



From waste to worth

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When Nilesh Samant moved into Seawood Society, a residential complex in Mumbai's western suburb of Gorai, in 2003, the giant landfill two blocks away made it impossible for people to step out of their homes. "The air was bad and most of us suffered breathing problems and asthma. Today we feel liberated; the air is clean and the foul smell is gone." Samant says even the temperature has come down a few degrees.

Barely two years ago, the Gorai dumping ground was a 26-metre-high mound of solid waste. Flanked by the Gorai creek on the west side and residential colonies on the east, this was where all the daily refuse generated by the western suburbs went—nearly 1,200 tonnes every day.

Mumbai, with its population of nearly 17 million people, is one of the largest municipal solid waste generators in India. Statistics show that urban India generates about 1,20,000 metric tonnes of solid waste per day, of which nearly 6,500 tonnes comes from Mumbai. However, till recently, environmentally safe collection, transportation, disposal and treatment of garbage was not of much concern.

The Municipal Solid Waste Rules of 2000 makes it mandatory for urban local bodies to collect and treat solid waste and dispose the residue in sanitary landfills. The rules, however, are largely flouted by most cities and towns. Typically, the garbage picked up from our doorstep is piled into municipal trucks, dumped in the open and left to decompose. After years of rot, the garbage at the dumping sites turns toxic, releases poisonous fumes and a dark sludgy fluid called lechate that pollutes the periphery. According to sanitary workers, the toxic gases in the dumps often cause spontaneous combustion—some so severe that the fire brigade has to be summoned.

At Gorai, the trash piling up since 1972 grew into a 26-metre-high mound of 2.34 million tonne of wastes, till the dumpsite was shut down following a Bombay High Court order on December 31, 2007.

Today, the site tells a different story. The vast ground is now a manicured green patch, showing off what is probably one of the most idyllic views of the city. Visible from here is the Vipassana Pagoda, one of Asia's largest pagodas, close to which the sun sets every evening. The breeze that drifts across the 19.6-hectare green knoll bears no evidence of the unbearable stench that residents in the neighbourhood once complained of. Dying mangroves have regenerated, and in fact spread across the entire eastern stretch of the ground. The residents talk of a "superior quality of life".

Better landfill management

The Gorai story is also heartening because it is an example of civic administrators demonstrating a keenness to keep up with global advancements in scientific management of landfills. It is not the only such effort underway in Mumbai, where all existing dumping grounds are dangerously close to residential colonies.

The BMC has already undertaken a similar project for the foul-smelling Deonar dump, the city's largest dumpsite that has served Mumbai for an incredible 71 years. At Rs 5,000 crore-plus, the Deonar scientific management project is the largest such plan by the BMC, involving a waste-treatment plant, carbon credits and electricity generation from the methane gas produced in the landfill site. The Deonar dump alone receives some 4,000 tonnes of garbage in a day, as much as 650 medium-sized dumper trucks. As much as 20 MW electricity can be generated from Deonar, the BMC hopes.

With the Gorai facility shut, the Mulund and Deonar dumping grounds are racing towards maximum capacity. Since finding more spaces where the ever-burgeoning garbage can be dumped out of sight is a prickly issue, the Mumbai Metropolitan Region Development Authority is also simultaneously initiating the development of at least three common landfill sites outside the city's borders, tip-toeing around protests from residents of the financial capital's satellite cities.

Success despite protests

R. A. Rajeev, additional municipal commissioner (city) of Brihanmumbai Municipal Corporation, believes the Gorai project was possible only because the civic department dared to steer away from "traditional ways" and explored a scientific closure method.

As usual, the public-private partnership between the BMC and United Phosphorous Limited initially earned a lot of scepticism. "It was a costly project and many people, activists and NGOs protested that it was a waste of funds. Many suggested bio-mining, but that would have taken at least 10 years to yield results. Today, I think all the stress was worth it," Rajeev says. The project cost Rs 503 million.

Work on the scientific closure of the dumpsite began in December 2007 and the contractors worked hard to meet their two-year deadline. Debashish Mukherjee, the United Phosphorous

site in-charge for the Gorai closure project, says, "When we started working on the site, we had to tread through unpleasant wastes, shuffling them, laying them in layers and so on." Once the slopes were reformed, they were covered with liner systems and geo-composite sheet (to prevent leachate from leaking out). Next, the company installed collection wells and venting pits to collect the landfill gases and leachate—about one tanker of the leachate is collected every month from the wells and sent to the civic authority's Versova treatment plant for treatment and sanitary disposal. Lastly, a common flaring system was installed to allow the methane to combust.

"This was one project we completed in record time," Rajeev says. "Now our only aim is to get our solid waste backlog under control in all the other sites. Then we'll have a scientific waste processing system according to the Municipal Solid Waste Rules."

Power from methane

The hard work paid off. Late in 2009, the BMC signed an Emission Reduction Purchase Agreement with the Asian Development Bank to receive an advance upfront money of Rs 245 million against future delivery of carbon credit. The total projected price for the carbon credits is Rs 720 million and 50 per cent was paid upfront.

Besides, the department is already in talks with electricity providers to set up a 2 MW power plant, which could convert and use up the methane collected from the buried solid waste. BMC Assistant Engineer Arun S Phadnis, who oversees the Gorai project, says, "We have done a few studies, which indicate that from the gases collected in the 40-odd gas wells we have constructed, methane constitutes about 54.4 per cent and carbondioxide 41.11 per cent. We will soon be installing landfill gas analysers on the site to ascertain the amount of methane generated. This can then be converted into electricity."

Rajeev is a proud man today, but he says he was seriously hurt by the portrayal of the city in *Slumdog Millionaire*. "Anyone who feels strongly for their city would flinch to see it being depicted in such bad light," he says, adding, "the Gorai closure is in a way my answer to *Slumdog Millionaire*. In the coming years, no filmmaker will come to Mumbai to make a movie with mounds of solid waste for a backdrop."

The Gorai closure is close to Rajeev's heart. "In our bureaucratic lives, it is rare that an official has the chance to conceive, plan, tender, implement and complete a project within his tenure. I had that opportunity and I am proud to see the success story of Gorai today," he says.