Cities at crossroads: Don’t waste the possibilities

Young Abhishek Gautam and his friends Deepak and Amit were out riding their bikes on the road beside East Delhi's garbage dump at Ghazipur last September, when a garbage slide from the steep mountain of mixed solid waste (50 metres high, about the height of a 16 storey building and more than twice the permissible height for landfills) pushed them into the Kondli canal nearby. Deepak and Amit were fortunately rescued by the locals, but Abhishek could not be saved. Rajkumari, a 32-year-old woman, also lost her life in the chaos that followed, as heaps of garbage full of slippery wet plastic slid into the canal, creating giant waves which hit the road, disrupted traffic and caused damage to life and property.

We have heard of landslides in the hills of Himachal or Uttarakhand. But garbage slides? Is this the new normal? It need not be, if only we get to the root of the problem. We do not need rocket science to correct the situation, nor too much additional finance, but only civic engagement, better governance and a diligent search for least-cost technical solutions, which do exist.

We should not be looking for more land to create a new "landfill" which in India is a euphemism for a dumping site. This is not just a bad idea; it is an idea that will not work. After the recent garbage slide, for example, in response to the orders of the Lieutenant Governor to stop dumping garbage at Ghazipur, East Delhi Municipal Corporation tried to start dumping at Rani Khera. But residents of five nearby villages gathered in protest, blocking traffic and deflating tyres of vehicles carrying waste. It was a no-go.

The powers-that-be should have seized the Ghazipur crisis as an opportunity to urgently implement a sustainable strategy of solid waste management. It involves building awareness at the household level for not mixing biodegradable waste with dry waste, and to enable the recycling of dry waste like paper, plastic, glass, and metal. We have in these columns spelt out the rationale for composting and decentralised processing of biodegradable waste, so that after taking care of recyclables, far less of the solid waste generated in our cities finds its way to processing sites and to properly designed landfills.

Barely a month after the garbage slide, just before Diwali, a massive fire broke out at the same place in Ghazipur from where the garbage had collapsed, adding to the air pollution woes of the city. Indeed minor and major fires in these dumpsites are only to be expected every now and then given the methane trapped in the accumulated heaps and combustibles in the mixed waste. It is still not too late to communicate to all citizens the reasons why a sustainable strategy of waste management is crucial for their own health and safety.

We saw some emergency action to stop dumping at the Ghazipur dumpsite following an order from the LG of Delhi. The LG also talked of the need to increase the capacity of waste to energy plants. Since the Solid Waste Rules clearly mandate the use of high calorie non-recyclables for waste to energy plants, these plants cannot use mixed waste without pre-sorting.

The National Green Tribunal (NGT) issued an order to reduce the mound height by at least 10 feet and use the material for highway construction. The NGT directed the NHAI (National Highway Authority of India) to lay a trial 2-km stretch of NH-24 using the Ghazipur waste for its widening.

Bringing down the height of tall garbage hills is not difficult, but it requires careful bio-remediation and bio-mining before the recovered material can be put to productive use. The first step is to reduce the volume of waste and to dry it out through bio-remediation using composting bio-cultures. This makes possible the second step of screening the waste, which is called bio-mining. The different fractions (usually through screens of 80 mm, 35 mm, 16 mm and 4 mm) obtained

from the stabilised waste after it is screened, and the light thin plastics which are collected as a dry fan or a separator blows them out, include useful material for compost, road building, and refuse derived fuel (RDF). The fractions between 16 mm and 80 mm which contain mostly inerts (stony and sandy material) are good for road building. The finer fractions below 16 mm containing organics can be used as planting covers for grassy side slopes of the highway.

The fractions coarser than 80 mm consist mostly of combustibles like cloth and coconut shells and are useful for making RDF. A less-known and highly innovative application in building roads is that of soiled and torn thin plastics which are blown out from the bio-mining process. Though not useful for recycling like clean plastics which are collected from dry waste separately at the doorstep, these thin plastics can more than double or triple the life and quality of bitumen (tar) roads thanks to an innovation by R. Vasudevan at Thiagarajar College of Engineering, Madurai.

Thin-film plastics including metallised multifilms are finely shredded to 2-4 mm size (like tea leaves) and used in hot-mix plants that supply ready asphalt/bitumen mixes which are spread and compacted for road-making. In such plants, stone aggregates of various sizes are blended and sent by conveyor into a heating chamber, where tar is poured onto the hot stones and mixed for three to four minutes before loading onto a vehicle for transport to the road laying site.

The key to making long-lasting "plastic roads" is that the shredded thin-films are not added into the bitumen, but added onto the hot stones. The flakes soften and in 30 seconds of mixing form a baked-on polymer coating over each stone. The bitumen adheres so much more strongly to these coated stones that potholes do not form during rains and road edges remain straight and firm. Such "plastic roads" withstand breakup in snowy regions and far outlast normal roads. With their capacity to handle tanks and heavy vehicle traffic, such roads are ideal for border roads. One km of single-lane tar road can consume one tonne of waste plastic, when added at 10 per cent of required bitumen quantity.

The good news is that Tamil Nadu, Himachal Pradesh and some other states are regularly laying plastic roads. In Tamil Nadu, 1,400 km of rural tar roads used plastic in 2003-2004 alone. The Central Pollution Control Board has put out guidelines for making such roads (PROBES/101/2005-06) and the results of comparative testing (PROBES/122/2008-09) after three years of laying. The results have been so good that on November 9, 2015 the Central Road Research Institute mandated plastic roads for all National Highways up to 50 km from cities that have a population over five lakh. Bengaluru has resolved to spend Rs 2,220 crore for fixing rain-battered roads in the next four months. There is a lesson here: Plastic roads will not only withstand future monsoon damage but will also solve the city's problem of disposing of non-recyclable plastic.

If salvaged waste from dumpsite hills can be thus consumed nationwide at the bottoms and tops of our highways, that will be a wonderful way to usefully manage waste and save scarce land.

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