

KERALA PUBLIC SCHOOL, KADMA

ENVIRONMENTAL APPLICATION
(STUDY MATERIAL)

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CLASS : IX

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**UNIT 1 : Our Main Environmental
problems**
Ch.3: Waste Generation

WASTE

Waste (or **wastes**) are unwanted or unusable materials. Waste is any substance which is discarded after primary use, or is worthless, defective and of no use.

I Types of Waste

There are various types but primarily there are three kinds of wastes:

A. Municipal Wastes:

Municipal Waste commonly consists of items we use on an everyday basis, then dump it. Cloths, paints, wires, glasses, unwanted food, etc come under municipal waste. These waste come from schools, factories, but primarily come from our homes.

Municipal waste divides further into :

1. Household waste

Materials like unused food, clothes, unwanted paper, damaged batteries, etc come under household wastes. Agricultural wastes also come under household waste.

2. Commercial waste

Wastes coming from any kinds of businesses, trading factories, schools, etc come under commercial waste.

3. Demolition waste

As clear from the word 'demolition', these wastes come from the destruction of any structure made of concrete, wood, bricks, etc. Although sometimes demolition wastes can also be recycled.

B. Hazardous Wastes:

Hazardous waste is a waste that has substantial or potential threat to public health or the environment. These refer to solid, liquid, or gaseous wastes from industries that have either of the properties:

- Corrosiveness (eating away through metals)
- Ignitability (easily catch fire)
- Reactivity (can easily explode)
- Toxicity (poisonous)

Treatment of these wastes is necessary before the industries dump it. Hazardous wastes are unsafe for human health and the environment at large.

Industrial Waste include materials which are considered to be no longer of use after a manufacturing process has been completed. Wastes such are chemicals, pigments, ashes, metals, oil, solvents etc come under industrial waste.

C. Biomedical Waste:

Any waste coming from medical facilities such as hospitals, medical colleges, research centers, etc come under biomedical waste. Examples are bandages, dressings, syringes, discarded gloves, laboratory wastes, needles etc.

CATEGORIES OF WASTES

Wastes are further divided into various categories i.e. Solid Waste or Liquid Waste.

Solid Waste

Any kind of garbage coming households, factories or hospitals come under waste. Except solid wastes are only solids or semi-solids. These solids/semi-solids can be dry or wet.

Wet Waste

Any dissolved liquid based waste or sludge coming from waste water plants, households, etc come under wet waste.

Examples such as leftover curries, juices, rotten vegetables will come under wet waste

Dry Waste

Waste which does not get dissolved in any form come under dry wastes. Examples such as plastics, bottles, etc will come under dry waste.

Biodegradable Waste

Any organic material that get decomposed by the action of microorganism in the soil, are called Biodegradable waste . These come from plants & animals. Some such wastes are left over food, wood, paper, leaves, grass clippings, dead remains of plants & animals etc.

Non biodegradable Waste

Any material that cannot get decomposed by the action of microorganisms are called non-biodegradable waste. Plastic products like grocery bags, plastic bags, water bottles, metals, cans, tins, glass, construction waste, rubber tyres etc.

HARMFUL EFFECTS OF WASTES

Improper waste disposal and management pose dangerous effects on the environment as well as human beings. Some of such effects are :

1. Soil contamination

- Degradation or pollution of soil due to chemicals from industries, mining, Oil spills, agricultural wastes like pesticides, fertilizers, construction wastes etc, spoil the natural composition of soil.
- Agricultural production reduces in amount & quality
- Chemicals from soil enter into plants and through food chains reach into the other organisms causing various diseases.

2. Air contamination

Air pollution is the contamination of air by smoke particles & harmful gases. They are mainly oxides of carbon, nitrogen & sulphur. These get added up into the air by :

- Burning of wastes in landfills
- Volatile substances from soil add up into air as pollutants
- Ash from incinerators contain toxins which pollute air
- Toxic dioxins released from incinerators affect reproductive system, immune system and may cause cancer too

3. Water contamination

Water pollution takes place due to :

- Seepage of chemical substances through soil layers contaminate the ground water table, which gives birth to lot of rivers & streams.
- Untreated sewage & industrial waste make the water bodies toxic, reducing the oxygen level in water. This leads to death of aquatic organisms in their natural habitat.

4. Bad impact on human health

Human health directly or indirectly get affected due to pollution of natural resources.

- Toxic substances from water get deposited in the bodies of fish, which enter the human bodies when such affected fish are consumed.
- Hydrogen sulphide released from landfills cause respiratory problems in waste workers & people living in nearby areas. It even results in lung cancer.
- Uncollected solid waste obstructs water runoff, resulting in formation of stagnant water bodies. Such water bodies become the breeding place for insects & pathogens causing diseases.

5. Impact on animals & marine life

Land, air & water are the natural habitats of animals. Destruction or disturbance in the natural composition effects the balance in nature. Adding up of greenhouse gases, particulate pollutants, heavy & toxic metals in air, soil & water, the habitats are getting disturbed.

- Organic matter & nutrients cause an increase in aerobic algae due to which dissolved oxygen reduces in the water bodies. Lack of oxygen results in suffocation & death of aquatic animals
- Plastic kills fish, birds, marine mammals & sea turtles, destroys habitats leading to extinction of the entire species

6. Extreme climate changes

Human activities have contributed to the global warming. The chemical composition of the atmosphere has been changed significantly by the increase in emissions of greenhouse gases, mainly carbon dioxide, methane & nitrous oxide. As a result, seasonal & weather patterns are changing & becoming more extreme with less snow cover, rise in sea level & heavier rainfall.

- Methane, a greenhouse gas is produced from the anaerobic decomposition of organic materials in maximum amount, in a landfill.
- Burning of fossil fuels add carbon dioxide in the atmosphere
- The industries release carbon dioxide into the air in their manufacturing process.

WASTE MANAGEMENT

Waste management include activities and actions required to manage waste from its source to its final disposal. This includes the collection, transport, treatment & disposal of waste, together with monitoring and regulation of the waste management process.

Waste management deals with all types of waste, including industrial, biological and household.

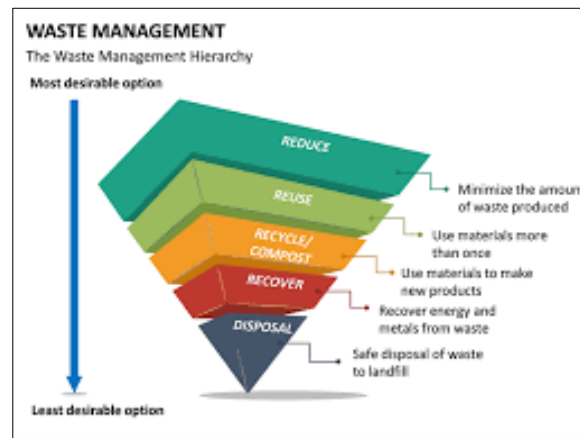
It aims to reduce adverse effects of waste on human health, the environment or aesthetics.

In India, the Union Ministry of Environment, Forests and Climate Change (MoEFCC)

is responsible for regulating and managing waste. One of the main activities of the ministry is prevention and control of pollution, and it has released many rules over the years to safely handle and dispose waste to ensure a clean environment. The Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB) ensure proper management of rules set forth by the MoEFCC.

WASTE HIERARCHY

The waste hierarchy refers to the 3 Rs - Reduce, Reuse and Recycle, which classifies waste management strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of end waste.



- The waste hierarchy is represented as a pyramid because the basic premise is that, policies should promote measures to prevent the generation of waste.
- The next step or preferred action is to seek alternative uses for the waste that has been generated i.e. by re-use.
- The next is recycling which includes composting.
- Then is material recovery and waste to energy
- The final action is disposal, in landfills or through incineration without energy recovery.

The waste hierarchy represents the progression of a product or material through the sequential stages of the pyramid of waste management.

METHODS TO DISPOSE WASTE

Dustbins aren't the only method to throw waste away. Here are few alternatives:

a. Burial Pits/Landfills

Throwing daily wastes in burial pits or what are also known as landfills is an alternative for dustbins and is the popular waste disposal method. It looks after burying waste in the ground and eliminating foul smell coming from the wastes.

b. Incineration

Burning of waste at high temperatures and converting them into residue or gaseous products is known as 'Incineration'. It's a better alternative to dustbins since the volume of waste here decreases by 20-30%.

c. Recycling

The process of reusing the discarded materials and converting them into something new is known as 'Recycling'. It's the third main element in the process of 'Reduce, Reuse and Recycle'. Recycling reduces the harmful effect of greenhouse gases and helps in conservation of resources for future.

d. Composting

When organic wastes are kept in a pit for a long period of time the microbes start decomposing the waste and convert the waste into compost which becomes a better manure for plants.



LANDFILL



INCINERATOR

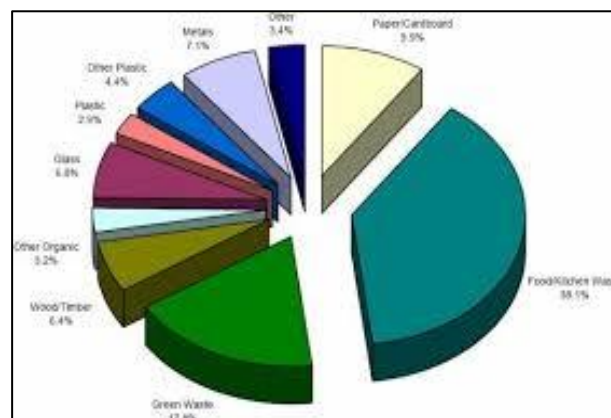


COMPOSTING

WASTE GENERATION

DATA

- According to the Press Information Bureau, India generates 62 million tonnes of waste (mixed waste containing both recyclable and non-recyclable waste) every year.
- According to the World Bank - Annual worldwide waste production is 2.01 billion metric tons



GLOBAL MUNICIPAL SOLID WASTE

GLOBAL WASTE TRADE

The **global waste trade** is the international trade of waste between countries for further treatment, disposal, or recycling. Toxic or hazardous wastes are often imported by developing countries from developed countries.

Toxic colonialism

Toxic colonialism, defined as the process by which underdeveloped states are used as inexpensive alternatives for the export or disposal of hazardous waste by developed states.

Examples of dumping of wastes in developing countries by developed countries

1. **Guiyu, China**, which has been called the electronic waste dump of the world. It may be the world's largest e-waste dump, with workers dismantling over 1.5 million pounds of junked computers, cell phones and other electronic devices per year.

2. Khian Sea incident

An example of incinerator ash being dumped onto the Global South from the Global North in an unjust trade exchange is the Khian Sea waste disposal incident. Carrying 14,000 tons of ash from an incinerator in Philadelphia, the cargo ship, Khian Sea, was to dispose of its waste. However, upon being rejected by The Dominican Republic, Panama, Honduras, Bermuda, Guinea Bissau, and the Dutch Antilles, the crew finally dumped a portion of the ash near Haiti. After changing the name of the ship twice to try and conceal the original identity, Senegal, Morocco, Yemen, Sri Lanka, and Singapore still banned the ship's entry. Upon consistent rejections, the ash is believed to have been disposed of in the Atlantic and Indian Oceans. Following this disaster of handling hazardous waste, the Haitian government banned all waste imports leading a movement to recognize all of the disastrous consequences of this global waste trade.

3. Italy dumping hazardous chemicals in Nigeria

One example of chemical waste being exported from the Global North onto the Global South was the event of an Italian business man seeking to avoid European economic regulations. Allegedly exporting 4,000 tons of toxic waste, containing 150 tons of polychlorinated biphenyls, or PCBs, the Italian businessman made \$4.3 million in shipping hazardous waste to Nigeria.

4. Shipbreaking in Asia

Another danger to developing countries is the growing issue of shipbreaking, which is occurring mainly in Asia. Industrialized countries seeking to retire used vessels find it cheaper to send these ships to Asia for dismantling. China and Bangladesh are seen as the two hubs of shipbreaking in Asia. One of the main issues lies in the fact that these ships which are now too aged to continue, were constructed at a time with less environmental regulation. In an environmental fact sheet, researchers demonstrate the immense impact this new toxic trade sector has on workers and the environment. For one, the older ships contain health-damaging substances such as asbestos, lead oxide, zinc chromates, mercury, arsenic, and tributyltin. In

addition, shipbreaking workers in China and in other developing countries traditionally lack proper equipment or protective gear when handling these toxic substances.

BASEL CONVENTION

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, usually known as the **Basel Convention**, is an international treaty that plays a crucial role in regulating the transnational movement of hazardous wastes.

The Basel Convention was created in 1989 and attempts to regulate the hazardous waste trade, specifically to prevent the dumping of hazardous waste from more developed countries into less developed countries.

The Basel Convention was developed following a series of high-profile cases in which large amounts of toxic waste were dumped into less developed countries, poisoning the people and environment. The Convention seeks to reduce the creation of hazardous wastes, and to control and reduce its trade across borders.

The Convention was opened for signatures on 22 March 1989, and officially entered into force on 5 May 1992. As of May 2014, 187 states and the European Union are parties to the Convention.

EXERCISE

I Short answer type questions :

1. Define waste. Name the categories of waste with two examples of each.
2. Differentiate between biodegradable & non biodegradable waste.
3. What is waste management? What is its aim ?
4. What is the amount of annual waste generation in India & in world ?
5. What is composting ? What is its importance ?
6. Give the full form of MoEFCC & CPCB.
7. State Basel Convention. When was it signed ? What is its objective ?
8. What do you mean by Global Waste Trade?

II Long answer type questions :

1. Explain waste hierarchy in detail. Which is the first step of Waste hierarchy ?

2. How does waste generation affect animals & marine life ?
3. In what ways improper management of wastes affect humans ?
4. Explain toxic colonialism with any two examples.
5. What is the impact of poor waste management on climate?