

08<sup>th</sup> FEBRUARY 2019



# GAYA

## City that Segregates

08<sup>th</sup> FEBRUARY 2019

### WASTE SEGREGATION

GAYA MUNICIPAL CORPORATION, GAYA



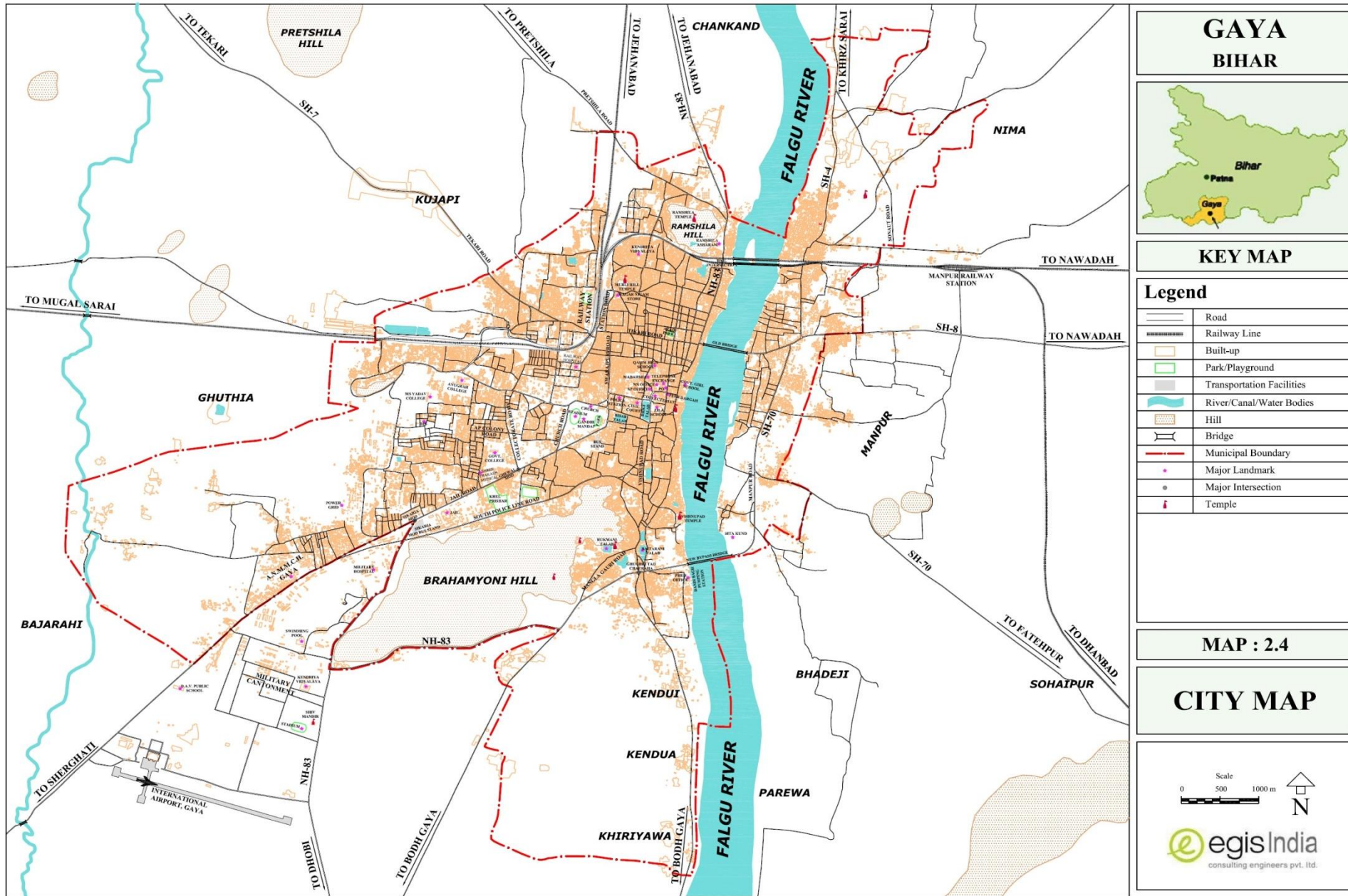


# Introduction to the City

- Gaya is one of the thirty-eight districts of Bihar state, India. Gaya city is both the district headquarters and the second-largest city in Bihar. Gaya is an important Tourist destination.
- It is surrounded by small rocky hills (*Pretshila, Ram-Shila and Brahmayoni*) by three sides and the river (Phalgu) flowing on the fourth (eastern) side. Geographically it is located on the intermediary zone coinciding with the transition of Gangetic plains to the Chotanagpur plateau.
- It is a place sanctified by the Jain, Hindu and Buddhist religions. Gaya is famous all over India for its religious importance for the ritual of Pinda-daan which is performed at the 45 holy sites in Gaya during a 15 day Pitrapaksha mela.
- Gaya is the second-largest contributor to the economy of Bihar, after Patna. Agriculture is the leading economic activity of the district.



# City Map



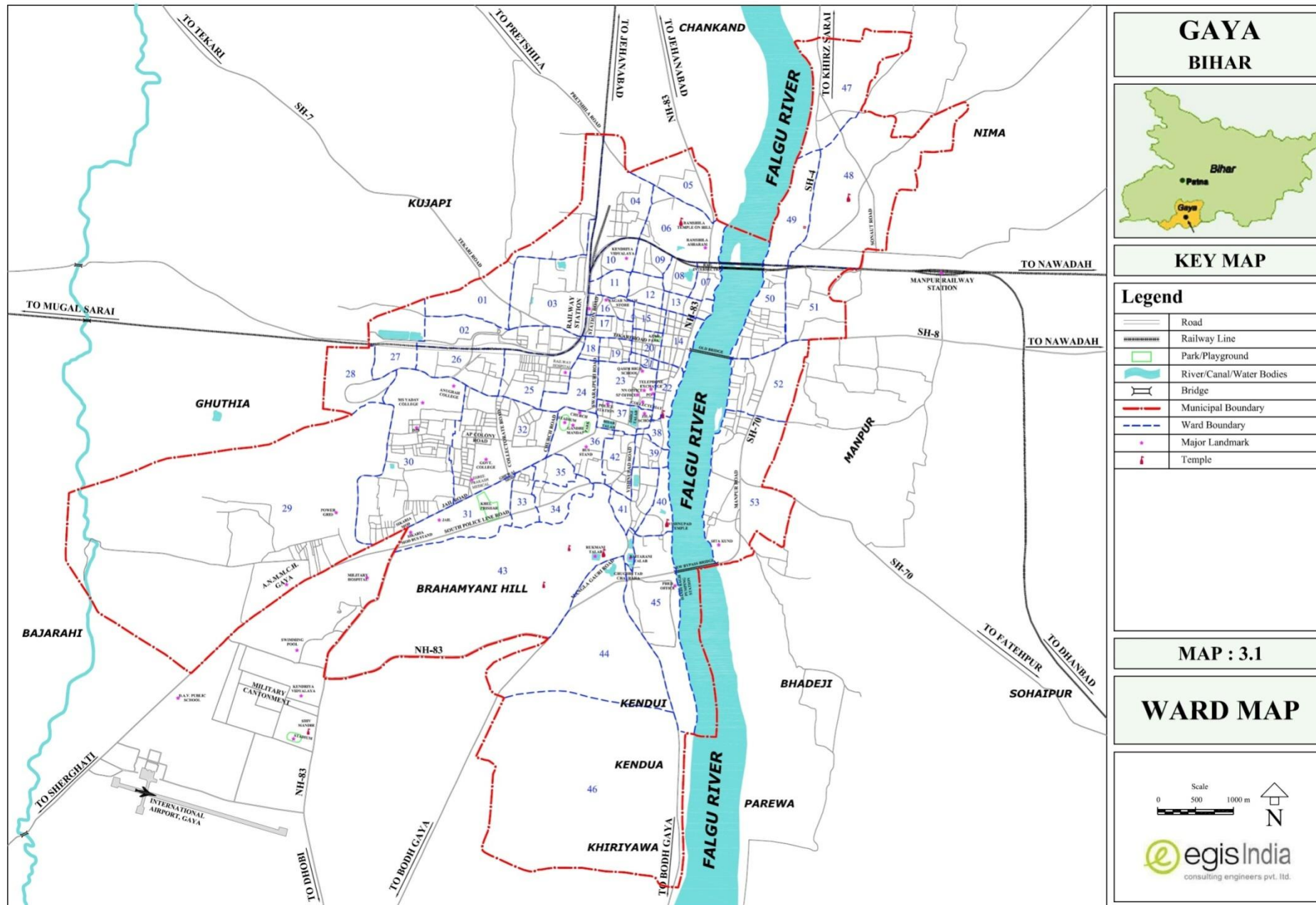
- The Adjacent map shows the Municipal boundary of Gaya Municipal corporation.

- The Gaya Municipal corporation has a vast coverage area with different geographical scenario covering -

1. Plain land
2. Hills
3. River
4. Sarovars



# City Ward map



- The Adjacent map shows the present condition of ward mapping.
- The Gaya Municipal corporation has 53 wards in total.
- Population – 4,74,093 (As per 2011 census)
- Municipal Coverage area: 50.17 Sqkm.
- No. of Households –
- ❖ As per New GIS mapping: **1,10,000**

# Gaya Municipal Corporation, Introduction:



- Gaya Municipal Corporation was formerly known as Gaya Nagar palika, consisting of 10 wards.
- It was rechristened as Gaya Municipal Corporation (Gaya Nagar Nigam) on 16<sup>th</sup> November 1983.
- The Gaya Municipal corporation has 53 wards in total.
- GMC plays an important role in cleanliness and waste management during 15 day long Pitrapaksha mela, which sees a footfall of around 3 lakhs per day
- The scope of work of Gaya Municipal corporation is vast, with the responsibility of Solid waste management in the city.



# Municipal Solid Waste Management

## Municipal Solid waste consists of:

- Household wastes
- Construction and demolition debris
- Sanitation residue
- Waste from streets
- Commercial wastes
- Institutional wastes

With rising Urbanization and change in life style and food habits, the amount of Municipal solid wastes is increasing rapidly.

Most of the Municipal Solid wastes generated can be classified as:

1. **Wet solid Wastes**
2. **Dry solid Wastes**
3. **Inert and Dust**

## Gaya Municipal Solid Waste scenario:

Total solid waste generated in Gaya Municipal area: 250 MT

### Composition by Weight:

1. Wet solid Wastes: 75 %
2. Dry solid Wastes: 20 %
3. Inert wastes: 5 %



**GAYA MUNICIPAL CORPORATION INTRODUCED  
SOLID WASTE MANAGEMENT THROUGH  
WASTE SEGREGATION SYSTEM**



# Before Introducing Waste Segregation System

- The Municipal Solid waste generated was disposed off in mixed way at ULB's own dumping ground situated in Naili village 8 km from heart of the town.
- The waste were dumped without any segregation and processing.
- The situation due to unprocessed dumping was getting worse day by day, causing harmful effects on the environment.
- Need of solid waste segregation and Processing was felt and as an responsible ULB, Gaya Municipal Corporation introduced the Waste Segregation System in the City.



**PROGRAM SCOPE**

**ACTIVITIES PERFORMED**

**AREA COVERAGE**

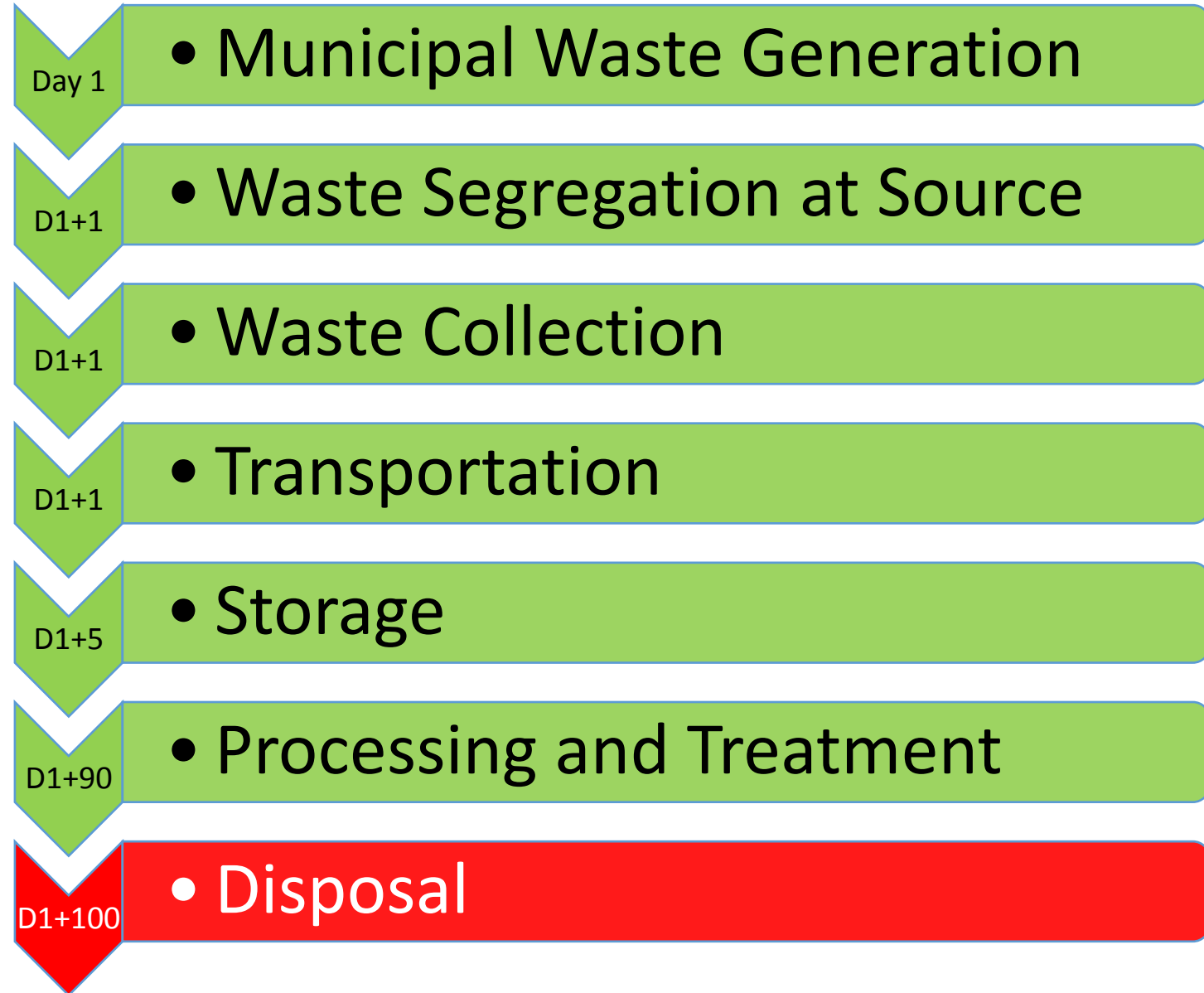
**CHALLENGES**

**IEC ACTIVITIES**



# Program Scope: Methodologies Adopted

- Gaya Municipal Corporation Conducted the Awareness program with the households for segregation of waste.
- Identification of gaps in segregating the waste at the household level.
- Listing the gaps and discussion with the informal sector workers and the residents on addressing the gaps.
- Conducting training / orientation programs to all stakeholders. This also included home composting activity training.
- Reporting on a weekly basis on each activity.
- Targeting Zero Waste Colonies.



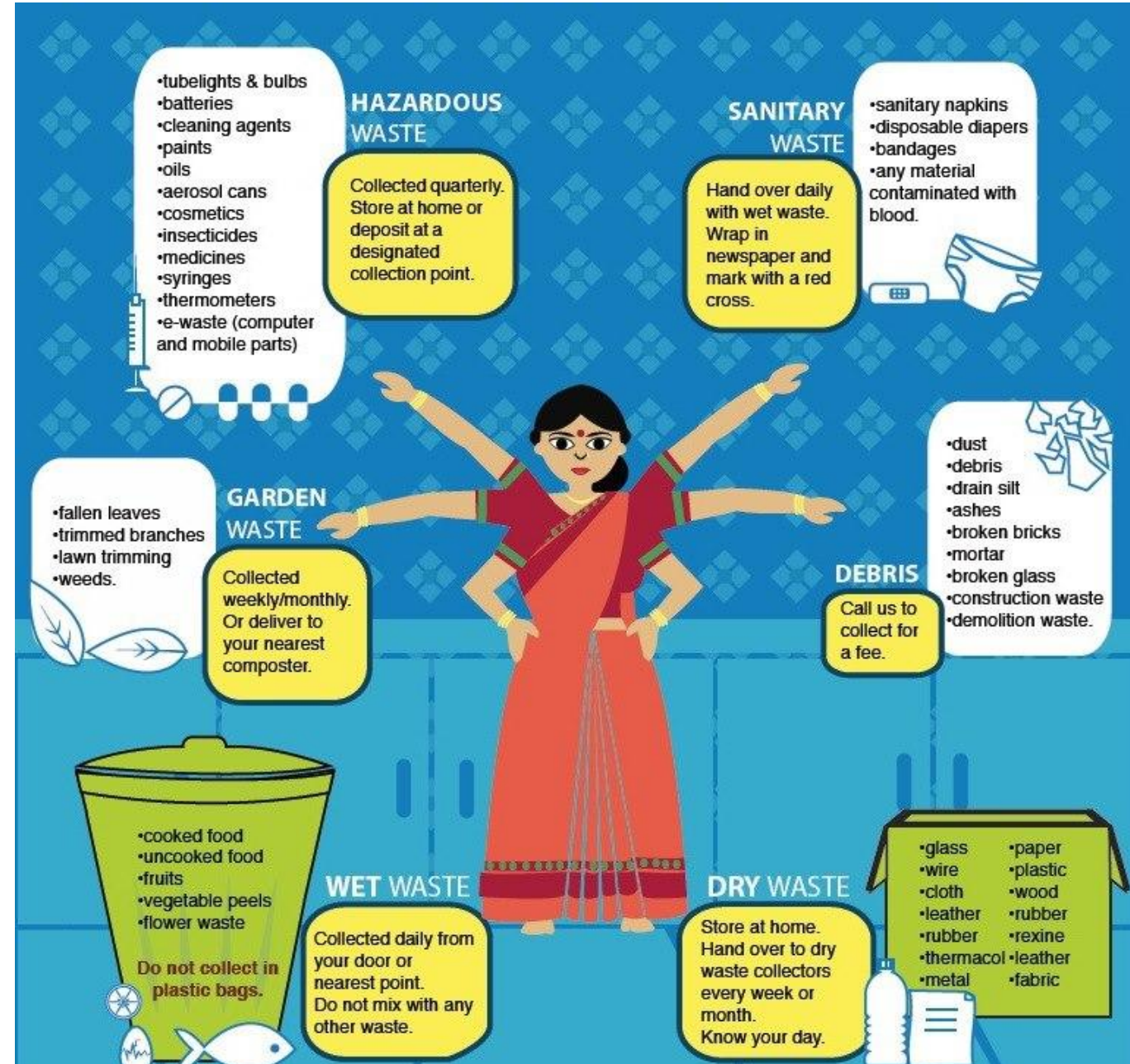


# GMC Scenario: Municipal Waste Generation

- There are various household solid wastes generated in the city which need to be treated and disposed of.

Physical characteristics of MSW samples

S. No	Physical Characteristics	Range	Average (%)
01	Organic Waste	22%-44%	32.6%
02	Plastics	8%-14%	10.5%
03	Metals	0%	0.2%
04	Glass & Ceramics	0%-1%	0.3%
05	Rags/Cloth/Cotton	0%-7%	3.6%
06	Rubber & Synthetics	0%-5%	1.1%
07	Leather	0%-2%	0.6%
08	Garden Waste	1%-8%	5.4%
09	Stone, Debris & Boulders	1%-9%	4.2%
10	Paper	1%-6%	3.9%
11	Coconut Shells	4%-13%	6.9%
12	Organics Waste mixed with Sand & Slit	18%-48%	30.9%
Total			100%

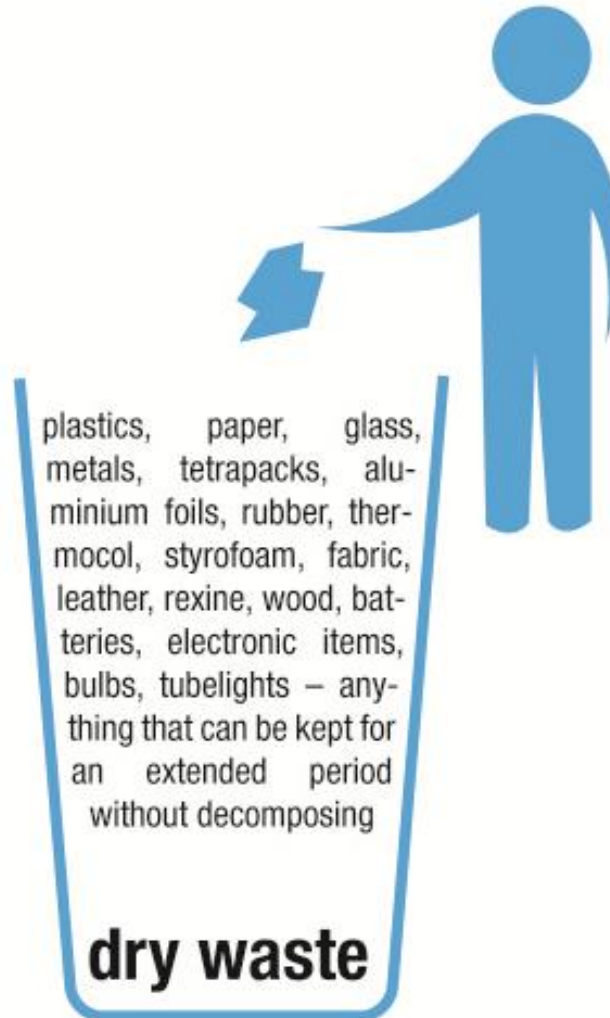




# GMC Scenario: Waste Segregation at Source

The waste are broadly categorised as two types as per its properties:

1. Dry wastes
2. Wet wastes



## Wet Waste

- Food waste of all kind including eggshells and bones
- Flower, fruit and waste including juice
- Vegetable peels
- Household garden/plant wastes
- Soiled paper (used toilet paper, paper towel etc.)



## Dry Waste

- Paper (newspaper, notebooks etc.)
- Cardboard & cartons
- Containers & packaging of all kind excluding those containing hazardous materials
- Compound packaging (tetra pack etc.)
- Plastics
- Wood
- Rag
- Discarded Clothing



# GMC Scenario: Waste Collection

Gaya Municipal corporation has distributed household bins of 10 lit capacity to all the house holds

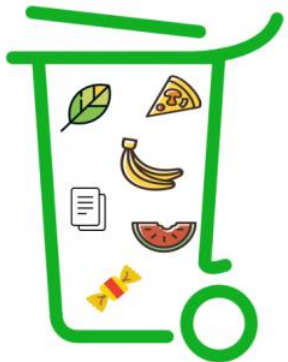
[Link](#)

Two bins were distributed to each household, one of Blue colour and other of green colour for Dry and wet wastes respectively

Blue Bins: Dry Wastes

Green bins: Wet Wastes

WET WASTE



DRY WASTE



# GMC Scenario: Waste Transportation

Gaya Municipal corporation adopted two systems for the transportation of the collected wastes.

1. 8 Bin Tricycle – For Narrow lanes – 1 person (as Whistle blower and collector)
2. Auto Tipper – For Broad roads – 2 persons (1<sup>st</sup> as driver 2<sup>nd</sup> as Collector and Whistle blower)

**As per the DPR Guidelines –**

- Each tricycle covers - 200 household.
- Each Auto Tipper covers – 1000 households

**Quantity of Tricycle and Auto Tipper in the City –**

- Tricycle – 300 Nos.
- Auto Tipper – 77 Nos.





# GMC Scenario: Waste Storage

Gaya Municipal corporation has identified four locations for the storage of the solid segregated wastes collected.

**Total 53 Wards: Divided in 4 Zones -**

1. Old GRDA Campus.
2. Gurudwara Bum Police Campus.
3. Ishwar Chowdhary Halt (Manpur).
4. Naili Dumping Ground.

## **GAYA MUNICIPAL CORPORATION**

**Has taken the GRDA Campus as a PILOT PROJECT**

- Dry and Wet wastes collected separately was brought to GRDA storage point.
- Two open platforms were created for dumping the dry and wet wastes.
- Segregation of minor mixes were done.



Auto Tipper dumping the wastes on the open platform at GRDA



Segregation of minor mixes in wastes on the open platform at GRDA



GRDA Campus



Naili Dumping Ground



# GMC Scenario: Waste Processing (WET Wastes)

- For Treatment and processing the wet wastes were dumped in compost pits.
- As per UD&HD (GOB) guidelines, compost pits were constructed at GRDA Campus in of size 4' x 4' x 4'.
- The capacity of 1 pit – 5000 kgs (50 kg/day upto 100 days)
- Quantity of Compost pits constructed:
  1. At GRDA Campus – 60 nos.
  2. At Naili Dumping ground – 180 nos.
- Bio Compost/Fertilizer produced: 15 %
- Time Duration – 90 days after dumping.



During Pitrapaksha temporary pits were constructed for composting of pind materials



Temporary pits constructed for composting of pinds collected during Pitra paksha



Compost pits constructed at GRDA Campus



Compost pits constructed at Naili Dumping Ground



# GMC Scenario: Waste Processing (Methodology)

- The wet waste was dumped in the pits in different layers for proper composting and high yield of fertilizers.
- Following is the pictographic view of sections of Compost pit.



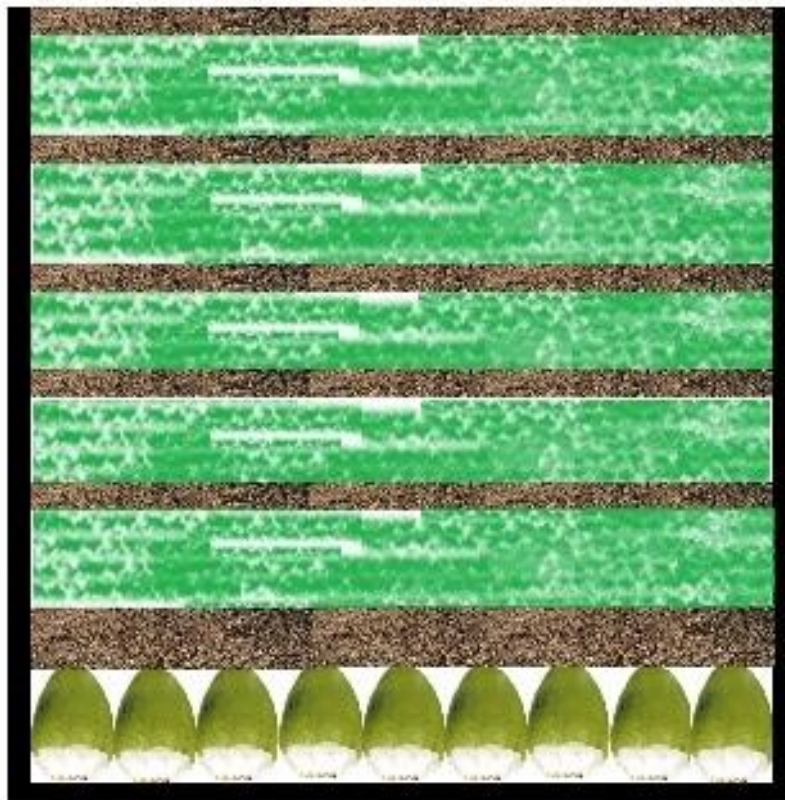
Wet Wastes



Leaves, grass, husk



Used Green Coconut Shell



- layer of dry leaves, grass, husk
- 4" layer of wet wastes
- layer of dry leaves, grass, husk
- 4" layer of wet wastes
- layer of dry leaves, grass, husk
- 4" layer of wet wastes
- layer of dry leaves, grass, husk
- 4" layer of wet wastes
- layer of dry leaves, grass, husk
- 4" layer of wet wastes
- 6" layer of cow dung
- Used Green coconut

Typical Compost Pit Section for composting of wet wastes



Cow Dung



# GMC Scenario: Waste Processing (DRY Wastes)

- 17 Components are identified as dry wastes.
  - After the dumping of dry wastes at the open platform, further Segregation is done.
  - The 17 types of dry wastes are stored in 17 separate PVC boxes of 260 lit capacity.
  - The main purpose of further segregation of dry wastes is to sell it separately to get higher cost of each materials.
- 
- As per analysis:
    1. Mixed dry wastes generates ₹ 4/kg revenue.
    2. Segregated dry wastes generates ₹ 10/kg to ₹ 200/ kg



## Dry Waste

- Paper (newspaper, notebooks etc.)
- Cardboard & cartons
- Containers & packaging of all kind excluding those containing hazardous materials
- Compound packaging (tetra pack etc.)
- Plastics
- Wood
- Rag
- Discarded Clothing

Some of the important dry wastes are listed above



# GMC Scenario: Packaging and selling

- The Bio compost thus produced is taken out from the pits (In next couple of months).
- The compost/fertilizers are then put into Grinder to produce the granular and uniform size of the composts.
- Further the composts are moved through the shredder to separate the granular compost and unprocessed large size wastes.
- The large size wastes are thus again treated.
- The fine granular/dust compost/fertilizers are ready for packaging and selling.

## Packaging Unit:

- Will be packed in 1kg, 2kg & 5 kg unit.
- Jute bags will be used for the packaging.
- Will be sold to open market as well as government departments.

## Government Policies:

### ❖ Bihar Government:

- As per the GOB guidelines, it is mandatory for Department of Agriculture to purchase the compost at fixed price of ₹ 6/kg.

### ❖ Central Government Incentives:

- To promote Bio compost in cities, GOI has proposed a incentive of ₹ 1.5/kg.

### ❖ Minimum Revenue Generation:

- GOB - ₹ 6.0/kg (Purchase value)
- GOI - ₹1.5/kg (Incentives)

- **Total Minimum Revenue - ₹ 7.5/kg**



# Implementation by GMC

## CHALLENGES:

- Ensuring 100% door-to-door collection of Segregated Waste from each household of unauthorized and slum areas.
- Ensuring purchase of the dry waste from the waste collector on a daily basis
- Ensuring proper segregation of the wastes at source as dry and wet wastes.
- Lack of awareness among public regarding the same.

## IMPLEMENTATION:

- To Educate, Interact and Communicate with the real producers of household wastes especially the housewives.
- A team of 23 Shelf Help Groups (SHG) women was formed.
- Duty of SHG's women:
  1. Reach every household of wards covered under Pilot project.
  2. Educate the house owners with live demonstration regarding the Identification and Segregation of Dry and Wet wastes.
  3. Guide the house owners during waste collection.



Group of SHG Women



Group of SHG Women



SHG Women with the 8 bin tricycle



# Implementation by GMC

- Various Public awareness programs and workshops were organised.
- Public awareness campaigns were organised.
- Advertisements and moving auto with waste segregation and management posters were run in the city.
- Cleanliness campaigns were organised.



Cleanliness campaigns at night



Cleanliness campaigns at night by women



Advertisements on moving Autos



# Implementation by GMC



Training program on Solid waste management at GMC



Training program on SWM



# Solid waste Segregation by GMC



The works in field of Solid waste management/Segregation was recognised by **“Forum of Cities that Segregates, A centre for Science and Environment Initiatives”**

GMC was awarded for the works on **Municipal Solid waste Management**



# शहर में गंदगी दिखी, तो कार्रवाई के लिए रहें तैयार : नगर आयुक्त

- निगम सभागार में कर्मचारियों के साथ बैठक कर दिये निर्देश
- कहा, साफ-सफाई से किसी तरह का सम्झौता नहीं

संवाददाता > गया

नगर आयुक्त का प्रभार लेने के बाद शुक्रवार को जनार्दन प्रसाद अग्रवाल ने निगम सभागार में कर्मचारियों के साथ बैठक की। बैठक में नगर आयुक्त ने कहा कि साफ-सफाई से किसी तरह का सम्झौता नहीं किया जायेगा। गंदगी की शिकायत मिलने पर कर्मचारी कार्रवाई के लिए तैयार रहें। श्री अग्रवाल ने कहा कि सभी लोग स्मार्ट फोन से अपने-अपने प्वाइंट पर सफाईकर्मी का फोटो खींच कर निगम ग्रुप में डालें। शहर में गंदगी दिखेगी, तो आप जिम्मेदार होंगे। उन्होंने कहा कि आधारभूत संरचनाओं का विकास, पानी, नाले, सड़क व पार्क का रखरखाव निगम की प्राथमिकता



नगर निगम कार्यालय में पदाधिकारियों के साथ बैठक करते मेयर वीरेंद्र कुमार, डिप्टी मेयर मोहन श्रीवास्तव व नगर आयुक्त जनार्दन प्रसाद अग्रवाल।

है। नगर निगम का काम शहरवासियों को मूलभूत सुविधाएं मुहैया कराना है। काम में कोताही बर्दाश्त नहीं की जायेगी। टैक्स कलेक्टर अगर फील्ड में जाये, तो आई कार्ड पहन कर ही रहें। उन्होंने कहा कि राजस्व बढ़ोतरी के लिए हर सप्ताह टास्क दिया जायेगा। इस दौरान इसे पूरा भी करना होगा।

उन्होंने कहा कि आई कार्ड जारी करने का निर्देश दे दिया गया है। वहीं, बैठक में उपस्थित वार्ड निरीक्षक, सफाई पर्यवेक्षक और सफाई प्रभारी को ड्रेस देने का भी निर्देश दिया। बैठक में मेयर वीरेंद्र कुमार व डिप्टी मेयर मोहन श्रीवास्तव के साथ निगम के अधिकारी व कर्मचारी मौजूद थे।

[Link](#)



THANK YOU



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WASTE SEGREGATION