

A note on SWM in Kerala

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This note is prepared for the Ministry of Urban Development (MoUD), based on the presentations and discussions at a recent Capacity Building workshop on Solid Waste Management held at Thiruvananthapuram on August 26 – 27, 2013.

Urban India generates about 42 million tons of unsegregated solid waste annually, amounting to about 305 grams per capita per day, and varying across cities and towns from 200 grams to 600 grams. The waste is projected to increase at a rate of 3 to 5 per cent per annum in the coming years because of the rising urban population, rising incomes, changing life styles and increased use of packaging material, particularly plastics. The biodegradable component has declined over the years, although it still accounts for about 47 per cent. Inert waste is the next highest at 25 per cent, while plastic, paper, glass and metal account for the rest. The share of plastics in municipal solid waste is expected to continue rising rapidly in the years to come. The carbon/ nitrogen ratio in the municipal solid waste generated in India ranges from 14 per cent to 53 per cent, while the moisture content ranges from 17 per cent to 65 per cent. The calorific value of the waste tends to be on the low side (about 800-1200 kcal/kg on “as received” basis).

The Municipal Solid Waste (Management and Handling) Rules had laid down the norms for collection, segregation, processing and disposal of waste in 2000. The Rules are followed more in the breach. According to MoUD, Urban Local Bodies (ULBs) are performing fairly well in collection efficiency and complaint redressal, but they are not segregating the waste, processing is limited, and the disposal is not scientific, while cost /value recovery is low.

The High Powered Expert Committee (Ahluwalia) Report of 2011 estimated that investment requirement for the urban sector in India is Rs. 39.2 lakh crore at 2009-10 prices over a 20 year period 2012-2031. Of this, only 1.6 per cent (a little less than Rs 50,000 crore) is required for solid waste management. But the challenge cannot be addressed by spending alone. There is need for better governance to ensure efficient collection, transportation, processing and scientific

disposal of the waste. At the same time, there is an urgent need for building awareness of the importance of reduction and segregation of waste at source.

India's urban population is projected to touch 600 million by 2031 and the number of metropolitan cities is projected to increase to 87. While "towns" as defined in the Census keep increasing, many of these do not have statutory local governments. In Kerala, the number of census towns has increased 5-fold during the period from 2001 and 2011, but the number of statutory towns has decreased from 60 to 59, over the same period. The absence of urban local government in such urban areas makes it more difficult to address the challenge of municipal solid waste management. It also has direct implications for public health conditions in India's cities and towns and has to be seen in the context of the overall challenge of water and sanitation.

According to Shri Manjalamkuzhi Ali, Minister for Urban Affairs, Department of Local Self Government, Kerala, the total waste generated in Kerala in 2007 was 8300 tonnes per day, of which 70 to 80 per cent was biodegradable. We need to know the municipal waste per capita per day to ascertain how Kerala's performance fares in comparison with the national average of 305 grams per capita per day. It is reasonable to expect that the quantity of waste in general and municipal waste in particular has increased and its biodegradable component decreased since 2007.

It is also pertinent to get data on door to door collection of the municipal solid waste in Kerala. As for processing, it seems that there is some processing using old technology but virtually no scientific disposal. All 5 Municipal Corporations have waste processing plants, but only 27 of the 60 municipalities have such plants. Most of these plants deploy windrow composting and bio gas generation. The Minister for Urban Affairs informed the participants at the workshop that the state government is encouraging treatment of waste at source, i.e., at the household level by providing a subsidy. We need to understand the exact nature of the subsidy and who is entitled to the subsidy.

Recognising the growing menace of solid waste, the state government has made it mandatory for hotels, commercial establishments, hospitals, meat outlets, etc. to treat their own waste safely.

Stringent penalties are levied for littering and disposing waste in water bodies. We need to understand whether these penalties are effectively enforced.

The Vice Chairman of the State Planning Board, Kerala, Mr. K.M. Chandrasekhar shared the findings of a Cabinet sub-committee on solid waste management, constituted in 2013 by the Department of Urban Affairs (this committee is headed by Mr. V.N. Rajasekharan Pillai, Executive Vice President of the Kerala State Council for Science, Technology, and Environment). The committee has recommended advanced aerobic composting plants, which employ engineered bacteria, and biomethanation plants, which generate methane from solid waste, as the most viable solutions for solid waste management in Kerala.

Segregation is a key factor in the solid waste management cycle. Segregation at source, whether carried out by individual households or by the municipality (in house or outsourced), is very important as it helps separate biodegradable, recyclable, inert and other (sometimes hazardous) waste materials – thus helping the ULB to decide upon the appropriate technology for treatment. An effective campaign on community sensitization can lead to segregation at source. Source segregation is very poor in most Indian cities; unsegregated waste is typically collected from the households and dumped at open dumpsites and/or transfer stations, creating health hazards. The basic principle of “Reduce, reuse and recycle” has to form the basis of any government intervention related to Municipal Solid Waste Management. The waste management systems must also find a role for people such as rag pickers who are engaged in collecting, segregating, recycling and informally managing waste. Pune, Pammal and some cities in Gujarat have used some innovative experiments in this respect.

Municipal governments currently spend close to 80 per cent of their budget on collection and transportation of waste. Minimising the transportation costs is very important. Even so, after working on reduction, segregation at source, cost-effective collection, and transportation, a huge task remains of treatment and scientific disposal of municipal solid waste. Availability of land to carry out treatment and disposal activities also poses a major challenge.

A number of technologies can be used for treatment and scientific disposal of waste. The selection of the combination of technologies and methods to treat waste must take into account the amount of waste generated and its composition. Certain technologies are cost effective only if a minimum scale of operations is assured. Also, the technology should take account of whether the waste is biodegradable, what its moisture content is and its calorific value. This depends on local conditions, the type of economic activity, and socio-cultural factors such as lifestyle of residents, etc.

Technology options on treatment and waste to energy solutions have widened in recent years. The alternatives include composting (windrow, in-vessel composting, and vermicomposting), anaerobic digestion (biomethanation), incineration, producing Refuse Derived Fuel (RDF) or fluff for energy generation, pyrolysis/ thermal gasification and plasma gasification. Choice of a specific technology for converting waste to energy depends on the quantum and nature of the waste as well as whether it is possible to transport segregated waste to the plant or deliver only unsegregated waste to the site. Following the presentations on waste to energy plants in Pune, Kanpur, and Jindal, there was extensive discussion on incineration-based technology, and thermal gasification technology which uses mixed, unsegregated waste to generate energy. The session highlighted how Waste to Energy option offers large benefits of mass reduction of solid waste while utilizing the minimal quantum of land while simultaneously adding power to the local/national grid. Experiences of Pune, Kochi, and Solapur in using decentralised biomethanation for compost and bio-gas generation from organic waste, were presented and discussed. Biomethanation works very well in Indian conditions as the plants are easy to operate and maintain. For smaller municipalities, decentralized plants are the most viable option. Factors such as taking account of the type of waste, minimising life cycle cost of operations, and least land area requirement, have to be considered before choosing any technology.

On sending the residual waste to scientific landfills, the example of Gorai was presented to draw lessons on how important it is to estimate the quantum and quality of the waste that has been deposited in the landfill so as to correctly estimate the carbon credits, and how important it is to generate conditions for scientific closure of sanitary landfills.

The importance of generating public awareness and gaining acceptability of the chosen methods to treat and dispose of the waste was highlighted. The role of communities and their cooperation is very crucial for the success of such initiatives. It requires sensitising the citizens through media campaigns which provide easy-to-understand information, school education, and other innovative communication tools.

Municipal Solid Waste does not include waste from industries and hospitals, much of which falls under the category of ‘hazardous or bio-medical waste’, and needs special treatment and disposal. This should be the responsibility of the respective industries and hospitals.

Public Private Partnerships (PPP) have emerged in the solid waste management sector. A successful PPP requires a well-designed contract with clearly defined roles for the two partners, and a dispute resolution mechanism in place. PPP has the potential to bring in greater operational efficiency as well as private finance, but it requires a concessionaire agreement which is very carefully designed, with clear specification of pricing, subsidy, risk assignment and dispute resolution mechanisms. The Kanpur case of solid waste management was discussed to draw lessons on how to avoid pitfalls of PPP. This case also raises the question of whether a single point contract for collection, transportation, processing and disposal is a desirable course or whether problems lay elsewhere.

The presentations at the workshop including those of the case studies are available on the ICRIER website. The link to the page dedicated to the workshop in Kerala is <http://icrier.org/Urbanisation/events/kerala.html>