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**Forum:** SF2: Sustainable Development

**Issue:** Providing safe removal and management of solid waste within cities with a special focus on India.

**Student Officer:** Duru Katircioğlu

**Position:** President Chair

## Introduction

Everybody has a right to breathe clean air, drink clean water, and eat clean food. This can only be achieved by sustaining a healthy environment. And to sustain a healthy environment we need to control waste. Throughout the globe, waste production rates are increasing. In 2016, cities generated 2.01 billion tonnes of solid waste, approximately a footprint of 0.74 kilograms per person per day. With rapid population growth and urbanization, annual waste generation is anticipated to increase by 70% from 2016 levels to 3.40 billion tonnes in 2050. In low-income countries, over 90% of waste is often disposed of in unregulated dumps or openly burned. These practices create serious health, safety, and environmental issues. Poorly managed waste serves as a breeding ground for diseases and contributes to global climate change through methane generation. Efficient waste management is costly, often holding 20%–50% of municipal funds. Conducting this essential municipal service requires integrated systems that are efficient, sustainable, and socially encouraged. Anything that is not needed by the owner, producer or processor is waste. Commonly, waste is described as the completion of the product life cycle and is disposed of in landfills. Most businesses define waste as “anything that does not create value” (BSR, 2010). From a common perspective, anything that is undesired or not useful is garbage or waste. However, scientifically, there is no such thing as waste in the world. Almost all the components of solid waste possess some potential if it is regenerated. Therefore we can specify solid waste as “Organic or inorganic waste materials produced out of household or commercial activities that have lost their value in the eyes of the first owner but which may be of great value to somebody else.” (Robinson, W.D.1986). Production of waste is inevitable in every abode big or small. Since the dawn of civilization, humanity has progressively diverged from nature and currently, there has been a radical change in the lifestyle of human society. A direct representation of this change is observed in the nature and quantity of garbage that society produces. We can dispose of the waste or reuse the waste. And if required methods are followed, States’ can even earn money through this process.





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## Definition of Key Terms

**Solid waste:** vegetable waste, kitchen waste, household waste, etc.

**E-waste:** discarded electronic devices such as computers, TV, music systems, etc.

**Liquid waste:** water used for different industries, tanneries, distilleries, thermal power plants

**Plastic waste:** plastic bags, bottles, buckets, etc.

**Metal waste:** unused metal sheet, metal scraps, etc.

**Nuclear waste:** unused materials from nuclear power plants

**Wet waste (Biodegradable):** Kitchen waste including food waste of all kinds, cooked and uncooked, including eggshells and bones.

- Flower and fruit waste including juice peels and house-plant waste
- Garden sweeping or yard waste consisting of green/dry leaves
- Sanitary wastes
- Green waste from vegetable & fruit vendors/shops
- Waste from food & tea stalls/shops etc.

### **Dry waste (Non-biodegradable):**

- Paper and plastic, all kinds
- Cardboard and cartons
- All sorts of containers excluding those containing hazardous material
- Packaging of all kinds
- Glass of all kinds
- Metals of all kinds
- Rags, rubber
- House sweeping (dust etc.)
- Ashes
- Foils, wrappings, pouches, sachets and tetra packs (rinsed)
- Discarded electronic items from offices, colonies viz. cassettes, computer diskettes, printer cartridges, and electronic parts.
- Discarded clothing, furniture, and equipment

**Domestic Hazardous Waste:** Can be generated at a household level. These include used aerosol cans, batteries, and household kitchen and drain cleaning agents, car batteries and car care products, cosmetic items, chemical-based insecticides/pesticides, light bulbs, tube lights and compact fluorescent lamps (CFL), paint, oil, lubricant, and their empty containers. Waste that is considered hazardous is first required by the EPA to meet the legal definition of solid



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waste. The EPA incorporates hazardous waste into three categories. The first category is source-specific wastes, the second category is nonspecific wastes, and third, commercial chemical products. Generally, hazardous waste “is waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludge. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes (EPA Wastes Website, 2010)

**Non-Hazardous waste:** Non-hazardous waste is any type of industrial waste which, according to regulations, cannot be added to a dumpster or sewage line. Examples of non-hazardous wastes would be sugars, lactic acid, bromides, or carbonates, just to name a few. Though these materials won't negatively affect the health of humans, they must be collected and disposed of properly for a variety of reasons.(BWSinc, Apr 13, 2017)

## Background Information

In ancient cities, wastes were discharged onto streets and roadways, where they were left to accumulate. It was not until 320 BCE in Athens that the first known law prohibiting this method was established. At that time, a method for waste removal began to evolve in Greece and the Greek-dominated cities of the eastern Mediterranean. In ancient Rome, property owners were accountable for cleaning the streets bordering their property. But regulated waste mass was correlated only with state-sponsored events such as parades. Disposal methods were very raw, involving open pits located just outside the city walls. As populations increased, efforts were made to transport waste farther out from the cities. Toward the end of the 18th century in America, municipal collection of garbage was begun in Boston, New York City, and Philadelphia. Waste disposal methods were still very crude, however. Garbage collected in Philadelphia, for example, was simply dumped into the Delaware River downstream. Water tight garbage cans were first introduced in the United States, and stronger vehicles were used to collect and transport waste. A significant development in solid-waste treatment and disposal practices was marked by the construction of the first refuse incinerator in England in 1874. By the beginning of the 20th century, 15 percent of major American cities were cremating solid waste. Even then, however, most of the largest cities were still using primitive disposal methods such as open dumping on land or in water.

Uncollected solid waste blocks drain and cause flooding and consequently spread waterborne diseases. This was the cause of a major flood in Surat in India in 1994, which resulted in an outbreak of a plague-like disease, affecting 1000 people and killing 56. Annual floods in East and West African and Indian cities are accused of plastic bags blocking drains. The responsibility of municipalities to provide solid waste collection services dates back to the mid-19th century when infectious diseases were linked for the first time to poor sanitation and uncollected solid waste. There are major cities in all continents that have had gathering services in place for a century or more. UN-Habitat health data shows that rates of diarrhea and acute respiratory infections are significantly higher for children living in households where solid waste is dumped, or burned in the yard, compared to households in the same



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cities that receive a regular waste collection service. Surprisingly, even in Europe and North America uncollected waste can still hit the headlines, as in the 2008 example of Naples, Italy, where mountains of solid waste lined the streets for months; collectors stopped picking up the waste because all of the region's landfills were full, and residents protested fiercely. The 20 reference cities in this report provide many examples of different approaches that have been successful in providing collections services across the city. For example, both Bengaluru (Bangalore) in India and Quezon City in the Philippines have collection coverage rates over 90 percent. One key message is to adopt and adapt to technology that is appropriate and can easily be sustained locally. Another key message is to 'mix and match' the methods of service delivery. New Delhi is an example of a city where the primary collection is done by authorized informal sector collectors/ recyclers, who deliver the waste by hand cart to a large private sector operator who provides secondary collection from communal bins. Until the environmental movement appeared in the 1960s, most wastes were disposed of with little or no control: to land, as open dumping; to air, by burning or evaporation of volatile compounds; or to water, by discharging solids and liquids to surface, groundwater or the ocean. There was little regard for the effects on drinking water resources and the health of those living nearby – the philosophy was 'out of sight, out of mind'. Over the last 30 to 40 years, countries and cities seeking to take control of growing quantities of waste and to maintain a clean environment have built up experience about what works. Shifting towards modern disposal has generally followed a step-by-step process: first phasing out uncontrolled disposal, then introducing, and gradually increasing, environmental standards for a disposal facility. In the method, controlling water pollution and methane emissions from sanitary landfills, and air pollution from incinerators, receive increasing attention. Notice in high-income countries may now be moving on to other aspects, but many cities in low- and middle-income countries are still working on phasing out open dumps and establishing controlled disposal. This is a fundamental first step towards good waste management; a properly controlled landfill site is an essential part of any modern waste management system. Whatever technologies and equipment are used, they should be appropriate for and adapted to the local conditions.



Graphic: Shantanu Dasgupta / IWA, 2022.  
Based on: Herring, S. and Shantanu Dasgupta (2012), 'What's Next? A Global Review of Solid Waste Management', New York, Washington D.C.



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## Major Countries and Organizations Involved

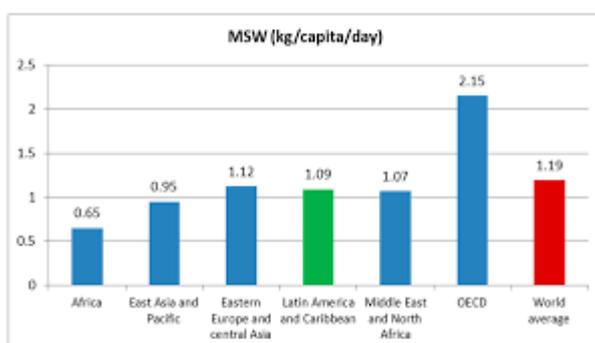
**EPA(U.S. Environmental Protection Agency):**The mission of EPA is to protect human health and the environment. EPA works to ensure that:

- Americans have clean air, land and water;
- National efforts to reduce environmental risks are based on the best available scientific information;
- Federal laws protecting human health and the environment are administered ,and enforced fairly, effectively and as Congress intended;
- Environmental stewardship is integral to U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and these factors are similarly considered in establishing environmental policy;
- All parts of society--communities, individuals, businesses, and state, local and tribal governments--have access to accurate information
- to participate in managing human health and environmental risks effectively;
- Contaminated lands and toxic sites are cleaned up by potentially responsible parties and revitalized; and
- Chemicals in the marketplace are reviewed for safety(About EPA,January 19, 2017)

**World Bank:**The World Bank finances and advises on solid waste management projects using a diverse suite of products and services, including traditional loans, results-based financing, development policy financing, and technical advisory. World Bank-financed waste management projects address the entire lifecycle of waste—from generation to collection and transportation, and finally treatment and disposal.(September 23, 2019,WB)

**India:** In India, they cannot afford sanitary landfilling as land is precious there, and there are a lot of municipalities who do not have land as trenching ground. And since India's population is more than 1 billion, the amount of waste is hard to control and India is insufficient to provide this to its citizens.

**International Solid Waste Association (ISWA):** ISWA's vision is a world with no waste. They support that waste should be reused and reduced to a minimum, then collected, recycled and treated properly. The residual matter should be disposed of in a safely engineered way, ensuring a clean and healthy environment. All people on earth should have the right to enjoy an environment with clean air, water, seas, and soils. To be able to achieve this, they suggest that we should work together.





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**Climate and Clean Air Coalition:** The Climate and Clean Air Coalition is a voluntary partnership of governments, intergovernmental organizations, businesses, scientific institutions and civil society organizations committed to improving air quality and protecting the climate through actions to reduce short-lived climate pollutants. Their global network currently includes over 120 state and non-state partners and hundreds of local actors carrying out activities across economic sectors. The Coalition helps partners and stakeholders create policies and practices that will deliver substantial reductions in short-lived climate pollutant emissions. They support actions on the ground through 11 Initiatives, Solution Centre and Action Programme to Address the 1.5°C Challenge.

**Korean Green Growth Trust Fund:** The objective of the Korean Green Growth Trust Fund is to mainstream inclusive green growth throughout the World Bank's lending operations and to help World Bank client countries identify and implement the most innovative, technical and operational solutions to their specific development challenges. In partnership with the World Bank, the Korean Green Growth Trust Fund (KGGTF) was established in 2011 to strengthen and expand the World Bank's global green growth portfolio by tapping expertise from Korea's green growth experience and investment through public and private resources. Its central approach is to support the World Bank and its clients to operationalize inclusive green growth initiatives, strategies, and investments.

**Global Partnership on Results-Based Approaches (GPRBA):** The Global Partnership for Results-Based Approaches (GPRBA), formerly known as the Global Partnership on Output-Based Aid (GPOBA) until February 2019, is a global partnership program in the World Bank Group. The Global Partnership on Output-Based Aid (GPOBA) provides innovative financing solutions that link funding to achieved results. GPOBA's results-based financing (RBF) approaches provide access to basic services like water and sanitation, energy, health and education for low-income families and communities that might otherwise go unserved. By bringing together public and private sector funders to maximize resources, and designing effective incentives for service providers to reach underserved low-income communities, GPOBA gives people the chance for a better life.  
(Wed,2019-03-13,PPPLRC)

## Previous Attempts to Solve the Issue

**The United Nations Conference on Housing and Sustainable Urban Development Goal 11.6:** The conference took place in Quito, Ecuador from 17-20 October 2016, and was



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the first UN global summit on urbanization since the adoption of the 2030 Agenda for Sustainable Development.

## Possible Solutions

- Region-specific planning should be done.
- Well planned and effective training policies should be provided ,and the fact that technical training at all levels forms the backbone of a successful waste management program should be kept in mind.
- Products that can be reused should be reused, repaired, refurbished, or remanufactured to have longer useful lives.
- Recyclable materials can be extracted, recovered ,and returned to industrial value chains where they strengthen local, regional and global production so recycling bins should be available to everyone.
- Legislation and its effective enforcement is key to sustainability for which the framework requires to be established.
- Efforts to improve waste storage and collection are required. This can be done when each household and locality are provided standard bins that are placed outside for ease of collection. In areas where this is not appropriate, centrally located waste collection points should be established that are shared by a number of households.
- Wastes need to be increasingly sorted at the source, to separate materials that can be recycled and to reduce the number of wastes requiring collection and disposal.

## Useful Links For Further Research

[https://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/E-Learning/Moocs/Solid\\_Waste/W5/Solid\\_Waste\\_Management\\_World\\_cities\\_2010.pdf](https://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/E-Learning/Moocs/Solid_Waste/W5/Solid_Waste_Management_World_cities_2010.pdf)

<http://www.bwaste.com/>

<https://www.epa.gov/>

<https://www.un.org>

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