



Waste Management by Mahtab Asari

TRAINING COURSE SYLABUS

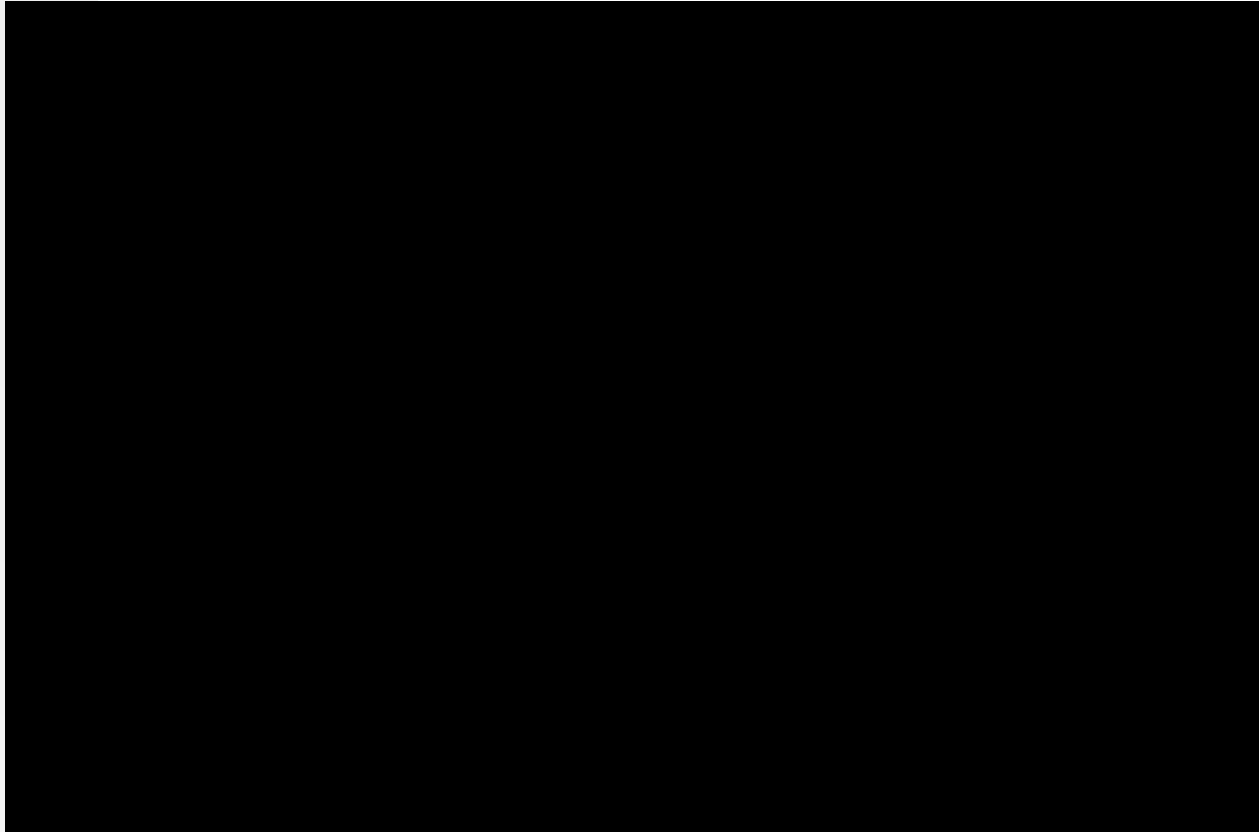
- Introduction
- International and Regional Agreement, Convention, Accord, and Standard on Waste Management
- Auditing Approaches on Waste Management
- Providing Some Palpable Waste Auditing Instances with Focus on Iran's Experience

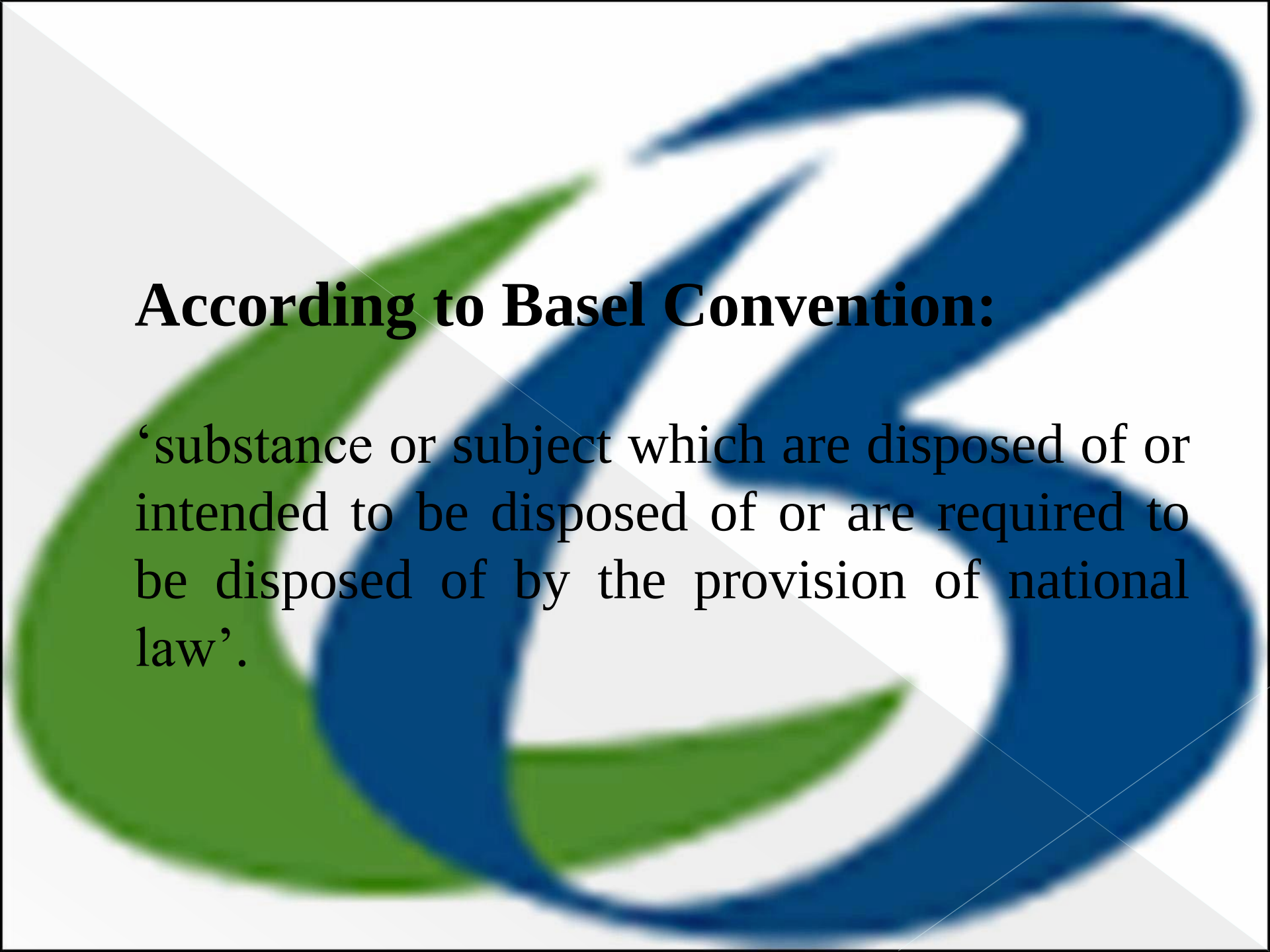
The Main Objectives of This Session

This session provided some information about the:

- I. Concept of waste and its boarder of definition according to some international sources and convention;
- II. Global opportunities and challenges related to waste;
- III. The most comprehensive classification of waste.

What is Waste?





According to Basel Convention:

‘substance or subject which are disposed of or intended to be disposed of or are required to be disposed of by the provision of national law’.

Definition of Waste by United Nations Statics Division (UNSD, 2012) :

‘waste are materials that are not prime product, that is product produced for the market 0 for which the generator has no further use in term of his/ her own purpose of production, transformation, or consumption, and of which he/she want to dispose’.



Dispose and Discard

❑ Discard is more general term than dispose.

❑ It combined 3Rs involved material

❑ Dispose is part of discard...

❑ It means put it away intentionally or unintentionally or by any force.

SIX INTRESTING FACTS ABOUT WASTE



- 1. Waste Generation;**
- 2. Greenhouse Gases;**
- 3. Market Size;**
- 4. E- Waste as Newborn Problem**
- 5. Employment;**
- 6. Food Waste;**

1. Waste Generation:

Every year, an estimated 1.3 billion tons of solid waste is collected worldwide.



Approximated time for compounds to biodegrade in a marine environment

Product	Time to Biodegrade
Paper towel	2–4 weeks
Newspaper	6 weeks
Apple core	2 months
Cotton gloves	1–5 months
Wool gloves	1 year
Plastic Bags	10–20 years
Tin Can	50 years
Plastic bottle	100 years
Aluminium cans	200 years
Glass bottles	Undetermined

2. Greenhouse Gases:

- ❑ Incinerators routinely emit dioxin, furans and polychlorinated by-phenyls, which are deadly toxins, causing cancer...
- ❑ Decay of the organic fraction of solid waste contributes about 5% of global greenhouse gases.



3. Market Size:

The global waste market, from collection to recycling is estimated at US\$410 billion a year, not including the sizable informal segment in developing countries.



4. E- Waste as Newborn Problem

□ By 2017, the global volume of discarded refrigerators, TVs, cell phones, computers, monitors and other electronic waste will weigh almost as much as 200 Empire State Buildings, a new report predicts.

□ Between 50% and 80% of e-waste collected for recycling in developed countries each year is being exported.



❑ The composition of e-waste is very diverse and differs in products across different categories .

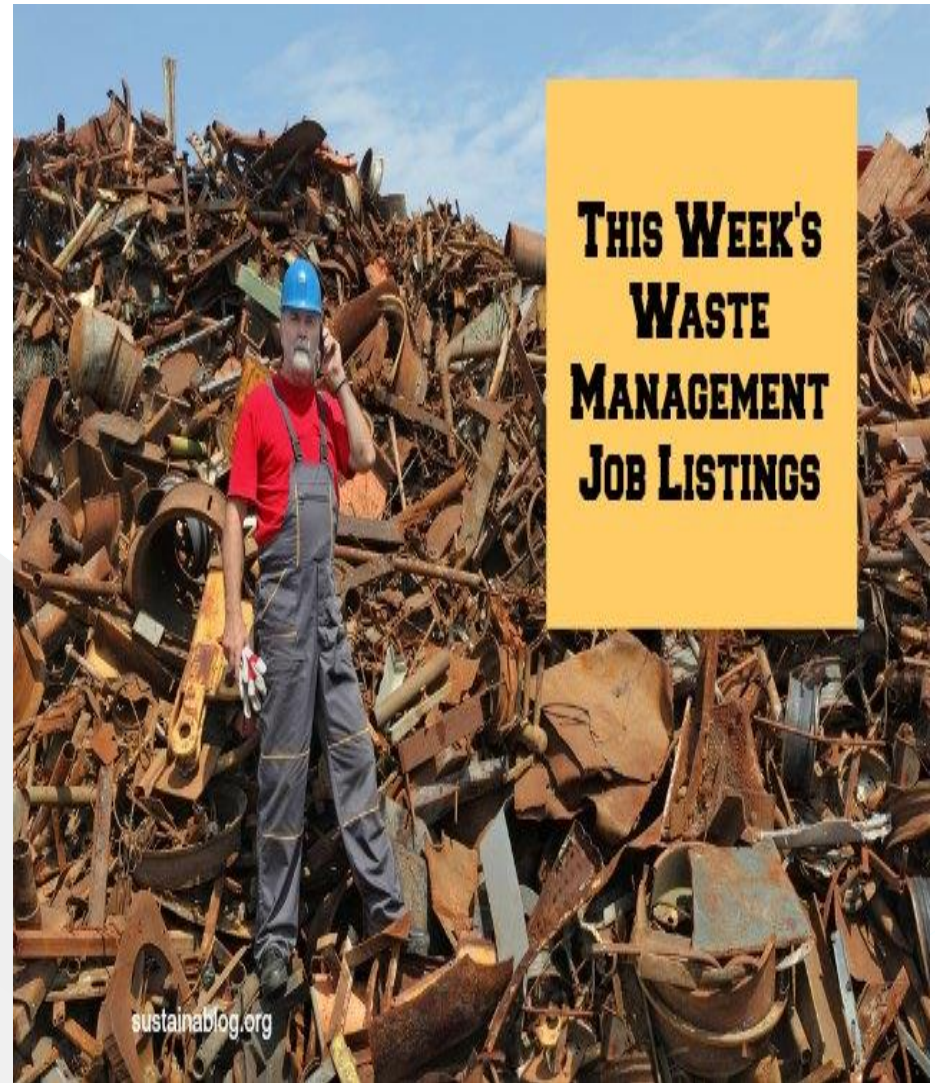
❑ It contains more than a 1000 different substances, which fall under ‘hazardous’ and ‘non-hazardous’ categories.

❑ Iron and steel constitutes about 50%, followed by plastics (21%), non ferrous metals (13%) and other constituents.



5. Employment:

The proportion of people employed in waste-related recovery activities in European increased from 422 persons per million inhabitants in 2000, to 611 in 2007, an increase of 45%.



6 . Food Waste :



- According to FAO, about one third of global food production (30% to 40%) is lost or wasted every years.

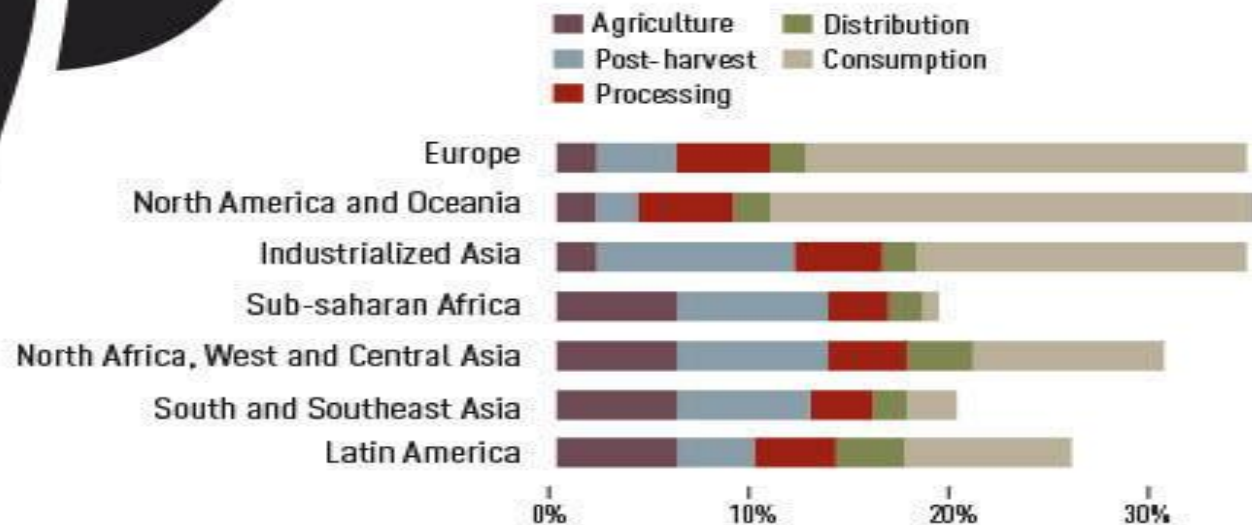


30% CEREALS FOOD LOSSES

In industrialized countries, consumers throw away 286 million tonnes of cereal products.



763 billion boxes of pasta



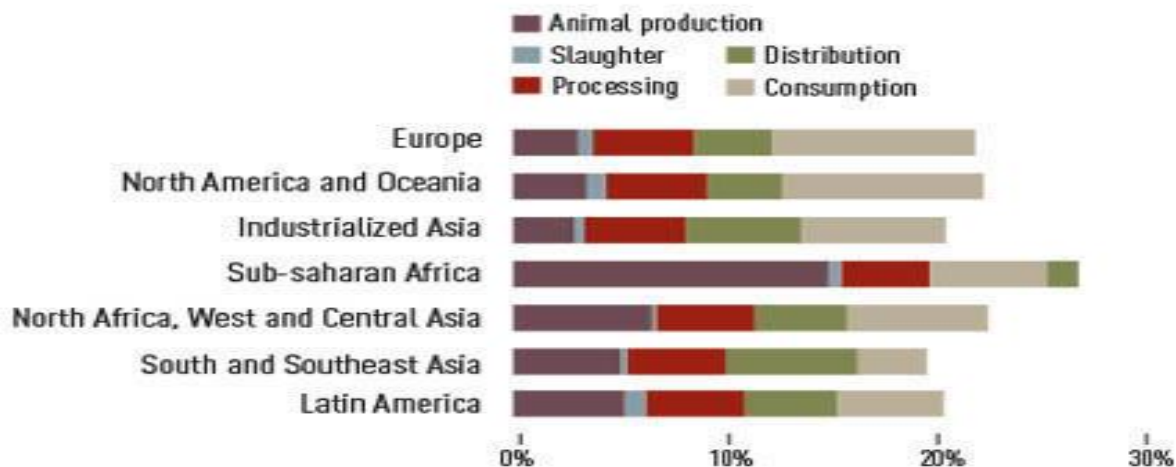


20% MEAT FOOD LOSSES

Of the 263 million tonnes of meat produced globally, over 20% is lost or wasted.



This is equivalent to 75 million cows.



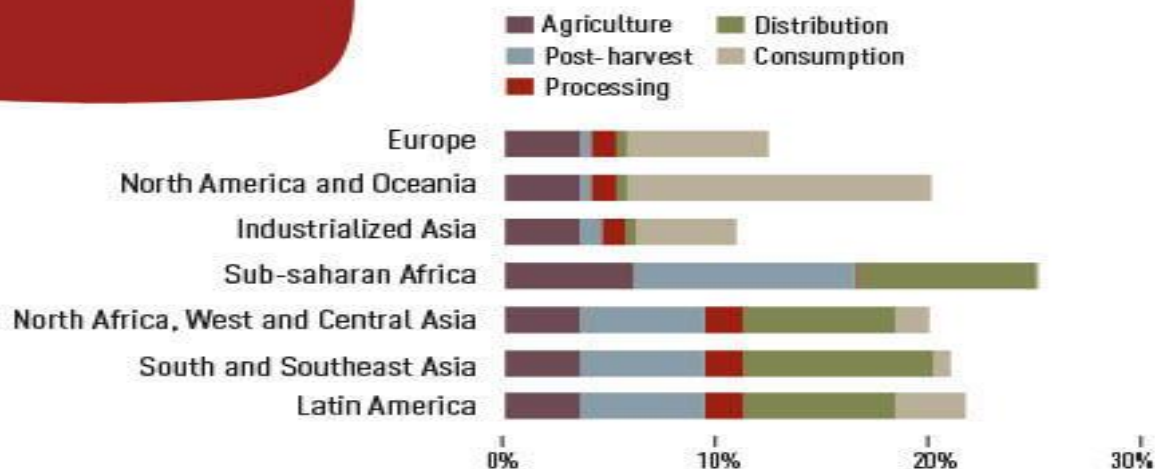


20% DAIRY FOOD LOSSES

In Europe alone, 29 million tonnes of dairy products are lost or wasted every year.



This is the same as
574 billion eggs.





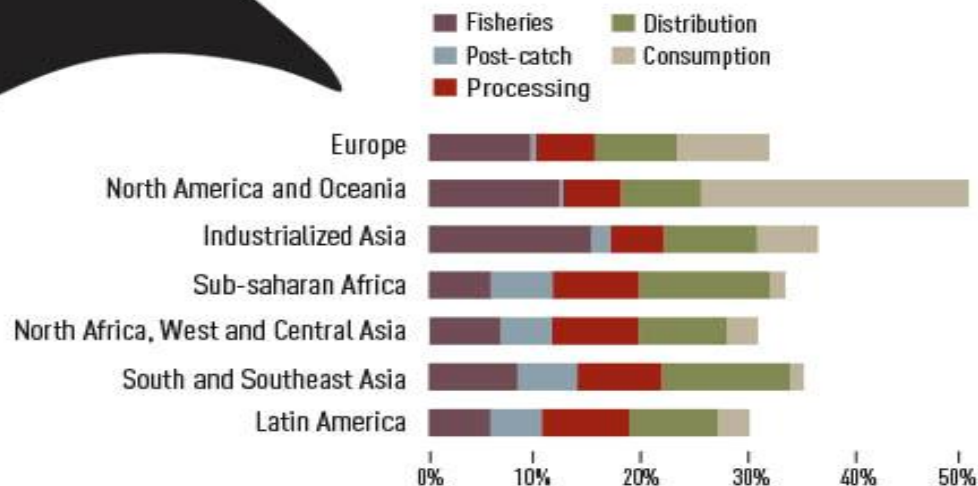
35%

FISH & SEAFOOD FOOD LOSSES

8% of fish caught globally is thrown back into the sea. In most cases they are dead, dying or badly damaged.



This is equal to almost 3 billion Atlantic salmons.



Classification of Waste

1. Generator
2. Chemical and Physical Properties
3. Organic and Inorganic
4. Composition
5. Hazardous properties



GENERATOR

- **Household**
- **Commercial**
- **Cafe and restaurant, hotels, food stalls**
- **School, universities, laboratories**
- **Retail operation (shops, supermarkets, warehouses, etc.)**
- **Markets**
- **Public facilities (sport grounds, street sweeping and cleaning)**
- **Hospitals and other health care facilities**
- **Mine and mineral processing facilities**
- **Agriculture and food processing facilities**
- **Fishing and fish processing facilities**
- **Forestry operations**
- **Building Sites**
- **Manufacturing Facilities**
- **Water treatment and Swede treatment facilities**
- **Land transport facilities (truck depot, bus and train stations and terminals)**

CHEMICAL AND PHYSICAL PROPERTIES

It is important for treatment plants to have knowledge of the physical and chemical properties of the waste, so that they treat it properly. Some important properties are:

- 1. Calorific Value**
- 2. Density/Specific weight**
- 3. Grain Size**
- 4. Moisture content**
- 5. Solubility**
- 6. Viscosity**

1. Calorific Value

Calorific Value:

- ❑ the amount of energy per kilogram of waste.
- ❑ The higher the energy content, the more valuable the waste is as fuel
- ❑ . It also means that the waste is less likely to be reused or recycled, for economic reasons.
- ❑ Selling the waste as a fuel is usually more lucrative than having it recycled.



2. Density/Specific weight

Density:

- ❑ The ratio between the mass and volume of the waste.
- ❑ This is important for the most aspects of handling and design of treatment plants.
- ❑ Light waste requires large storage volumes and more vehicles to transport it.



3. Grain Size

Grain Size:

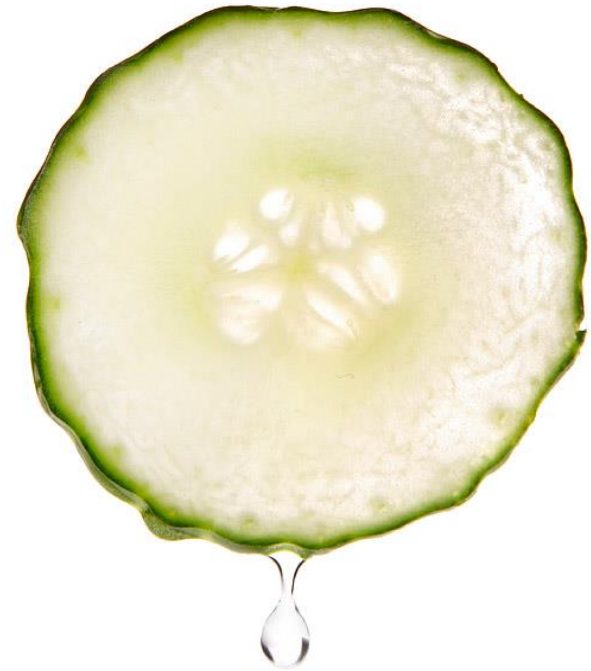
- ❑ is an important parameter for all aspects of handling.
- ❑ Small grains are more prone to be swept away by the wind and thus more difficult to keep in place.



4. Moisture content

Moisture content:

- ❑ Water content in percent.
- ❑ High water content usually means higher treatment costs, since the waste will be less useful as a fuel, and because in most cases it can be released to sewage or recipient.



5. Organic/In organic

Feature	Organic	Inorganic
Major constituent	Carbon	Metals are common
Chemical complexity	Varies from quite simple to highly complex	Usually simple (with the exception of silicate mineral)
Energy content	Usually high (with the exception of water). Chlorinated components often require energy (i.e. high temperatures) to be destroyed	Usually low, but can be reactive.
flammability	Flammable	Not Flammable, but certain components containing oxygen can support combustion are highly reactive because of this.
Type of Treatment	Incineration, Chemical or biological	Physical or Chemical

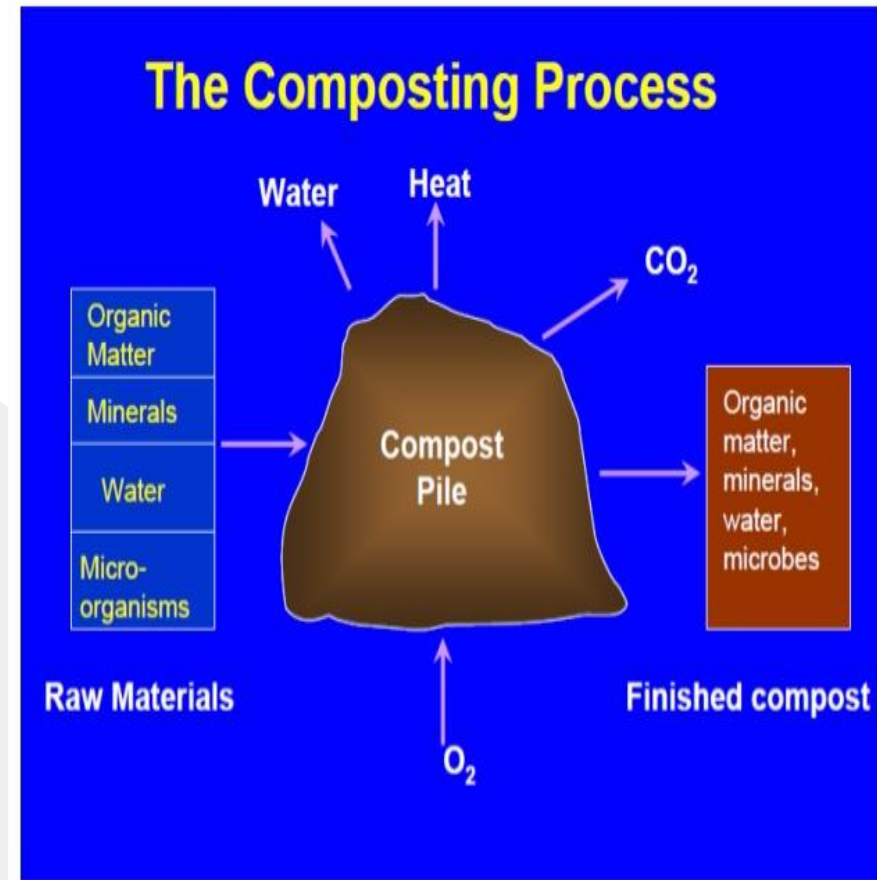
Table 1: Summary of major feature of organic and inorganic component

III. Composition

composition is a description of contents of the waste.

Waste composition means finding out how much paper, glass, food waste, etc. is discarded in our waste stream.

Waste composition information helps in planning how to reduce waste, set up recycling programs, and conserve money and resources.



V I. Hazardous Waste and Non-Hazardous Waste

Hazardous waste is solid, liquid, or gaseous material based on:

- quantity,
- concentration,
- physical,
- chemical,
- infectious characteristics

may pose a hazard to human health or the environment.

VARIOUS KINDS OF HAZARDOUS WASTE:

I. CHEMICAL WASTE

II. CLINICAL WASTE

III. RADIOACTIVITY

1.CHEMICAL WASTE



- This is an inaccurate term that is most often used to describe the hazardous fraction of industrial waste.
- Such waste needs special handling to avoid dispersal of the waste.
- One good example is an ordinary household fire extinguisher.



2. Health-Care Waste

Categories of health care waste

1. Sharps: Used or unused sharps
2. Infectious
3. Pharmaceutical
4. Chemical
5. Radioactive



1.Sharps: Used or unused sharps

e.g. hypodermic, intravenous or other needles; auto-disable syringes; syringes with attached needles; infusion sets; scalpels; pipettes; knives; blades; broken glass



III. Infectious:

- Infectious waste is material suspected to contain pathogens (bacteria, viruses, parasites or fungi) in sufficient concentration or quantity to cause disease in susceptible hosts.
- This category includes: waste contaminated with blood or other body fluids, cultures and stocks of infectious agents from laboratory work,



I V. Pathological:

⦿Pathological: Human tissues, organs or fluids; body parts; fetuses; unused blood products



VI. Chemical:

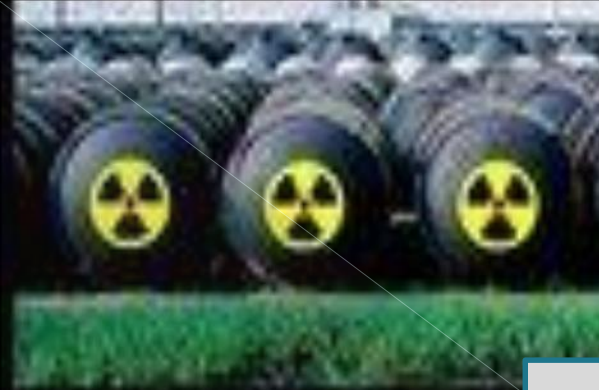
⦿ Waste containing chemical substances (e.g. laboratory reagents; film developer; disinfectants that are expired or no longer needed; solvents; waste with high content of heavy metals, e.g. batteries; broken thermometers and blood pressure gauges)



VII. Radioactive:

❑ Waste containing radioactive substances (e.g. unused liquids from radiotherapy or laboratory research; contaminated glassware, packages, or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources)





3 . Radioactivity





❑ Recently nuclear power has entered many discussion as world energy need rise and oil reserves diminish.....

❑ Nuclear waste is any form of byproduct or end product released radioactivity.

❑ How to safely dispose of nuclear waste is pivotal for the continued operation of nuclear power plants, safety of people living around dump sites, and prevention of proliferation of nuclear material to non nuclear states.

Nuclear Waste Management

- ❑ Most common method for handling nuclear waste.
- ❑ Typically kept separate from actual plants and buried far below ground.
- ❑ First used in 1999 in the US.



Yucca Mountain Site

THANKS FOR YOUR ATTENTION