What is waste?

The understanding of waste is different from places to individuals to society. But, it is common issue which requires immediate action. The level of understanding the concept and fundamentals of waste is an important for the sustainable management of waste. The following session will define the terminologies of waste and management.

As per the international Organizations like:

United Nations Statistics Division, as per Glossary of Environment Statistics, *"wastes as materials that are not prime products (that is, products produced for the market) for which the generator has no further use in terms of his/her own purpose of production, transformation or consumptions, and of which she/he wants to dispose. Waste may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities,. Residuals recycled or reused at the place of generation are excluded."*

Understanding waste and management requires determined approaches that can be consistently understandable and applicable for all kinds of wastes. Waste is unwanted products which otherwise can be recycle and used for other purpose with certain innovation. The waste can be generating from initial extraction of the raw materials till final products are consumption by the customer. Planning and management of solid waste in developing countries has remained an exceptional task due to the unchecked exponential growth of urban population, unplanned urbanizations, lack of training in modern solid waste management practices, lack of awareness on the dangers of unsustainable waste management practices, poverty, illiteracy, and poor Government support amongst other factors.

Firstly, understanding the interpretation of what is waste and management, and classification of waste is important. Secondly, understanding of these conceptual words will have effective implication in waste management through regulation and planning. Wastes management in our cities is currently limited with understanding

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Urban Waste and effluent management

Daffodil
International
University
Sagar Mozumder
Lecturer, ESDM, DIU

of waste and management. The following session will describe the important fundamentals of terminologies relating to waste and management.

5 Types of Waste

Organic/Food	Recyclable	Solid	Hazardous	Liquid

Eschooltoday (http://www.eschooltoday.com/waste-recycling/types-of-waste.html) has good facts on information of waste management studies. The following waste information (types of waste, kinds and classification of waste, sources of waste and management of waste) are all reviewed, compiled and included as per the requirement of the study:

Kinds of Wastes

i. **Solid Wastes**: the wastes that are generating from domestic, commercial and industrial wastes especially common as co-disposal of wastes for instance; plastics, containers, bottles, cans, papers, scrap iron, and other trash. These forms of waste are degradable and non-degradable which include any waste that is non-liquid.

ii. **Liquid Wastes**: the wastes that are in liquid form for instance; domestic washings, chemicals, oils, etc. Waste water from ponds, manufacturing industries and other sources. The liquid wastes are most chemical content waste which is really hazardous to human and environment.

iii. **Organic waste**: the wastes coming from plants or animals sources for instance; food waste, fruit and vegetable peels, flower trimmings, etc.

iv. **Recyclable Waste**: the wastes that can be potentially recycled are termed recyclable waste". For instance; aluminum products (like soda, milk and tomato cans), plastics (grocery shopping bags, plastic bottles), glass products (like wine and beer bottles, broken glass), paper products (used envelopes, newspapers and magazines, cardboard boxes), etc.

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Classification of wastes

i. **Bio-degradable** (wastes that can be degraded naturally or though certain interventions for instances wastes from; paper, wood, fruits and others.)

ii. **Non-biodegradable** (wastes that cannot be degraded for instance; plastics, bottles, old machines, can and others).

Classification of wastes (as per their effects on human health and the environment)

i. **Hazardous Wastes**: the substances wastes generated from commercially, industrially, agriculturally, or economically which are unsafe to use for instance; herbicide, pesticide, car batteries and other chemicals.

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Lecturer, ESDM, DIU

ii. **Non-hazardous Wastes**: the substances wastes generated from commercially, industrially, agriculturally or economically for instance; paper, wood, fruits, vegetables and etc which are safe.

NON-HAZARDOUS WASTE
Types of Non-Hazardous Waste

Household Waste	Ordinary Industrial Waste	Solid Waste	Construction Waste	Organic Waste
Wastewater	Sludge from Wastewater Treatment Plants	Packaging & Recyclable Material	Infectious Healthcare Waste (IHW) & Medical Waster	Bottom ash from Solid Waste Incinerators

Sources of wastes: different sources of wastes are been identified as per the types of waste

a. Municipal sources of waste
b. Medical/clinical sources of waste
c. Agricultural sources of waste
d. End-of-life automobiles
e. Industrial sources of waste
f. Electronic sources of waste

Waste Management

Waste Management is collection, transport, processing or disposal, managing and monitoring of waste materials to minimize its' consequences on human and environment. The waste management or waste disposals are all the activities and actions required to manage wastes from its inception to its final disposal (United Nations Statistics Division - Environment Statistics). The management of waste needs to under the kinds of waste and its implication through analysis

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of different measures. Thus, waste can be treated economically, commercially and environmentally through following methods.

Scientifically, different measures for the treatment of waste are invented depending on the kinds of waste we produce. The methods of managing waste are:

1. **Incineration method**

   The waste management through burning waste is called incineration method. This method is most common in countries with the limited landfills and a common practice in rural communities. The method is common both impactful and hazardous. It's impactful in reduction of waste but contamination (like waste from hospital) and hazardous waste from factories with release of huge carbon dioxide.

2. **Sanitary landfills**

   This method identifies large area away from civilization where the waste from the civilizations are dumped or deposited. The proper management of this method involves sorting out types of waste (separation) and sending them to identified places.

3. **Waste recycling**

   The method involves recycling processing of used materials (waste) into new, useful products. The recycling also uses less energy and great way of controlling air, water and land population. Innovation is required for the recycle our own waste, which can start from personal waste at office, home, etc. This method is found most effective with more cost saving and generation of source of income.

Urban Waste Management

Arising quality of life, and high rates of resource consumption patterns have had a unintended and negative impact on the urban environment - generation of wastes far beyond the handling capacities of urban governments and agencies. Cities are

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Urban Waste and effluent management

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Lecturer, ESDM, DIU

now grappling with the problems of high volumes of waste, the costs involved, the disposal technologies and methodologies, and the impact of wastes on the local and global environment.

Most local governments and urban agencies have, time and again, identified waste management as a major problem that has reached proportions requiring drastic measures. We can observe three key trends with respect to solid waste - increase in sheer volume of waste generated by urban residents; change in the quality or make-up of waste generated; and the disposal method of waste collected, by land-fill, incineration etc.

- According to the World Bank, the world generated 2.01 billion metric tons of municipal solid waste (MSW) in 2016, and this is projected to increase to 3.40 billion metric tons by 2050.

- The United Nations Environment Program (UNEP) estimates that global e-waste production is expected to reach 74 million metric tons by 2030.

- Plastic waste is a major concern worldwide. A study published in the journal Science Advances in 2017 estimated that since the 1950s, 8.3 billion metric tons of plastic have been produced globally, and only 9% of it has been recycled.

- In 2019, China was the world's largest generator of MSW, producing approximately 231 million metric tons, followed by the United States with 207 million metric tons, according to the World Bank.

- Low- and middle-income countries generate more than 90% of the world's waste but often lack the infrastructure and resources to manage it properly, leading to health and environmental impacts. According to UNEP, only 13% of all cities in low- and middle-income countries have formal waste management systems in place.

- Construction and demolition (C&D) waste is a significant contributor to global waste production. The Global Waste Management Outlook report

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estimates that C&D waste accounts for about a third of all waste generated worldwide.

- Food waste is also a major issue globally. According to the Food and Agriculture Organization of the United Nations, about one-third of all food produced for human consumption is lost or wasted, amounting to approximately 1.3 billion metric tons annually.

- Hazardous waste, such as electronic waste, medical waste, and industrial chemicals, pose significant health and environmental risks. The United Nations estimates that globally, around 44 million metric tons of hazardous waste are generated annually, and only about 10-15% of it is treated or disposed of safely.

Sources of Waste

Waste is always an issue with the growing urbanization. Garbage dumped on the roadside, solid waste thrown away at river banks and landfills amassed with huge amount of rubbish most common slight we observed in urban areas. It is becoming more and more hustle for the city municipal, hazardous to general public and unhealthy surrounding for the tourist.

The origin of waste

Mining
- waste rock
- tailings
- mine water
- chemicals
- and others

Agriculture Forestry
- obsolete pesticides and fertilizers
- organics
- plastics and containers
- manure
- slaughter waste
- and others

Industry
- textiles
- plastics
- chemicals
- ash
- nuclear waste
- and others

Household, commercial and government bodies
- municipal solid waste
- electronics
- medical waste
- tyres
- and others

Construction Demolition
- concrete
- plastic
- wood
- metal
- glass
- and others

Wastewater treatment
- sewage sludge
- solid waste
- chemicals
- and others

The most identified waste is:

    a. Municipal sources of waste
    b. Medical/clinical sources of waste
    c. Automobiles waste
    d. Industrial sources of waste
    e. Electronic sources of waste
    f. Residential sources of waste

The wastes collected from these different sources are segregated into two ways:

1. Dry Waste: from resident and office, business and industries, etc.
2. Wet Waste: from resident and hoteliers, business and industries, etc.