Waste Management

إدارة المخلفات

Prepared by

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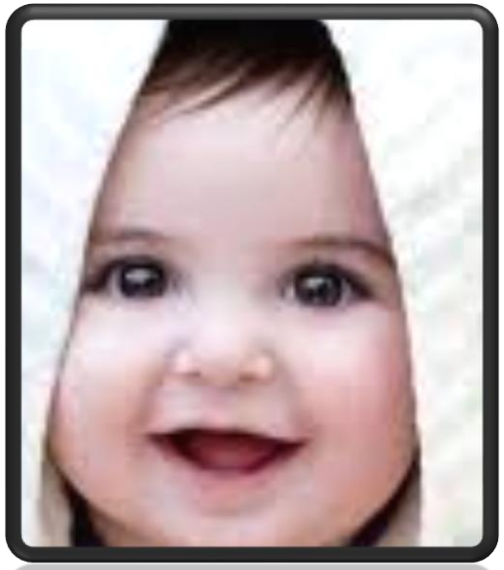
Lecture Strategy

Please



1- Smile

2- Respect the lecture time

3- Make your mobile Silent

COURSE CONTENT

Course Code: MPE224 Waste management إدارة المخلفات

Contact Hours: 2 Lec. – 0 Tut. – 0 Lab., (2 Cr. hr.)

Course Content

Wastes basics: What is waste? – Waste categories – Waste quantities and composition – Household wastes – Waste policy and regulation – Waste reduction and reuse. Waste management technologies: Landfill – Waste incineration – Advanced thermal processing techniques – Anaerobic digestion – Composting – Materials recycling – Mechanical–biological treatment. Waste management process and environmental impact modelling: Leachate formation within a landfill – Incineration emissions – Life-cycle assessment. Health impacts of waste management: Emissions and impacts – Critical reading of the literature – Assessing the health impacts of waste management – Health and safety issues associated with waste collection - Health impacts of landfill – Health impacts of incineration – Health impacts of recycling and biological processing. Integrated solid waste management and waste strategies

محتوى المقرر

أساسيات النفايات: ما هي النفايات؟ - فئات النفايات - كميات النفايات وتكوينها - النفايات المنزلية - سياسة النفايات وتنظيمها - الحد من النفايات وإعادة استخدامها. تقنيات إدارة النفايات: مدافن النفايات - حرق النفايات - تقنيات المعالجة الحرارية المتقدمة - الهضم اللاهوائي - التسميد - إعادة تدوير المواد - المعالجة الميكانيكية - البيولوجية. عملية إدارة النفايات ونمذجة الأثر البيئي: تكوين المادة المرتشحة داخل المكب - انبعاثات الحرق - تقييم دورة الحياة. الآثار الصحية لإدارة النفايات: الانبعاثات والآثار - قراءة نقدية للأدبيات - تقييم الآثار الصحية لإدارة النفايات - قضايا الصحة والسلامة المرتبطة بجمع النفايات - الآثار الصحية لمكب النفايات - الآثار الصحية المترتبة على الترميد - الآثار الصحية لإعادة التدوير والمعالجة البيولوجية . الإدارة المتكاملة للنفايات الصلبة واستراتيجيات النفايات

References

1- Stephen Burnley, Solid Wastes Management, John & Wiley Sons Inc., 2014.
2- Muralisrinivasan Natamai Subramanian, Plastics Waste Management: Processing and Disposal, 2nd Edition, John & Wiley Sons Inc., 2019.

CHAPTER (1)

1. **What is meant by waste management?**
2. **Waste Categories.**
3. **Waste quantities and composition**
4. **Municipal Solid Waste MSW**
5. **Waste policy and regulation**
6. **Waste reduction and reuse**

What is meant by Waste Management?

WM is the "generation, prevention, characterization, monitoring, treatment, handling, reuse and residual disposition of solid wastes". The term usually relates to materials produced by human activity and the process is generally undertaken to reduce their effect on health, the environment, or aesthetics.

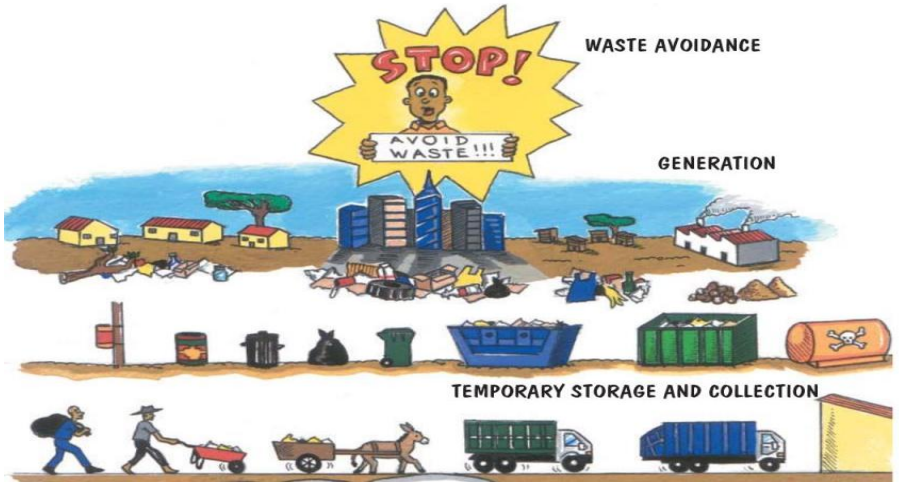
It comprises purposeful and systematic control of the generation, storage, collection, transport, separation, processing, recycling, recovery, and disposal of solid waste.

What is meant by Waste?

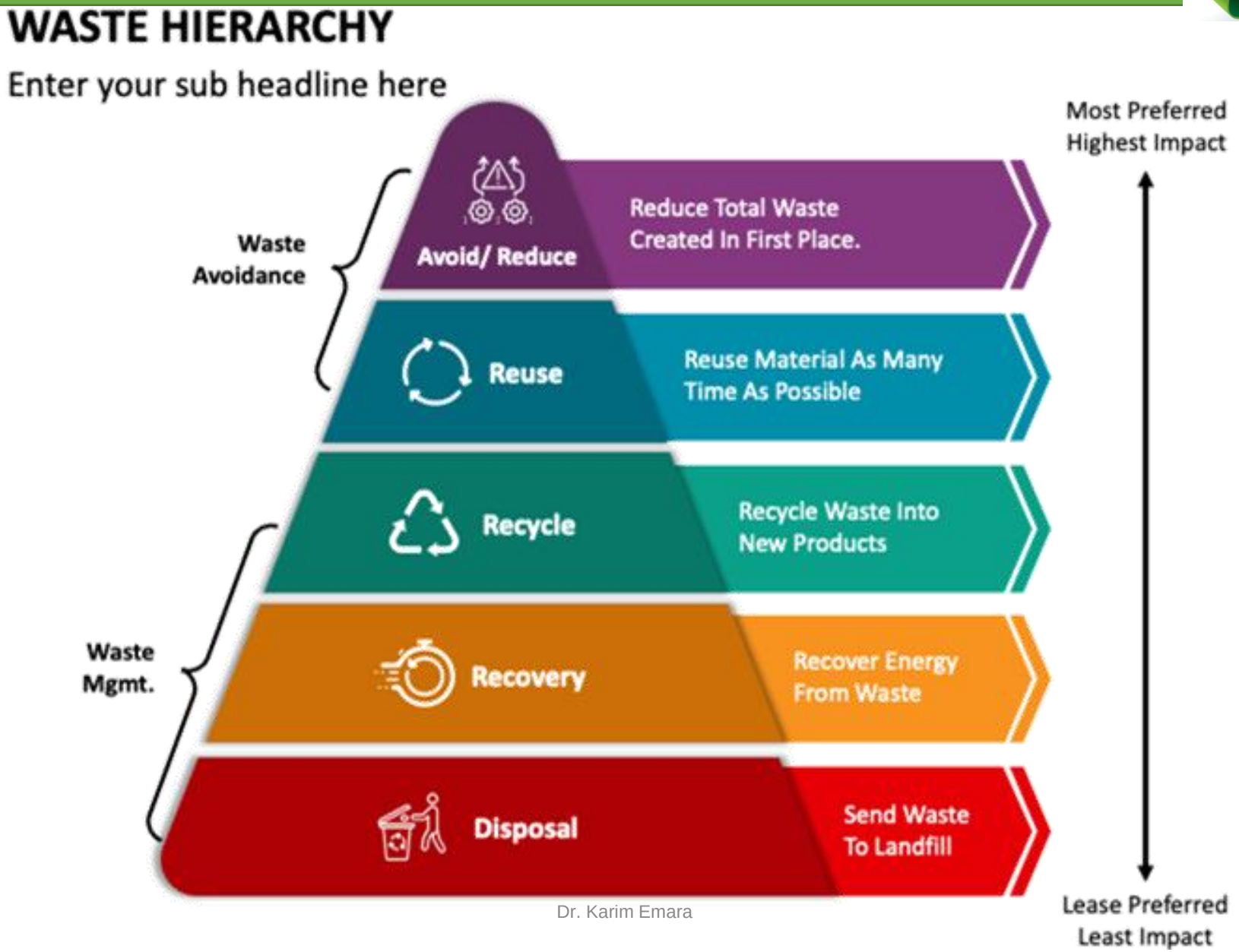
- Waste and wastes are unwanted or unusable materials.
- Waste is any substance that is discarded after primary use, or it is worthless, defective, and of no use

Waste management includes:

- Generation of waste
- Waste minimization
- Waste removal
- Treatment
- Landfill disposal
- Waste transportation
- Planning and implementation.
- Environmental considerations
- Financial and marketing aspects
- Policy and regulation
- Education and training
- Waste treatment
- Recycling and reuse
- Storage, collection, transport, and transfer



Waste Management hierarchy



Reduce means

- **Each person adds to the waste management problem. If each household reduces its waste, the problem will be reduced. You can start by analyzing what you throw away and what goods are needed at home.**

Table 1. How Long Does It Take to Decompose (EPA, 2013a)

Paper towel	2–4 weeks	Plastic bag	10–20 years
Newspaper	6 weeks	Plastic film container	20–30 years
Apple core	2 months	Tin can	50 years
Waxed milk carton	3 months	Rubber boot sole	50–80 years
Plywood	1–3 years	Styrofoam plastic cup	50 years
Wool sock	1–5 years	Aluminum can	80–200 years
Cigarette butt	1–5 years	Disposable diaper	450 years
		Plastic beverage bottle	450 years
		Monofilament fishing line	600 years
		Glass bottle	1 million years

Reduce

- Reduce office paper waste by implementing a formal policy to duplex all, draft reports, and by making training manuals and personnel information available electronically.
- Improve product design to use fewer materials.
- Redesign packaging to eliminate excess material while maintaining strength.
- Work with customers to design and implement a packaging return program.
- Switch to reusable transport containers.
- Purchase products in bulk.
- Use incoming packaging materials for outgoing shipments.
- Encourage employees to reuse office materials

Reuse means

- The process of reusing starts with the assumption that the used materials that flow through our lives can be a resource rather than refuse. Waste, after all, is in the eye of the beholder.
- One person's trash is another person's treasure. If we really look at things we are throwing away, we can learn to see them as materials that can be reused to solve everyday problems and satisfy everyday needs.
- Most of us, however, haven't even started to exploit the resources in our trash. Once you have made up your mind to use trash for positive uses, you can begin to brainstorm and generate ideas.
- Reusing saves money, conserves resources, and satisfies the human urge to be creative.

Reuse: What Can We Do?

The following are some examples of reuse.

- Containers can be reused at home or for school projects.
- Reuse paper, plastic bags, boxes, and lumber.
- Give outgrown clothing to friends or gifts.
- Offer furniture and household items that are no longer needed to people in need, friends, or charity.
- Sheets of paper that have been used on only one side can be used for note-taking or rough drafts.
- Old tires can be used in the garden and in the play yard.
- Old towels and sheets can be cut in small pieces and used for dust cloths.

Recycling

A lot of the things that people trash can be recycled. Prime examples include paper, newspaper, corrugated cardboard, high-grade paper, aluminum, steel (tin) cans, glass, plastic, motor oil, organic waste, and scrap metals. Some notes on recycling

The main benefits of recycling are:

- Recycling generates industry
- Recycling creates jobs
- Cost avoidance of recycling

Recycling should be thought of as a cost-effective disposal option. It usually requires fewer government subsidies than landfilling or incineration. It saves natural resources and helps Protect the environment.

Classification of solid waste

Sources of solid waste

- Residential
- Commercial
- Institutional
- Construction and demolition
- Municipal services
- Treatment plant sites
- Industrial
- Agricultural
- Biomedical waste

Residential, Commercial, Institutional, Construction and demolition, Municipal services, Treatment plant sites → Municipal solid waste (MSW)

Industrial → Industrial solid waste

Agricultural → Agricultural waste

Biomedical waste → Hospital waste

Classification of solid waste

It is based on Sources, types of solid waste, the composition of solid waste, and the rate at which it is generated discarded, or disposed of.

1. Residential– it refers to wastes generated from dwellings, apartments, townhouses. It consists of leftover food, vegetables, peeled material, plastic, clothes, wood, ashes, etc.

2. Commercial– Waste from stores, hotels, markets, restaurants, shopping malls, etc. It consists of grocery material, leftover food, metals, E-waste, etc.

3. Institutional– waste generated from schools, colleges, offices. It consists of paper, plastic, glass, E-waste.

Classification of solid waste

4. Municipal waste- waste generated from households, commercial buildings, street sweeping, hotels and restaurants, clinics, and dispensaries, construction and demolition, horticulture, and sludge.

5. Industrial– consists of process waste, ashes, demolition and construction waste, hazardous waste from various industrial processes.

6. Agricultural– Includes spoiled food grains and vegetables, agricultural remains, litter generated from fields, farms, vineyards, etc.

Composition of solid waste

The composition of waste varies with

1) The socioeconomic status (Lifestyle, consumption pattern)
2) Geographical Location
3) Season
4) Collection Frequency
5) Population diversity
6) Public attitude
7) Legislation


Thank
you