

DISPOSAL OF WASTES

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Learning Objectives

At the end of session , student shall be able :

- 1) To understand solid wastes and its effects on health.
- 2) To understand sources of refuse and its storage.
- 3) To know methods of waste disposal.

SOLID WASTES

The term “solid wastes” includes

- **Garbage (food wastes)**
- **Rubbish (paper, plastics, wood, metal, throw-away containers, glass),**
- **Demolition products (bricks, masonry, pipes),**
- **Sewage treatment residue.**
- **Dead animals, manure and other discarded material.**

Output of daily waste

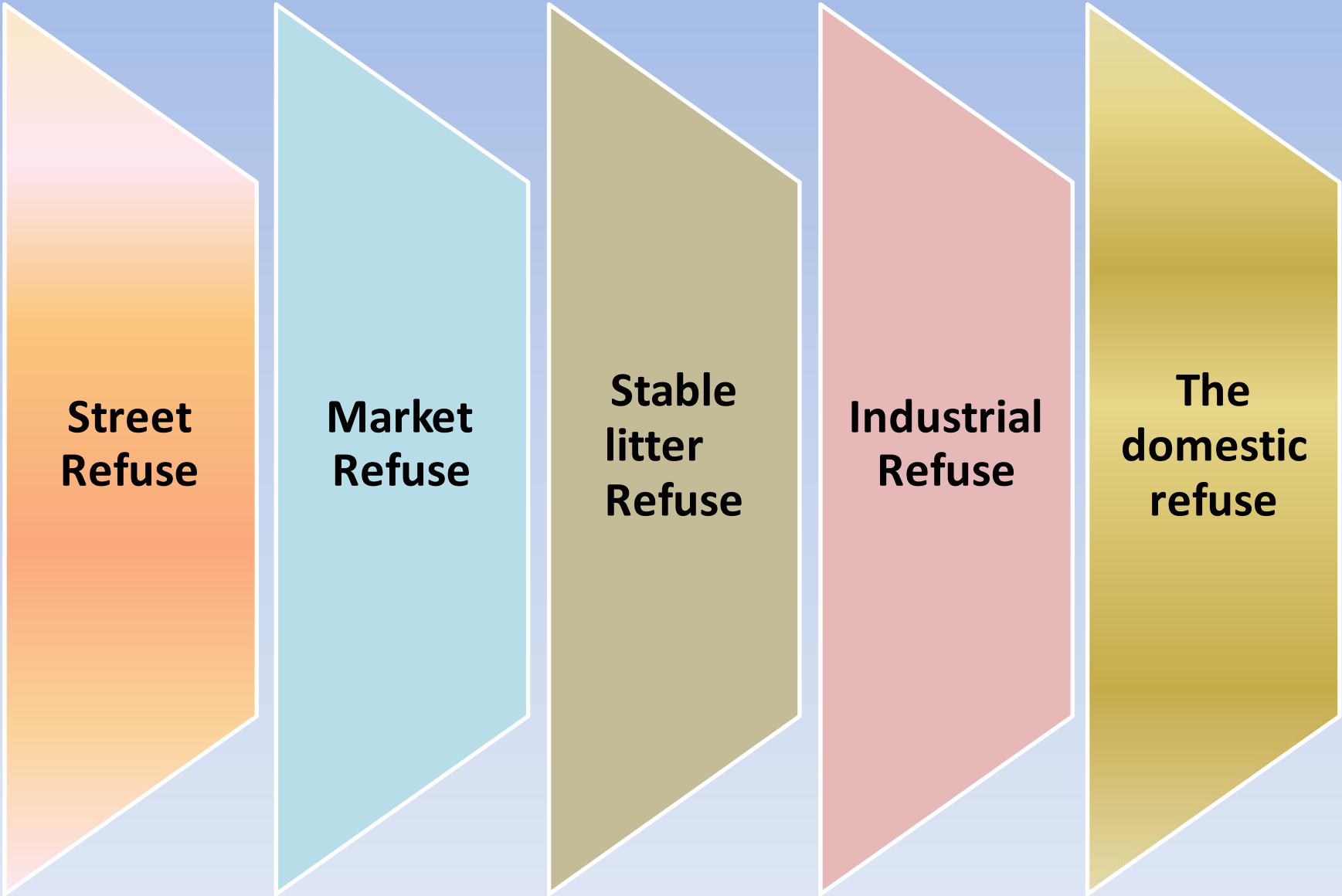
The output of daily waste depends upon the

- Dietary habits,**
- Life styles,**
- Living standards and**
- The degree of urbanization and industrialization.**
- The solid waste produced ranges between 0.25 to 2.5 kg in different countries.**

HOW IT AFFECTS HEALTH?

- It decomposes and favors fly breeding
- It attracts rodents
- The pathogens may be conveyed back to man's food through flies and dust.
- Water and soil pollution,
- An unsightly appearance, bad odors.
- Incidence of vector- borne diseases.

Sources of refuse



**Street
Refuse**

**Market
Refuse**

**Stable
litter
Refuse**

**Industrial
Refuse**

**The
domestic
refuse**

STORAGE

1. The galvanized steel dust bin
2. Paper sack
3. Public Bins



1. Galvanized steel dust bin

- It is close fitting cover is a suitable receptacle for storing refuse.**
- In India per capita is estimated to vary from 1/10 to 1/20 c. ft.**
- For a family of 5 members, a bin having a capacity of 5/10 or ½ c. ft.**

2. Paper sack

- A recent innovation in the western countries is the “paper sack”.
- Refuse is stored in the paper sack, and the itself is removed.



3. Public Bin

- Public bins are for a larger number of people.
- Kept on a concrete platform.
- It handled and emptied mechanically by lorries fitted with cranes.



COLLECTION

- ❖ Depends upon the funds available.
- ❖ House-to-house collection
- ❖ India people dump the refuse in the nearest public bin.



TRANSPORTATION OF WASTE





The environment hygiene committee (1949) recommended that municipalities and other local bodies should arrange for collection of refuse not only from the public bins but also from individual houses.



METHODS OF DISPOSAL

- **The methods of waste disposal are:**
 - » **Dumping**
 - » **Controlled Tipping or Sanitary Land-fill**
 - » **Incineration**
 - » **Composting**
 - » **Manure Pits**
 - » **Burial**

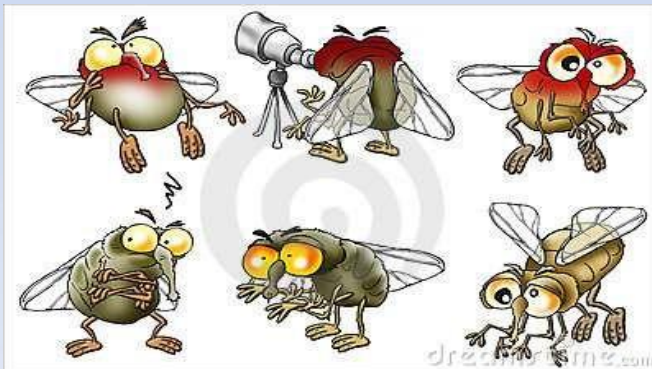
DUMPING

- Refuse is dumped in low lying areas.
- As a result of bacterial action, refuse decreases considerably in volume and is converted gradually into humus.



The drawbacks of DUMPING are:-

- The refuse is exposed to flies and rodents.
- Drainage from dumps contributes to the pollution of surface and ground water.
- A WHO Expert Committee (1967) condemned dumping as “ a most insanitary method that creates public health hazards, a nuisance, and severe pollution of the environment”.



CONTROLLED TIPPING/ SANITARY LANDFILL



The trench method



- **The trench method:- Where level ground is available, the trench method is usually chosen.**
- **A long trench is dug out-2 to 3 m (6-10 ft.) deep and 4 to 12 m, (12-36 ft.) wide, depending upon local condition.**
- **The refuse is compacted and covered with excavated earth.**

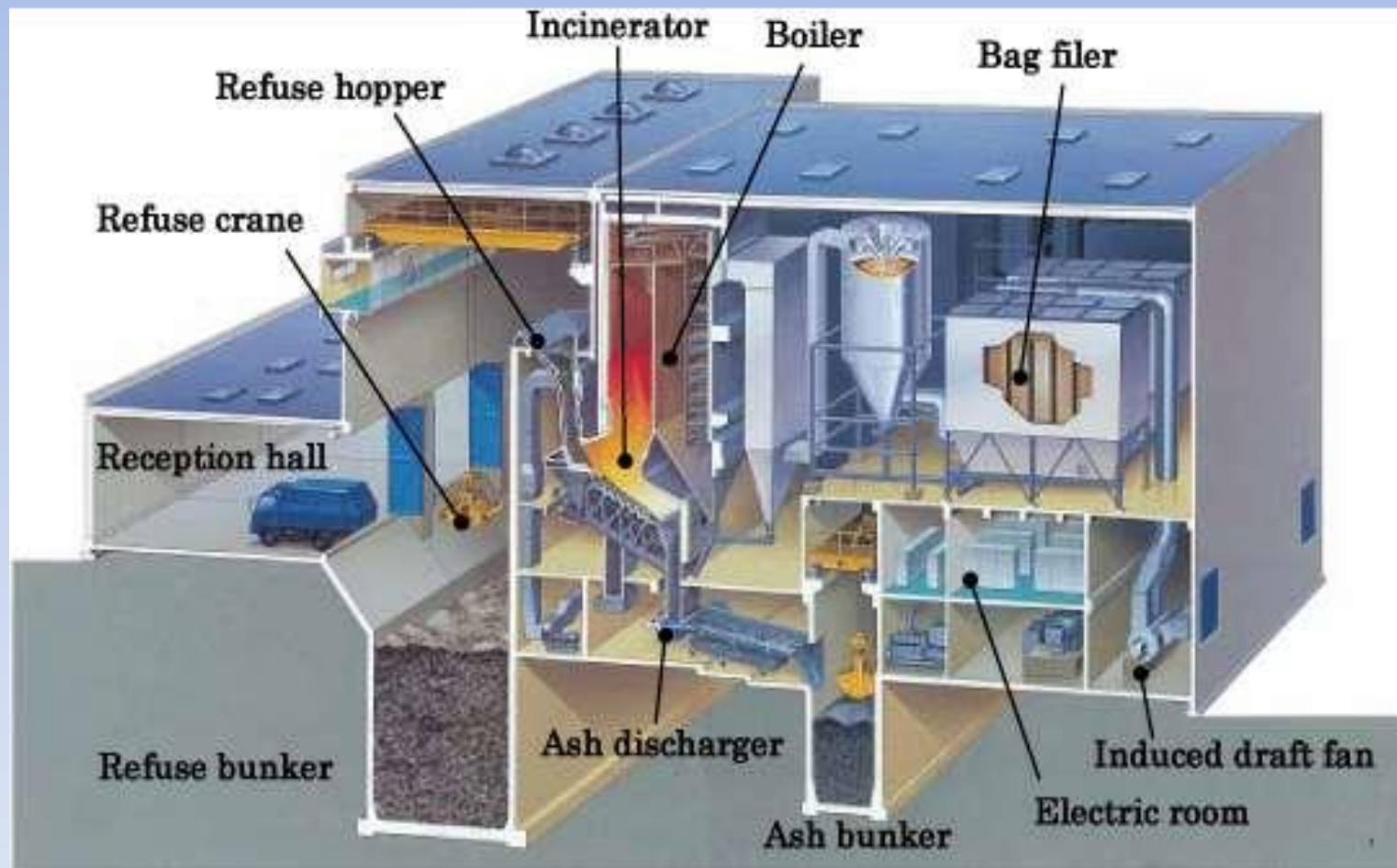
The remp method:

- **This method is well suited where the terrain is moderately slopping. Some excavation is done to secure the covering material.**

The area method:

- **This method is used for filling land depressions, disused quarries and clay pits.**
- **The refuse is deposited, packed and consolidated in uniform layers up to 2 to 2.5 m (6-8 ft.) deep.**
- **Each layer is sealed on its exposed surface with a mud cover at least 30 cm (12 inches) thick.**
- **Such sealing prevents infestation by flies and rodents and prevents smell and dust.**

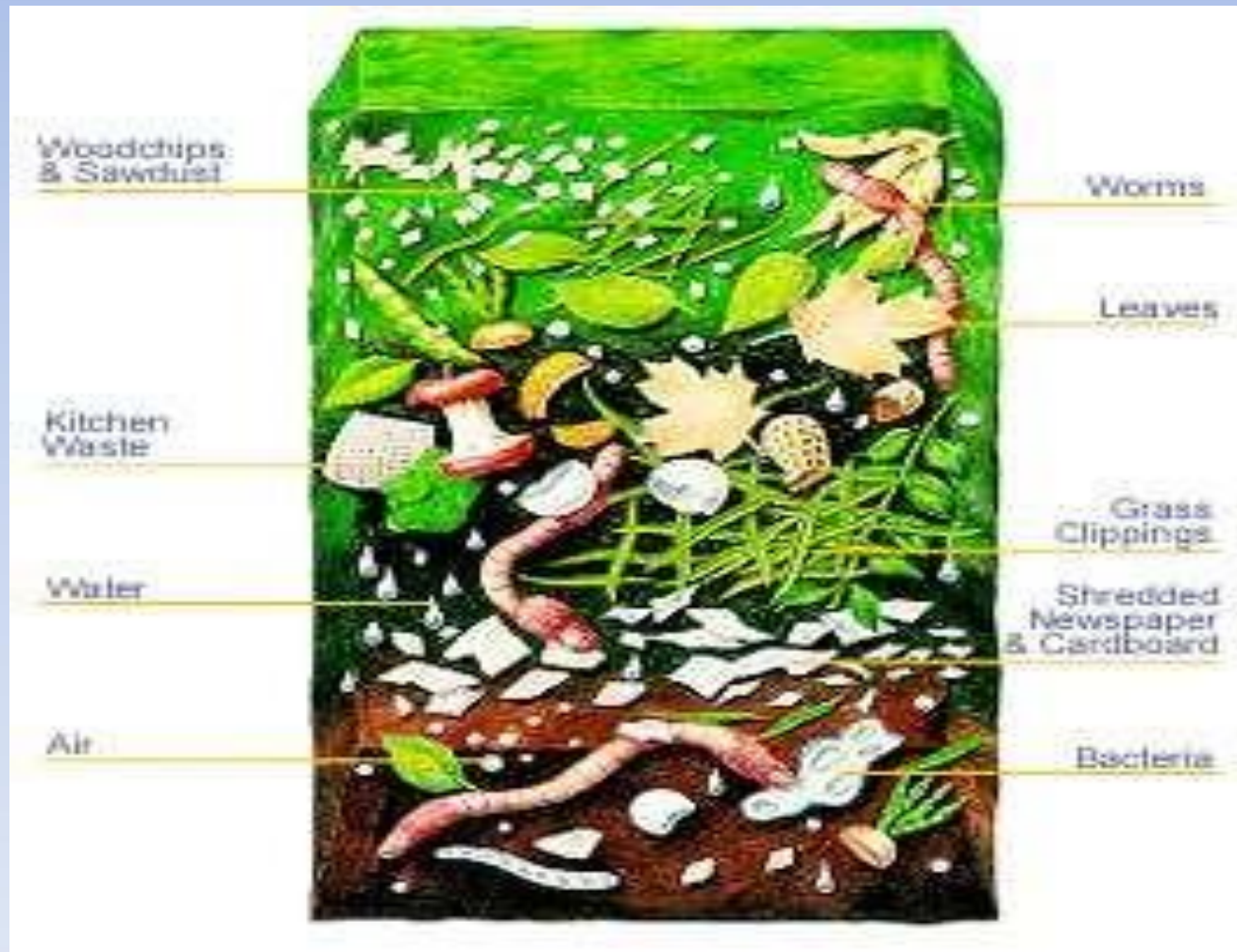
INCINERATION



INCINERATION

- **Refuse can be disposal of hygienically**
- **It is method of choice where suitable land is not available.**
- **Hospital refuse which is particularly dangerous is best disposed of by incineration.**
- **Incineration is practiced in several of the industrialized countries.**

COMPOSTING



COMPOSTING

- Composting is a method of combined disposal of refuse and night soil or sludge.

Organic matter



Bacterial action



Relatively stable humus-like material



Manurial value for the soil.

- **The heat produced during composting -60 deg C or higher, over a period of several days- destroys eggs and larvae of flies, weed seeds and pathogenic agents.**
- **The end-product is a good soil builder containing small amounts of the major plant nutrients such as nitrates and phosphates.**

Methods of composting

**Bangalore
Methods(Anaerobic method)**

**Mechanical Composting
(Aerobic method)**

BANGALORE METHODS:- (Hot fermentation process)

- ☐ Indian Council of Agriculture Research at the Indian Institute of Science, Bangalore.
- ☐ It has been recommended as a satisfactory method of disposal of town wastes and night soil.



- Trenches are dug 90 cm deep, 1.5 to 2.5 m (5-8 ft.) broad and 4.5 to 10 m (15-30 ft.) long.
- Depths greater than 90 cm (3 ft.) are not recommended because of slow decomposition.

- **First layer - 15 cm (6 in) thick is spread at the bottom of the trench.**
- **Second layer- night soil is added corresponding to a thickness of 5 cm (2 in).**
- **Third layer- refuse and night soil are added in the proportion of 15 cm and 5 cm respectively, till the heap rises to 30 cm (1 ft.)**
- **The top layer should be of refuse, at least 25 cm (9 in) thickness.**

- **After 7 days - heat (over 60 deg. C) is generated in the compost mass - intense heat which persists over 2 or 3 weeks- decompose the refuse and nightsoil and to destroy all pathogenic and parasitic organisms.**
- **After 4 to 6 months, decomposition is complete and the resulting manure is a well decomposed.**

MECHANICAL COMPOSTING



- **The entire process of composting is complete in 4 to 6 weeks.**
- **This method of composting is in vogue in some of the developed countries, e.g., Holland, Germany, Switzerland, Israel.**
- **The Government of India is considering plants in selected cities.**
- **Cities such as Delhi, Nagpur, Mumbai, Chennai, Pune, Allahabad, Hyderabad, Lucknow, and Kanpur have offered to join the Government for setting up pilot plants for mechanical composting.**

Manure pits

- **The problem of refuse disposal in rural areas can be solved by digging 'manure pits' by the individual householders.**
- **The garbage, cattle dung, straw, and leaves should be dumped into the manure pits and covered with earth after each day's dumping.**
- **This method of refuse disposal is effective and relatively simple in rural communities.**

Burial

- For small camps.
- A trench 1.5 m wide and 2 m deep is excavated
- The contents are used after 4 to 6 months



PUBLIC EDUCATION



ECONOMICS AND FINANCE

- **If refuse disposal is to be carried out efficiently, hygienically and economically, heavy capital outlay will be needed whatever system of disposal is adopted.**
- **In the highly industrialized countries up to 20 per cent of municipal budgets.**

INTERNATIONAL CORPORATION

- **International Solid Wastes and Public Cleansing Association (ISWA) in 1970.**
- **A WHO International Reference Centre Switzerland**

Conclusion

- **Disposal of waste is an important procedure to be followed by an individual in a community.**
- **Health professionals need to have a basic knowledge of the subject since improper disposal of wastes constitutes a health hazard.**
- **Health professional may be called upon to give advice in some special situations, such as coping with waste disposal problems when there is a disruption or breakdown of community health services in natural disasters.**

Thank You