

**AI 3010 WASTE AND BY PRODUCT UTILIZATION**

**UNIT I NOTES**



## **TYPES AND FORMATION OF BY-PRODUCTS AND WASTE**

Waste is defined as unwanted and unusable materials and is regarded as a substance which is of no use. Waste that we see in our surroundings is also known as garbage. Garbage is mainly considered as a solid waste that includes wastes from our houses (domestic waste), wastes from schools, offices, etc (municipal wastes) and wastes from industries and factories (industrial wastes).

### **Sources of Waste**

Sources of waste can be broadly classified into four types: Industrial, Commercial, Domestic, and Agricultural.

#### **Industrial Waste**

These are the wastes created in factories and industries. Most industries dump their wastes in rivers and seas which cause a lot of pollution.

**Example:** plastic, glass, etc.

#### **Commercial Waste**

Commercial wastes are produced in schools, colleges, shops, and offices.

**Example:** plastic, paper, etc.

#### **Domestic Waste**

The different household wastes which are collected during household activities like cooking, cleaning, etc. are known as domestic wastes.

**Example:** leaves, vegetable peels, excreta, etc.

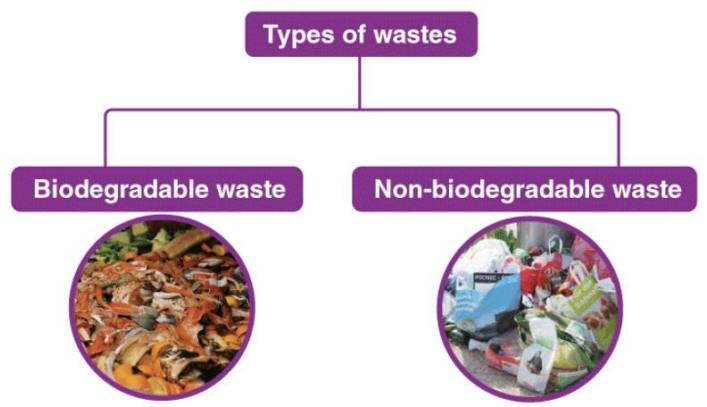
#### **Agricultural Waste**

Various wastes produced in the agricultural field are known as agricultural wastes.

Example: cattle waste, weed, husk, etc.

Commonly waste is classified into two types: Biodegradable and Non-biodegradable waste.

These two kinds of wastes are explained below:



### **Biodegradable waste**

These are the wastes that come from our kitchen and it includes food remains, garden waste, etc. Biodegradable waste is also known as moist waste. This can be composted to obtain manure. Biodegradable wastes decompose themselves over a period of time depending on the material.

### **Non-biodegradable waste**

These are the wastes which include old newspapers, broken glass pieces, plastics, etc. Non-biodegradable waste is known as dry waste. Dry wastes can be recycled and can be reused. Non-biodegradable wastes do not decompose by themselves and hence are major pollutants.

### **Recycling of Waste**

Recycling of waste product is very important as this process helps in processing waste or used products into useful or new products. Recycling helps in controlling air, water, and land pollution. It also uses less energy. There are a number of items that can be recycled like paper, plastic, glass, etc. Recycling helps in conserving natural resources and also helps in conserving energy. Recycling helps in protecting the environment as it helps in reducing air, water, and soil pollution.

Availability of high quality, safe, nutritious food is fundamental need for good health and general well being of human being. Continuous supply of these foods has been major concern of civilizations all through the ages of human development. With rising urbanisation and limited natural resources like agricultural land, water and energy, producing good quality and nutritious food for all is a challenge. The food supply chain starts from field and end with consumer. It consists of different stages and stakeholders starting from farmers, intermediate handler/traders, processing industry, suppliers, transport, retailer, consumer and waste managers. All these players in the supply chain needs to devise ways and means for full utilisation of agricultural produce keeping the wastage (losses) to the minimum. The food manufacturing industry needs to transform agricultural resources, in addition to producing food for humans, into different component such that each of it may be used like animal feed, fertilizers, cosmetics, pharmaceuticals, bio-plastics and bio-fuels.

**By-product/waste**

Foods wastes are usually organic residues generated by the processing of raw agricultural materials into food and are made up of liquid (wastewater) and solids. The wastewater results from the cleaning processes or in the form of excessive or polluted process water. Its dry material content is typically less than 5% by mass. It possibly also contains organic or inorganic cleaning agents or disinfectants. Solid food wastes with an organic origin have remarkably high water content (mostly about 80% by mass). They are usually characterized by a constant quality and purity due to the forgone processes. The fact that these substances are removed from the production process as undesirable ingredients makes them, wastes.

The term by-product,“ which is common in industry, points up that these are mostly concealed usable substances, often with a market value. So the wastes could be considered valuable by-products if there were appropriate technical means to produce products whose value exceeds the cost of reprocessing. Residues in this case cannot be regarded as wastes but become an additional resource to augment existing natural materials. Recycling, reprocessing and eventual utilization of food processing residues offer potential of returning these byproducts to beneficial uses rather than their discharge to the environment which cause detrimental environmental effects.

Recycling, reprocessing and eventual utilization of food processing residues offer potential of returning these by-products to beneficial uses rather than their discharge to the environment which cause detrimental environmental effects. Types of food by-product and wastes.

**The most common methods of waste management.**

**1. Landfill**

Landfills are designated sites where collected waste is dumped and buried. This is where 31 million tonnes of the waste generated in India is dumped.

**2. Recycle**

Recycling is an effective tool for solid waste management. It refers to the process of converting waste materials, like plastics or metals, into something reusable. Only 50% of the 3.6 lakh million tonnes of total plastic waste generated in India is recycled, the rest ends up in landfills

**3. Incineration**

Incineration is the disposal of waste through burning. Hazardous or medical waste is typically incinerated. Whilst burning can be used as a source of energy it is still a major source of air pollution.

**4. Biological reprocessing**

This is the process of decomposing organic materials through methods of composting or anaerobic digestion. This method recovers value from waste by producing biogas which can be used to generate electricity and heat and also produces mulch or compost that can be used for agricultural purposes.

**5. Waste to energy**

Waste to energy is a method that converts non-recyclable materials into usable energy. Heat, fuel and electricity are generated through combustion, methane recovered from landfills and even biological reprocessing.

**The benefits of waste management.**

**1. The environmental benefit**

Waste directly impacts the environment and its disposal pollutes the air, water and soil. Waste management reduces greenhouse gas emissions and improves the quality of air and water, and the condition of any area affected by the waste.

**2. The health benefit**

Waste and emissions impact the health of the exposed nearby communities, industry personnel and surrounding animal life in the long run. Such risks can be averted with stringent waste management processes in place that ensure proper waste disposal and assure safety.

**3. The cost benefit**

Waste management processes may be expensive but they facilitate recycling. In the long run, using recycled material is more cost-effective than buying non-recycled material for industrial use.

**4. The employment benefit**

Waste management is complex due to how expansive it can be. The requirement of labour would open up employment opportunities across the country.

**5. The energy benefit**

Energy generated through certain methods of waste management compels industries to use less of the earth's resources that are associated with manufacturing new materials.

**6. The efficiency benefit**

Effective waste management policies ensure that disasters posing a threat to the general public, animals, birds and other surroundings attributed to improper waste management remain avoided.