear	2.00
White plastic Pieces	22.00
Block Plastic Pieces	3.00
Mixed Plastic Pieces	18.00
Tablet Strips	3.00
Toothpaste Strips	3.00
Hard Silver	22.00
Plastic Silver	10.00
Paste Silver	10.00
Cardboard	8.00
Waste Paper	3.00
Tins	8.00
Iron Pieces	13.00
Rubber, Tyre & Tubes	5.00
Metal Bottle Cap	10.00
Plastic Bottle Cap	2.00
Road Waste	2.00
Cooker Waste	3.00
E-Waste	10.00
Wires	6.00

Various categories in which th waste is segregated at the Zero waste management center



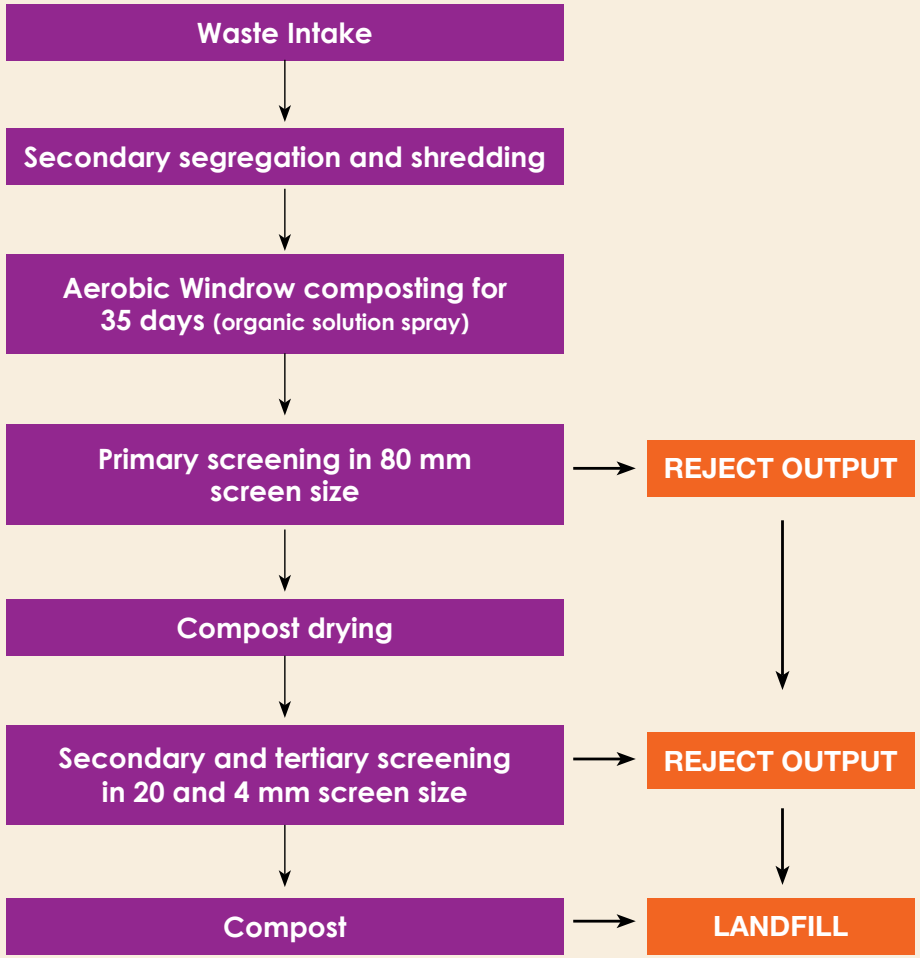
Compost produced at the centralized waste to compost plant is marketed under various brands

CENTRALIZED COMPOSTING FACILITY IN MYSURU

Mysuru City Corporation has set up a Waste to Compost plant on PPP basis with IL&FS. The plant has been running successfully since 2001.

- The plant is spread out in the land area of 12.9 acres. The company gives MCC land lease rent at Rs. 4.20 Lakhs/annum
- The plant is currently running to its full capacity and managing 50% of waste (200 MT) generated in the city
- 45-50 MT of organic compost is produced daily through windrow composting method
- For selling compost, IL&FS has tied up with companies like, Coromandel, Zuari, SPIC, KRIBHCO, and sells compost at a price of INR 2500- 3000/ MT
- The company also provides compost to Raitu Sampark Kendras at a price of INR 1600/ MT

COMPOSTING PROCESS AT CENTRALIZED COMPOSTING PLANT



Compost manufactured at the central facility

Composting in place at the Zero waste management unit

LEARNINGS

- When Mysuru was treating its waste centrally it was incurring very high transportation cost and waste collected was not segregated
- With the cooperation of its citizens, the city is successfully running 9 Zero Waste Units
- Through the current model of waste management, MCC has saved INR 14-15 Cr per annum.
- The current model of participation has also assisted the corporation in finding out alternate sources of income for member of SHGs
- Through active people participation, the corporation aims to have 100% segregation by December 2018

NAVI MUMBAI

HAR DIN DO BIN

Navi Mumbai is a beautiful city in Thane district to the Northeast of Mumbai. It was founded in 1971 as a satellite township. The city of Navi Mumbai, also known as the City of the 21st Century is a well-planned township of Mumbai off the west coast of the Indian state of Maharashtra from the Konkan division.

CITY AT A GLANCE

- State:
  MAHARASHTRA
- Population as per Census 2011:
  11,20,547
- Size:
  109 SQ. KM
- Number of Households:
  2,55,737
- Waste Generation/ day:
  720 MT
- Segregation Level:
  85% HOUSEHOLDS

A wall painting promoting segregation of waste at source in Navi Mumbai

Various equipment for compostin at household level on display

BACKGROUND

In Swachh Survekshan 2017, the city of Navi Mumbai was the 8th cleanest city in India. The city currently has segregation of waste in around 85% households. The corporation did not only start a massive IEC campaign, it also ensured to provide all necessary infrastructure required for effective segregation process.

Like any other Indian city, Navi Mumbai also faced the mammoth challenge of solid waste management. Prior to October 2015, the city did not have the city did not have full coverage of door to door collection of waste, which resulted in incessant dumping of solid waste on the streets of the city. Though the corporation had set up a waste to compost plant but it wasn't receiving segregated wet waste as there was no practice of segregation at source which was prevailing in the city.

Further, there was lack of awareness among the residents of the city. Therefore, to change their score on the Swachhata parameters, Navi Mumbai did not just have to focus on building the necessary infrastructure but also on bringing about on ground behaviour change, both of the residents and municipal employees, who were providing the above services.

HIGHLIGHTS OF THE MODEL

Creating awareness among cities

NMMC has undertaken massive IEC campaign to educate citizens

Educating municipal workers

Municipal employees who were providing the services of D2D collection were also educated

Availability of necessary infrastructure

Necessary infrastructure such as segregated dustbins, segregated auto tippers, etc was made available

Promoting in situ treatment of wet waste

NMMC motivated BWGs, housing societies etc to start on site treatment of waste

Strict enforcement and monitoring

The teams comprising NMMC officials and volunteers strictly supervised the D2D collection process of segregated waste

Sustainability

The corporation is taking all measures to ensure sustainability of this initiative

Volunteers education children through puppet shows on importance of segregation of waste at source

Volunteers assembled before the walkathon organized to spread the message of swachhata

COLLABORATIVE COMMUNITY EFFORT FOR SWACHH NAVI MUMBAI

- The citizens were motivated with several IEC activities
- Rallies, Walkathons, Competitions, Demonstrations, Puppet Shows and Plays were conducted
- A massive Walkathon with more than 40,000 students which is also registered in Limca Book of Records was also organized
- A bike rally registered as a Guinness World Record for the largest bike rally in the world with more than 1525 participants was also organized
- NMMC encouraged 4.5 lakh school and college students to act as 'Swachhata Soldiers' and create awareness

Painting competition organized for school kids by NMMC

A wall painting promoting segregation of waste at source

TOTAL PREPAREDNESS FOR SEGREGATION AT SOURCE

- Trainings were imparted to the municipal staff responsible for D2D collection of waste
- Elected members of the corporation were also given training so that they could implement segregation and composting in their Wards
- Aggressive IEC activities coupled with stringent law enforcements like not lifting unsegregated garbage from societies, hotels, etc. and imposing strict fines on repetitive offenders
- The corporation also installed segregated public and community bins on roads

IN-SITU TREATMENT OF ORGANIC WASTE

- As part of the composting at home campaign, NMMC motivated people to compost at home and also promoted innovative and affordable methods
- The various method of composting encouraged by NMMC were
  - Compost Basket / Bin at household level
  - Drum for medium scale establishments
  - Compost pits and OWCs for BWGs
- To lead by example, 500 NMMC employees have started composting at home using compost baskets

Volunteers demonstrating drum composting in the city

School children attending an event organized by NMMC

LEARNINGS

- With the help of a collaborative approach adopted by the city, the segregation percentage has reached 85% from 55%
- It is extremely important to provide the necessary infrastructure to public before expecting them to change their already established behaviour
- Any significant behaviour change is a slow process and takes it own time to happen
- At the time of running an IEC campaign for segregation of waste, NMMC also started the campaign for on site treatment of wet waste
- NMMC establishments use innovative methods of composting
- NMMC has created composting facilities for more than 54 corporation gardens and 55 municipal schools

VISAKHAPATNAM

Technology enabled elimination of garbage vulnerable points

Visakhapatnam is a coastal, port city, often called 'The Jewel of the East Coast'. Situated in the state of Andhra Pradesh, located on the eastern shore of India, nestled among the hills of the Eastern Ghats and facing the Bay of Bengal to the east. It is the administrative headquarters of Visakhapatnam District and is also home of the Eastern Naval Command of the Indian Navy.

CITY AT A GLANCE

- State:
  ANDHRA PRADESH
- Population as per Census 2011:
  9,77,771
- Size:
  550 SQ. KM
- Number of Households:
  2,48,162
- Waste Generation/ day:
  1000 MT
- Segregation Level:
  55% HOUSEHOLDS

Elimination and beautification of a GVP by GVMC

RWA in visakhapatnam has successfully eliminated a GVP with the help of GVMC

BACKGROUND

The city of Visakhapatnam has successfully eliminated 221 Garbage Vulnerable Points (GVP) in the city.

To eliminate GVPs from Visakhapatnam, GVMC started with provision of 100% door to door waste collection service to avoid creation of new GVPs and the city administration took it upon itself to eliminate all the existing GVPs in the city.

Earlier, due to inefficient segregation at source and lesser coverage of door to door to collection services, the city was experiencing open disposal of garbage. These points, also known as garbage vulnerable points or black spots are areas in the neighborhood where unofficial or indiscriminate dumping of garbage takes place. In Visakhapatnam, GVPs earlier have caused pollution of surface and of ground water, present unsightly appearance along with posing threat to the health of humans, wildlife and environment. Keeping in view the various consequences arising from GVPs and also to uplift the sanitation standards, municipal bodies have begun to take a closer look at this unacceptable disposal practice.

HIGHLIGHTS OF THE MODEL

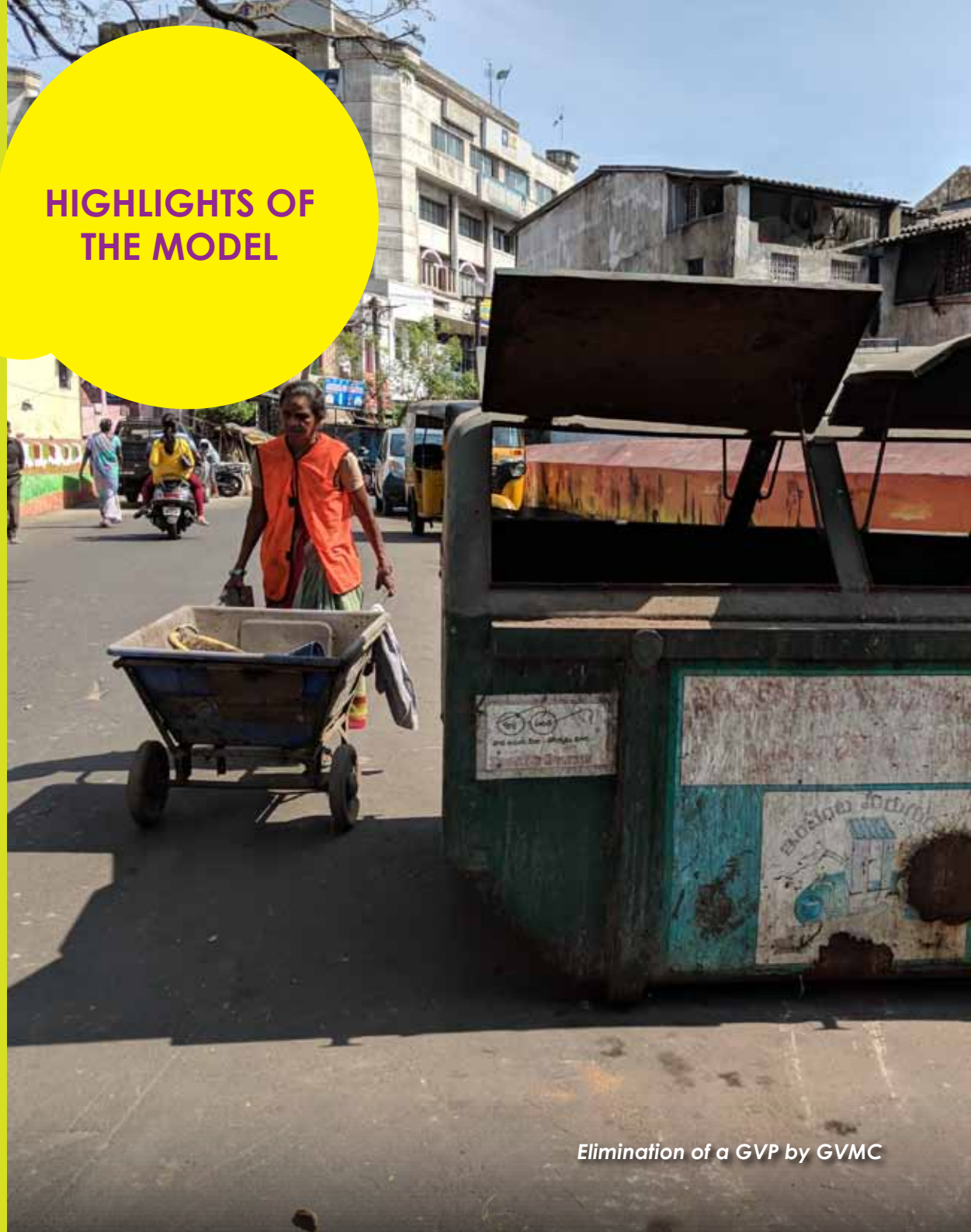
Identification of GVPs
After carrying out the physical survey of the city, 221 Garbage vulnerable points were identified.

Monitoring of GVPs
After identification, the GVP is monitored to ascertain the cause of its existence

Elimination of GVPs
After ascertaining the reason, the GVPs are eliminated through a localized approach

Black spot app
The corporation has created a special application, called as the Black spot app for citizens to update any GVP in their vicinity

Monitoring of GVPs for sustainability
After converting the Black spot the local team monitor the area along with the spot for 6 months

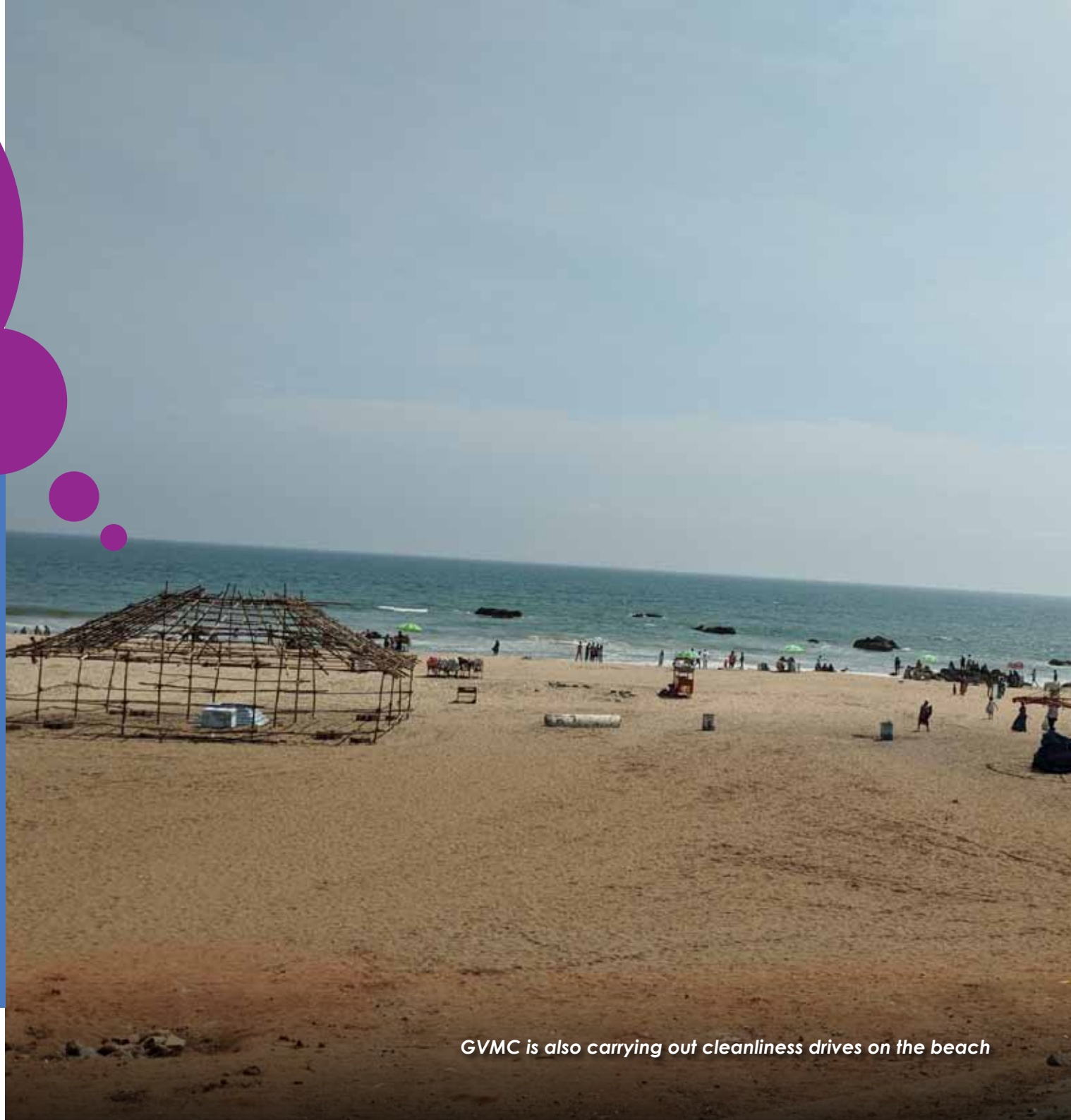


Elimination of a GVP by GVMC

Elimination and beautification of a GVP by GVMC

TOWARDS A SWACHH VISAKHAPATNAM

- Today, Visakhapatnam generates around 1000 MT of solid waste per day
- The biggest problem which GVMC was facing was indiscriminate disposal of waste on the streets, creating several black spots
- The city also had an inefficient coverage of door to door collection service which worsened the problem
- In the survey, the major reasons for GVPs came out to be, Lack of D2D collection of waste, lack of community bins and some behavioural aspects



GVMC is also carrying out cleanliness drives on the beach

GVMC has also converted some GVPs in city into vending zones

TECHNOLOGY BASED SOLUTION TO ELIMINATE GVP

- GVMC's Ward officers conducted physical surveys and identified 221 black spots
- Residents can also upload pictures of any black spot which they come across, on the 'Black spot' app
- The local ward officer is required to survey the spot for at least 2 days and ascertain the reason
- The team converts a Black spot into a Green one in 24 hours and then continues to monitor it
- After converting the Black spot the local team monitor the area along with the spot for 6 months
- Ward office uploads photographs of the spot on the Black spot application on alternate days for

LIST OF GARBAGE VULNERABLE POINTS IN GVMC

Before	After	Before	After	Before	After
					
					
					
					
					

Elimination and beautification of a GVP by GVMC

LEARNINGS

- Improper door to door collection service is a major reason for existence of GVPs
- One solution fits all approach is not applicable in elimination of GVPs, as each requires a localized approach
- Due to correct measures taken by GVMC, not only the existing GVPs have been eliminated, there isn't any occurrence of new points
- Even after converting a black spot into green, GVMC officials do not stop monitoring the point to ensure sustainability of the initiatives
- As a result of sustained efforts and interpersonal communication, the GVPs in slum areas have also been eliminated


नगर निगम इंदौर
1 नीला कचरा
स्टार चौराहा ट्रांसफर स्टेशन
HYVA
HYVA

POPULATION CATEGORY > 15 LAKH

BENGALURU

Bulk waste management the BBMP way

INDORE

Changing behaviour, one household at a time

PUNE

Leveraging partnerships

BENGALURU

Bulk waste management the BBMP way

Bengaluru lies in the southeast of the South Indian state of Karnataka. Bengaluru is also referred to as the 'Silicon Valley of India' (or 'IT capital of India') because of its role as the nation's leading information technology (IT) exporter. Indian technological organizations like ISRO, Infosys, Wipro, HAL are also headquartered in the city.

CITY AT A GLANCE

- State:
  KARNATAKA
- Population as per Census 2011:
  92,00,000
- Size:
  741 SQ. KM
- Number of Households:
  31.00,000
- Waste Generation/ day:
  4600 MT
- Segregation Level:
  60% HOUSEHOLDS

Segregation of waste in a hotel kitchen in Bengaluru

Set up for converting waste into compost at a housing society

BACKGROUND

BBMP has made Bengaluru the lighthouse city in the area of waste management by BWGs. 40% of the waste generated in the city is from the BWGs, hence it became imperative for the Corporation to address this. BBMP has taken several steps to address this mammoth challenge.

The steps taken by the corporation have started showing results, as BBMP already has the details of 1100 BWGs and therefor can closely monitor their waste management procedure.

Over last three decades, due to the presence of IT industry, Bengaluru has seen migration of young individuals from all over the country. This migration has led to the overall economic development of the city. Many subsidiary industries such as tourism, have thrived due to this rapid migration and urbanization. The city now has many high rise buildings where the population is residing. There are exorbitant number of Bulk waste generators in Bengaluru, which contribute to more than 40% of the city's total waste generated.

HIGHLIGHTS OF THE MODEL

BG Notification
BBMP classifies the bulk generators as domestic (greater than 50 units) and commercial (generating 10kg or more waste)

Incentivizing BWGs
Those following the rules are being given a rebate of 50% of the SWM cess

Bulk Generator Network
Online portal where all information of the BWGs is recorded

Simple registration process on BG Net
To ensure hassle free onboarding, the registration process on BG Net is kept very simple

Identification of BWGs
Along with self registration, Sanitary Health Inspector of the area also identifies BWGs in every ward

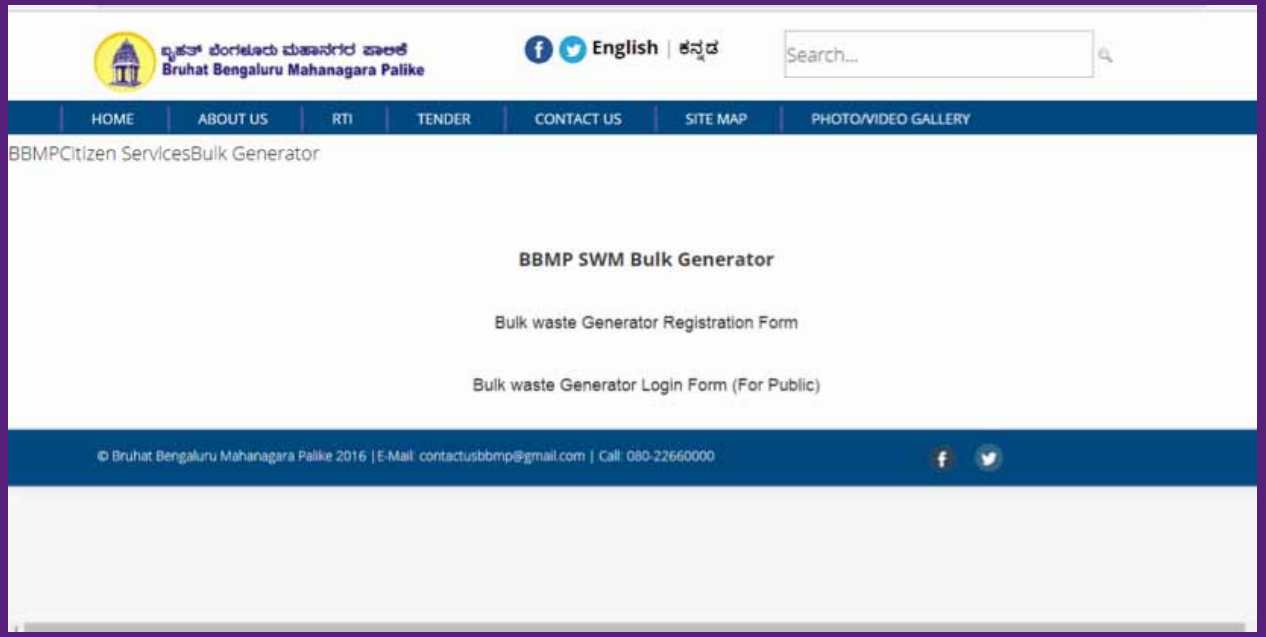
Kasa Vilavaari Sevadararu program
Service provider enlistment program which aims at creating a regulatory framework for BWG service

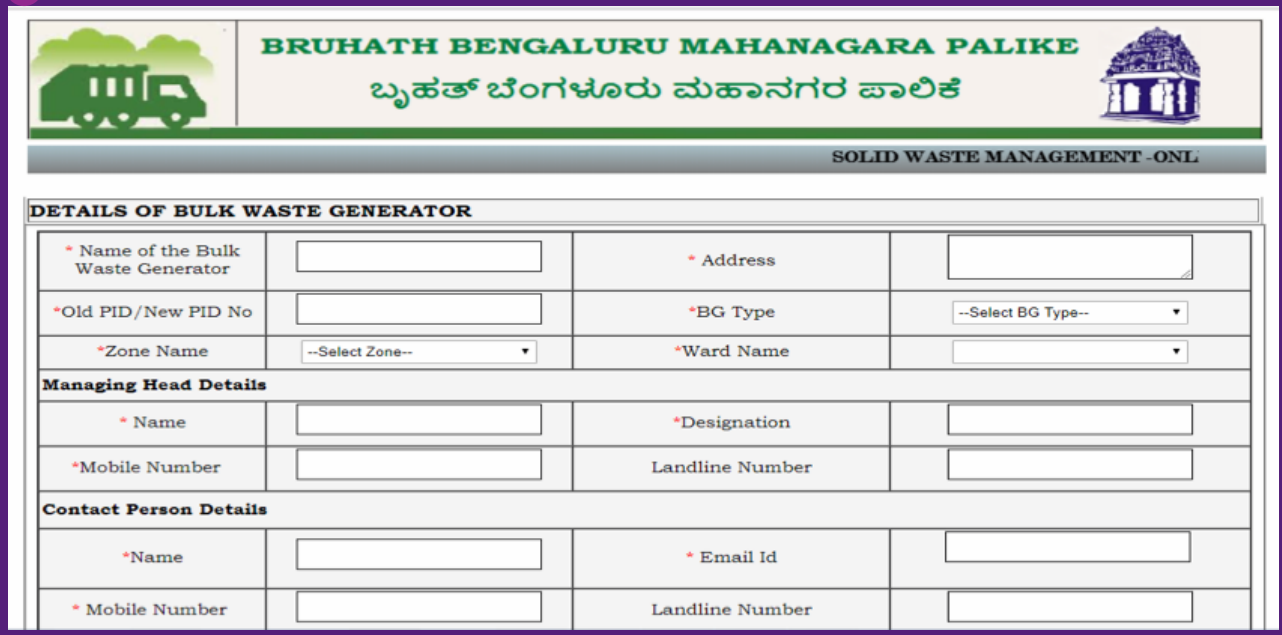
An employee taking wet waste for processing in a Hotel

Garbage room in a hotel in Bengaluru

BULK WASTE MANAGEMENT, THE BBMP WAY

- The BBMP Bulk Generator notification issued in August 2013 broadly classifies the bulk generators as domestic (greater than 50 units) and commercial (generating 10kg or more waste)
- It requires BWGs to carry out in situ management of organic waste and hand over dry waste, electronic waste and sanitary waste separately to BBMP empaneled contractors
- To give a thrust and incentivize the BWGs, they are being given a rebate of 50% of the SWM cess
- BBMP has also developed an online portal where all information of the BWGs is recorded.





BG Net portal of BBMP

Segregation of waste in a hotel kitchen in Bengaluru

BULK GENERATOR NETWORK PORTAL OF BENGALURU

- BG Net is an online portal where all information of the Bulk Waste Generators such as, the quantity of waste produced, method for on-site composting etc. is recorded
- Every BWG in Bengaluru is required to register on this portal
- The information updated by BWGs is updated annually
- So far, 1100 BWGs have registered on the BG Net portal

‘KASA VILAVAARI SEVADARARU PROGRAM’

- BBMP service provider enlistment program which aims at creating a regulatory framework for Bulk generator service provider empanelment
- The program has defined the criteria within which the empaneled destinations and their appointed collection and transportation service providers are expected to operate
- Basic norms and standards for performance, norms for segregation of waste at source, etc. are also included
- The program has also published public lists of all empaneled destination and their appointed collection and transportation service providers

Shredders installed in a hotel in Bengaluru

Organic waste converter plant in a housing society

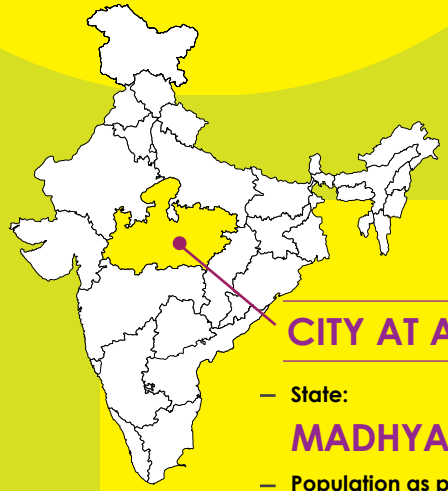
LEARNINGS

- Bulk waste generators often contribute to waste generation of cities in large amounts and hence there should be proper mechanisms to treat that waste
- BBMP's initiative has made Bengaluru one of the lighthouse cities in the area of waste management by BWGs
- The steps taken by the corporation have started showing results, as BBMP already has the details of 1100 BWGs
- BBMP has also created regulatory framework for empanelment of BG service providers The city, with community effort aims to onboard all BWGs of the city on the portal

INDORE

Changing behaviour, one household at a time

Known as the commercial capital of Madhya Pradesh, Indore was the capital of the Holkars. The largest and most densely populated city in central India, the city is popular for its history, monuments, food and bazaars. Indore is the largest city of Madhya Pradesh by population. It serves as the administrative headquarters of both Indore District and Indore Division.



CITY AT A GLANCE

- State:
  MADHYA PRADESH
- Population as per Census 2011:
  19,94,397
- Size:
  390 SQ. KM
- Number of Households:
  6,49,540
- Waste Generation/ day:
  1115 MT
- Segregation Level:
  100% HOUSEHOLDS

Painting competition organized by IMC for school children

Door to door collection in segregated vehicles in Indore

BACKGROUND

After securing 25th position in Swachh Survekshan 2016, Indore was declared the cleanest city in 2017. Not only has Indore achieved the distinction of excelling in all swachhata parameters, it has also laid new standards in cleanliness for other cities to follow. The city is the first with population greater than 10 Lakh to achieve segregation at source in 100% of its households. IMC ran a very successful campaign with some NGOs and covered over 5 Lakh households in 19 zones and 85 wards of the city.

However, like most Indian cities Indore also faced problems in the area of solid waste management. In Indore nearly 50% of generated solid waste remained unattended, giving rise to unsanitary conditions especially in thickly populated areas. The city generates nearly 1115 MT of solid waste every day. Few years ago, the city was almost choking in smog caused due to the burning of large amounts of plastic waste.

Amount and contents of generated solid waste may differ among different cities but problems related to collection, transport and disposal are same. Major parts of generated solid waste remain uncollected on the streets, road side, open places, etc. which pollutes the environment.

HIGHLIGHTS OF THE MODEL

Overall cleanliness
Waste which used to be piled up on roadsides was removed

Knowledge on segregation of waste
Before launching the drive for segregation IMC decided to impart knowledge to people

Collaboration with NGOs
For mass reach, IMC availed the services of many NGOs

Decentralized approach
The teams divided their tasks zone wise and started their job of educating citizens

Orientation of volunteers
Volunteers were tutored on the different methods of communications

Sustainability
NGO partners still continue to send their volunteers to different zones, daily

Off loading of dry waste near a dry waste segregation center

Offloading of wet waste for making compost

DOOR TO DOOR COLLECTION OF SEGREGATED WASTE

- D2D collection of waste was started in June 2015 as a pilot project in two of the 84 wards of the city
- It took almost a year to achieve D2D collection from 100% households
- Indore through its commendable collaborative efforts has achieved segregation of waste at source at 100% of its households and commercial units
- D2D awareness campaign led by NGOs and Municipal staff was the game changer in Indore's transformation story

Municipal workers wearing Personal Protective Equipment at a waste to compost plant

IMC Commissioner explaining the onsite composting to residents

COLLABORATIVE COMMUNITY EFFORT FOR SWACHH INDORE

- Before launching the drive for segregation, it was imperative for the Corporation to impart knowledge on segregation of waste at source to all residents
- For mass reach, IMC availed the services of many NGOs
- This massive door to door awareness generation initiative started at an individual level but slowly became a public movement
- Every single household was covered individually along with commercial areas and establishments
- To ensure transportation of segregated waste, 8 transfer stations with state of compactors were installed

‘RUKO, DEKHO AUR DALO’ CAMPAIGN FOR SWACHH INDORE

- The segregation campaign spread the message of ‘ruko, dekho aur daalo’ among masses
- NGOs and agencies covered over 5 Lakh households in 19 zones and 85 wards of the city
- The teams divided their tasks zone wise and started their job of educating citizens about the various types of waste and the need for segregation at source
- Before the start of the campaign, the volunteers were tutored on the different methods of communications
- The teams used flip charts, pamphlets, banners, nukkad nataks, gave live demonstration of waste segregation using green and blue colored dustbins

IEC activities in low income areas for spreading the message of swachhata

A centralized composting facility in Indore

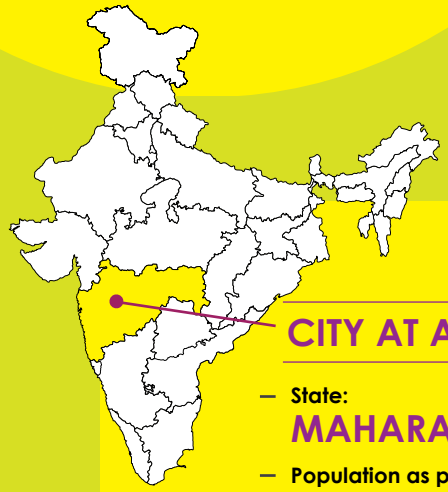
LEARNINGS

- For any behaviour change campaign to be successful it is important for it to strike a chord with people so that the change is not restrained
- Indore scored well in all swachhata parameters through a collaborative approach
- In spite of achieving segregation at source in 100% households, IMC hasn't stopped the campaign and is aiming for sustainability of the result
- The whole process took IMC, 2 years and hence behaviour change is a time taking process
- IMC built the necessary infrastructure before commencing the campaign

PUNE

Leveraging partnerships

Pune is the 2nd largest city in the state of Maharashtra. Situated 560 metres above sea level on the Deccan plateau on the right bank of the Mutha river. Considered to be the cultural capital of Maharashtra. Pune is also known as the 'Oxford of the East' due to the presence of several well-known educational institutions in the city.



CITY AT A GLANCE

- State:
  MAHARASHTRA
- Population as per Census 2011:
  31,24,000
- Size:
  250 SQ. KM
- Number of Households:
  10,00,000
- Waste Generation/ day:
  1550 MT
- Segregation Level:
  85% HOUSEHOLDS

SWaCH worker carrying out the D2D collection activities in a housing society

SWaCH worker segregating waste at a segregation center in Baner

BACKGROUND

The city of Pune has laid an exemplary model of integration of marginalized section of the society into mainstream waste management system. PMC has signed a contract worth INR 3.87 Cr. (per year), for a period of 5 years with a co-operative society SWaCH to carry out waste collection, segregation and composting activities. In 2016 alone, the SWaCH members have handled a total of 2.57 Lakh Tonnes of waste from households and other establishments in Pune city.

Due to rapid industrialization and urbanization, Pune city witnessed an increased pressure on water supply, sewage and management of solid waste. Though PMC appointed contractors to collect waste from households and other establishments, but due to improper disposal methods, the waste was largely dumped at open sites. The garbage depot constructed at a residential locality in Pune was also shut due to the protests by residents. In addition to this, back then, PMC was not able to recruit additional staff for waste management due to limited funds flow. At the same time, thousands of waste pickers were scavenging in from containers, dumps and landfills to retrieve the recyclables from the waste.

The above problem led to PMC starting the waste revolution in the city.

HIGHLIGHTS OF THE MODEL

Partnership
Three prongs of the model are PMC, SWaCH and the citizens. The partnership benefits each party and also holds each one accountable.

Stakeholder Participation
All stakeholders are incentivized to participate equally for the efficient working of the system.

Recycling
Segregation of waste at source is promoted and enforced to retrieve recyclables

Socially inclusive model
SWaCH –PMC partnership is an inclusive model, which empowers the weaker sections of the society

Affordability
The services are offered at minimal rates

Permanency and Stability
The system has been corrected for all identified gaps up till now

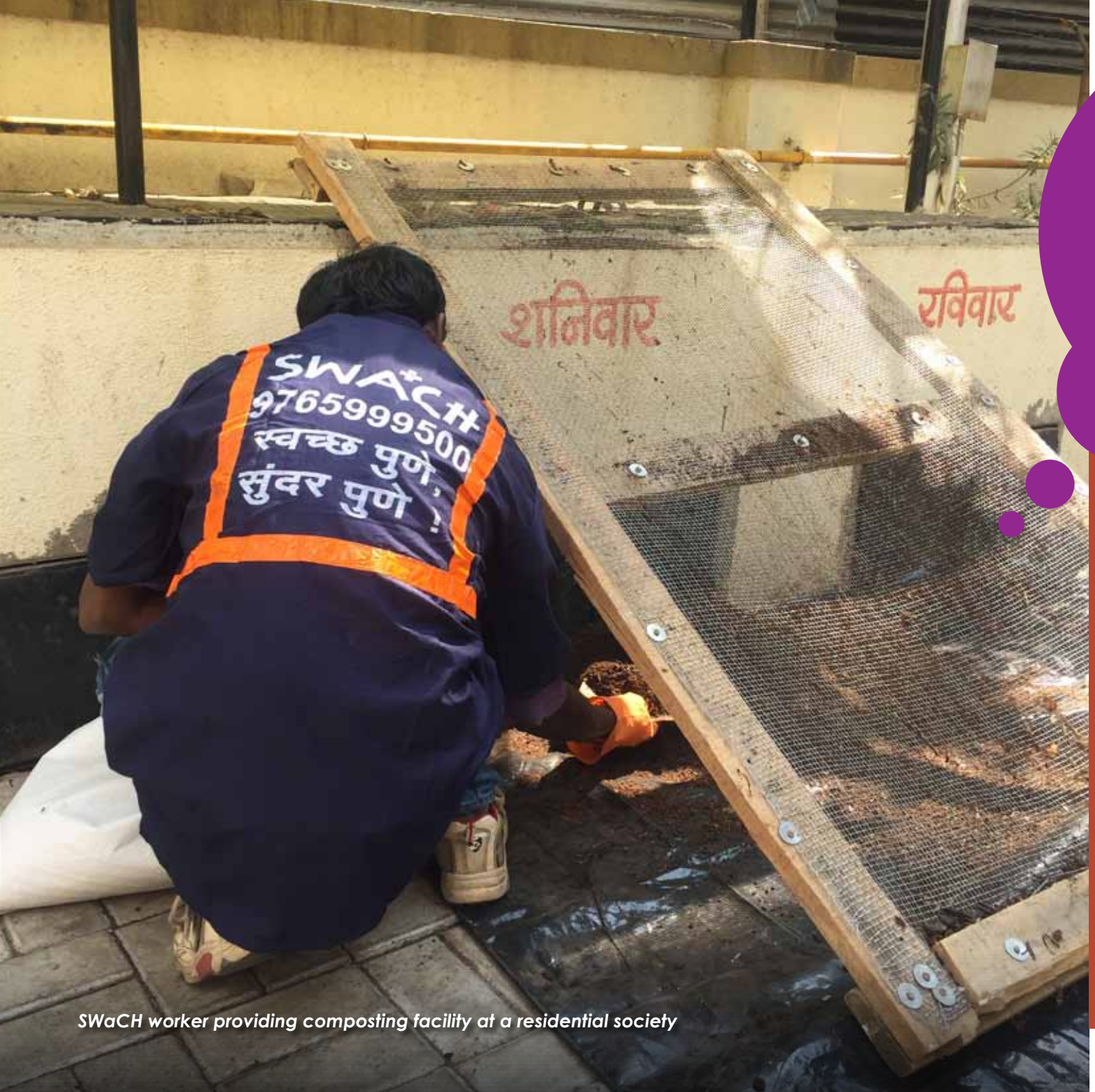
Door to door collection of segregated waste in slums by SWaCH workers

SWaCH workers at a segregation center in Pune

DOOR TO DOOR COLLECTION AND MONTHLY FEES

- SWaCH is currently covering about 60% households and other establishments in Pune with door to door collection activities
- They have also attained success in collecting segregated waste from slum areas
- Each pair of SWACH members, services anywhere between 150- 400 households
- PMC has notified charging of user fees for providing D2D collection services in their by-laws
- These user charges as notified by PMC are collected in differential pattern from households, commercial areas and households in slums. The member performing these services gets to keep the user fees

Door to door collection of segregated waste in Pune



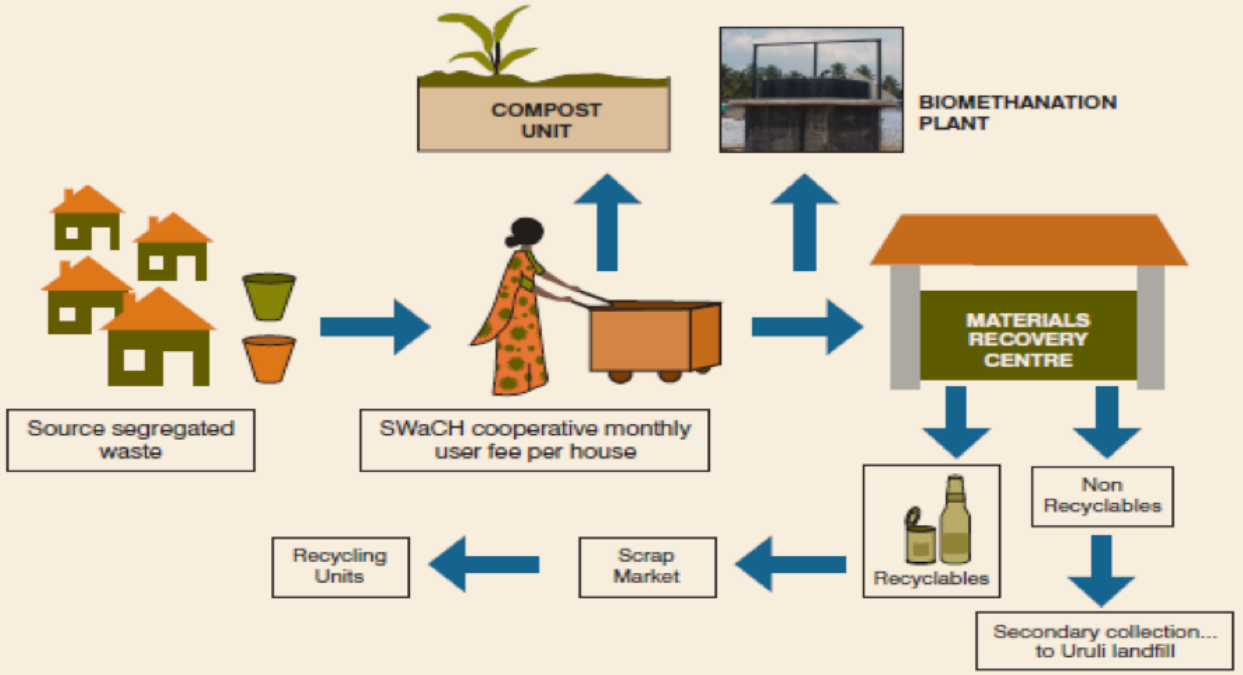
SWaCH worker providing composting facility at a residential society

PROCESSING AND DISPOSAL OF WASTE

- The SWaCH members also provide services for carrying out composting in households and establishments at a very basic fee
- If not at the location, the wet waste is carried to the MRF by the member for composting
- At the MRFs, dry waste is further segregated into categories
- The MRFs are provided by PMC
- In case of absence of a MRF in an area, the segregated waste is delivered to PMC at feeder point by the SWaCH member
- After very fine sorting, the recyclables are sold to scrap dealers
- The non -recyclable waste is taken to Uruli landfill by and disposed of there after adequate treatment

Shanti, an erstwhile rag picker who now works with SWaCH at their sorting shed in Baner explains, "Earlier, my son would say that his mother picks up garbage from the streets of Pune, now if someone asks him about me, he mentions with pride that I work with SWaCH. Working with SWaCH has changed my life for good!"

WORKING OF SWACH MODEL



Through the SWaCH model, PMC has saved a total cost of about INR 60 Cr. on manpower, transportation and processing.

The rag-pickers are now formally integrated into the system and have an average earning of INR 12-15,000 per month

In 2016 alone, SWaCH has managed to integrate 40% more rag-pickers into the formal system

PMC is also paying a subsidy of Rs. 10/ household for door-to-door collection to waste pickers in all notified slums.

The responsibility of development of adequate infrastructure for carrying out various activities lies on the PMC

SWaCH and PMC together have also set up a strong grievance redressal system comprising SWaCH field coordinators, SWaCH mitras and PMC staff

Segregation baskets kept in a housing society

LEARNINGS

- Pune has presented a decentralized model of waste management which is also socially relevant and inclusive in nature
- With concentrated efforts, PMC has been successful in mainstreaming rag pickers who often belong to socially under privileged sections of society
- The joint effort of PMC and SWaCH is also impacting the environment positively by maximizing recycling and minimizing land filling
- This model of waste management has also saved PMC around INR 60 Cr. on manpower, transportation and processing
- The rag-pickers are now formally integrated into the system and have an average earning of 12-15,000 per month

NOTES

Ministry of Housing and Urban Affairs
Government of India

सत्यमेव जयते

स्वच्छ भारत
एक कदम स्वच्छता की ओर