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Sustainable Waste Management Infrastructure for Indian Cities: Need to Focus Beyond Markets

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Abstract – In most modern economic systems domestic waste is the end product of a one-way flow of materials. Raw materials are drawn from the environment and transformed through a production process into consumer goods. (Haynes and El-Hakim et al. 1979)

Thus, domestic waste is directly related to consumption, standard of living and level of technology of a society. In Europe and the United States, domestic waste production has increased to the point where these areas face what has been termed "the solid waste crisis" (Garrett De Bell et al. 1970). Whereas, the problem of waste is also becoming a grave for the emerging economies like India, mainly due to large population and ever increasing consumerist middle class.

As a result, cities are forced to deal with even greater quantities of waste by such ecologically disastrous and economically inefficient means as sanitary landfill, incineration, or ocean dumping (Muhick, Klee and Britton et al. 1968)

There are strong drivers at all levels towards a culture of more sustainable waste management. These drivers include those at an international level, such as the Rio Earth Summit, at European level, such as Fifth Action Programme (1993-2000) and at the national level such as legislation of MSW (Handling and Regulation Act 2000), after a series of PILs in the Supreme Court, and courts strict interpretation of Fundamental Right under Art. 21 as the 'right to dignified life'.

Keywords: Sustainable, Waste, Management, Infrastructure

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INTRODUCTION

According to Aspinwall and Cain (1997), the business response to these drivers has led to an emerging interest in moving away from a waste disposal mentality towards a material management mentality in which waste is reused, recycled, reduced and minimized. It is one of the most effective ways for the companies to reduce their impact on the environment and to benefit from financial savings, improved corporate image, byproduct opportunities. This is considered to be a fundamental shift which could create a huge challenge for the waste management industry, requiring a robust and flexible strategically driven approach at the household, local authority and business levels.

Urban India is facing an ever increasing challenge to provide for the incremental infrastructural needs of the growing urban population. According to the 2011 census, the population of India was 1.21 billion, of this 31% lives in cities. It is further projected that by 2050 half of India's population will live in cities. (2011 census)

With this increasing population, the management of Municipal Solid Waste (MSW) in the country has emerged as a severe problem not only because of the environmental and aesthetic concerns but also because of the sheer quantities generated every day.

According to the Central Pollution Control Board 1,27,486 TPD (Tons per day) of MSW was generated in India during 2011-12, with an average waste generation of 0.11kg/capita/day. Of the total waste generated, approximately 89,334(70%) of MSW was collected and only 15,881 TPD (12.45%) was processed or treated. Segregation at source, collection, transportation, treatment and scientific disposal of waste was largely insufficient leading to degradation of environment and poor quality of life.

The fact that management of MSW was increasingly becoming a critical issue, first became evident in the 1990s, when large scale concerns regarding unsuitable MSW management resulted in numerous Public Interest Litigations (PILs) prompting the Supreme Court of India, in 1996 to order the Ministry of Environment and Forests

(MOEF),Government of India, to release Municipal Solid Waste (Management and Handling)Rules in 2000.

The rules contained directives for all Urban Local Bodies (ULBs) to establish a proper system of waste management including a timeline for installation of waste processing and disposal facilities by end of 2003, not only for Metros and Class I cities but for all ULBs. The Ministry of Urban Development (MoUD), Government of India developed a Guidance Manual for SWM for all ULBs and published it simultaneously with the Rules in 2000.However, until 2003, all ULBs were not able to establish a sustainable MSW system including treatment and disposal systems.

The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) for 65 mission cities, and its related Sub-Missions for smaller towns in the country - the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT), and Integrated Housing and Slum Development Programme (IHSDP), were launched with much fanfare at the end of 2005. Yet nine years later, citizens and governments alike have little idea about how these ambitious programmes have affected infrastructure and governance outcomes in these target cities and towns. The quality of data available on the projects, reforms, and their impact is poor with data formats designed by the JNNURM secretariat not focusing sufficiently on assessing outcomes for those on the frontline of governance transformations such as urban local bodies (ULBs) and the users of actual services. This makes it hard to assess the performance of the JNNURM, UIDSSMT and IHSDP. Far from undertaking a comprehensive assessment in order to inform the next version of JNNURM, the Central Government seems disinclined to even acknowledge that such an assessment could have tremendous value. Over the seven-year mission period, there have been a number of academic articles and civil society voices from the ground that provided valuable critique on and suggestions for substantially changing the JNNURM but these have been sidelined or looked at piecemeal. By assessing what we know of how the JNNURM and its Sub-Missions have affected infrastructure and governance outcomes and small medium and smaller towns in cities across the country, this paper aims to contribute to a more grounded understanding of the impact of these programs in a variety of state and city contexts.

In order to give an impetus to MSW Management in cities, government of India has sanctioned 12th and 13th Finance Commission Grants and funds were allocated for improvement of MSWM under flagship projects like JnNURM and UIDSSMT from 2005 onwards. Funds for implementation of SWM projects are also available from state funds. Many ULBs have put in place system of door to door collection, transportation, treatment and safe disposal of waste. However, despite encouraging pilots and achievements, most ULBs continue to face challenges not only in the selection of appropriate or advanced collection and transportation systems, treatment and processing technology and disposal methods, but also in the sustainable financial management of MSWM. Non-compliance with MSWM rules is still a relevant cause for concern even after 14 years of notification of the MSW Rules, 2000.

FORMS OF PUBLIC-PRIVATE PARTNERSHIPS IN INFRASTRUCTURE

Forms of partnership can be classified based on the extent tasks, risks and responsibilities of former public service provisions are transferred to the private sector. Akintoye, Beck and Hardcastle (2003) have identified three models of private sector participation in urban between full privatization and complete public ownership. In reality far more arrangements can be found.

a) Operation maintenance and service contracts (OM&S contracts): under this private sector performs the service for agreed costs and must meet performance standards set by the government. The government is responsible for funding any capital investments. These contracts do not solve the problem of limited public budgets and are believed to lead to greater efficiency.

b) Build, operate and invest: These forms bring private investments to the construction of new infrastructure or the upgrading of existing infrastructure. Concession contracts (e.g. design, build, finance (maintain) and operate) and the build operate and transfer (BOT) model are examples.

c) Joint Venture: Both government and private parties invest in joint ventures, in which benefits, costs and risks are shared.

Some private sector participation may be more suitable than the other for the attainment of specific sustainability aims in certain situation. The form of participation also depends on the available knowledge, skill and capacity of the public regulator and existing policy framework. The choice of form of participation is also influenced by the incentives available to the private participant.

Koppenjan and Enserink (2009) argues that 'perfect market' conditions in infrastructure based service delivery are generally lacking. Because ownership of infrastructures creates entry barriers for newcomers, this kind of service delivery has the characteristics of a natural monopoly. By giving private firms exclusive rights to construct and operate urban infrastructure during long term concession periods, legal monopolies are created.

Ahmed and Ali (2004) also argues that private sector participation in public infrastructure may result in market failures. Such market failures lead to rent-seeking and opportunistic behavior on the part of

both public and private parties; Parties pursue their self-interest rather than the (social) sustainability objectives that underlie the choice of private sector participation in sustainable urban infrastructures. As a result unwanted outcomes are realized such as –

(a) Monopolistic service provisions

(b) Overexploitation and misallocation of resources

(c) Production of social and environmental externalities

(d) Underprovision of basic needs

(Johnstone and Wood 2001)

It must be understood clearly that private sector participation in urban infrastructure does not automatically contribute to efficiency and sustainability. In fact, it depends on the quality of the governance mechanisms by which these private contributions are regulated and the extent to which regulations issues are recognized and acted on.

STATUS OF OPERATIONAL WASTE TO ELECTRICITY (INCINERATION) PROJECTS IN INDIA (AS OF 2013)

As per the Municipal Solid Waste Management Manual published by Ministry of Urban Development in consultation with Central Public Health and Environmental Engineering Organisation (CPHEEO), there are currently 5 waste-to-Energy plants are underway. All of these plants are based on PPP model and have received grants from the Ministry of New and Renewable Energy (MNRE). All these plants claim to comply with the international emission standards, however only one plant is operational.

Timarpur-Okhla Waste Management Co-Pvt Ltd – It's the only operational plant based on incineration technology. The project promoter is M/s Jindal ITF Ecopolis. The incineration plant was commissioned in January 2012 and is said to process 1300 Tons of MSW producing 450 Tons of Refuse Derived Fuel (RDF), expected to generate 16MW of electricity.

Gazipur Delhi Plant,– The project is still under construction phase. The PPP operator is M/s ILFS. Out of 2000 Tons waste received at the landfill daily the facility will process/incinerate 1300 TPD to generate 433 TPD of RDF and 12 MW power.

Bangalore Plant – An 8 MW power plant is in the process of being set up in Bangalore. This initiative is carried out under a PPP framework between M/s Srinivasa Gayathri Resources Recovery Ltd and Bruhat Banglore Mahanagar Palike (BBMP). The plant is not yet operational.

Pune : A 10MW gasification plant is being set up in Pune with funds from MNRE. The plant will need 700 TPD of waste for production of 10MW of electricity. The plant is still being constructed.

Hyderabad : 11 MW power plant, which will utilize 1000 TPD of MSW is being installed in the Nalagonda district. The plant will produce RDF for in house incineration and power generation. The plant is currently under construction.

ISSUES WITH SWM BY PRIVATE SECTOR: AN INDIAN EXPERIENCE SO FAR

In his study of Chennai City Srinivasan (2006) argues that the notification of the MSW(Management and Handling) Rules 2000 brought about a whole new dimension into the management of solid waste in Chennai – that of environmental considerations. While the madras Municipal Corporation Act, 1919, continues to govern the corporation, the MSW rules prevail over the state enacted 1919 act in so far as the SWM is concerned. The concepts of the 3 Rs(Reduce, Reuse and Recycle), source segregation of waste and composting of organic waste were introduced to incorporate environmentally sustainable management of waste. In the zones handled by the private company Door to door collection, source segregation was introduced at least in selected areas, mixed refuse was not accepted and an administrative charge was imposed on people who do not hand over their garbage to the waste collector to deter them from dumping it on the roadside.

The handing over of SWM operations to the private agency in select zones of Chennai city seems to have brought about some positive changes, at least in terms of effectiveness of SWM operations and cleanliness levels of neighbourhoods. The residents were of the opinion that the private company's performance in SWM is better than that of the corporation's. This is attributed to better equipment, monitoring and supervision systems, younger workers and more stringent enforcement of performance norms for employees in the private organization. (Srinivasan 2006)

a) Participation of NGOs and CBOs

The private sector participation in SWM includes decentralized, community-based initiatives that typically are spontaneous responses to ineffective SWM by the ULB. A lot of faith has been places in the concept of community participation to overcome the inadequacies and evils of both state and private (for profit) intervention in SWM, and these are seen as ideal models for environmentally safe handling of waste, as externalities are supposed to be greatly reduced in localized systems. Such civil society initiatives that intervene in public services imply

changing relationships between the people and the state- civil society begins to involve itself in active governance, when it takes on provisions of basic services like SWM that are obligatory on the state (Srinivasan 2006)

Evidence (Dahiya 2003; Muller et al 2002) shows that civil society organisations can be quite successful in managing waste locally and that they have enormous potential to introduce environmentally safe practices. Yet CBO and NGO experiences in SWM have not been all positive, and even the best ones are prone to hiccups at every stage.

He further says that in the initial years the CBOs participation was a great success in Chennai, but as time passed, CBOs were not capable of maintaining operations consistently as they need strong support from the ULBs. All the CBOs were in middle or upper income localities- such initiatives were hard to come by in low income localities, where probably the struggle for daily existence does not allow the residents the luxuries of time and resources to work for cleaner and healthier neighborhoods.

Muller's (2002) study of Banglore substantiates this observation that the CBO members are able to take on voluntary tasks like awareness campaigns but are not in a position to take managerial roles like handling SWM operations or resolving labour issues.

b) Equity and exclusion of poor

One major fallout feared whenever private sector participation is attempted is the exclusion of the poor. Bateley2011, has noted that private players perform better than public service providers as they are usually allocated easier sectors of the market/richer areas with easier access and where waste generation is high, while ULBs are responsible for low income areas where collection is difficult and generation levels are low.

c) Neglect of Labour

The job permanency with corporation (ULBs) workers vis a vis private operator's (Onyx in Chennai) workers also play an important role. Many workers were of the view that the low quality of services offered by the corporation is because of the fact that the workforce is large, but does not work. Once the worker is granted permanent status, she/he tends to shirk work. Consolidated workers are overburdened because of this practice and they are also assigned unpleased tasks. Here, diversification of workforce can be one of the solution.

In addition, Baud et al 2001, in Post et al 2003, point out that appraisals of private sector participation in SWM have not paid much attention to both labour conditions of conservancy workers in private agencies and ecological considerations.

d) Lack of consistency

He further argues that the private organisations performance has slipped over the years, mainly due to three reasons: (a) uncertainty in political atmosphere and renewal of its contract (b)The corporation's policing of the private company has come down over the years (c) emergence of workers union in the private organization.

e) Need of competitive environment.

The literature documenting private sector participation in SWM (Bartone 1991; Batley 1996, 2011, Srinivasan 2006) across the world suggests that the competition is needed for efficient private sector participation in SWM. This seems to apply to the public sector too – competition offered by another player in the field seems to be incentive for the ULB, which till then had monopoly control over the service.

f) Financial viability of SWM operations

Srinivasan (2006) argues that the financial viability of SWM operations may need closer examination. Even if private player is capable of collecting waste at a lower cost per tonne, it must be kept in mind that the corporation acquires additional expenses in terms of establishing monitoring and supervisions systems. It also has to support its entire workforce even though its direct involvement in SWM has reduced. In addition, greater effectiveness in waste collection means that the corporation's net expenditure on SWM may have shot up as payment is based on tonnage.

g) Need of training and capacity building

It is essential that conservancy workers are given the requisite training and comprehend the need for environmentally safe management of waste, as the entire system is contingent upon their cooperation. They can be also effective vehicles for imparting awareness to public, as they are the ones who come in contact with the waste generators on daily basis.

It is vital that designing of new SWM systems is done with the involvement of and inputs from conservancy workers as they are the most conversant with ground realities.

h) Livelihood of rack-pickers at stack

The entry of the private agencies in SWM has had definite negative impacts on the livelihoods of itinerant waste pickers who operate in these zones. Just the fact that waste does not remain accumulated on the roads for long periods means that their access to this waste is drastically reduced. Their incomes have dropped over the last five years and some of them were left without jobs. The itinerant waste pickers will also be affected by the implementation of door-to-door collection and source segregation by the corporation in the other zones, as

mixed waste will no longer be available on the streets. As the MSW rules are implemented more thoroughly, the condition of this section of the urban poor is going to become increasingly vulnerable.

i) Apathy on part of private operators

In his study of Chennai Srinivasan (2006) observed that even though the private operator (onyx) has the capacity and know how to implement environmentally safe management of waste, they continue to refuel to follow the MSW rules unless the contract with the ULB is amended to compensate them for the extra costs that would be incurred if they were to implement segregation systems. It must also be emphasizes that under the present contract, there is no incentive for the private operator (Onyx) to implement source segregation of waste as its collection tonnage would come down, affecting its profits. Therefore, a revision of the contract to make it more suitable to the laws of the country is an urgent requirement.

One of the area of concern is financial sustainability of the agency's operations, as the system of payment by tonnage definitely must be a large burdon on the ULB that already claims to be cash strapped. Secondly, the private agency's response to the ecological safety aspects of SWM has not been satisfactory with it refusing to follow even the MSW rules without amendment to the contract. However, the onus is on the corporation, being directly accountable for SWM to enforce the country's legal framework on the private agency.

The question of permanency continues to be a confounding one. Worker vulnerability is definitely reduced when a job is permanent in nature like in the ULBs. However, like even workers admit, the status of permanency seems to have a direct negative bearing on the performance of the workers, impinging directly on the quality and sustainability of the services.

j) Increased role for ULBs

Further, in any case of private participation, particularly in the case of essential services like SWM, it is imperative that the ULB continue to play a principal role in setting standards, monitoring, ensuring equity, accountability and ecological safety and above all, retaining ultimate responsibility for the service- being capable of offering competition to the private player, possessing the technical know-how and systems for effective monitoring, and being prepared to step in, during the times of crises and need.

k) Lack of regulatory framework for CBO and NGOs

When one considers civil society initiatives in SWM, they too can be viewed as a form of privatization – informal or unintended privatization (Bately 1996, identifies programmed, pragmatic and informal privatisation)- in which the failure of public services leads private bodies or communities to step in. The CBO initiatives in SWM have been largely ignored by any regulatory or monitoring framework that looks into worker interests and ecological concerns in SWM. It is necessary that even these forms of informal privatization come under the purview of norms and standards that need to be followed in SWM operations at the nature of work and the consequences of its improper implementation could have remained the same regardless of the type of agency involved. A point of consideration is that CBOs could take on newer roles in this arena, facilitating effective service delivery by public or private agencies and monitoring the same to ensure accountability.

l) Enforcement mechanisms

An effective implementation of the MSW rules would necessitate the incorporation of enforcement mechanism like fines. This in turn requires political will. The awareness programmes also need to be designed more carefully so that the public understands the rationale for the new systems and is clear about the manner in which they work and people's role in them.

m) Introduction of user fee charges

The concept of user fees can be explored to as a means of reducing generation of waste and to inculcate a sense of responsibility in the waste generator. (city of Guelph in Canada and Date-shi in Japan) While SWM is an obligatory function of the ULB, the fact that it is available for free leads most propel to take it for granted and perceive waste as something that does not concern them. One things that must be kept in mind when it comes to user fees is equity for the poor, for whom daily existence is a struggle, SWM is not high on the list of priorities. The user fee protocols that do not recognise this may result in their (the poor's) exclusions from the SWM system.

n) Problem with collection system

In many cases, people who are willing to segregate complain that if they do so, the corporation's collection systems do not retain the segregation, thus discouraging them from continuing with the practice. To avoid this, the corporation needs to first set up collection systems all over the city (both door to door and community bins) that have provisions for segregated waste before enforcing the practice. There should be specially designed community bins for low income areas where there is no space within the house to store waste even for short periods of time.

Thus, the experience of private sector participation is SWM in Chennai City has been a mixed one. It does appear at the outset that the private sector

has been able to step in where the ULB failed to deliver and perform the function, at least at the superficial level of collection and transportation, quite effectively and efficiently.

CONCLUDING REMARKS

Solid waste management is a complex, multilayered issue. The efficiency and efficacy of service provisions have significant implications for public health and sustainability of operations.

The private sector participation in SWM as in most other areas, is a difficult and contentious issues. Public sector, on its own, has not been able to respond effectively to the SWM challenge. On the other hand, it also clearly shows that private and civil society participation also pose several challenges especially in terms of equity and accountability. Thus, it is clearly evident that both the models of waste management infrastructure – state owned and privately owned- have failed drastically in delivering the public good. There is a strong case for moving away from the traditional polarization between champions of privatization on the one side and those advocating complete state responsibility on the other towards a more fruitful partnership.

The key lesson learnt is that while crucial roles exist for the private sector- for profit and not for profit; the intervention of the state and public policy is imperative to safeguard ecological and equity interest and enable greater accountability of both public and private sectors.

As Dreze and Sen (1995) point out with respect to the liberalization debate, it is not the question of more governance or less governance, or of more market or less market, but of going beyond the market. The analysis of SWM in Indian scenario clearly establishes that it is not a question of expanding or restricting private sector participation but of going beyond it. It is important to focus on the ends, i.e. ecologically safe and equitable solutions to the problem of SWM, rather than just on the question of more or less private sector participation.

A few suggestions:

1. The main problem appears to be in the areas of policy, ownership and governance. So would advise you to go for more in-depth discussion in these areas.

2. As the title of this write-up suggests and rightly enough that the basic paradigm of waste-management should change. Thus, cash flow positivity cannot be the focus of attention. The issue remains more complex. Cash-flow analysis can hardly handle many other impacts that need to be assessed. And that needs a different skill set.

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