

## Setting the scene: Waste and Toxic substances

### Knowing type of wastes:

(Source: [dtm mix 2021](#))



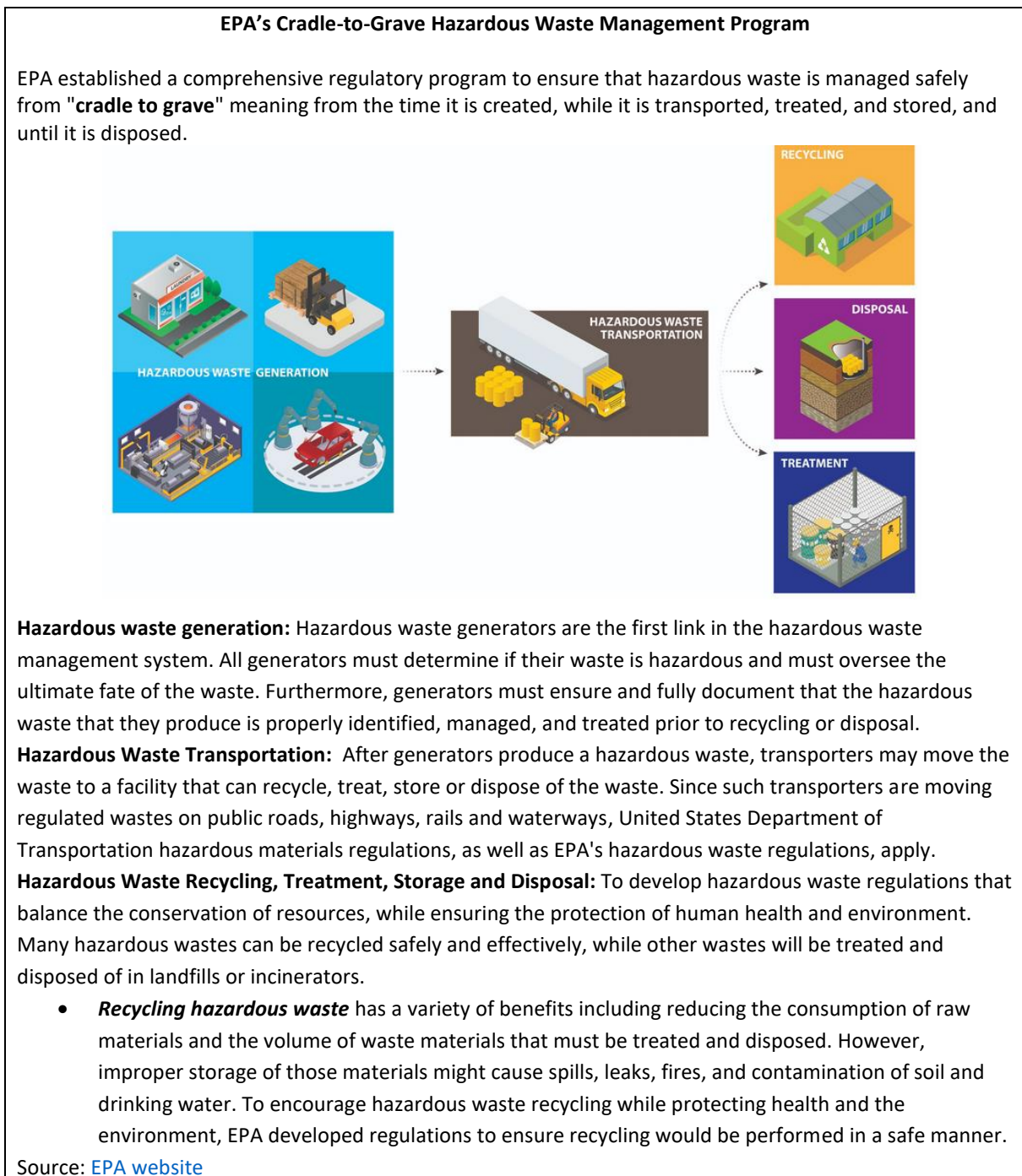
- **Organic waste** = rotten meat, garden and food waste that are commonly found in homes. They decompose and turn into manure by the action of microorganisms on them with time. However, when decomposing, organic waste produces methane, so, it must not be thrown away with regular waste. Instead, get a green bin and dispose of this type of waste properly.
- **Hazardous waste** = according to EPA definition, a hazardous waste is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. Hazardous waste is generated from many sources, ranging from industrial manufacturing process wastes to batteries and may come in many forms, including liquids, solids gases, toxic and reactive materials.
- **Liquid waste** = all grease, oil, wash water, waste detergents and dirty water that have been thrown away. They are hazardous and poisonous to our environment and are found in industries as well as households. Wastewater, as it is often called, is any waste that exists in liquid form. Three methods to remove liquid waste: Containment, Treatment and Disposal.
- **Solid waste** = any garbage found in home, industrial and commercial locations, including glass and ceramics, plastic waste (non-biodegradable cannot be recycled), paper rubbish (recyclable), metals and tins (from food containers and household materials)
- **Recycle waste** = all discarded items like metals, furniture, organic waste that can be recycled. Not all items are recyclable, so checking the item's packaging before putting in the recycle bin.

Each type of waste requires different ways to dispose and different waste management.

## Trends in wastes and their effects on human health and the environment

Source: [EPA website](#)

Solid waste management challenges that raise public concerns in the U.S since mid-century and continue today include: increasing solid waste generation, shrinking disposal capacity, rising disposal costs, and public opposition to the siting of new disposal facilities. Many communities are struggling to develop **cost-effective, environmentally protective solutions**. The growing amount of waste generated has made it increasingly important for solid waste management officials to develop strategies to manage wastes safely and cost effectively.



### Trends in waste generation:

Economic activity, consumption, and population growth has influenced the amount of waste generated.

In developed economies, such as the United States, generally produce large amounts of waste:

- municipal solid waste (e.g., food wastes, packaged goods, disposable goods, used electronics)
- commercial and industrial wastes (e.g., demolition debris, incineration residues, refinery sludges).

Among industrialized nations, the United States generates the largest amount of municipal solid waste per person on a daily basis. Waste generation, in most cases, **represents inefficient use of materials**.

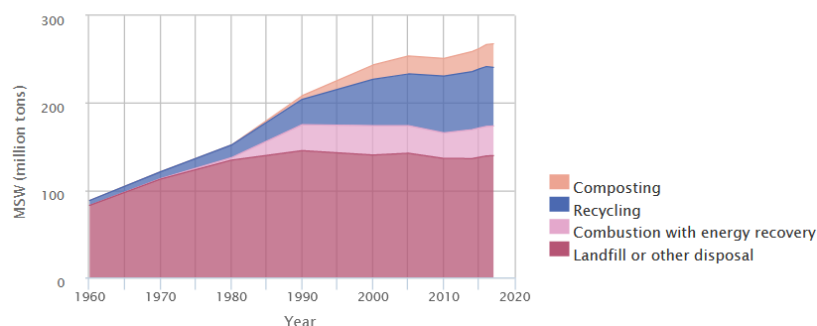
Tracking trends in the quantity, composition, and effects of these materials provides insight into the efficiency with which the nation uses (and reuses) materials and resources and provides **a means to better understand the effects of wastes on human health and ecological condition**.

Waste Management

### Trends in waste management:

Wastes must be managed **through reuse, recycling, storage, treatment, and/or disposal**. Most municipal solid wastes and hazardous wastes are managed in land disposal units. For hazardous wastes, land disposal includes landfills, surface impoundments, land treatment, land farming, and underground injection. Land disposal created problems such as ground water contamination, methane gas formation and migration, and disease vector hazards.

**Exhibit 1. Municipal solid waste generated and managed in the U.S., 1960–2017**



This graph reflects data for 1960, 1970, 1980, 1990, 2000, 2005, 2010, 2015, 2016, and 2017. No composting data are available prior to the 1990 data point. "Landfill or other disposal" includes combustion without energy recovery.

**Data source:** U.S. EPA, 2019

Prior to Resource Conservation and Recovery Act (RCRA) regulations, waste management practices left legacies of **contaminated lands including the following sites:**

- Sites contaminated by improper handling or disposal of toxic and hazardous materials and wastes.
- Sites where toxic materials may have been deposited as a result of natural disasters
- Sites where improper handling or accidents resulted in release of toxic or hazardous materials that are not wastes.

These sites must be carefully managed through containment or cleanup to prevent hazardous materials from causing harm to humans, wildlife, or ecological systems, both on- and offsite. Examples of the problems related to contaminated lands include:

- Contaminated soils can leach **toxic chemicals into nearby ground or surface waters**, where these materials can be taken up by plants and animals, contaminate a human drinking water supply, or volatilize and contaminate the indoor air in overlying buildings.
- In dry areas, contamination in soil can be further distributed through wind-borne dust. Once soil contamination migrates to waterways, it may also accumulate in sediments, which can be very difficult to remediate and **may affect local ecosystems and human health**.
- Humans can be harmed by contact with toxic and hazardous materials on a contaminated site via exposure to contaminated land, air, surface water, and ground water.
- When contaminated lands are not properly managed, humans and wildlife can be exposed to contaminants through inhalation, ingestion, or dermal contact. The risks of human exposure are site-specific and difficult to generalize at the national level. Potential effects may be acute or chronic.

**Current approaches to waste management evolved primarily due to such health concerns.** In the past, waste often was deposited on land just outside developed areas. More recently, excavation of land specifically for deposition of wastes became common, often accompanied by burning of wastes to reduce volume, a practice eventually determined to be a contributor to degraded air quality in urban areas. Burning of wastes occurred at multiple levels, from backyard burning to large, open-burning dumps of municipal solid wastes to onsite burning of commercial and industrial wastes.

### Effects on human health and environment

The effects associated with waste vary widely and are influenced by the substances or chemicals found in waste and how they are managed. Although data do not exist to directly link trends in waste with effects on human health and the environment, the management of waste may result in waste and chemicals in waste entering the environment.

- **Hazardous waste** has the potential to negatively affect human health and the environment, which is why it is so strictly regulated. Hazardous wastes are either specifically listed as hazardous by EPA or a state, or exhibit one or more of the following characteristics: ignitability, corrosivity, reactivity, or toxicity. Generation and management of hazardous wastes can contaminate land, air, and water and negatively affect human health and environmental conditions.
- **Municipal solid waste landfills** are the third-largest source of human-related methane emissions in the United States, accounting for approximately 16 percent of these emissions in

2016.2 Methane is one of several non-CO<sub>2</sub> gases that contribute to global climate change. Methane gas is released as wastes decompose, and emissions are a function of the total amount and makeup of the wastes as well as management facility location, design, and practices. EPA is interested because gas emissions can be affected by recycling and changing product use. For example, recycling office paper or aluminum can reduce environmental effects (e.g., by reducing the need to harvest trees or mine bauxite to produce aluminum), and it will also create positive environmental benefits, such as reductions in energy consumption and greenhouse gases.

While numerous waste-related data collection efforts exist at the local, state, and national levels, the availability of indicators on how materials are generated, used, and managed is **constrained by the existing data on non-hazardous waste management**.

- Over the past 35 years, the paradigm has shifted from a “waste management” approach to “**sustainable materials management**” focusing on resource, environmental, and human health impacts over the entire life cycle of materials.
- The amount of waste generated and managed may describe ambient conditions in terms of wastes in the environment, but **does not provide any indication of the effects on human health or environmental condition**.

There have been changes in the management of wastes over the past few decades, designed to reduce hazardous and potential exposures, but data that more concretely measure the overall exposure (and thus effects on human health and the environment caused by wastes and waste management practices) are still lacking.