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SOLID WASTE MANAGEMENT POLICIES AND STRATEGIES IN INDIA: SOME INSIGHTS

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Abstract
India is rapidly shifting from agricultural-based nation to industrial and services-oriented country. About 31.2 per cent population is now living in urban areas. Over 377 million urban people are living in 7,935 towns/cities. India is a vast country divided into 29 States and 7 Union Territories (UTS). There are three mega cities-Greater Mumbai, Delhi, and Kolkata-having population of more than 10 million, 53 cities have more than 1 million population, and 415 cities having population 100,000 or more (Census, 2011). India generates about 42 million tonnes of municipal solid waste per annum. By 2050, 50 per cent of the country's population is projected to be urban, and the amount of waste will increase substantially. The 12 Schedule of the Constitution of India makes it obligatory for municipal authorities to keep cities and towns clean. Given their wide range of responsibilities, however, dealing with waste in both practical and environmentally sound ways is one of their most significant challenges, and innovative solutions need in globe. The present paper provides a comprehensive view of SWM and most importantly highlights some major points of the policies/programmes initiated by the Government of India to overcome the challenges of solid waste management in our country.

Key Words: Public Private Partnerships, Integrated Municipal solid waste management, urban local bodies, Ministry of Urban Development

Introduction

India is rapidly shifting from agricultural-based nation to industrial and services-oriented country. About 31.2 per cent population is now living in urban areas. Over 377 million urban people are living in 7,935 towns/cities. India is a vast country divided into 29 States and 7 Union Territories (UTS). There are three mega cities-Greater Mumbai, Delhi, and Kolkata-having population of more than 10 million, 53 cities have more than 1 million population, and 415 cities having population 100,000 or more (Census, 2011). India generates about 42 million tonnes of municipal solid waste per annum. By 2050, 50 per cent of the country's population is projected to be urban, and the amount of waste will increase substantially. The 12 Schedule of the Constitution of India makes it obligatory for municipal authorities to keep cities and towns clean. Given their wide range of responsibilities, however, dealing with waste in both practical and environmentally sound ways is one of their most significant challenges, and innovative solutions need in globe. The present paper provides a comprehensive view of SWM and most importantly highlights some major points of the policies/programmes initiated by the Government of India to overcome the challenges of solid waste management in our country.

Public Private Partnerships (PPPs) in SWM In some cities like Mumbai, Chennai, Delhi, Bangalore, Hyderabad, Ahmadabad etc., garbage disposal is done by Public Private Partnerships (PPPs). The private sector has been involved in door-to-door collection of

solid waste, street sweeping in a limited way, secondary storage and transportation and for treatment and disposal of waste. Some private firms are carrying out Integrated Municipal Solid Waste Management (IMSWM) which includes collection, segregation & transportation, treatment, compost, bio methanation, refuse derived fuel, and final disposal. However, there are serious barriers to private sector participation in urban infrastructure as the financial status of ULBs except for a minority, is unstable. Urban sector is seen as a very high-risk sector and also because of institutional complexity due to multiplicity of agencies involved in service delivery. Further, there is lack of a regulatory or policy enabling framework for PPPs, barring few exceptions, and lack of bankable and financially sustainable projects considering the opportunities and risks involved. There is also a need to rationalize tariffs and user charges.

Solid Waste Management in India

Municipal solid waste management (MSWM), a critical element towards sustainable metropolitan development, comprises segregation, storage, collection, relocation, carry-age processing, and disposal of solid waste to minimize its adverse impact on environment. Unmanaged MSW becomes a factor for propagation of innumerable ailments (Kumar et al., 2009).

The key drivers enhancing Solid Waste Management and Solid Waste to Energy are Legal drivers (eg. laws and regulations); (ii) Regional and international drivers (e.g. solid waited flow as recyclable resources): (i) Socio-economic drivers (e.g. population trends and public awareness); (iv) Technology development and institutional drivers (e.g. available technologies and (v) Environmental Protection Groups (EBTC, 2011).

Legal (Laws and Regulation)

In the absence of a strong legislation, competition between cities, to provide a 'clean city with good municipal environmental infrastructure, in order to attract (often foreign investment can be a key driver. This appears to be particularly important in India where competition for foreign information technology investment is strong.

Regional and international

Clean development mechanism is extending this to developing countries (promoted by international financial institutions (IFIS); Provides a livelihood for large numbers of the urban poor, and India still relies on imports of recycled materials as industrial raw materials.

Socio-Economic

Capacity building and good governance are key drivers (being promoted by IFIS); Focuses still on food, shelter, security and livelihoods-waste becomes an issue when public health or environmental damage impacts on these priorities; Public Health Remains a key driver, particularly in hot climates. Outbreak of diseases such as Plague, Cholera, diarrheal diseases due to the uncollected refuse has pushed the government to formulate rules and regulations for SWM

Technology development and institutional

Ability to perform this function is still limited. Various waste-to-energy alternatives will play a major role as key drivers in the solid waste management industry.

Environmental protection

Focus still on initial steps, to phase out uncontrolled disposal For instance; climate change energy from waste is emerging as a key driver worldwide. The clean development mechanism under the Kyoto protocol is seen as providing an important source of income to encourage cities in developing countries to maintain investments in new landfill sites.

SWM: Issues AND Challenges

VAO and City leaders are faced with several challenges in their effort to streamline waste management services. A few of the pressing issues include rapidly increasing quantities and diverse characteristics of waste, the undesirable consequences of conventional methods of waste management, and failure to tap the resource value of waste.

Household Storage and Segregation of Waste

Most households, shops, and establishments throw their waste just outside their premises .on streets, in drains, in open spaces, in water bodies, and in other inappropriate places. In most cases source segregation is not done.

The solution household waste

Citizens must be informed and motivated not to litter, the streets so they develop the habit of storing their waste at its source in at least two separate bins (one for biodegradable waste and one for recyclable waste);

Citizens also need to be educated about risks to human health and the environment and taught to separate domestic hazardous waste and infectious waste; Municipal authorities must take concerted efforts to convince all classes of citizens to store and segregate their waste properly.

Irregular Street Sweeping

A schedule of street cleaning that indicates which roads require daily cleaning and which ones need to be cleaned periodically: A program for street cleaning, keeping in view the norms of work (yardsticks) prescribed: A timetable for cleaning of open public spaces daily or periodically,.

Municipal authorities should identify suitable locations, preferably from among the existing locations of waste storage depots in the city.

The transport of waste can be managed and monitored centrally or through a large.decentralized arrangement.

Transport can be contracted out to private operators. The transport system must be harmonized with the secondary storage system of waste to prevent manual and multiple handling of waste

Lack of Waste Treatment The MSW generated in Indian cities is, by and large, not treated but is directly taken to the open dumpsites. Although India is known for its age-old technology of composting agricultural waste, composting of municipal organic waste is infrequent. In a few cities, however, initiatives exist for aerobically composting. However, many plants are not operated according to their installed capacity. Many plants face problems with compost marketing and find financial sustainability difficult.

Lack of Waste Treatment Solution

The municipal authorities must treat the organic fraction of waste before disposal. The authorities are expected to set up a plan for composting waste or to adopt waste to-energy technology as may be appropriate Municipal authorities have to assess the suitability of new technology to Indian conditions

Collection

Waste produced by houses is usually transferred into communal bins that are fabricated from metal, made from concrete or in combination of both. Street sweepings also find its way to community bins. These community waste bins are also used by other essential commercial sectors in the vicinity of disposal bins along with household waste except where some commercial complexes or industrial units engage municipal authorities for transfer of their waste to disposal site by paying some amount (Kumar et al., 2009).

Reuse/recycle

This entails activities like collecting those materials from the waste, which could be gainfully retrieved and utilized for making new products. Since un segregated waste is dumped at community bins, its optimal recycling is not possible. However, rag pickers usually sorted out and took and sell recyclable material like plastics, glass, etc. (Pattnaik & Reddy, 2010)

Transportation

Modes of transportation for MSWM practiced in India are bullock carts, hand rickshaws, compactors, trucks, tractor, trailers, and dumpers. In smaller towns trucks having 5-9 ton capacity are used without adequate cover system. Stationary compactors, mobile compactors/closed tempos, and tarpaulin- covered vehicles are used in the transportation of MSW and about 65, 15, and 20.0 per cent of waste is transported through these compacters, respectively (Joseph, 2002). The overall collection, transportation, and disposal efficiency reduces considerably. Only few transfer stations can be found in some metropolitan. Important Solid Waste Management Policies and Strategies in India

1989	**The Hazardous Waste (Management and Handling) Rules**
1994	**MSW Management Strategy Paper by NEERI; J.L. Bajaj Committee**
1998	**Bio-medical Waste Handling Rules,**
1998	**Supreme Court-appointed Barman Committee**
2000	**MSW (Management and Handling) Rules, Central Public Health and Environmental Engineering Organization**
2000	**Report of the Technology Advisory Group on Solid Waste Management**
2005	**Strategy and Action Plan-Use of Compost in Cities**
2006	**Manual on MSW**
2008	**National Urban Sanitation Policy 2009 Draft Document on E-Waste Handling Rules**
2010	**National Mission on Sustainable Habitat**
2011	**Plastic Waste (Management and Handling) Rules**
2011	**The E-Waste (Management and Handling) Rules**
2013	**Draft MSW (Management and Handling) Rules**

Source: http://jnnurm.mic.in/toolkits-report-primers.html

Conclusion

The aim of this study is to present the status of MSW and other important aspects challenges for integrated SWM, intricacy of PPP mode, role of rag-pickers, prevailing practices MSWM, and the rules pertaining to waste management in India. MSWM has emerged as be challenge not only because of the health and environmental concerns but also due quantities of waste generated. It is observed from many research documents that most urban local bodies (ULBS) in India are unable to handle such huge quantities of solid waste due to financial and institutional debilities. Furthermore, ULBS rarely have sufficient funds, resources infrastructure and appropriate strategies for improved solid waste management. Segregation waste, door to door waste collection, technologies for the treatment of waste, land resources and scientific disposal methods are some of the major challenges. Recognizing these challenges, the two ministries of Government of India namely Ministry of Environment, Forest and Climate Change and Ministry of Urban Development (MoUD) have initiated several policies and programmes to improve the current scenario of MSWM in India.

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