Closure and rehabilitation of waste dumpsites in Indian megacities Delhi and Mumbai

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EXECUTIVE SUMMARY

Large Indian cities are modernising their waste management systems. As an important technical component serving to protect public heath and the environment, waste disposal sites are being upgraded from open dumpsites to controlled disposal sites, or they are being closed and modern waste facilities, including engineered landfills, being built instead.
This research focuses on the recent initiatives to close waste dumpsites in two Indian megacities Delhi and Mumbai.
The structure of this research is based on the Integrated Sustainable Waste Management framework proposed by Van de Klundert and Anschütz (2001), with addition of consideration of development drivers (Wilson, 2007). Methods used in this research include review of locally available documents as well as interviews with key stakeholders involved in closure activities (city officials, companies involved in closure activities).
The dumpsite Gazipur is one of the three dumpsites of Delhi and is preparing for closure. The closure project assumes excavation of waste, sorting into various fractions, and subsequent composting, RDF production, and reuse as filler material in construction respectively, with only rejects being destined for disposal at a landfill to be built at the same location. Gorai dumpsite of Mumbai has been closed and turned into a park. In addition to installation of appropriate engineered control measures, the site is also earning carbon credits from Clean Development Mechanism (CDM). Besides these two cases, the closure of Koparkhairane dumpsite in Navi Mumbai and Urali-Devachi dumpsite in Pune are discussed as early examples of sound environmental practices in dumpsite closure. Also, the case of Bengaluru is included, as an interesting example of political commitment and focus on solid waste management in the city.
These dumpsites have been in function since 1970s and 1980s and are reaching their capacity simply because they have become surrounded by the city and cannot expand any more. In addition, public protests and complaints as well as the development of national legislation on solid waste management, in particular MSW Rules 2000, have prompted authorities to address the problem of waste disposal in their jurisdiction.
This research has found that the economic and social impact of dumpsite closure on waste pickers who used to work on the sites have been considered in only one case – that of Navi Mumbai. The authorities have engaged with advocacy NGO to provide work for waste pickers at the new disposal site by deploying their skills in waste sorting.

INTRODUCTION

As an essential urban service, with a direct impact on the quality of urban life, waste management has been receiving marked attention both from the public and the authorities in India. The adverse impacts of poor waste management vary in a very broad range, from nuisance to the citizens from animals attracted by uncollected waste, to clogging of drains by dumped waste and consequent

prolonged effects of floods, to foul smell and pollution of groundwater sources by inadequate waste disposal practices. Accordingly, negligence in urban solid waste management has prompted civil action by individuals and civil society organisations, including a widely publicised case of Almitra H. Patel v. Union of India, in1996 (Balakrishnan, 2010) as well as work with informal recyclers by NGOs like Chintan Environmental Research and Action Group (e.g., Chaturvedi, 2009).

Partly in response to the pressure from the public, Central and state governments have enacted various laws to address solid waste management. For example, in response to the disastrous consequences of the monsoon flooding in Mumbai and the entire state of Maharashtra in August 2005, including over 900 deaths and billions of rupees (hundreds of millions of USD) in material damage, the State of Maharashtra banned the manufacture, sale and use of plastic bags, as they clogged the drains and aggravated the situation (e.g., Talwar Badam, 2005). Similarly, the Delhi Degradable Plastic Bag (Manufacture, Sale and Usage) and Garbage (Control) Act, 2000, was enacted to prevent contamination of foodstuff carried in recycled plastic bags, reduce the use of plastic bags, throwing or depositing non-biodegradable garbage in public drains, roads and places open to public view (Delhi Act No. 6, 2001).

Much like in most cities around the world, irrespective of their level of economic development, solid waste management in urban India relies heavily on disposal. Therefore, enactment of Municipal Solid Wastes (Management and Handling) Rules in 2000 by the Ministry of Environment and Forest (MoEF) of the Government of India constitutes a significant milestone in the process of development and modernisation of the solid waste management activities in Indian sub-continent (MSW Rules, 2000). This legal document addresses the entire chain of SWM services, from effective collection, transportation, processing to disposal. Regarding the existing facilities, the rules stipulate that "the existing landfill sites which continue to be used for more than five years shall be improved in accordance of the specifications given in this Schedule". Central Pollution Control Board (CPCB) of the Ministry of Environment & Forests, Government of India, is assigned to monitor the implementation of the Rules, whereas the municipalities are required to submit annual SWM reports to the CPCB.

The upgrade of the existing facilities required by the MSW Rules 2000 has prompted municipal authorities in many cities to take a closer look at their waste disposal sites, which, in practice, have often been little more than open dumpsites. In addition, municipal authorities have been pressured by the public and the media to close or to upgrade the existing dumpsites, as numerous headlines in the media testify (e.g., Bhasin and Lalchandani, 2009; Jadhav, 2009; Mahapatra, 2011).

This paper focuses on two Indian megacities, Delhi and Mumbai, with extensive references to three other Indian cities that have had a leading role in the developments of their solid waste management systems. Hence, the cities studied here include Delhi (the National Capital Territory of Delhi), Mumbai (the capital city of the Maharashtra State), Bengaluru (the capital city of the Karnataka State), Pune (the second largest city in the Maharashtra State, after Mumbai) and Navi Mumbai, a planned satellite city of Mumbai. Selection of these cities, however, does not preclude other cities from being considered exemplary in their efforts to improve in this field.

Research Objective

The objective of this research is to establish and evaluate the current efforts regarding upgrade or closure of waste disposal sites in Indian megacities of Delhi and Mumbai, with a comparison to efforts in Bengaluru, Pune and Navi Mumbai.

The research reported in this paper partly draws upon the findings of the research done in the course of preparation of the UN Habitat Third Global Report 'Solid Waste Management in the World's Cities', in which both authors had been involved (Scheinberg *et al*., 2010). Namely, information from the city profiles for Delhi and Bengaluru is used and referred to as appropriate.

METHODOLOGY

Theoretical Framework

The structure of this research is based on the concept of Integrated sustainable (solid) waste management – ISWM (Van de Klundert and Anschütz, 2001) that distinguishes three dimensions in analysis of solid waste management and recycling systems, asking three questions:

- WHAT technological components and interactions comprise the SWM system in the city,
- WHO are the stakeholders (actors) involved in the SWM system and how do they interact,
- HOW is the system organised and run – how is the situation regarding various sustainability aspects, such as social, financial, economic, environmental and technical aspects, and institutional strength and arrangements.

Based on the framework used in the UN Habitat Third Global Report "Solid Waste Management in the World's Cities" (Scheinberg *et al*., 2010), in this research a fourth dimension is added to the ISWM structure – driving forces for the development of the SWM system in the city (Wilson, 2007), whereby answering the question: WHY has the system developed to the current state. As the driving forces (drivers) that govern cities' policies and practices in solid waste handling are indicative of their stage of modernisation, we sought to identify the drivers that determine the current situation in each city.

This paper presents the findings on the first dimension – WHAT, thus describing the components of the system, and focusing on disposal.

Data Collection and Analysis

The research reported in this paper uses literature study, interviews and field visits as research methods. Data are gathered from literature review in combination with fieldwork in each city. Local literature pertains to legal documents, official reports by municipal corporations, as well as technical reports by the consultants involved in dumpsite closure. Interviews are held with key stakeholders.

WASTE GENERATION

Municipal waste includes household waste, waste from commerce and institutions as well as residues from cleansing of public spaces such as street sweepings. Construction and demolition waste is also taken to the same disposal sites as municipal waste. The data on quantities of waste *generated* are scarce, as confirmed in the large research for UN Habitat (Wilson *et al*., 2012). Usually, some records are available on waste *collected*, either as measured or estimated at the disposal site gate. This means that the waste taken out of the system (typically by informal recyclers) prior to collection is not registered. Furthermore, as construction and demolition waste usually ends up at the disposal sites for municipal waste, amounts registered at the gate do not distinguish this waste stream from the other waste, which further blurs the data on municipal waste.

Table 1. Waste generation in selected cities

City	Population (million inhabitants) (2011 Census data)	Waste generation (Kg/person/day)		Compostable (%)	
		2000 data (Sharholy, 2008)	2004 data (CPCB & NEERI)	1998/2000 data*	2004 data (CPCB & NEERI)
Pune	3.8	0.312	0.46	55	62
Bengaluru	5.7	0.484	0.39	45	52
Delhi	12.9	0.475	0.57	32	54
Greater Mumbai	16.4	0.436	0.45	40	62

* These data are cited by Agarwal (2005) as pertaining to 1998, whereas Sharholy (2008) cites the same values as pertaining to 2000.

The waste generation data for the cities studied in this research are found in one and the same source, thus presumably using the same methodology, which makes comparison among the cities possible. Information is not available on the methodology used to determine waste amounts and composition. The data are presented in table 1 above.
Based on the data from Table 1 above, service providers in these cities are assigned a daunting task of managing between 0.6 and 2.7 million tonnes of waste per year respectively.

WASTE COLLECTION

In most cases, city corporations do not provide primary collection services, due to the ensuing increase in costs required. For example, a pilot trial of providing door-to-door collection waste collection by Municipal Corporation in Delhi (MCD) showed that such service would increase its budgetary requirements by around 35% (Mehta and Dasgupta, 2006). This means that citizens and other waste generators in Delhi bring their waste to the collection point in the neighbourhood, called *dhalaos* (Talyan *et al*., 2008; Handayani *et al*., 2010). In some areas though New Delhi Municipal Corporation (NDMC) works with NGOs that advocate the rights and organise informal sector recyclers to provide primary waste collection services in the form of door-to-door collection in New Delhi (Handayani *et al*., 2010). Informal collectors take the waste from the households and bring it to the *dhalao*. Secondary collection is provided by municipal authorities and/or private companies contracted by the municipal authorities – trucks take waste from these collection points to a transfer station or disposal site. In some cases, if horticultural waste is collected from parks and green areas, it is taken to a composting plant (Handayani *et al*., 2010). The coverage rate is estimated at 75% of the city population, with low income families not being served (Wilson *et al*., 2012). According to Delhi Human Development Report 2006 (as cited by Handayani *et al*., 2010), 26% of surveyed people, regardless of their income level, stated that they throw their waste at other than designated places.

The situation in Bengaluru is quite different in terms of the waste collection method. Due to a strong political commitment to improving and modernising waste services, performance goals are set at high standards. Some 70% of the city residents, particularly those in central business district and affluent areas, receive a waste collection service based on a door-to-door scheme. Waste collection service is provided by 70 medium- and small-size enterprises, contracted by the municipal authorities on yearly basis (Gupta, 2010). Collectors use handcarts and unload them directly into large trucks that then take waste to the processing or disposal sites. This means that most of the city is bin-free: large containers and masonry structures, which had earlier served as receptacles for waste from primary collection, have been removed. As for most part this system is well-functional, and most waste transport is done by covered vehicles, this has eliminated presence of cattle on the road (a regular feature in other Indian cities), which has improved traffic movement and reduced accidents (Gupta, 2010).

DISPOSAL

Delhi – Gazipur dumpsite

For waste disposal, which is the main component of the solid waste management system in Delhi, the city relies on three disposal sites: Gazipur (or Ghazipur), Bhalaswa and Okhla. They have each exhausted their capacities and were supposed to be closed in 2009 (SENES Consultants, 2009, as cited by Handayani *et al*., 2010), but are still in operation due to lack of alternative solutions. Studies show that leachate has polluted groundwater to the extent that renders the associated aquifer unreliable for domestic water supply and other uses (Mor *et al*., 2006; Jhamnani and Singh, 2009).
Gazipur dumpsite started receiving waste in 1984. A plot of municipal land, partly including some low lying areas, was taken into operation as a designated waste disposal site, thus having some sort

of a legal status from the beginning. Initially all kinds of waste coming from the city were dumped there, including industrial and special (hazardous) medical waste. Post MSW Rules 2000, Delhi authorities report to CPCB that only municipal waste is accepted, including construction and demolition waste. During field visits, however, other waste could be observed, including special (hazardous) medical waste, some industrial waste, and waste from garages such as used oil and tyres. Ponds of black leachate are formed on the sides of the dumpsite. Based on the accounts of the local residents, it can be stated that the situation worsens during the monsoon season, when the entire low lying area turns into small ponds of black leachate and rainwater. The foul smell of waste and liquid is pervading. There is no precise data regarding the distance to the nearest houses when the site started; still, according to the interviewees, the nearest houses were at least 1.5 km far from the site. Now Gazipur dumpsite is surrounded by both commercial and residential areas including slums that started developing in the late 1990s and are now within a 500m radius. Communities, especially newcomers, are complaining to the authorities about foul odours.

Initially there was no regular staff present at the site. The staff was introduced in mid-1990s. Earlier the dumping took place in a highly disorganised manner, with very inefficient use of space and no soil covering. Currently there is an office, three excavators, four bulldozers that are operated 10-12 hours every day. At present, placing of waste is organised, waste is covered with soil and use of space is better. Records of the incoming amounts of waste have been kept since late 1990s. While in full operation, the site used to receive about 1800-2000 tonnes/day (450-500 trucks). The site is still operational, albeit at low capacity: about 400-500 tonnes/day.
At any point in time 250-350 waste pickers are present at the site. If the total presence throughout the day and night is counted, it would be more than 600 pickers, as they come in different shifts.

The total dumpsite area is 29.6 ha, whereof 25.2 ha are covered by waste. Current average height is 25.5m, with the highest part at 30.5 m. The study about reclamation of this site was done in 2008. The closure has not yet started though the tender has been awarded to a private contractor to start some construction works. The idea is to excavate the old waste and sort it into different streams. The total amount of waste dumped at Gazipur up to 2003 was estimated at 4.74 million tonnes. A very rough extrapolation based on 1900 tonnes/day until 2009 when the site was supposed to be closed, gives an additional amount of 4.16 million tonnes, totalling almost 9 million tonnes waste.
Organic materials will be taken out and processed into compost; other waste (plastic, paper, rags, rubber, etc.) will be shredded and processed into RDF; some mineral waste materials will be supplied as filler material for construction activities. Only rejects (expected to amount to 20-30% of waste) will be disposed of at the new landfill site, to be developed at the reclaimed land as per the guidelines of sanitary landfilling. The site will continue to receive waste for some time into the future and the same processing steps will be applied to new waste. Waste acceptance at the gate will differ from the current situation in so far as the site will not take construction and demolition waste, drain silt and street sweepings.
It is planned that once the reclamation is completed, the Clean Development Mechanism (CDM) will be applied for the composting plant and RDF plant, which will generate 40-80 million INR (0.6-1.2 million EUR).
In their considerations of the solution for the Gazipur dumpsite, Municipal authorities do not address the loss of income and livelihood for the dumpsite pickers in any way. As construction of the plants progresses, waste pickers are denied access to waste. There is also no official plan from the municipality or the private operator to allow pickers access to waste or provide jobs at the plants. Many picker organisations and advocacy NGOs have protested but to no avail so far.
In addition, environmental groups are opposing the plans on grounds of environmental pollution resulting from burning of RDF containing PVC and other (possibly hazardous) waste materials that may have been dumped at the site in the past.

The plans for waste segregation of waste at source by households and other waste generators are there but it is locally considered highly doubtful that these plans will be implemented any time soon.
The municipal authorities see various benefits of the rehabilitation for the solid waste management system in the city: no immediate need for a new landfill, use of disposed waste materials, land reclaimed for new processing and disposal site for the next 25-30 years, and also possibly lesser number of citizens' complaints due to better air quality in the surroundings.
Residents in the surrounding areas expect that the reclamation will create better living environment and lead to an increase in property value. Accordingly, new residential and commercial areas have even popped up in the surroundings of the site recently, as people are expecting that, once the project for dumpsite reclamation is completed, the prices of land and houses will rise by 50-100%.

Mumbai – Gorai dumpsite
Gorai, in Western Suburb of Mumbai, used to be one of the major dumpsites in the city. It started operation in 1972 on officially designated municipal land, and it was closed in 2007-2009. Much like in Delhi, before MSW Rules 2000, all kinds of waste had been received at the site. Its surface area was 8.9 ha, with 7.8 ha covered by waste. The waste mound has an average height of 15.5 m, with some parts at 23 m (CDM, 2009).
In the last years of operation, the site used to receive 1200 tonnes of waste per day.
Very similarly to Delhi Gazipur dumpsite, Gorai has had staff only since 1998. Normally, there was staff for 10-12 hours a day to supervise and organise operations.
Around 150-200 waste pickers were present in the last year of operation. They had some improvised temporary sheds on the site.

The project to close the site was widely publicised in India as it was the first one to receive approval from CDM; thereby it was considered to be a model project in dumpsite closure (CDM, 2009). The purpose was to reduce greenhouse gas (GHG) emissions by capturing and utilising methane generated by anaerobic decomposition of municipal solid waste residues. The captured methane is to be combusted to generate electricity that will feed into the national power grid and be used as an alternative source of cheap, local renewable energy that will reduce dependence on conventional coal based power. In case of any emergency, the landfill gas collected shall be flared.
Similarly to Gazipur dumpsite in Delhi, dumping of waste at Gorai in Mumbai had been done in a random uncontrolled fashion, without any spreading or compaction. Preliminary site investigations found that the waste mound was geotechnically unstable, primarily due to an excessive face angle of the waste. In order to reach a permanently stable situation, it was necessary to carry out levelling, relocation of waste and reformation of slopes. Furthermore, waste was evenly spread out and compacted using JCBs. In order to prevent entry of the tidal water and provide protection to the closed fill, an interesting civil engineering feature was installed: 830 m long and 7 m high concrete sheet pile wall was erected along the creek-side boundary of the fill. The elements were driven into the soil to a depth of 5 m, with remaining 2 m above the ground level.
Top cover over the finished profile of the waste fill consists of a 30 cm thick protective layer, a 1.5 mm HDPE geomembrane liner, a drainage layer for storm water and a 30 cm thick vegetation soil layer. Grass is planted in the soil, for erosion prevention. Landfill gas extraction system with flaring possibility is installed, in combination with a unit for gas upgrading by pressure swing adsorption and a power generation unit. Monitoring will be done for 15 years.
The project has not included any consideration of the dumpsite waste pickers whatsoever.

The dumpsite reached and exceeded its limit, now it is a recreational ground. The closure project was organised by Municipal Corporation of Greater Mumbai, developed by IL&FS Ecosmart Ltd. and implemented by United Phosphorous. The operations had completely ceased when closure works started.

There had been protests by the NGOs about the site. Now the residents of the surrounding areas are happy as there are no odours and they have a nice recreational area. There have been repeated questions in the media though about the high costs of the project.
In addition to financial benefits from CDM, the closure project has achieved some major environmental benefits, including, *i.a.*, improvement of coastal water quality near the creek areas adjacent the site due to elimination of discharge of untreated leachate into the environment.

Mumbai – other disposal sites
Mumbai disposes its waste at other disposal sites now. Deonar dumpsite started receiving waste as long ago as 1927. It covers an area of 132 ha and receives over 6000 tonnes of waste a day. In the recent years it has been managed with soil covering and compaction, with numerous waste pickers working on it. Residents from the surrounding areas have been strongly complaining to the authorities. Phased closure is in the planning – the closure project has been sanctioned under the Jawaharlal Nehru National Urban Renewal Mission and received environmental clearance from the Ministry of Environment and Forests. After the closure, the site will earn carbon credits issued by the CDM.
Another landfill, Mulund, operational since 1968, has reached its capacity and is in the process of being closed, with a large anaerobic digestion (locally termed *biomethanisation*) plant being built.
Kalyan is a new (sanitary) landfill developed in 2011, together with composting and RDF plants.
Kanjurmarg is another site given by the Government to develop an ISWM facility, which is yet to start. An area of 141 ha is designated for the facility; the planned capacity is 4000 tonnes/day.

Navi Mumbai – Koparkhairane dumpsite
Similarly to the efforts described above, Municipal Corporation of Navi Mumbai, a Planned Satellite City of Mumbai, closed its dumping ground at Koparkhairane in 2005, following instructions of Maharashtra Pollution Control Board (MPCB) and directives of the High Court. The closure was carried out following a scientific procedure, including liners, leachate collection and removal as well as gas extraction, as the first such case in the State of Maharashtra. The reasons behind the dumpsite closure seem to be rapid development in the area and frequent protests and complaints from nearby multi-storey residential areas. Now people have expressed confidence in the Municipality.
After the closure, NMMC set up a new waste-processing facility at Turbhe, also in Navi Mumbai, in 2010. This new facility has been approved for CDM as waste will be sorted into several fractions and further utilised. Fractions include: organic waste to be processed into compost, recyclables to be cleaned, stocked and sold, and input materials for RDF production. The rejects – estimated at less than 8 % – will be landfilled. RDF will be burnt for energy recovery (CDM, 2010).
Waste pickers have shifted from the old Koparkhairane dumpsite to the new facility at Turbhe. They have been issued an identity card that grants adult pickers access to the site, where a shed is provided to them to sort the incoming waste. This was done with help of an NGO Stree Mukti Sangathana that had organised and trained the pickers.

Bangalore
The capital city of Karnataka State, also known as Silicon Valley of India due to its extensive information technology industries, Bangalore has put a lot of effort in modernising its solid waste management system.
Old dumpsites have been closed and new sanitary landfills built. The focus has been on constructing new landfills rather than on properly closing old dumpsites and rehabilitating the areas around them – old dumpsites have just been covered with soil and abandoned for the moment. Municipal authorities have remediation plans though to turn the area into parks. (Gupta, 2010; information updated in May 2012).
Waste processing plants and two landfills have been recently developed. These two landfills, situated in Mavallipura - Hesaragatta Hobli and Mandur, BideraHalli Hobli, are state-of-the-art

facilities (Gupta, 2010). As much as 500-600 tonnes/day of organic waste are brought to the composting facility of the Karnataka Compost Development Corporation (Lakshmikantha, 2006). Municipal authorities claim that, once the processing plants run at their full capacities, the use period of the landfill sites would be 25-30 years or up to 2030. The focus is on efforts to prolong the use period of the disposal sites by waste processing. According to the City officials, most of the incoming waste will be processed while only 20% is expected to be rejected and disposed of. In order to make sure that this target is met, the operator will not be paid the tipping fee for the waste amounts in excess of 20%.
The benefits of these developments are seen mainly in terms of their contribution to the city image and its ability to attract foreign investment in local IT and other industries.

Pune
From 1992 to 2002 the city's waste – in tune of 1000-1200 tonnes/day – was indiscriminately dumped in a former stone quarry near Urali-Devachi village, resulting in pollution of the air and water wells in the vicinity. In accordance with MSW Rules 2000, a decision was made to close the dump in 2002, which constitutes one of the early examples of such practices in India.
Due to an acute shortage of land available for this kind of land use, upgrading the existing dumpsite was chosen instead of constructing a new landfill. The waste was brought to required levels. The capping comprised layers according to MSW Rules 2000, including an HDPE geomembrane. As most organic waste had been burnt due to frequent fires, only passive vents were provided to release any remaining landfill gas. A landfill of 1.2 ha was built on the top of the closure as a temporary measure, until a more permanent solution is found. As no alternative site was available even for the duration of the closure works, the tipping continued throughout (Purandhare and Gupta, 2010).

WHY – DEVELOPMENT DRIVERS

Based on the evidence from the cities studied here, current developments are driven by a number of driving forces. One cluster of drivers includes protection of public health to environmental concerns, as voiced by the public living near waste dumpsites and reinforced by the media attention and support from the civil society organisations.
Even though 25-30% of the population still do not receive adequate and effective waste collection services, the cities have been focusing on the apparently more urgent problem of waste disposal space and the pressure from the legislation, mainly MSW Rules 2000.
In the process of modernisation of their municipal SWM systems cities are opting for waste processing technologies, which are expected to result in reduction of waste amounts destined for disposal. At that, the authorities often seem to ignore the existing activities, which could be seen as the already available strength and built upon. For example, about 17% of Delhi waste handling is done by rag pickers, who collect, sort and transport waste free of cost, as part of the informal trade in recyclables. In Bangalore, the informal sector is attributed with preventing 15% of the municipal solid waste going to the disposal (Sharholy, 2008). Navi Mumbai authorities have worked with an advocacy NGO to include these waste workers into the system for the benefit of all, not least the city budget for solid waste management. Other cities have not considered such options (yet).

CONCLUSIONS

In face of a common problem – huge amount of waste to be managed every day – municipal authorities in Indian (mega)cities have been putting a lot of effort to cope with the issue at hand, while at the same time responding to their legal obligations as stipulated in the MSW Rules 2000. In addition, municipal officials in charge of waste management in their respective cities have been learning about public relations – a new trade for a public servant in India.
The activities to close and rehabilitate dumpsites have been prompted by the MSW Rules 2000, in combination with the fact that most locations have reached their capacities and cannot expand

further as they are now encapsulated by the city. Citizens' complaints have certainly contributed to the process.

Different cities have opted for different solutions. While Delhi is attempting an integrated solution that aims at waste valorisation and reduction of waste destined for disposal, Mumbai has taken a more business-like approach (in accordance with its image) to closing the old dumpsite and has obtained approval from CDM to 'get some cash' for methane generated from the waste. These differences may be significant at this point in time, but each city is considering some form of waste processing and valorisation in the near future. Authorities are increasingly opting for waste processing and valorisation partly due to possible revenues (mainly from CDM) and partly as an alternative solution to the waste disposal space problem. Due to public opposition, it has proven to be extremely difficult to find a suitable location for a new landfill in India, as it is the case in the rest of the world. Together with their counterparts in other countries, Indian (mega)cities will continue on the path towards a sustainable, integrated solution that combines various methods of waste management, favouring waste material valorisation, while resorting to disposal only after other options are exhausted. At that, the cities would benefit from a more open attitude and co-operation with the existing informal recyclers, which is now lacking.

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