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Session: 'Sustainable Waste Management – Transformative Approaches'

With 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. Of the total waste generated, approximately 89,334 TPD (70%) of MSW was collected and only 15,881 TPD (12.45%) was processed or treated (CPCB, 2013). 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 institutional framework of solid waste management in India is broadly divided into three tiers - central, state and urban local bodies (ULBs). The main function at the central level is to make laws and rules, frame policies, prepare guidelines and manuals for effective management of waste and provide financial support. The state is responsible for implementing the rules, laws and guidelines set by the centre at the state level. ULBs are responsible for the actual implementation and to prepare plans for collection, transportation, treatment and disposal of the solid waste.

Even though the major responsibility of MSW management lies with the governmental agencies and urban local bodies, there are other stakeholders which play a crucial role as well. These are households, businesses, industries, informal sector, non-governmental organizations (NGOs), community based organizations (CBOs) and self-help groups (SHGs). Involvement of all these stakeholders is necessary in proper planning of solid waste management.

The key strategies for efficient management of waste as part of improving the services in the waste sector would include:

- Waste reduction strategies: Waste reduction strategies involve lesser generation of waste at source and using alternative material which generate waste of lesser hazard as compared to traditionally used ones. It is necessary to decouple the waste generation process from the growth of economy and population. Various ways in which this can be achieved are:
    - Alternative packaging – use of fabric or jute packaging instead of traditionally used polythene bags which are difficult to collect and recycle (reviving of jute sector)
    - Designing products like cell phones and other electronic goods for longer shelf life so that they enter the waste stream a little later
    - Designing products for disassembly so that majority of their components can be recycled at the end-of-life
    - Developing re-manufacturable products to increase their life cycle
- Waste inventory: In absence of dynamic waste inventory, long term planning for waste management becomes difficult. Each municipality should maintain a complete database for its waste management activities, particularly generation of waste (daily data), characteristics of waste (monthly data), processing facilities actually installed and operated and their performance (monthly data) and final disposal in a sanitary landfill (monthly data).
- Source segregation of waste and as far as possible processing of waste at source to minimise the unwanted transportation costs and also to reduce pressure on the disposal sites. The key municipal waste processing techniques include the following

- MSW to composting: Excessive use of chemical fertilizers and resulting run off is resulting in pollution of soil and water bodies and is key non-point source of pollution. The top soil as a result of over irrigation is also getting depleted in organic carbon which affects soil fertility. As stated earlier, MSW in India comprises of around 50% organic or food waste with high moisture content. This waste (food waste, agricultural residues, etc.) can be composted either aerobically or anaerobically. This process not only treats the waste, diverting it from landfill (thus saving on cost of disposal) but also the compost produced can enrich the top soil with organic carbon which is key to soil fertility. The process is net GHG saver as compared to open dumping of waste which results in uncontrolled emission of methane. Decentralized, community composting options should be explored wherever feasible (away from residential areas to avoid community conflicts)
- MSW to energy: Viability of producing energy from MSW (woody waste, agricultural residues, food waste, waste papers and plastics) and extraction of landfill gas from 'open but soon to be closed waste dumps' can not only treat the waste but also provide renewable source of energy to 'energy starved' cities. Technologies like anaerobic digestion (producing power as well as compost), use of refuse derives fuel and landfill gas will be explored for processing such waste. These processes also would be net GHG saver as compared to open dumping of waste which results in uncontrolled emission of methane. Decentralized biomethanation options as implanted in Pune should be explored for other cities as well. The Ministry of New and Renewable Energy (MNRE) estimates that there is potential of generating around 2500 MW of energy from processing of waste in the country.
- Material recovery and recycling: India reportedly salvages and recycles around 70% of MSW, though most of it is collected and recycled by informal sector using rudimentary technologies. It is reported that in developing countries around 15-20 million people are engaged in waste recycling activities – in some cities 2% of the population. More than 1 million people are engaged in waste recycling activities in India. It is also reported that informal sector (waste pickers) remove around 10-15% of waste every day from city streets and are key to solid waste management system in any city. There should be efforts to institutionalize informal sector and modernization of recycling technologies. Informal waste recyclers can be trained to collect the waste from households, do decentralised waste processing (composting or biogas) and trade recyclable waste as is demonstrated by Stree Mukti Sangathan in Mumbai.

Key issues for discussion regarding management of municipal solid waste include the following:

- Limited primary collection and segregation at the doorstep
- Reluctance in public to take ownership
- Unavailability of adequate funds
- Lack of access to proper waste processing technology and
- Unscientific disposal of MSW at dump sites