

## Varanasi, India

### City Information

**Population:** The population in Varanasi for 2018 is estimated to be 1,441,251.

Owing to its rich tourism potential, the estimated daily flow of tourists and pilgrims to the city is 25,000.

**Area (km<sup>2</sup>):** 82.1

**Climate:** Average temperature 26.6°C

**Main Economic Activities:** Silk production, Glass beads, Religious and cultural tourism, Gulabi Meenakari, stone and wood carving

**City website:** <https://varanasi.nic.in/>



### Country Information

**Population:** 1,339.2 million (estimated by World Bank in 2017)

**Area (km<sup>2</sup>):** 3,287,263

**Economy and GNI/Capita:** Lower middle and 2020 USD

#### Main Economic Activities

- **Agriculture-** About 14% share in GDP of the country and more than 50% of the total population dependent on agriculture sector.
- **Industry sector-** City has power looms as a cottage industry. Varanasi is famous for woodwork and silk weaving.

- **Service sector**- 60% of the GDP contribution comes from the services sector. Banking, Finance, Business Process Outsourcing - and most importantly Information Technology services.

**Government Agencies responsible for guidance on waste legislation**

- Ministry of Environment, Forest and Climate Change, Government of India  
<https://parivesh.nic.in/>
- Central Pollution Control Board  
<http://www.cpcbenviis.nic.in/>
- State Pollution Control Board  
<http://www.uppcb.com/>

# MSW Sector Overview: City Level

## Classification of MSW

It consists of household waste, construction and demolition debris (C& D), sanitation residue, and waste from streets, generated mainly from residential and commercial complexes. As per the Ministry of Environment Forest & Climate Change (MoEFCC). It includes commercial and residential waste generated in municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes.



## MSW Generation

- 273,294 tonnes/year for 2018 (GIZ-TERI, 2018)
- For 2018, per capita waste generation was estimated 211.7kg/capita/yr. (GIZ-TERI, 2018)

## Collection Coverage and Type

- Waste collected inside formal collection zone is 76.9% in 2018. (GIZ-TERI, 2018)
- From November 2020, Varanasi Nagar Nigam will cover 100% door-to-door collection. There is a PPP arrangement being done.

## Waste Composition

Waste Composition	Percentage (%)
Food Waste	14.75
Green	27.20
Wood	3.10
Paper/Cardboard	1.00
Textiles	5.20
Plastic	6.00
Metal	1.10
Glass	6.00
Tires	4.20
Others	31.45
Total	100

## Waste Management Practice

- **One Composting plant at Karsada started in 2016-** Here about 283.03 TPD of wet waste is diverted towards composting in 2018.
- **Anaerobic digestion in three Bio-methanation plants (Capacity 5 TPD each) started in 2017-** For anaerobic digestion on an average 3.56 TPD of waste diverted to the three bio-methanation plant.
- **A waste combustion using waste to energy gasifier technology-** About 25TPD of waste diverted to this facility.
- **Material Recovery Facility-** A MRF is also running from January 2020.
- **Karsada Landfill-** About 102.6 TPD end up to this landfill.

- The waste collection and transport fleet in Varanasi runs on diesel. There are 88 Light Motor Vehicles (LMVs) and 67 Heavy Motor Vehicles (HMs) currently available for municipal solid waste collection and transport (GIZ-TERI, 2018).

#### **Formal Waste Sector**

- Until now Varanasi Nagar Nigam collects the waste with the help of Kiyana solutions and IL&FS. However, from November 2020, all door to door collection will be covered by AG Enviro.
- Until March 2020 all three bio-methanation plants were operated by ORSPL, now all bio-methanation plants are handed over to Varanasi Nagar Nigam.
- The composting plant at Karsada is currently operated by Excel Industries.
- Material Recovery Facility at Bhawania Pokhari is being operated by Trilok Chand Enterprises, this is a pilot facility with 2 TPD capacity.

#### **Informal Waste Sector**

Informal waste sector has a major role to play in recycling of waste. There is an established network of waste collector, waste dealers and recyclers. The waste collectors are under informal engagement. VNN has in past conducted training programs for informal sectors, even issued ID cards, but they are directly not part of VNN activities. They recover recyclables from intermediate transfer stations at present.

#### **Financing of MSW**

- Each year Varanasi Municipal Corporation spends 31% of its total budget on SWM.
- The bio-methanation plants were until the beginning of 2020 under Corporate Social Responsibility arrangement funded by IOCL.
- At present, there is no user charge; property taxes are collected from formal settlement.

#### **Waste Management Challenges**

- Waste characterisation at various levels of management is unknown. Ingression and recycling rates of informal recycling is not known. City wants to establish Material recovery facilities but challenges persist in doing so. There are 19 potential sites identified for MRF facilities.
- Capacity building among the citizens and participation on door-to-door collection.
- Transform the present landfill into engineered landfill. Access to this facility is also lost in period of high river levels.
- Improve the quality of compost. The current challenge is waste segregation at source.
- Sustainably running all three decentralized bio-methanation plant is challenging. Due to un-segregation of organic waste, plant operators find it difficult to operate these plants.
- Space problem for BWG to manage their own waste. Although many BWGs are willing to manage their waste at source, there are constraints.
- The landfill facility is about 25 kms from centre of city. It takes lot of fuel and resources to transport this waste.

#### **Technical Assistance**

- Reducing transportation costs.

- Financial sustainability of decentralized plants and locations/operations for coming biomethanation plants.
- Mechanisms to make Varanasi litter free and reduce emissions from waste sector.
- Better manage organic waste and move more waste to circular economy loop.

## MSW Sector Overview: Country Level

### General description and overview of common practice

About 62 million tonnes of waste is generated annually, out of which 5.6 million is plastic waste and 0.17 million is biomedical waste. In addition, hazardous waste generation is 7.90 million TPA and 15 lakh tone is e-waste. In which 43 million TPA is collected, 11.9 million is treated and 31 million is dumped in landfill sites.(Bureau, 05-April-2016 17:05 IST)

### Waste Generation (per capita/year) and Composition

This varies from 0.17kg/c/day – 0.6kg/c/day, average being 0.45kg/cap/day.

### Collection Coverage

*[% of population receiving collection services]*

### Number of Landfills/MSW Disposal rate (tonnes/year)

Until 2010-11, there was record of 59 landfills constructed in the country, 376 landfills under planned and 1305 landfill sites were identified for future use.(CPCB, STATUS REPORT on MSW, 2013)

### Recycling Rate

*[if known; ideally for different fractions: metals, glass, plastics, paper & cardboard. If no figures are available descriptive information can be given]*

### Waste management of Organic fraction (composting, anaerobic digestion)

Yes, AD and composting is practiced in cities, Varanasi also promoting home composting for manage the organic waste at household level.

### Energy Recovery Rate

*[Mention if energy is recovered from waste, and if so by what means (landfill gas; anaerobic digestion; thermal treatment etc.) and from what quantities of waste, if known.]*

## City Level

### Aimed at improving waste management in general

- Three bio-methanation plant for managing organic waste in decentralized manner.
- A centralized compost plant at Karsada.
- Different NGOs involving in IECs and make aware the citizens for systematic SWM.
- TATA trust is working in transforming the wards into model ward.
- Ongoing project Development and Management of NAMA in India.
- C&D plant will also be commissioned in few months, presently under development phase.



### Aimed at addressing climate change and reducing SLCPs through waste related activities

Varanasi Municipal Corporation is working on streamlining waste management activities and target waste at source. VNN would however like to work in this direction. VMC is planning to install seven more biomethanation plant in future. Waste NAMA is being piloted at present in Varanasi whereby means for capacity building and ways to reduce GHG emissions are being identified.

## Country Level

### Aimed at improving waste management in general

Swachh Bharat mission aims to provide 100% population coverage for waste management by 2026. The aim was to achieve 80% coverage by 2019 and thereafter 2% every year. There is also a Swachh Survekshan every quarter that helps ULBs scale up their management practices and document them for obtaining higher ranks.

### Aimed at addressing climate change and reducing SLCPs through waste related activities

Country does have declared NDCs that covered waste sector as well.

### **City Level**

#### **Legislation governing MSW management**

SWM By Laws and Solid Waste Management Rules 2016.

#### **Guidance for MSW management (after legislation, before inspection activities)**

Guidance documents on MRF, landfill siting criteria's are given by Swachh Bharat mission guidance (under MoHUA) and CPHEEO technical wing (MoHUA) and central pollution control board (CPCB) under MoEFCC.

#### **Inspection activities/supervision and enforcement of legislation**

Done by Municipal Staff and Uttar Pradesh Pollution Control Board.

### **National Level**

#### **Legislation governing MSW management**

Solid waste Management Rules 2016

#### **Guidance for MSW management (after legislation, before inspection activities)**

Guidance documents on MRF, landfill siting criteria's are given by Swachh Bharat mission guidance (under MoHUA) and CPHEEO technical wing (MoHUA) and central pollution control board (CPCB) under MoEFCC.

#### **Inspection activities/supervision and enforcement of legislation**

Central Pollution Control Boards

## **Current Projects or Activities Aimed at Reducing SLCP Emissions**

At present Varanasi Nagar Nigam have three decentralized bio-methanation plants of 5 TPD organic waste handling capacity each, and one material recovery facility.. The basic idea is to come-up with solutions which can prevent transportation of waste. One C&D Waste processing plant under is construction at Ramana site with capacity of 200TPD.

City has also undertaken garbage vulnerable point mapping of fifteen wards in Varanasi to improvise waste management and restrict littering of waste.



## Key Stakeholders

- IL&FS (<https://www.ilfsindia.com/>)
- Kiyana Solutions
- A to Z (<http://www.a2zgroup.co.in/>)
- TERI-GIZ (<https://www.teriin.org/>)
- TATA Trust (<https://www.tatatrusters.org/>)
- Japan International Cooperation Agency(<https://www.jica.go.jp/english/>)
- YASHU –ORSPL
- AG Enviro Infra Projects Pvt Ltd

## Additional Useful Information

- Initiative for reducing Plastic in Varanasi-
  - Plastic Waste management programme through UNDP
  - Plastic lao thaila pao,
- TERI-GIZ team developed pilot model colonies in Varanasi to understand challenges in waste segregation and ways to improve waste management.
- Door- to-door segregated collection is planned to start in all wards of Varanasi from November 2020.
- One C&D processing plant is under construction and it will be operated by M/s IL&FS Environmental infrastructure& Service Limited.

## Contacts

*[Include name, title, phone and email]*

### Waste Initiative City Contact

Mr. Surjeet Singh  
Data Analyst (Varanasi Nagar Nigam)  
Cell: +91-7618872872  
Email- surjeetsingh891989@gmail.com,

### Waste Initiative Country Contact

Mr. Kaushal Vashisht,  
Ministry of Environment, Forest and Climate Change (MoEFCC)

### Municipal Waste Representative (if different from the city contact for the Waste Initiative)

### Other Municipal Representative