A Better Way of Waste Management

This article is based on **"Segregation of waste: There is a disturbing pushback against this effort"** which appeared in The Indian Express on 27/09/2019. It talks about flaws in current modes of waste disposal and advantages of segregation of waste.

The first rule of waste management all over the world is that households must segregate their waste before it is collected from the doorstep. Also, the **Solid Waste Management Rules 2016** in India prescribe the same.

Waste segregation can help Indian cities 'get' cleaned up, as current modes of solid waste disposal just make the city to 'look' clean.

Advantages of Segregation of Waste

- If wet waste is not mixed with dry waste, it significantly reduces the burden of solid waste management on municipalities.
- The wet waste can be composted locally; the dry recyclable waste can go for recycling and what remains can be safely disposed of.
- Wet waste, which is more than half the total waste, is used for **composting** or **biomethanation** in a decentralised manner.
    - **Composting** is a natural biological process, carried out under controlled aerobic conditions (requires oxygen).
        - Composting through various microorganisms (bacteria and fungi) biodegrades organic waste (food waste, manure, leaves, grass trimmings, paper, wood, feathers, crop residue etc.,) into valuable organic fertilizer.
        - This can be used by farmers to improve their yields.
    - **Biomethanation** is a process by which organic material is microbiologically converted under anaerobic conditions to biogas.
        - Three main physiological groups of microorganisms are involved: fermenting bacteria, organic acid oxidizing bacteria, and methanogenic archaea.

        - Microorganisms degrade organic matter via cascades of biochemical conversions to methane and carbon dioxide.
- Tamil Nadu has achieved 100 % segregation in 20 of its 50 smaller municipalities, and 80 to 90 % in the rest.

What are the current modes of waste disposal and challenges associated with them?

- **Waste-to-energy (WtE) plants which rely on the incineration of mixed waste**
    - WtE plants in India **burn mixed waste.** The presence of chlorinated hydrocarbons like PVC results in the release of dioxins and furans when the waste is burnt at less than 850 degree Celsius
    - **Harmful emissions:** Dioxins and furans are known to be **carcinogenic** and can lead to impairment of immune, endocrine, nervous and reproductive systems.
    - **Poor compliance:** These WtE are **not in compliance** with guidelines given by National Green Tribunal.
    - **Environmentally unsustainable :** Even when incineration takes place under optimal conditions, large amounts of flue gases, mercury vapour and lead compounds are released, and there is always about 30 per cent residue from incineration in the form of slag (bottom ash) and fly ash (particulate matter), which are also known to be serious pollutants of air and water.
    - Also, WtE plants in India are also **inefficient in generating energy.**
        Municipal waste in India has a very high biodegradable (wet) waste content ranging anywhere between 60 to 70 % of the total, compared with 30 % in the Western countries. This gives our waste high moisture content and low calorific value.
- Compactors
    - Compactors are expensive machines that **squeeze and compress the volume of waste,** this enables more waste to be carried per trip and, thus, reduce transportation costs.
    - **The antithesis of segregation:** The use of compactors on mixed waste makes it almost impossible to extract the recyclable dry waste such as plastics, metal, paper and cardboard from the mixture.
    - **Polluting:** The compression of wet waste in the mixture releases **leachate** (a black foul-smelling liquid) that is difficult to dispose of. Leachate percolates into the soil and contaminates groundwater. When it drains off into the sewer system, it overloads the sewage treatment plants.
    - **Increases global warming:** After the compacted waste is transported and dumped, the lack of aeration at the site results in the decomposing wet waste generating methane, a potent greenhouse gas that causes global warming.
- **Waste transport contracts with private parties**
    - A payment for waste transportation is made on a **tonnage basis.**

    - This provides an incentive to maximize the weight of waste.
    - These private players mix whatever the waste is given to them separately.
    - Also, the unmixed transportation and processing of wet and dry waste encourage citizens to keep their waste unmixed too.

Challenges to Solid Waste Management in India

- Increasing urbanisation in India has resulted in hyper-consumerism, resulting in more waste generation.
- Organic farming and composting are not economically attractive to the Indian farmer, as chemical pesticides are heavily subsidised, and the compost is not efficiently marketed.
- Lack of financial resources with Municipal Corporations/Urban Local Bodies, result in poor collection, transportation and management of solid waste.

Possible Solutions

- There is a need for a comprehensive waste management policy that stresses the need for decentralised garbage disposal practices as this will incentivise private players to participate.
- It is important that Bio-mining and Bio-remediation are made compulsory for areas wherever they can be applied.
- To overhaul the waste management sector and induce the necessary behavioural change, citizen participation and engagement is the key.

Way Forward

- Waste segregation practice can be inculcated in the masses through awareness-building programme accompanied by a fine if mixed waste is handed out.
- Ministry of Housing and Urban Affairs should either stop financing compactors or at least offer municipalities similar levels of support for more sustainable methods of waste management.
    For example, access to bio-composters in residential localities.
- A much smarter alternative for municipalities under the Smart Cities Mission would be to promote decentralised composting of wet waste, tie-up with local “kabadiwalas” or NGOs for recyclable dry waste, and work on safe disposal of the rest.
- The savings from eliminating costly secondary transport can easily fund the construction and operation of decentralised centres for the processing of wet and dry waste.

Drishti Mains Question

What are the challenges to solid waste management in India? What measures can be taken to ensure a sustainable waste management system in the country?
