

Panaji, India

City Information

Population: The population in Panaji is 40,017 as of 2011

Area (km²): 8.27

Climate: Average temperature 27 °C, Average precipitation 2744mm

Main Economic Activities: Institutions, hotels, tourism etc.

City website: <http://www.ccpgoa.com/>



Country Information

Population: 135.26 X10⁷

Area (km²): 3.287 million Km²

Economy and GNI/Capita: Lower-middle income economies (\$1,036 to \$4,045).

Source: <http://data.worldbank.org/about/country-classifications>

Main Economic Activities

Government Agencies responsible for guidance on waste legislation Ministry of Environment, Forest and Climate Change (MoEFCC)

<http://moef.gov.in/>

MSW Sector Overview: City Level

Municipal Corporation of the City of Panaji (CCP) has developed an extensive system for collection, segregation, storage, transportation and processing/disposal of municipal solid waste through various scientific/ Using Modern Technologies. CCP comprises of 30 Municipal Wards within its territorial jurisdiction. Within the 30 Wards, seven waste management zones have been setup. CCP through its door-to-door collection system covering all the 30 Wards collects segregated municipal solid waste, which is transported by different vehicles assigned for wet waste and dry waste fractions. The wet and dry fractions are transported to the decentralized facilities within the City.

Classification of MSW

Waste arising from residential areas, institutions, and commercial markets comprises of organics, horticulture waste, paper plastics, metals, inert, etc. At present Panaji generates around 50 TPD of Municipal solid waste, out of which 28TPD is organic waste out of which around 40% originates from the hotels/restaurant, remaining 07 TPD is non-biodegradable waste, 09 TPD is horticulture/garden waste and 06 TPD of littered waste.



MSW Generation

At present, Panaji generates and collects around 42 TPD of MSW from 30 municipal wards of 7 zones and about 40,000 residents and 30000 of floating population.

Collection Coverage and Type

CCP collects almost 100% of Municipal Solid Waste from generators under door to door collection service with the help of municipal workers. Since September 2011, CCP has also initiated '5-way segregation' system to enhance the recovery and recycling from the MSW. This segregation system includes Organic waste, Glass & metal waste, Plastic waste, Paper & Carton waste and Non-recyclable waste.

Waste Composition

Waste generated in Panaji, consist of 46.27% of organic waste, 13.25% of glass waste, 13.24% of plastic waste, 7.29% of paper waste, 7.16% of rag waste, 1.49% of metal waste, and 11.3% of waste including inert, cement, soils, etc.

Waste Management Practice

- CCP adopts a combination of centralized and decentralized composting to treat its organic (wet) waste and has a centralized material recovery facility (MRF) to recycle and auction/sell non-biodegradable (dry) waste. The centralized MRF is supplemented by the services of 12 decentralized sorting centers across the City.
- CCP has three centralized composting facilities (Heera plant 5 TPD, LIC plant 3 TPD & Market plant 3 TPD) and about 100 decentralized pit composting stations (total 1.5 TPD) to process the segregated wet waste. The total capacity of these facilities stands aggregated at 12.5 TPD
 - The Heera facility has a capacity of 5 TPD but receives 21 TPD of waste (i.e. 8 TPD of residential waste, 11 TPD from hotels/restaurants, and 2 TPD of fish/slaughter waste).
- CCP has about 31 vehicles of different types that are used for various stages of primary collection and transportation to the sorting centre, treatment plants or to the disposal sites.
- There are twelve decentralized sorting centers in the City, where all the collected dry waste is first aggregated. It is then sent to the Heera site for weighing, and from there it is then sent to the MRF, which has a capacity to process 7 TPD of dry waste. All the recyclable material salvaged (about 3 TPD) is then auctioned to the vendors at the site itself, and the combustible non-recyclable waste (4 TPD) is sent for co-processing in cement plants based in the neighboring state of Karnataka.

Formal Waste Sector

CCP has its own waste collectors for door-to-door collection and transportation service.

All three centralized facilities for wet waste have been operated and managed by the CCP.

MRF at St Inez of capacity 07 TPD is being operated under the PPP agreement via 21 Century Polymers.

Informal Waste Sector

Informal waste collector recover recycle waste from markets or intermediate collection points. Informal waste dealers provide recyclables to large scale dealers who supply these items to recycling mills.

Financing of MSW

Municipal solid waste management is a significant cost in the municipal budget. The financing for infrastructure comes through Grants from national government schemes, ULBs resources and under PPP agreement via private partners as well.

Waste Management Challenges

The Heera plant is over loaded by almost four times its handling capacity creating an acute lack of space.

Technical Assistance

- CCP plans to implement 16-way segregation, capacity building for this is going on via UNDP, Saahas zero waste and TERI-GIZ team.
- City plan to run up a pilot on zero-rupee model shop and drive in drive out facility for dry waste collection.
- Assistance to upcycle waste and strategies to reduce and reuse waste are desired.

- City Plans to manage its organic waste to reduce GHG emission, technical & financial assistance on sustainable models is desired.
- City also needs to educate citizens and stakeholders for better participation and strategies to reduce waste burden on the City and to make the city 'bin-free city'.

MSW Sector Overview: Country Level

General description and overview of common practice

Country generates 68 Million tonnes of MSW every year.

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

86% of the waste gets collected and of this collected only 27% gets treated

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

Recycling Rate is about 27% for paper and 60% for plastics

Waste management of Organic fraction (composting, anaerobic digestion)

Yes, AD and composting is practiced in cities, even legislation does not allow disposal of organic waste at disposal sites. We have micro composters (in house composters) to 300 TPD bio-methanation plants in Pune.

Energy Recovery Rate

Energy in form of landfill gas, biogas is recovered from waste. However, earlier researches identified that there were 13 potential landfill sites for energy recovery but the fuel was expected of low calorific value. With inclusion of rules of 2016 not allowing organic waste to be landfilled, any new landfill gas capture is not seen to be coming up.

City Level

Aimed at improving waste management in general

- City has already implemented 5-way segregation, city plans to go ahead with 16-way segregation.
- City has proposed to setup bio-methanation plants of 5 TPD capacity (cumulative capacity of 20 TPD) to manage its organic waste.
- MRF is already running on a capacity of 7 TPD that is appropriately linked for RDF with cement plants.



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

- City has proposed to setup bio-methanation plants of 5 TPD capacity (cumulative capacity of 20 TPD) to manage its organic waste.
- 16-way segregation will reduce the amount of non-recyclables material going to RDF to avoid waste transportations and related emissions.

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 which 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 Bye Laws and Solid Waste Management Rules 2016.

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

Guidance documents on MRF, landfill siting criteria 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 Corporation of the city of Panaji (CCP) and Goa state 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 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 CCP is operating 3 centralized composting facilities and 100 decentralized pit composting stations to manage their organic waste whose total capacity is 12.5 TPD. CCP also earn the revenue from the sales of the compost.
- City has a 07 TPD capacity of MRF is functioning under PPP agreement to manage the dry waste generated from the city.
- At present CCP sends its balance organic waste to Saligao Plant which has a capacity of 100TPD. It is outside the CCP jurisdiction.

Key Stakeholders

- UNDP (<https://www.undp.org/content/undp/en/home.html>)
- Mineral Foundation of Goa (<http://goamining.org/index.php/organisation/mfg>)
- 21st Century Polymers (<https://www.21centurypolymers.in/>)
- Saahas Zero- waste (<https://saahaszerowaste.com/>)
- TERI (<https://www.teriin.org/>)
- GIZ (<https://www.giz.de/en/html/index.html>)

Additional Useful Information

Goa state has setup a Corporation for establishing common facilities for Waste Management in the State and to provide support to the local bodies in the management of waste.

Contacts

Waste Initiative City Contact

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Waste Initiative Country Contact

Mr Kaushal Vashisht
MoEFCC

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

Other Municipal Representative