

# Do not Waste the 'Wealth' of Waste

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3Rs of waste management

**W**ASTE refers to materials that cannot be used at the source of their generation but can be used for other purposes. Waste exists in liquid, gas or solid form as a 'useless' byproduct of manufacturing processes or daily activities. Humans, animals, plants and almost all living organisms generate waste. Even sweat or perspiration also counts as waste, with the skin being the largest organ of excretion in the human body. What is a waste for one can be a resource for another. Thus, the term 'waste' is subjective, and the exact composition or constitution of waste is not known most of the time.

The rapid growth in population, industrialisation, and urbanisation have significantly increased the volume and diversity of waste generated. Piling up of waste and improper waste management have resulted in many fatal epidemics like plague in many parts of the world, killing millions of people. India generates about 63 million tonnes of waste annually, and global waste generation is anticipated to reach 3.5 billion tonnes per year by 2050. Efficient waste management is a key factor in assessing the development index of countries.

## Waste Management for a Healthier Environment

Normal excretion and timely disposal of waste from the human body is important for maintaining a healthy body. Similarly, the safe disposal of waste from society is important for environmental health. Efficient waste management has become a necessity and a basic need of society and people. It includes collection, transport, storage, handling, treatment and disposal of waste to eliminate harmful effects. "Reduce,

Reuse, Recycle" is the slogan of cleanliness programmes in modern and urban areas, aimed mainly at eliminating Single-use Plastics (SUPs) from the environment. At the same time, refuse, reduce, recycle, repurpose, and reuse are considered as the 5Rs of waste management. Management of waste through disposal, reduction in waste generation, reuse and recycling waste to value-added and usable products are of utmost importance for maintaining a clean and healthy environment for safe living.

Waste can be grouped as solid, liquid or gaseous waste based on the physical state or as farm or agricultural, industrial, urban, rural, domestic or household, commercial, construction, mining waste, etc., based on the source. Waste can be hazardous or non-hazardous to the environment and can be grouped accordingly.

## Agricultural or Farm Waste Management

Agriculture is a source of food and livelihood directly and indirectly distributed to millions worldwide. Every year, India generates about 350 million tonnes of agricultural waste (crop residues, animal manure and silage).

Agricultural waste, contributing to about 26% of the annual greenhouse gas emissions, contains suspended solids and has a high value of Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). Crop residues, which otherwise cause nutrient imbalances and decrease soil fertility, can be used as animal feed, as mulch, to reduce soil temperature or as a green manure cover crop to increase the organic matter content of soil or converted to biogas through anaerobic digestion. Nutrient-rich compost, fertiliser and biogas can be produced from animal manure, and liquid livestock manure can be used for wastewater irrigation.

The spoiled and discarded produce from farms, such as grains, fruits and vegetables that cause almost 8% of greenhouse gas emissions, can be used as animal feed for biogas production, silage, compost, or organic fertiliser. Pesticide containers should be leak-proof to avoid contaminating soil and water and stored securely in designated areas away from water sources or areas prone to flooding. Waste contaminated with pesticides should not be used for composting or as animal feed. Incineration of crop residues should be avoided as large-scale burning of crop residues after harvest causes environmental pollution due to the smoke particles.

Waste management is a challenge for small land holdings and medium farms. Centralised waste processing units focusing on community composting centres can, to an extent, address this issue. Eco-friendly and sustainable farm waste