Sustainably Managing Waste

With management of waste becoming a major challenge in India, sustainable waste management (SWM) is the need of the hour. The Clean India Campaign or the “Swachh Bharat Abhiyan” launched by the Hon’ble Prime Minister, apart from taking care of our concerns, holds the potential for business in waste management and recycling solutions.

Waste management and recycling has been emphasized in one of the eight missions of the National Action Plan on Climate Change (NAPCC) covered under the National Mission on Sustainable Habitat which also aims at promoting energy efficiency as a core component of urban planning by extending the existing Energy Conservation Building Code, strengthening the enforcement of automotive fuel economy standards, and using pricing measures to encourage the purchase of efficient vehicles and incentives for the use of public transportation.

Recycling of material and urban waste management will be the major component of ecologically sustainable economic development. The mission will focus on bio-chemical conversion, waste water use, sewage utilization and recycling options wherever possible.

Sustainable waste management involves reduction of waste, the re-use of consumables, and the recycling and recovery of waste that is produced. Waste recovery not only saves resources but also protects the environment and reduces the expense of producing new products.

Waste is generated by various means. Most waste comes from domestic and municipal consumption of goods, manufacturing, construction, sewage treatment, agriculture and the generation and disposal of hazardous substances. Waste includes paper, plastics, glass, metals, foods, chemicals, oils, bricks, wood, soil, and effluent. Institutional and household wastes primarily comprise of paper, metals, glass, plastics, tin, wood and electronic items, etc. Most of these are recyclable for their continued use in a productive manner which not only reduces load on virgin resources but also generates employment.

Types of Wastes
1. Municipal
2. E-Waste
3. Plastic
4. Bio-medical
5. Agricultural
6. Industrial (Hazardous and Non-hazardous)
Sustainable waste management involves reduction of waste, the re-use of consumables, and the recycling and recovery of waste that is produced. Waste recovery not only saves resources but also protects the environment and reduces the expense of producing new products.

Improper Waste Management

The scale of urbanization in India and around the world is unprecedented with respect to the Earth’s limited resources. The social and economic development of a country can cause an increase in pressures on its environment. Some of these damaging activities involve the production and disposal of waste.

The more waste we produce, the more we have to dispose. Currently, disposal of waste is considered to be a growing burden. By 2050, if current consumption and production patterns remain the same and with a rising population expected to reach 9.6 billion, we will need about three planets to sustain our ways of living and consumption.

In most cities in India, scientific and systematic storage of waste at source is not yet practiced. One can find waste being thrown in nearby vacant areas. Often people throw waste in open and large drains passing across the city, causing these drains to be clogged. This often leads to ground and surface water contamination from runoff, air pollution caused by toxic gases and public health problems due to mosquitoes and scavenging animals.

The country generates about 1,35,000 metric tonnes of Municipal Solid Waste per day of which only about 30,000 tonnes is treated every day. As per the current information obtained from State Pollution Control Boards, there are about 41,523 hazardous waste generating industries in India and their hazardous waste generation is about 7.90 million tonnes per annum. These wastes can be categorized into three components such as recyclable, land fillable and incinerable and their percentage constitutions are as below:

<table>
<thead>
<tr>
<th>Category</th>
<th>Generation (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfillable</td>
<td>3.32</td>
</tr>
<tr>
<td>Recyclable</td>
<td>3.98</td>
</tr>
<tr>
<td>Incinerable</td>
<td>0.60</td>
</tr>
<tr>
<td>Total</td>
<td>7.90</td>
</tr>
</tbody>
</table>

In a rapidly growing technology-based economy, there is also an unprecedented increase in the consumption of electrical and electronic products worldwide. The electronic industry happens to be the fastest growing manufacturing sector which has led to rapid growth in waste streams. Electronic waste, or e-waste, is an emerging problem today. The Basel Convention has identified e-waste as hazardous, and developed a framework for controls on transboundary movement of such waste.

India is the fifth biggest producer of e-waste in the world discarding 1.7 metric tonnes of electronic and electrical equipment in 2014. A UN report has warned that the volume of global e-waste is likely to rise by 21 per cent in the next three years. The ‘Global E-Waste Monitor 2014’, compiled by U.N.’s think tank United Nations University (UNU), said at 32 per cent, the U.S. and China produced the most e-waste overall in 2014. India is behind the U.S., China, Japan and Germany.

While only 7 per cent of e-waste last year was made up of mobile phones, calculators, personal computers, printers, and small information technology equipment, almost 60 per cent was a mix of large and small equipment used in homes and businesses such as vacuum cleaners, toasters, electric shavers, video cameras, washing machines, electric stoves, mobile phones, calculators, personal computers, and lamps (Ref: The Hindu, 20 April 2015).

The risk of pollution arising from these wastes needs to be reduced. Delhi generates about 5,000 tonnes of hazardous waste annually which was sealed and stored by industries generating it.

The Delhi Jal Board is setting up five decentralized wastewater treatment plants in the city to bridge the demand supply gap. Also the capital will have hazardous waste treatment, storage and disposal facility (TSDF) in Bawana, Delhi (about 16 acres in area) to treat its toxic industrial waste. Till now industries had been storing it in their own facility but with lot of risk because land for the facility was not available.

TSDFs (Treatment, Storage and Disposal Facilities) are facilities for treatment, storage and disposal of hazardous wastes in an environmentally sound and techno-economical viable manner. The common TSDFs are generally expected to have facilities such as authorized vehicle for transportation of hazardous wastes from industries/units, weighing machine, laboratory facilities (to determine characteristics of hazardous wastes to decide their storage and disposal pathway), hazardous waste storage facilities, waste treatment/stabilization facilities, etc.

The common TSDFs may have only secured landfill facilities or both secure land facilities and incineration facilities. Disposal at TSDFs is advantageous as compared to the captive facility
In most cities in India, scientific and systematic storage of waste at source is not yet practiced. One can find waste being thrown in nearby vacant areas. Often people throw waste in open and large drains passing across the city, causing these drains to be clogged. This often leads to ground and surface water contamination from runoff, air pollution caused by toxic gases and public health problems due to mosquitoes and scavenging animals.

because of reasons such as reduced capital investment, reduced cost of treatment, checking mushrooming of treatment equipment in an area, easy implementation by the regulatory bodies, etc. The number of TSDFs in the country has increased gradually from 4 facilities in the year 2003 to 38 TSDFs in 16 States/UTs currently.

The MoEFCC administers waste management rules which have been notified under EPA, 1986 for environmentally sound management of wastes to ensure environmental sustainability as well as promotion of ways and means for reuse and recycling of waste. Hazardous waste management rules say “operators may store the hazardous wastes for a period not exceeding 90 days and shall maintain record of sale, transfer, storage, recycling and reprocessing of such wastes.”

These rules are primarily framed on the basis of source characteristics and aimed at preservation, conservation and protection of the environment and emphasize gainful utilization of the waste as resource. In order to facilitate the integrated waste management concept, the MoEFCC has finalized amendments to the rules.

**Rules notified under Environment (Protection) Act, 1986**
- Municipal Solid Waste Management (Management and Handling) Rules, 2000
- Bio-medical Waste (Management and Handling) Rules, 1989
- Plastic Waste (Management and Handling) Rules, 2011
- Electronic Waste (Management & Handling) Rules, 2011

**Way Forward**

Every waste has value. The reuse and recycling of wastes generates resources through a process of recovery of useful constituents from such wastes. Waste-to-

wealth represents generation of economic benefits out of what was traditionally considered as waste. Successful implementation depends upon capacity building and knowledge sharing at state, national and regional level.

There should be use of Clean Technology for abatement of greenhouse gases emitted from the waste. The development of technologies such as landfill gas recovery (like the one at Okhla, Delhi) provides sustainable solutions and options for dealing with this serious problem. This can help turn all of the city’s waste into fuel oil or gas, or into recycled products. While formulating integrated solutions, it is important we consider the time period associated with various technologies and methods and their applicability.

By integrating SWM in use, we can save large amounts of non-renewable fossil fuels and raw materials, reduce green house gas emissions, generate employment and increase treatment capacity for hazardous chemical in addition to minimizing environmental hazards. Urban India needs SWM to keep pace with growth.

Dr. A.B. Harapanahalli is Scientist ‘G’, Ms. Rita Khanna is Scientist ‘F’ and Ms Kanchan Puri is Programme Coordinator (backupmoef@gmail.com), Environment, Education Division, Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh, New Delhi-110003