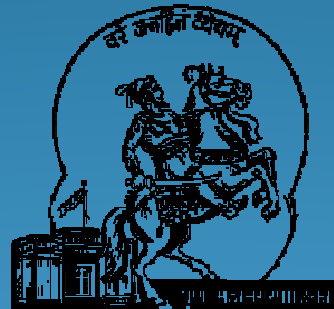


# Best Practice Initiatives in Waste Management- Pune City



Suresh Jagtap  
Joint Municipal Commissioner,  
Pune Municipal Corporation

# Pune City

Pune is the 8<sup>th</sup> largest city in India and the 2<sup>nd</sup> largest in the state of Maharashtra.

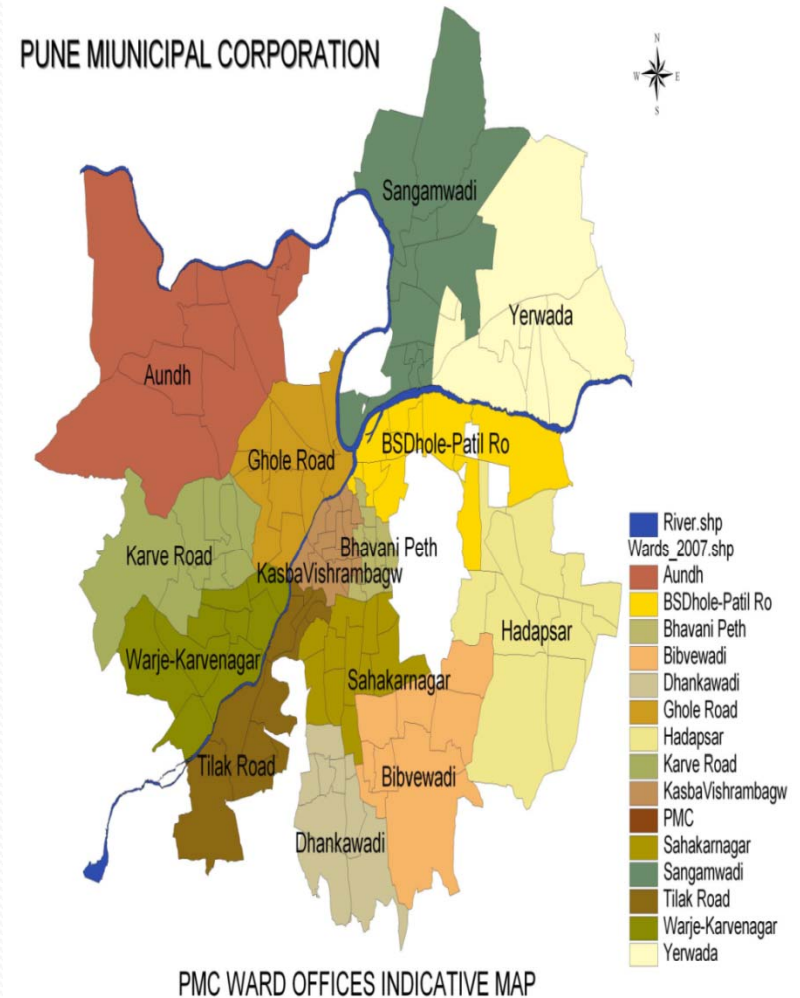
Population ; about 4 million

Households ; nearly 1 million

Area of city is 244 sq. kms.

4 Zones ; 15 Administrative

Ward Offices ; 76 Prabhags





# Overview of city waste management

- Pune generates 1500 to 1600 tons of solid waste per day.
- 122 trucks collect waste door-to-door, collecting an average of 137 organic tons per day.
- 56% of households have door-to-door coverage.
  - 44% of households provide segregated waste.
  - 125 tpd Hotel waste collected by 23 Hotel Trucks.
- 936 containers and 412 compactor buckets dispersed around Pune.
- SWaCH Cooperative, which is wholly owned by waste pickers, also provides services.
- Ward wise average- 350 to 750 gms per capita per day

# The Paradigm Shift in Approach

- PMC's approach towards waste management is in a comprehensive manner with careful selection and sustained application of appropriate technology, working conditions, and establishment of a 'social license' between the community and other service providers
- Instead of something disposable, we see waste as a renewable resource with potential to aid in problems including electricity shortages and resource recovery.
- Effective use of IEC for community partnership





## Best practices to generate Wealth Out of Waste

- No open dumping and 100% scientific processing of waste
- Integrating Informal Sector in Municipal Solid Waste Management
- Pune's Trash Solution: A Zero Garbage City
- Biomethanation cum power generation plants
- Waste to energy – Plasma gasification
- Sonia gram udyog prakalp for plastic recycling



# Best Practices (Cont.)

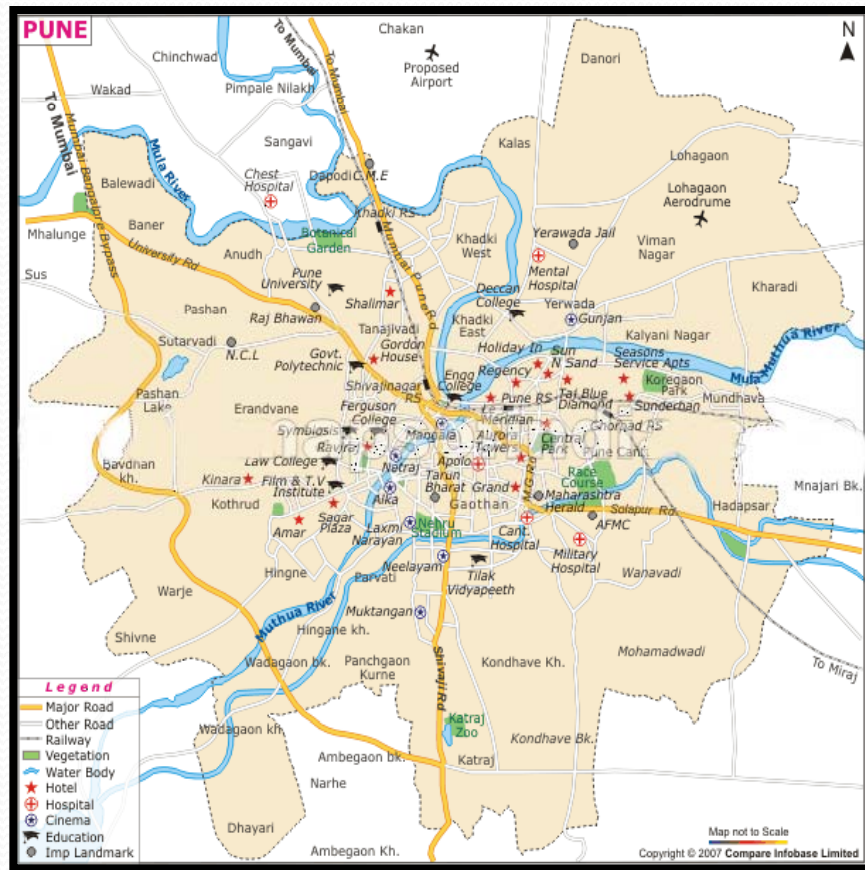
- Shredding and composting of garden waste
- Mandatory onsite disposal in post 2000 residential and commercial schemes
- Data collection for MIS using Mobile SMS
- ALERT G-Complaint Redressal through citizens participation
- Celebration of Ganesh Utsav in Eco friendly manner
- Capping of old dumping site

## SWaCH Cooperative: Public-Private Partnership

- SWaCH Cooperative is the first cooperative in India wholly owned by waste pickers.
- The organization was the joint effort of Pune Municipal Corporation and the waste picker trade union Kagad Kach Patra Kashtakari Panchayat (KKPKP).
- In 2008, the PMC signed a five-year Memorandum of Understanding to decentralize **door-to-door collection services** for households, shops, offices and small commercial establishments and allow SWaCH members to carry out this work.



# Coverage of doorstep waste collection



**Household Coverage with user fee recovery = 3,78, 419 households**

**No. of Waste Collectors = 2300**

**Supervisors = = 80**

**Coordinators = = 11**

**Cycle rickshaws = = 689**

**Buckets = 5958**

## PMC pays for Equipment and Management Costs



# New Portable Sheds for SWaCH



- There are 25 sorting shed Including 6 Portable & Other
- Sonia Gram Udyog Prakalp
  - 1) Aundh
  - 2) Katraj
- 200 – 250 Waste Picker Directly Attached Processor
- 4 TPD of waste is Processed



## Benefits of SWaCH model

- **Decentralized:** Helps PMC to collect waste from door step in decentralized way
- **Cost-effective:** reducing waste transport costs.
- **Energy efficient and environmentally sound:** Waste pickers often travel on foot or scooter and reduces waste sent to landfills.
- **High-resource recovery:** Enhancing recycling and climate change mitigation.
- **Labour friendly:** Makes use of available workers and improves their earnings and quality of work day.
- **Sustainable and accountable enterprise:** Cost and environmental benefits and availability of workforce make decentralized system administratively feasible.

# ECO FRIENDLY GANESH UTSAV BY PMC

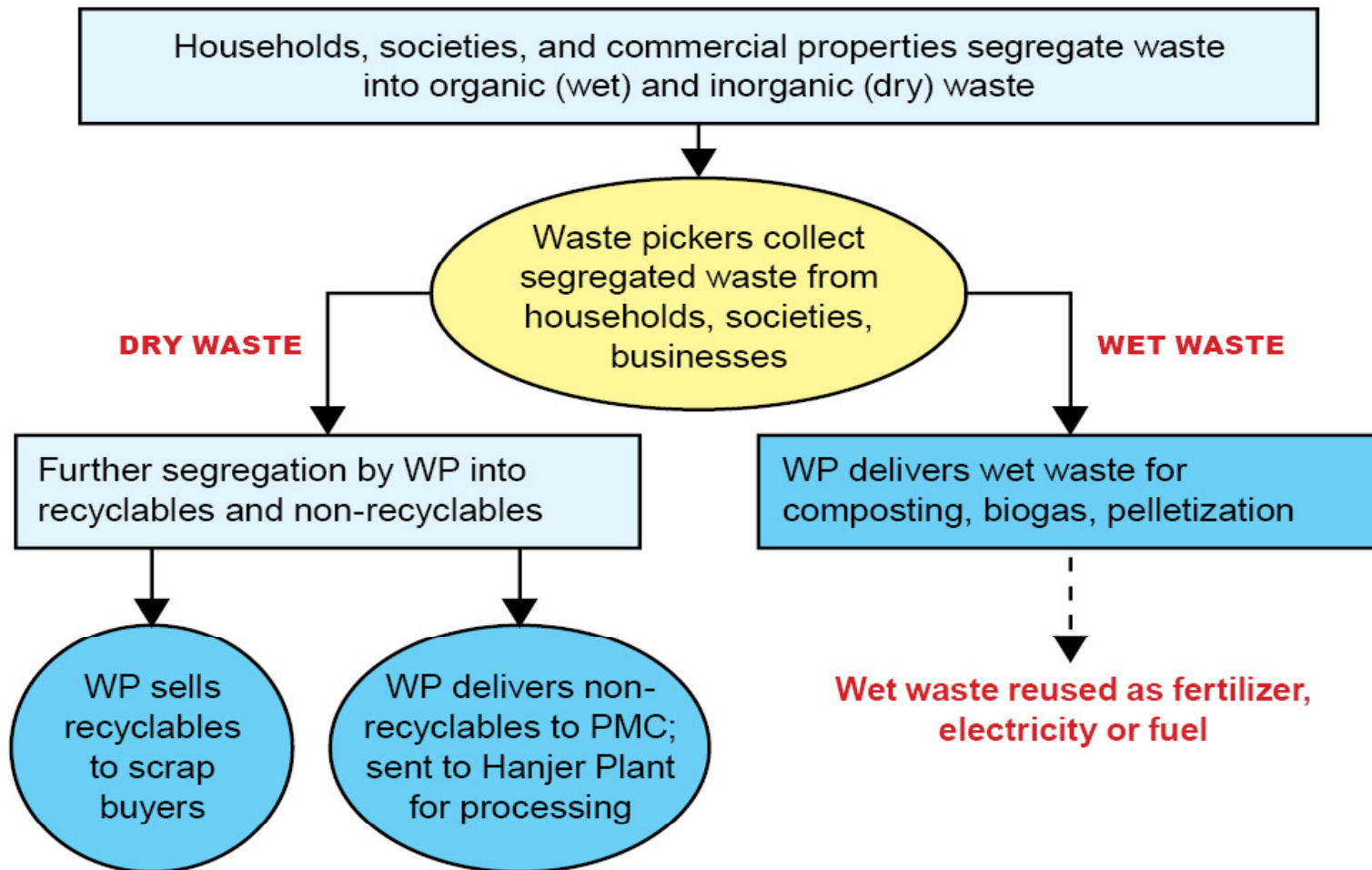




## Pune's Trash Solution: A Zero Garbage City

Adapting Katraj ward case study into an innovative model  
for a citywide system

# Basic structure of Zero Garbage model



# Zero Garbage Pune



## WHAT IS THE MEANING OF 'ZERO GARBAGE'?

1

**ELIMINATING NEED FOR LANDFILLS** by reusing organic waste through biogas, composting and other technology and recycling plastic, paper, glass, metal, etc.

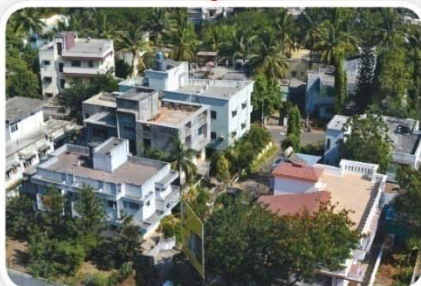
2

**ADDING VALUE TO WASTE** through use of innovative technologies to reuse organic waste and enhancing recycling through segregation and doorstep collection.

3

**CREATING A PARADIGM SHIFT** from garbage as disposal to garbage as a renewable resource by changing attitudes about the value and potential of trash.

## WHO DOES IT HELP? ZERO GARBAGE MODEL HAS WIDE-RANGING BENEFITS



### RESIDENTS

- Cleaner streets and neighborhoods.
- Improved quality of life by reducing health risks, such as dengue fever and malaria, associated with garbage piles.
- Doorstep collection service at low cost.



### WASTE PICKERS

- Improved quality of life with integration into doorstep collection to eliminate need to climb in community waste bins.
- Better health because of new conditions.
- Higher, more stable income.



### GOVERNMENT

- Reduced transportation and landfill maintenance costs.
- Citizens forced to take responsibility for waste generation.
- Cleaner, more appealing city.

### PHASE 1 WARDS

Warje Karve Nagar  
Kothrud  
Aundh  
Ghole Road  
Dhole Patil  
Sangamwadi  
Nagar Road  
Kasaba Visram  
Tilak Road  
Sahakaranagar  
Bhavani Peth  
Hadpsar  
Bibvewadi  
Dhankwadi (a)  
Dhankwadi (b)

**Contact:** Dr. Ketaki Ghatge, Zonal Medical Officer for PMC, at 9689931364 or Saroj Badgujar, Deputy Manager for Janwani, at 9970078596.

# Results in Katraj

- First waste management system in India to receive ISO certification.



- Manual developed for ISO establishes correct practices for waste collection, transportation and disposal.
- Manual outlines process for complaints by both residents and waste pickers.
- Certification process paid by Cummins India.

# Mandatory onsite scientific disposal of solid waste

Residential & commercial schemes. Built after Yr 2000.

**\*Tax Rebate Incentive Scheme\***

DETAILS	No. of Properties
Solar	4075
Vermiculture	10429
Solar & Vermiculture	7254
Vermiculture & Rain Harvesting	1024
TOTAL	22782



# MIS using Mobile SMS

- Aim is to make available real time MIS reports for SWM system
- Deploys up to 5000+ sweepers across 4 zones comprising of 15 wards having a total of 165 sub offices.
- Total attendance at each of the 165 sub office is recorded in registers. Data in registers is used for generating MIS.
- Day to day MIS of all these activities was recorded using Registers.



## **ALERT G**

### **Complaint Redressal-Citizens' Participation**

- Activated new mobile SMS Alert system for timely and effective complaint redressal about garbage containers.
- Citizens have to type- ALERT G Ward Office Name, complaint site area name and complaint and SMS is to be sent to 9223050607.
- PMC officials and staff effectively redress the complaint within 8-10 hrs and give feedback to the concerned complainant.
- Installation of this system will help in forming Public Private Partnership



# Current processing of waste in Pune

- No open dumping since June 2010; scientific processing only.
- Decentralized waste processing plant. (around 27 TPD)

Hanjer Biotech 1 & 2	<ul style="list-style-type: none"><li>• 1000 TPD; Composting, RDF, Pellets and Bio-fuel.</li><li>• Location- Urali and Fursungi</li></ul>
Ajinkya Biofert	<ul style="list-style-type: none"><li>• 100 TPD; Vermi- compost and compost</li><li>• Hadapsar Ramp</li></ul>
Disha Waste Management	<ul style="list-style-type: none"><li>• 100 TPD; Vermi- compost and compost</li><li>• Ram Tekdi Industrial Estate</li></ul>
Biogas and Mechanical Compost	<ul style="list-style-type: none"><li>• 60 TPD; Electricity and Compost</li><li>• 14 Decentralized Plants</li></ul>
Rochem Separation Systems	<ul style="list-style-type: none"><li>• 700 TPD; Electricity</li><li>• Ram Tekdi, Hadapsar</li></ul>

# Hanjer Biotech – Composting and RDF



# Ajinkya Biofert - Composting



# Disha Waste Management - Composting

Dish Waste Management



Disha Waste Management



Dish Waste Management



Dish Waste Management



# on Plants



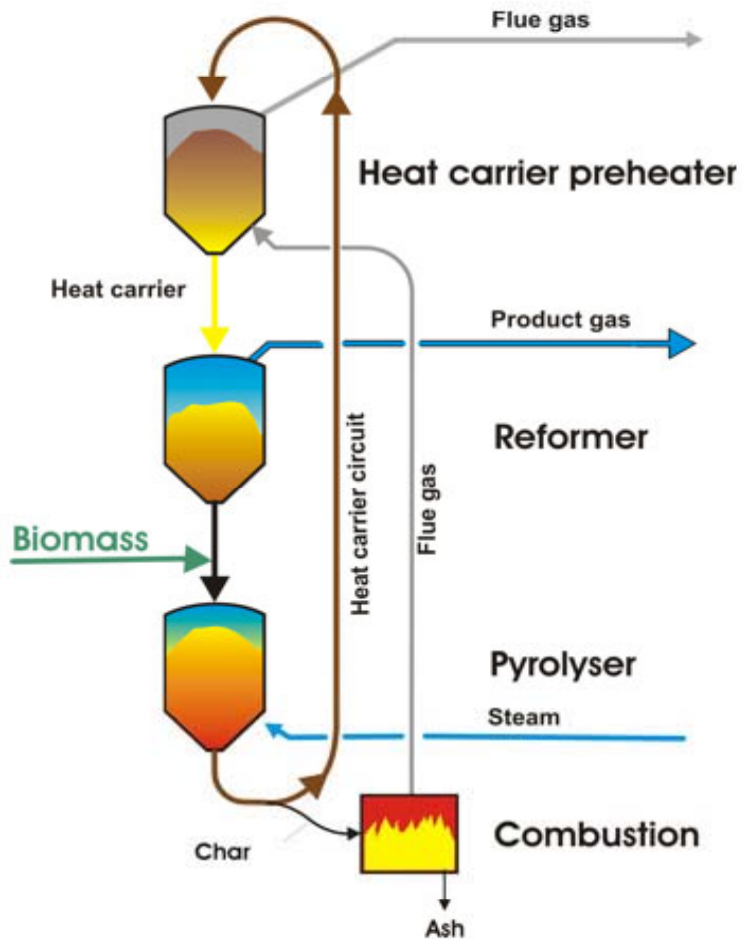
Description	Value
Biogas Generation	300+ / - 5% m <sup>3</sup> /day
Calorific Value	4800-5000 Kcal/cum
Engine Efficiency	25%
Electricity Generation	1.5 kWh/cum of Biogas
Equivalent Electricity Generation	450kWh/day
Auxiliary Power requirement	@50 kWh/day
Net Surplus Electricity for sale	400 kWh/day

## Processing- Mechanical Composting

Sr. No	Location of Biogas Plants	Capacity of Plant
1	Ram Tekdi Garden	2 TPD
2	Aundh Ward office	2 TPD



# Facility for MSW to Energy at Pune Rochem plant



1. MSW Processing plant of capacity 700 TPD
2. Technology: Gasification/Pyrolysis
3. Output: Electricity generation@ 10 MW per hour
4. DBOOT basis
5. Space Requirement: 10000 sq mts
6. Waste disposal in 48 hours
7. Less inert material after treatment
8. Carbon credit system under CDM.

# Rochem Separation System



Shredding



Drying



Pre Conditioning



Gasification

# Scientific Closure of MSW Dump Site




As per MSW Rules 2000, Scientific closure and beautification of 30 hectares of dumping site at Urali Devachi is in progress



# Achievement @ Glance

- **SWaCH model : Substantial reduction in waste handling cost**
- Waste pickers & itinerant buyers collect recyclable materials that amount to **22%** of municipal solid waste
- Reduction in Greenhouse Gas Emissions of **2,94,316 Metric Tonnes of Carbon Dioxide Equivalent (mtCO<sub>2</sub>-eq)** per annum (2006)
- **Zero Garbage Ward:** improved service delivery of DTDC and segregation of waste.
- **ISO Certification for Decentralized Solid Waste Management System:** Easy to transfer and replication

- 
- **Energy generation :** More than half MW of energy from 60 tons of organic waste using biogas (*Pay back period-3 Years*)
  - About 10 MW /hr of energy from 700 Tons of waste by using plasma pyrolysis technology  
*Less space required, no capital cost, and share in Carbon credits.*
  - 100 percent scientific disposal since 2010 and no open Dumping - *Scientific land filling & Capping*



# Awards

- NagarRatna Award by JNNURM in 2010-2011.
- ICON SWM 2012- Award of Excellence in SWM.
  - By International Society of waste management, Jadhavpur University & Karnataka Govt, 2011-12.
- HUDCO Awards for Best Practices to “ Improve the living Environment 2012-13”



# Challenges

## Primary collection:

- Limitation of waste collection coverage in slum areas as collection of user fee is not possible
- Improving professionalism among the waste pickers .Success of the model depends upon economic class, psychology , demographics of the area
- Political intrusion disturbs the system
- Existence of the community bins gives the relaxation to the citizens to dispose mixed waste.
- Lack of proper sorting sheds. Place for segregating the waste not available.
- Gap in market availability for the Scrap dealers and no proper market value chain.
- Irregularity in payment by citizens disturbs the model.
- With segregation at source, the Society watchman and maids take out valuables which affects overall income and sustenance of the model.
- Getting Citizens to participate is the biggest challenge.



## Secondary collection and transportation:

- Synchronization of both the primary (operated run by waste pickers) and secondary ( operated by PMC staff) systems is difficult
- Increased prices of fuel disturbs the economic calculation

## Processing and scientific disposal:

- Land acquisition for garbage processing and changing mindset of citizens
- Identification of proper technology and its sustainability
- Success of the processing technology depends upon economic status, psychology , demographics of the area

## Street Sweepings:

- Inadequate staff and out sourcing leads to labor issues
- Mechanical sweeping – Operation and Maintenance issues



# CONCLUSION

- The city is making use of important partnerships and achieving results with involvement of informal sector, citizens, NGO's & with the active participation of elected representatives.
- Combination of decentralized and centralized models of waste processing with sustained application of appropriate technology.
- Zero Garbage and SWaCH Models enhance the quality of work of the waste picker, while also meeting demands for neighborhood cleanliness and limiting garbage sent to landfills.

- 
- Thank you for patient listening .