



# SOLID WASTE MANAGEMENT



# SOLID WASTE

- It is defined as  
“non liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex & sometimes hazardous substances”.
  - **Solid waste includes:**
    - Garbage
    - Demolition products
    - Sewage treatment residue
    - Dead animals
    - Manure and other discarded material.
- Per capita solid waste: 0.25-2.5 Kg/day

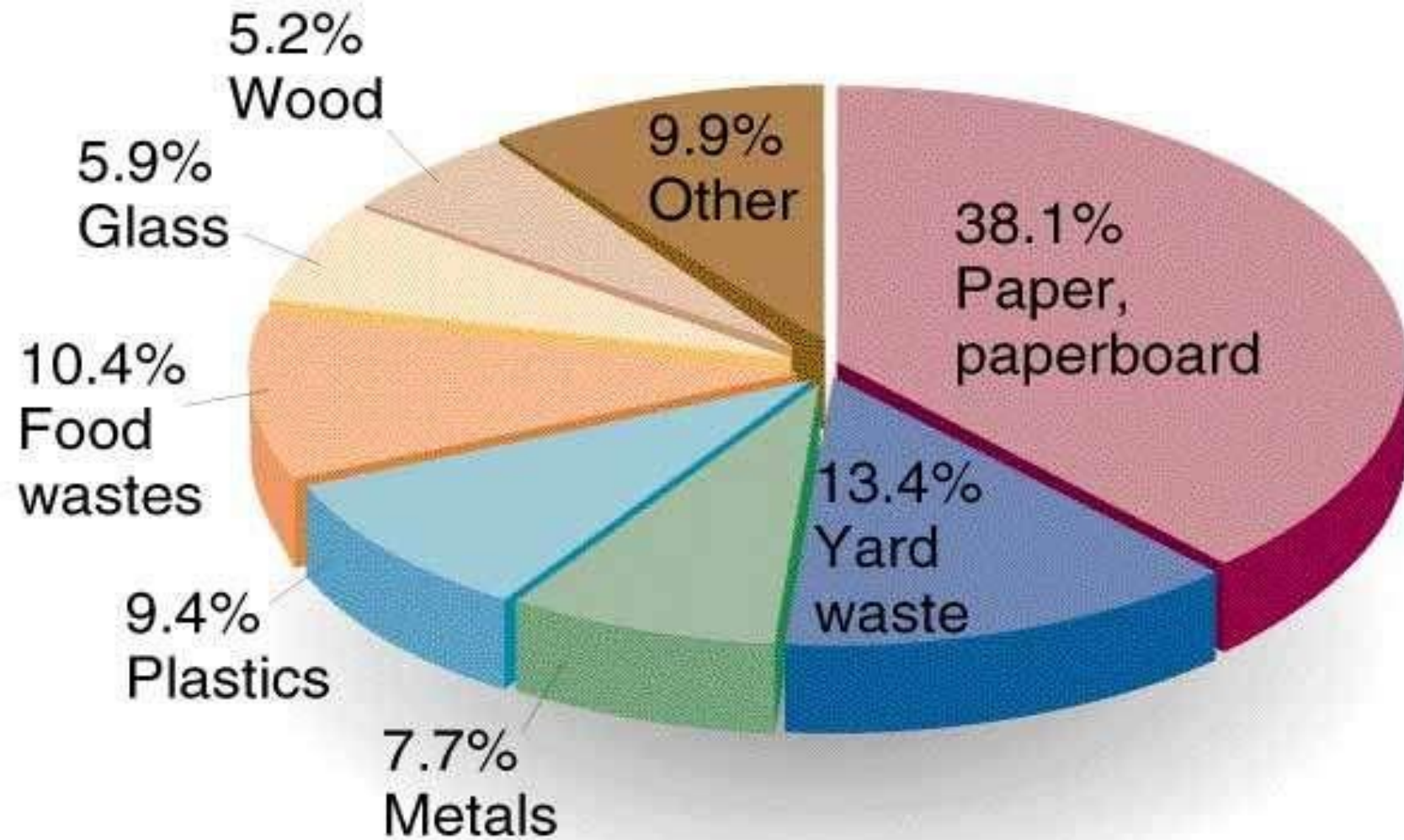
# TYPES

**Broadly three types of waste as follows:**

1. Household waste as municipal waste
2. Industrial waste as hazardous waste
3. Bio-medical waste or hospital waste as infectious waste

*“Whatever the origin, content or hazard potential is, solid waste must be managed systematically to ensure environmental best practices”*

# CHARACTERISATION OF MUNICIPAL SOLID WASTE



# SOLID WASTE MANAGEMENT

- Solid Waste Management is defined as the discipline associated with control of generation, storage, collection, transport or transfer, processing and disposal of solid waste materials.
- Solid waste management includes planning, administrative, financial, engineering and legal functions in the process of solving problems arising from waste materials.
- The primary goal of solid waste management is reducing and eliminating adverse impacts of waste materials on human health and environment to support economic development and superior quality of life.



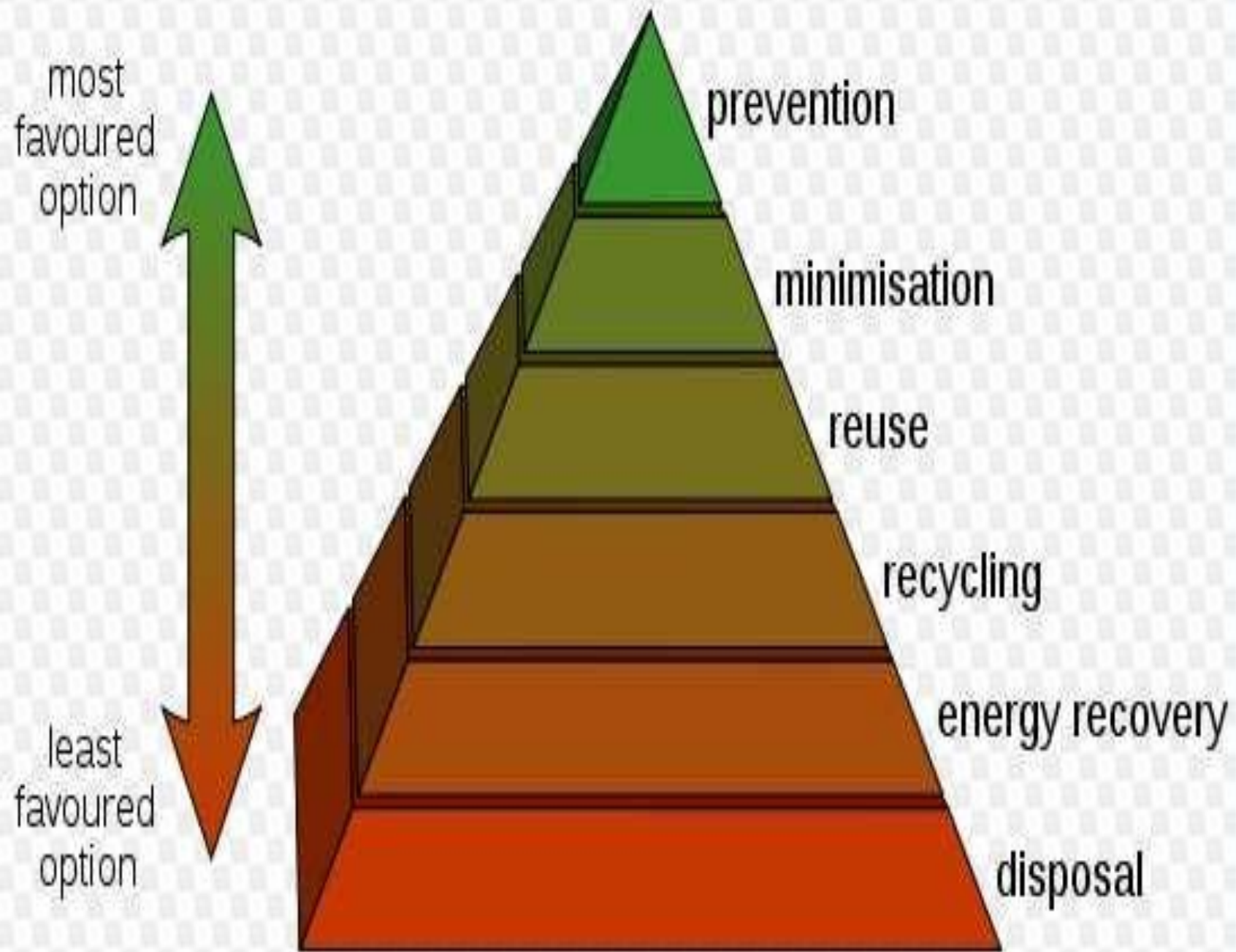
# WASTE MANAGEMENT CONCEPT

- The 3 R's (Reduce, Reuse, Recycle) to be followed for waste management.



# WASTE MANAGEMENT HIERARCHY

- There are a number of concepts about waste management which vary in their usage between countries or regions. Some of the most general, widely used concepts include:
- Waste hierarchy - The waste hierarchy refers to the "3 R's" reduce, reuse and recycle, which classify waste management strategies according to their desirability in terms of waste minimization. The waste hierarchy remains the basis of most waste minimization strategies.
- The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste .





# STAGES IN THE SOLID WASTE MANAGEMENT

- Storage
- Collection
- Transport and handling
- Recycling
- Disposal

# STORAGE

- ✓ Galvanized steel dust bin
- ✓ Paper sack
- ✓ Public bins



# COLLECTION

- House-to-house collection
- Collection from the public bins



# WASTE HANDLING AND TRANSPORT

- Waste handling and separation involves activities associated with waste management until the waste is placed in storage containers for collection.
- Handling also includes the movement of loaded containers to the point of collection.
- Waste is transferred from a smaller collection vehicle to larger transport equipment



# RECYCLING

- Recycling refers to the collection and refuse of waste materials such as empty beverage container.
- Materials for recycling may be collected separately from general waste using dedicated bins.

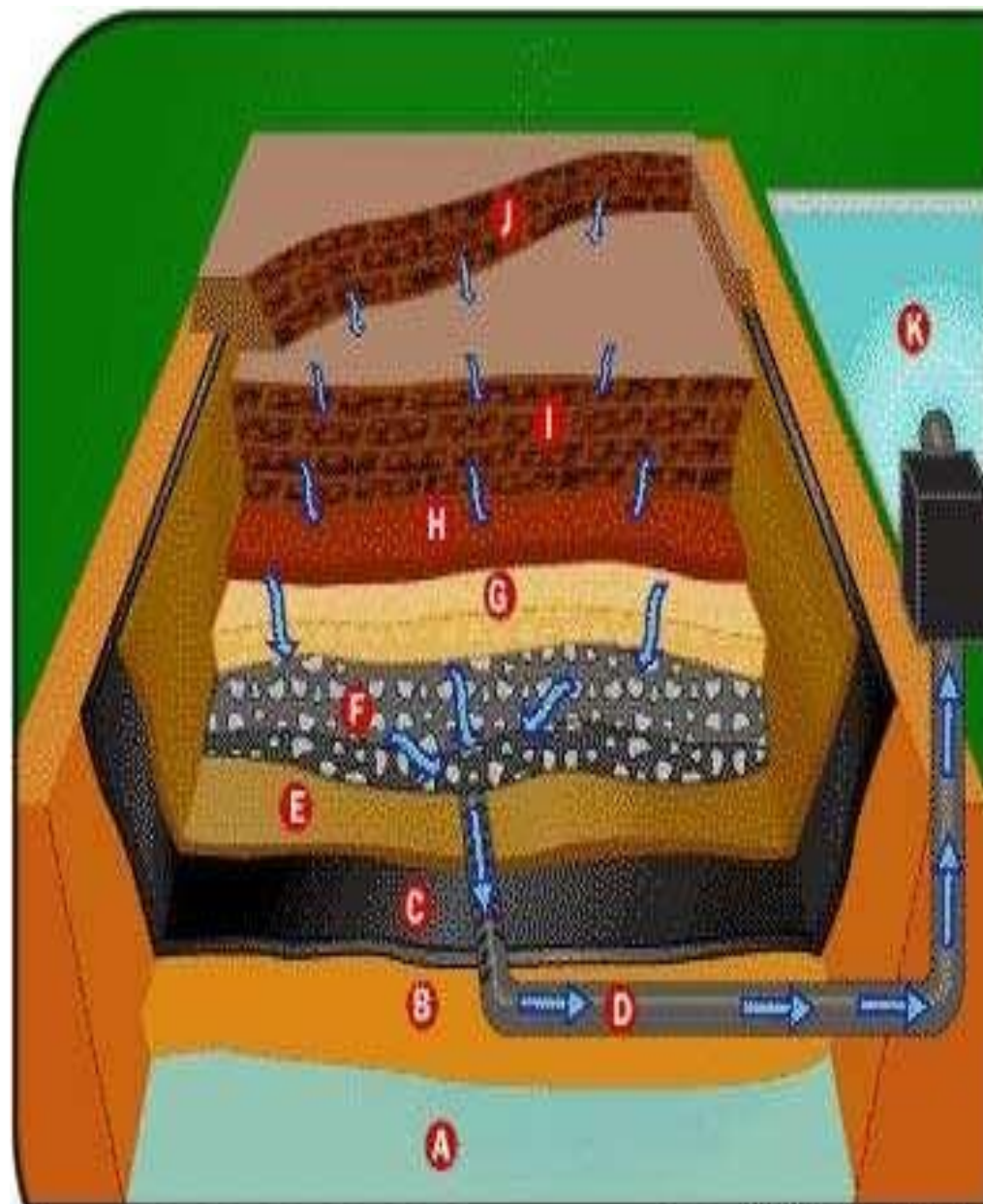




BASIS FOR COMPARISON	REUSE	RECYCLE
Meaning	Reuse, means putting an item to same or a different use, after it has fulfilled its original function.	Recycle is a process, wherein a used item is turned into a new product, to reduce waste of potentially useful material.
Form	Does not change the original form of the product.	A new product is created, so form of product is changed.
Harm to environment	It does not harm environment, in any way.	It sometimes causes harm to environment.

# LANDFILLING

- A landfill is a site for the disposal of waste materials by burial and is the oldest form of waste treatment.
- Waste is directly dumped into mining voids or borrow pits. Disposed waste is compacted and covered with soil.
- Gases generated by the decomposing waste materials are often burnt to generate power.



- A** Ground Water
- B** Compacted Clay
- C** Plastic Liner
- D** Leachate Collection Pipe
- E** Geotextile Mat
- F** Gravel
- G** Drainage Layer
- H** Soil Layer
- I** Old Cells
- J** New Cells
- K** Leachate Pond

# INCINERATION

- Incineration is a waste management technology that involves the combustion of organic materials and/or substances.
- It is carried out at high temperature.
- The waste material is converted into ash, flue gases, particulates and heat.

## ➤ Advantages:

- ✓ Less space requirement.
- ✓ Hygienic process.

## ➤ Disadvantages :

- ✓ Expensive process.
- ✓ Special care required.

- This process reduces the volume of solid waste to 20-30% of the original volume.
- Also described as "thermal treatment".
- Used when land is not available for landfilling



# COMPOSTING

- It is controlled biological decomposition of organic matter, such as food and yard wastes, into humus.
- Composting is the natural process of 'rotting' or decomposition of organic matter by microorganisms under controlled conditions.
- It can be anaerobic and aerobic.
- This process takes about 4 to 6 weeks.
- Method of combined disposal of refuse and sludge
- Principal by products are: CO<sub>2</sub> and water
- End product- compost

# WASTE MANAGEMENT POLICIES

- Environment protection act, 1986
- Hazardous waste rule, 1989
- Bio-medical waste rule, 1998
- Municipal solid waste rule, 2000
- Waste management act, 1996
- Solid waste policy in India, 2006

# RECOMMENDATIONS

- The improvement of people and private sector through NGOs could improve the efficiency of solid waste management.
- Public awareness should be created especially at primary level.
- Littering of solid waste should be prohibited in cities, towns and urban areas.

# CONTD.....

- The collection bins must have a large enough capacity to accommodate 20% more than the expected waste generation in the area.
- Municipal authorities should maintain the storage facilities to avoid unhygienic condition.
- It is advisable to move from open dumping to sanitary landfilling.

