

**Status of Solid and Biomedical Waste  
Management in Muzaffarpur City and  
Proposed Plan  
for Swachh Muzaffarpur**

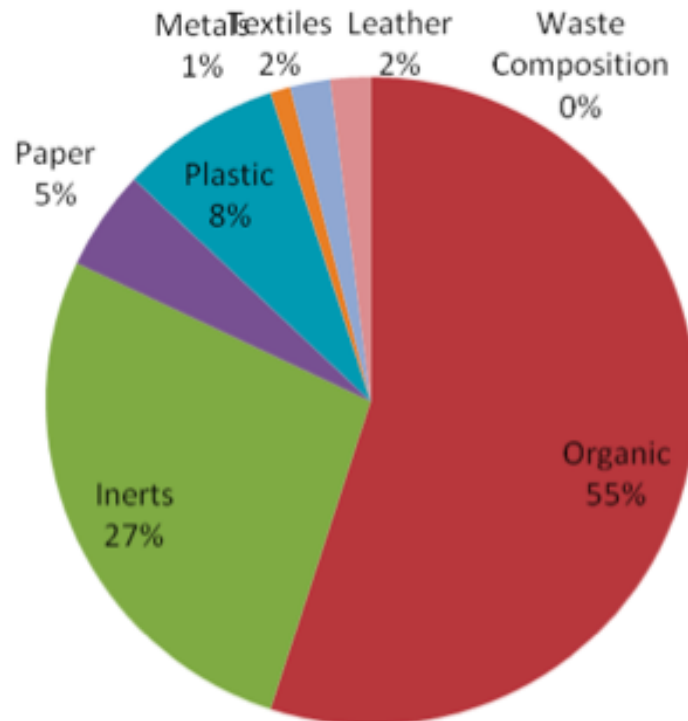
**BACKGROUND: CSE STUDY ON SOLID  
WASTE MANAGEMENT IN  
MUZAFFARPUR**

# Collection of non-segregated waste



# Composition

- Major fraction **organic, approximately 55 percent**. Plastic littering is a huge problem in the city.





# Littering on roads and open drains





# Collection mechanism established





# Open drains clogged



# Collection

- Whistle blow method for door to door collection of solid waste --- started very recently, in 2015.
- In most of the wards that were visited- waste is collected only four days in a week





**Open dumping in Rautiniya, ; nearby villages  
have opposed in the past**



# Available infrastructure

- Waste not segregated. But infrastructure available.
- Color coded bins in push carts were observed for collecting waste from close to 5 wards, however, mix waste is being collected in them.
- In the financial year (2015-16), municipality has spent close to 90 lakhs per month on the salary of its sanitation staff (out of which **833 is contractual and 267 is permanent**).
- Every month, 11 lakhs spent on fuel
- 1.5 crore was spent on the procurement of vehicles in 2015.

# Muzaffarpur has adequate infrastructure to collect & transport its wastes

	Number
Tractor	50
Tipper	20
Compactor	1
JCV (loader)	3
Push carts	200
Metal bins	200
Hand Trolley	200

As informed by City Manager, Ravish Chandra Verma, Muzaffarpur Nagar Nigam



# Background: Biomedical Waste, Health Hazard

# Hospitals visited to access situation of biomedical waste

S No	Name of Healthcare Facilities	Type of Facilities	Bed capacity
1	District ( <i>Sadar</i> ) hospital	Government	164
2	KDKM hospital	Private	250
3	Prasad hospital	Private	150
4	Sri Krishna Medical College & Hospital	Government	637
5	Ma Janki Hospital	Private	100
6	Glocal Healthcare System Pvt.Ltd	Private	100
7	KantiPrimary Health Centre	Government	11
8	Bhawani Hospital & Research Institute	Private	100
9	Manas Nursing Home	Private	12
10	Meenakshi Multi-speciality Hospital	Private	55

# Current Status

- No source segregation
- No color coding, staff were not familiar
- Needles left undestroyed after administering injection - ended up in general dump yard
- Open **dumping of waste in hospital backyard premises**
- Onsite **burning of mixed waste** was also found occasionally



## Contd...

- Discharging the liquid waste water from domestic sanitary and non-sanitary activities through septic tank followed by the open public sewer
- No pre-treatment before discharging toxic effluent generated from the non-sanitary section

# High chance of infection to staff handling BMW





# Mixed with Solid Waste, no color coding





# But situation is improving

- Infrastructure improved
  - ✓ Fleet of vehicles for C&T
  - ✓ Manpower
  - ✓ Resources and funds
- In past 5 years, waste collection efficiency has increased from 20-30% to 50%

# **PROPOSED PLAN OF ACTION**

# How to make Muzaffarpur Clean

- **First pilot city** in the state to adopt segregation at source in 49 wards ---2 bin model
- Households, hotels, commercial complexes to give segregated waste
- Training and awareness raising for segregation
- Segregated waste to go to transfer stations/sorting centres (illegal dumping points of the city to be converted to waste sorting centres)



# Contd...

- At transfer station, collector to further segregate dry waste
- Segregated dry waste to be given to franchise (authorised recycler)
- Waste collector to get incentive for giving segregated waste to franchise
- From franchise, to go to recycling stations

# Contd...

- Segregated organic waste: Composting, Biogas generation
- ITC identified NGO will help
  - ✓ **facilitate and guide franchise for managing dry resource collection centre**
  - ✓ **facilitate for efficient composting system at ward level**
  - ✓ **link to technology providers**

# **ROLE AND RESPONSIBILITY**



# Responsibility of Nagar Nigam

- ✓ Collection from households, commercial areas to be regularized, through notices, awareness rallies in selected wards
- ✓ Create infrastructure at each ward level for handling segregated wet and dry waste, by providing
  - sorting facility
  - push cards with color coded bins to collect segregated waste
- ✓ Manage the Black spots or remove them

# Responsibility of ITC

- Designing the program of total waste management along with CSE
- Coordinating and setting up end to end process
  - ✓ Create models of training the Waste Handlers, Rag Picker, Social entrepreneurs
  - ✓ Work out a model for incentivise the waste collectors for long term sustainable
  - ✓ Coordinate with recyclers for supplies and provide market linkages
  - ✓ Training and education

# Responsibility of CSE

- CSE shall ensure and overlook the sustainability and workability of this model
- Coordinate with state and central government
- CSE shall conduct training programmes and provide support material for awareness raising
- Will work with Nagar Nigam and CSTF to ensure Muzaffarpur becomes a SMART CITY

**HOW WILL THE CITY LOOK, IF THIS  
INITIATIVE IS SUCCESSFULL**





BEFORE



AFTER





BEFORE



AFTER





BEFORE

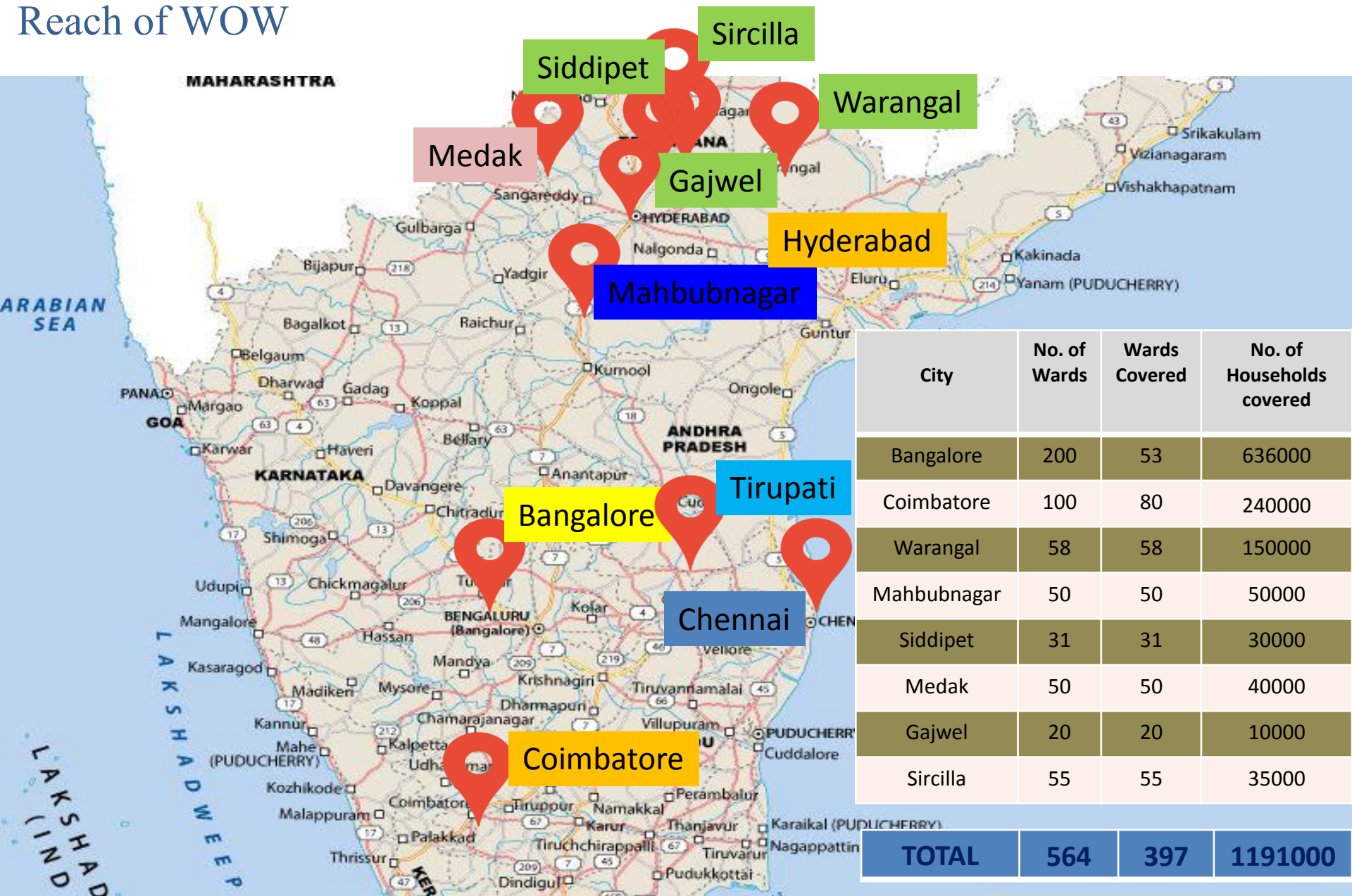


AFTER

# **ABOUT ITC AND THEIR CSR INITIATIVE 'WELL-BEING OUT OF WASTE'**



# Reach of WOW



8 cities, 11 lakh households, 44 lakh population, 397 wards

**LET US AIM TO MAKE  
MUZAFFARPUR A SMART CITY**

# **THANK YOU**

**Swati Singh Sambyal**  
**Programme Manager**  
**Centre for Science and Environment**  
**New Delhi**



**WOW**

**WELL BEING OUT OF WASTE**



# WOW Objective

**ITC - Paperboards and Specialty Papers Division** conceptualised WOW in 2007 to create a clean and green environment by educating citizens on source segregation and effective recycling of dry waste and creation of livelihoods for Waste Handlers.

## ■ OBJECTIVE:

- Better environment, Hygiene and reduce land fills.
- To educate citizens on source segregation of Dry and Wet Recyclables.
- Create awareness among school children for long term .

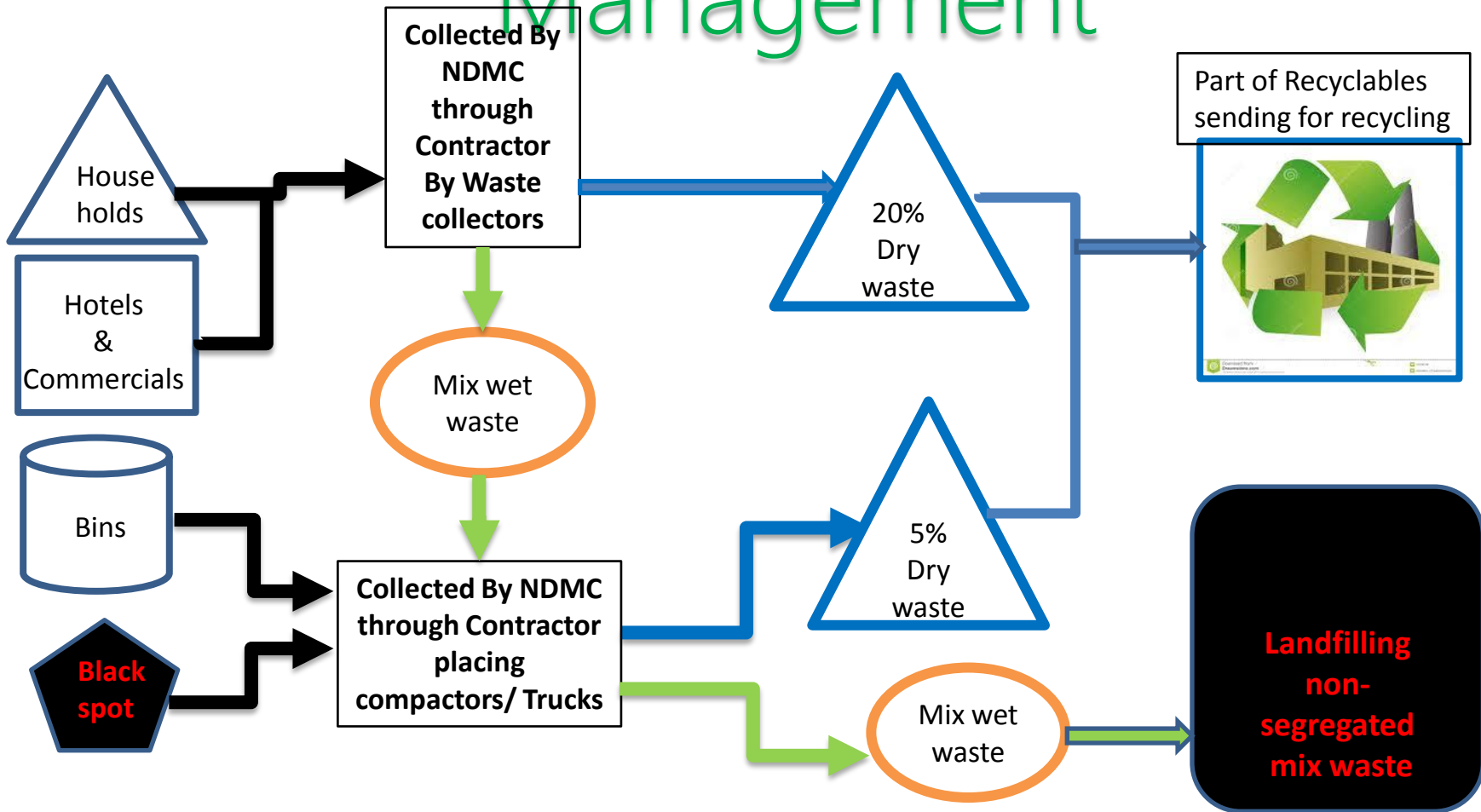
## ■ APPROACH:

- Collaborate with Municipal Corporations .
- Create a sustainable livelihood for waste handlers.
- Coordinate with recycling units.
- Educating school children on importance of source segregation.
- Creating social entrepreneurs with a sustainable business model.

## ■ REACH & COVERAGE :

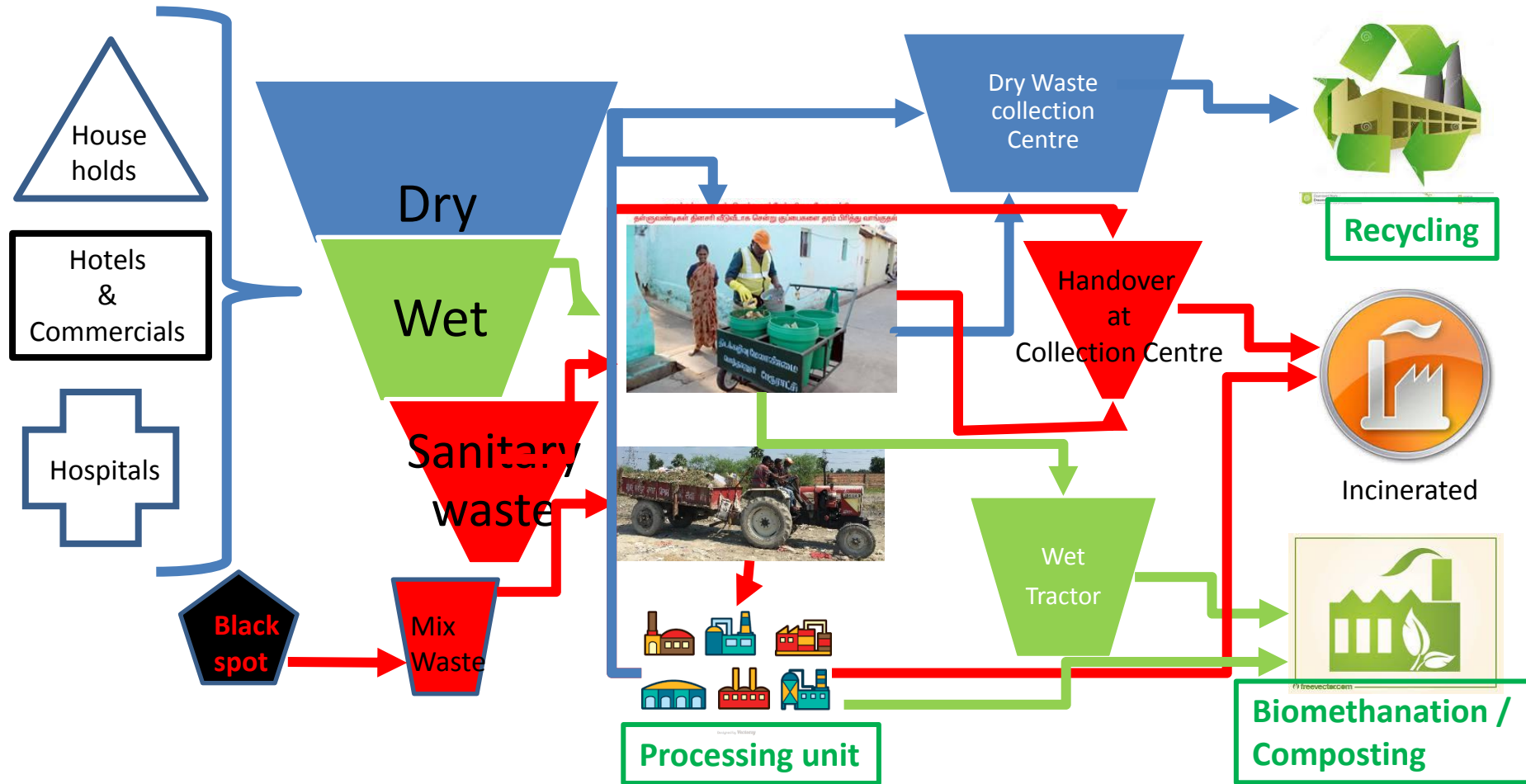
- Major cities covered Bangalore, Coimbatore ,Telangana and Chennai.

# Muzaffapur Management



# Propose Collection of source Segregated Waste

## Source Segregated Waste







## Source Segregation & Segregated Dry waste Collection



# Collection of Dry Waste at collection point / Dry Waste Centre



# Impact

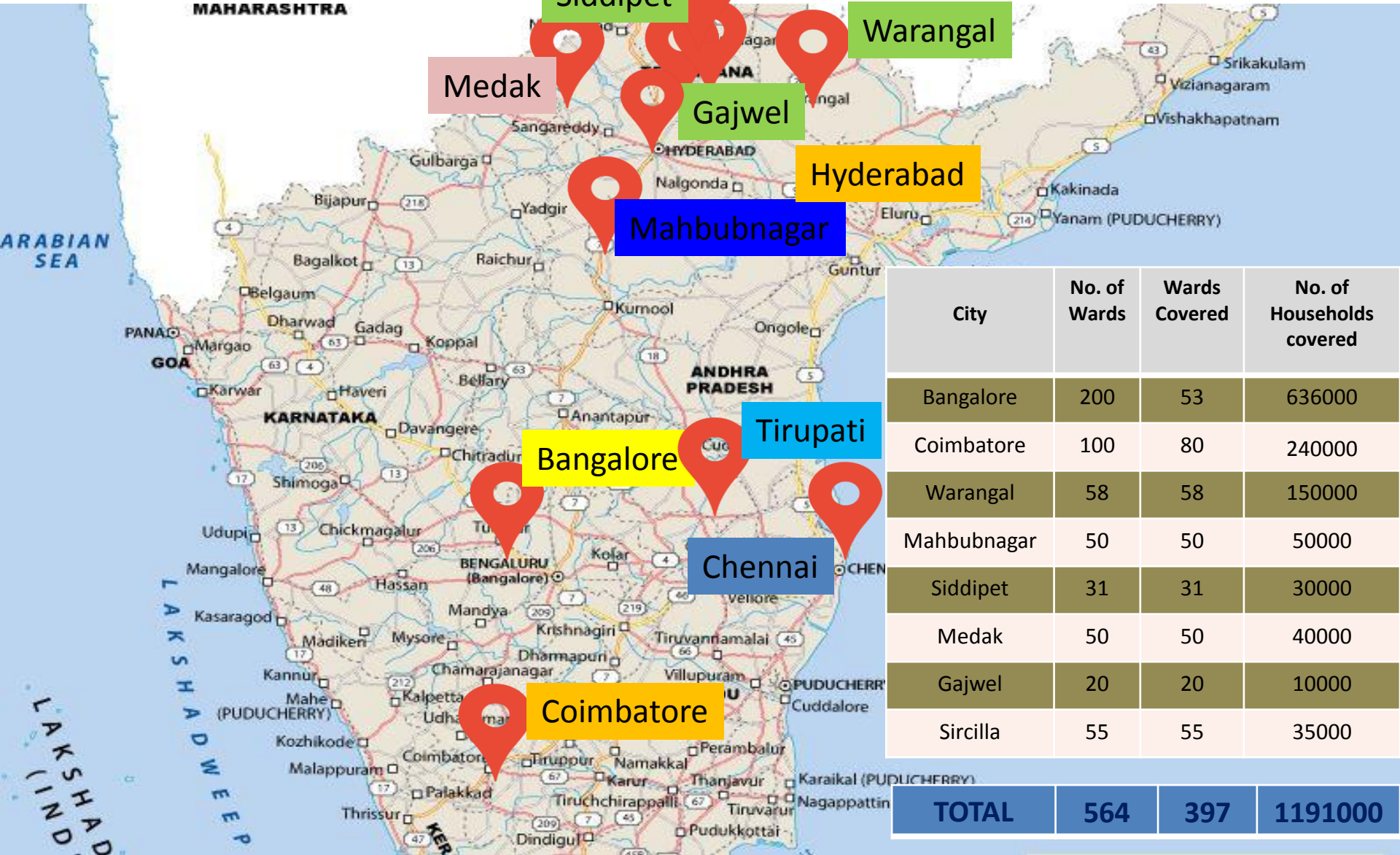






**ACHIEVEMENTS**

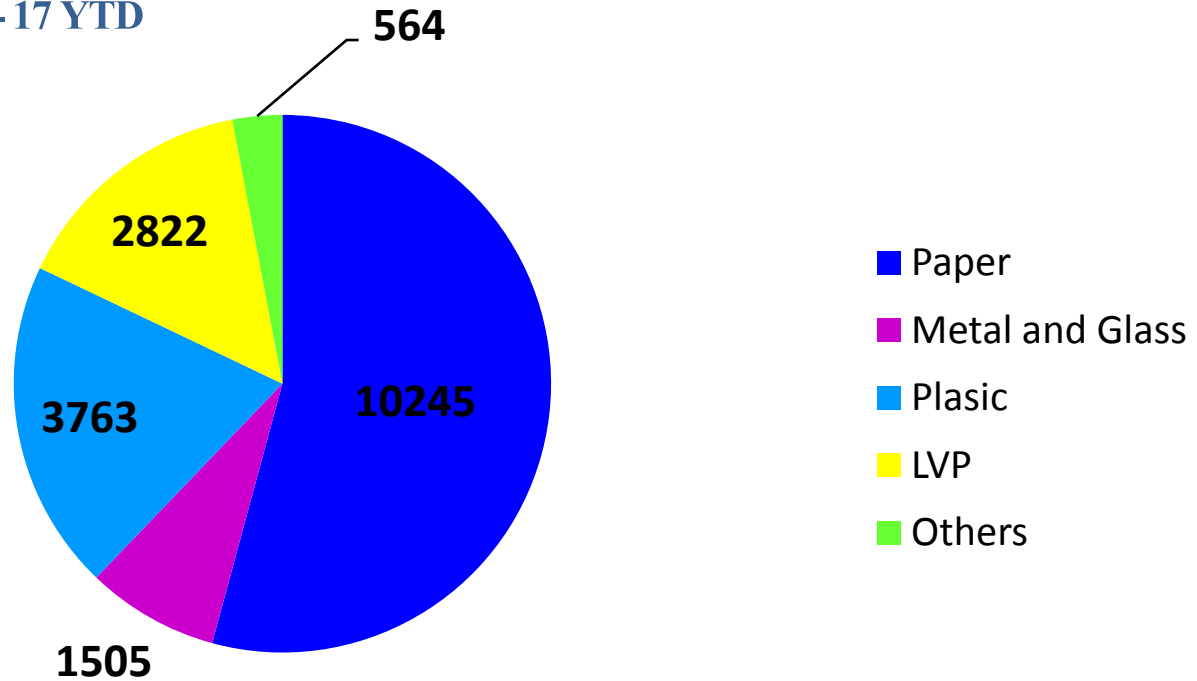
# Reach of WOW





# Dry Waste Collection 18,899 MT

2016-17 YTD



## Total Collection from 2016-17 YTD

Location	Paper	Metal and Glass	Plastic	LVP	Others	Total Qty.
Bangalore	6041	872	2179	1634	327	11053
Coimbatore & Chennai	2553	377	943	708	142	4723
Telangana & AP	1651	256	640	480	96	3123
<b>Total</b>	<b>10245</b>	<b>1505</b>	<b>3763</b>	<b>2822</b>	<b>564</b>	<b>18899</b>

# Awards & Recognitions

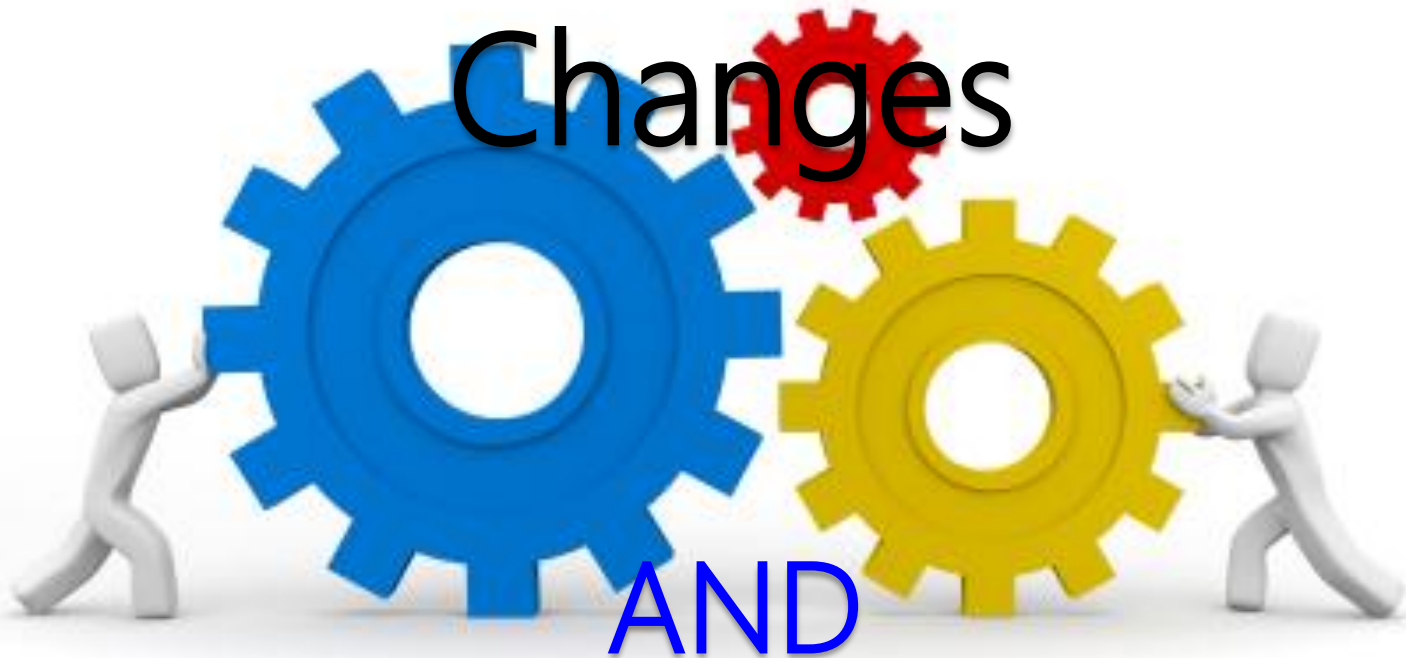
## ASSOCHAM Award For WOW

## SWACHH BHARAT MISSION AWARD Municipal worker Coimbatore

## India Today Safaigiri Award - 2016



All This possible with small  
habitual & behaviour  
Changes

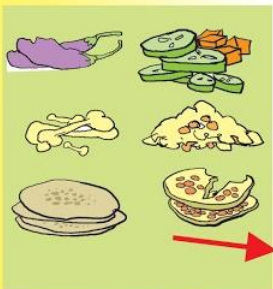


Corrections in the existing system

# Educate citizens on source segregation of Dry and Wet Recyclables.

## Wet Waste

- ❖ cooked food (veg / non-veg)
- ❖ uncooked food (veg / non-veg)
- ❖ fruit and flower waste
- ❖ fallen leaves and similar compostable materials



## Dry Waste

- ❖ paper / plastic / wood
- ❖ metals / fabrics / cloth rags
- ❖ glass / wire / leather
- ❖ rexin / rubber
- ❖ thermocol etc...



**Sanitary Waste**  
wrap in newspaper  
marked with a red cross



Used Sanitary Napkins    Used Child /Adult Diapers    Used Bandage/Band Aids    Used Ear Buds

**What is required to make this  
model successful?**



# Massive awareness drive--- to make people realize the importance of segregation at source, **public participation**



Houses that are convinced to segregate, marked at their doorstep, a slip issued for followup

Two copies of a registration slip from the E SREE FOUNDATION. The slip is titled 'E SREE FOUNDATION' and includes the address '#207, 2nd Floor, 8th Main, NGEF Layout, Sadanandanagar Bangalore - 38'. It contains fields for 'No.', 'Profile of Household', 'Date', 'Name of Householder', 'Ph No', 'Full Address', 'Bag Issued', 'Signature of Householder', 'Emp. ID', and 'Name of the PE'. The first slip is for household No. 1, with the householder's name 'GIRANESH' and phone number '9530253612'. The second slip is for household No. 2, with the householder's name 'GIRANESH' and phone number '9530253612'. Both slips have a date of '11/26/2016' and a ward number of '105611'. A yellow date stamp '11/26/2016' is visible on the left side of the second slip.

Once a slip is issued, the household gets registered and gets updates through mobile, household can address grievances



# Households to give segregated waste





# Partition in municipal trolley to collect segregated waste





# Further segregation of dry waste at sorting facility





Waste bought to franchise, waste collectors get money for giving dry waste to franchise owner  
(Direct Incentive)



Date	Material Received from	DWCC Ward No.: 04	Segment (PK / RP / Individual)	Collection Point Name	Vehicle No.	Color Record	Pet Bottle	Milk Pouches	Hard Plastic	Tetra Pack	Kraft	Old Newspaper (Chart)	Old Magazines	Old Books (Text Books)	Write Paper (WR)	Metal (Iron)	Metal Alloys	Stic Metal Cans	Total Items (Sum)	Other Items (Sum)	Total Qty (kg)	Credit Total Qty (kg)	Net Total Qty (kg)	Cum Total Qty	
03/11/16	Annamma		PH	Ganesh Theatre	257	994	-	-	1109	-	321	-	-	-	24	-	-	-	518	131	3360	-	1616		
	Changamma		"	"	161	724	-	-	906	-	465	-	-	-	55	-	-	-	244	185	2273	-	1282		
	Chinnamma		"	"	311	974	-	-	925	-	264	-	-	-	07	-	-	-	15	438	226	3244	-	14744	
	Jayamma		"	"	169	523	-	-	688	-	197	-	-	-	-	-	-	-	312	261	2100	-	9244		
	Jaya		"	"	229	933	-	-	914	-	390	-	-	-	-	-	-	-	10	311	244	3044	-	9244	
	Kelavathi		"	"	73	523	-	-	595	-	166	-	-	-	-	-	-	-	14	399	62	2894	-	12071	
	K.Krishnappa		"	"	158	784	-	-	806	45	251	-	-	-	-	-	-	-	158	43	1560	-	3755		
	Munikaappa		"	"	210	700	-	-	938	43	327	-	-	-	-	-	-	-	14	399	62	2894	-	12071	
	Muthyalamma		"	"	191	662	-	-	760	-	233	-	-	-	16	02	-	-	02	300	160	2733	-	12785	
	Rajappa		"	"	239	624	-	-	639	-	185	-	-	-	09	-	-	-	02	393	197	2175	-	10813	
	Ramarandrea		"	"	165	524	-	-	704	-	272	-	-	-	-	-	-	-	02	393	197	2175	-	9435	
	Raju		"	"	192	776	-	-	813	-	303	-	-	-	22	37	-	-	263	139	2103	-	10344		
	Shankaramma		"	"	267	692	-	-	811	-	304	-	-	-	83	-	-	-	20	10	338	188	2403	-	12744
	Sheradamma		"	"	171	684	-	-	604	-	289	-	-	-	-	02	-	-	61	51	1832	-	9242		
	Sudharar		"	"	126	558	-	-	739	-	270	-	-	-	13	-	-	-	02	225	160	2096	-	10041	
	Venkateshappa		"	"	292	729	-	-	771	-	277	-	-	-	20	07	-	-	02	266	102	2566	-	11931	
	Narayanasappa	Commercial	"	Ganesh Theatre	286	1268	-	-	763	17	204	-	-	-	04	-	-	-	02	273	194	2883	-	16572	
	Reddy		"	"	67	766	-	-	1083	107	411	-	-	-	27	-	-	-	28	76	789	181	3541	-	18510
	Subarasappa		"	"	480	1930	-	-	1108	-	244	-	-	-	04	-	-	-	27	377	293	4494	-	58725	
	Arthik	Ragireddy	"	AALASAMPOR	-	-	-	-	3453	-	2745	361	268	-	325	-	181	-	240	969	-	-	58045		
	Zurgan		"	"	-	-	-	-	3246	-	2777	304	267	-	300	-	231	-	2152	967	-	-	74889		
	Shannukka		"	"	4076	15205	-	-	25708	212	45001	1098	906	-	293	1000	-	642	155	6600	4447	3405	-	404430	

Check-out 11/26/2016



# Recyclables bailed and sent to recycling units





Wet waste can be composted, city has a fair share of agricultural area, market for compost as fertilizer



# Aerobic bins and pot composting





# Potable Biogas Plant



