

Module 4.1

GreenVETAfrica

Training Programme

Waste Management Hierarchy and Recycling



Co-funded by
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2023-2024 GreenVETAfrica



OBJECTIVE

Participants will be able to assess the various options for solid waste management and select the most appropriate

Waste Management Hierarchy

- As you know, waste management simply refers to all the decisions, actions and activities that you engage in to control the spread of waste from when you generate it, to final disposal.
- Waste Management Activities include Generation, Temporary Storage, Collection, Transportation, Treatment (also called processing) and Disposal.



Waste Management Hierarchy

The waste hierarchy is a ranked structured of waste management options according to environmental impact, taking into consideration the lifecycle of the material (Scottish Government, 2017).

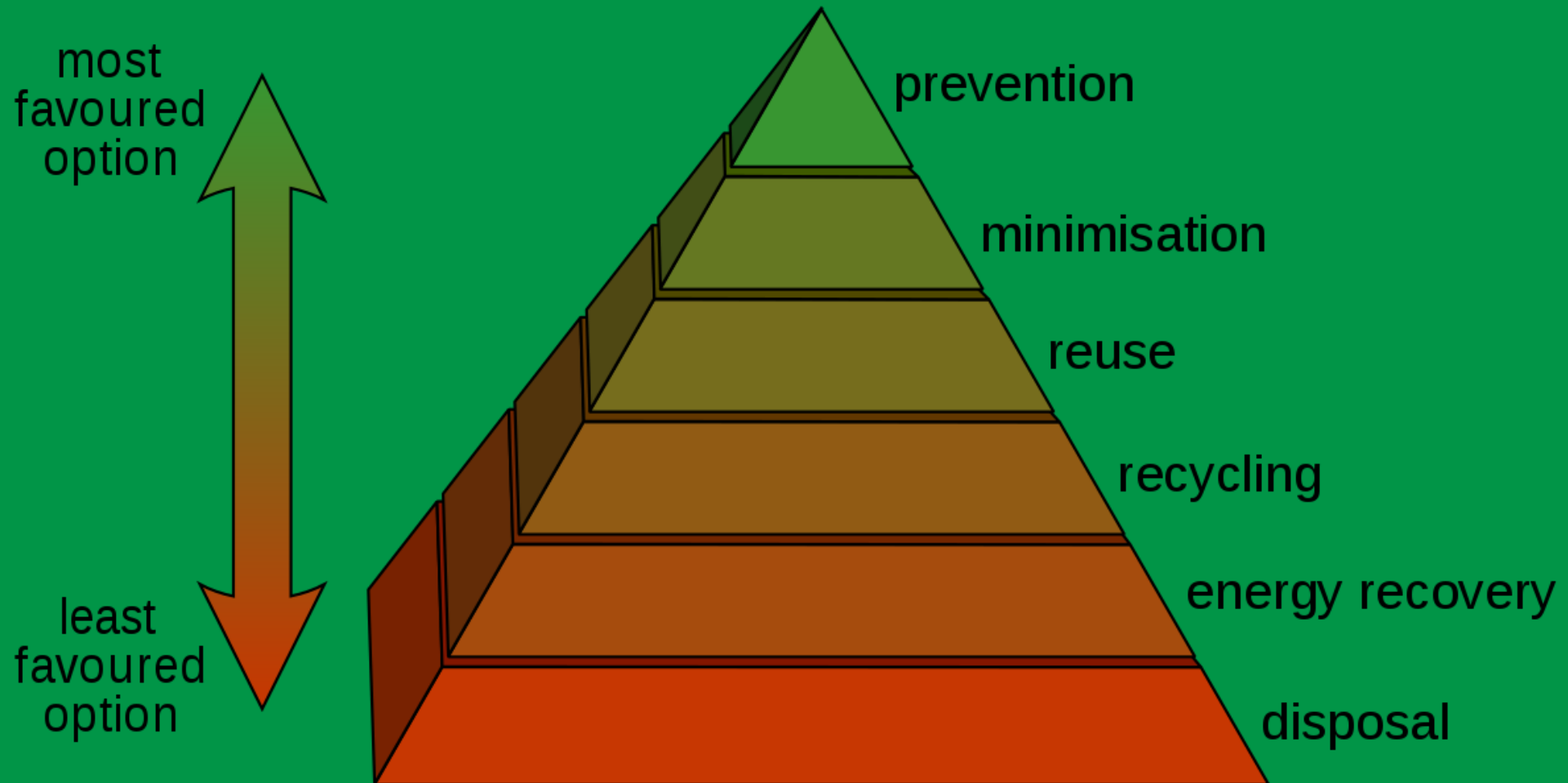
It is used as a universal tool to provide insight into the options for minimising waste, from prevention through to the final last resort of direct disposal

The EU introduced the term ‘waste hierarchy’ in 1975, encouraging countries to take up this ideology to establish long-term waste policies and aid them moving upwards on this ladder (European Commission, 2008).

Waste Management Hierarchy

- In simpler terms, what does Waste Management Hierarchy (WMH) refer to?
- Waste Management Hierarchy simply refers to the arrangement of waste management actions in order of environmental friendliness and sustainability
- This ranks waste management actions and activities in the order of most favourable to the environment to least favourable to the environment
- It is important to note that one important function of the waste management hierarchy is to explore safer options for waste handling and Management such that waste disposal is not explored or only explored as the final option when all other options have been exhausted

Waste Management Hierarchy



Waste Prevention

Waste Prevention (also called Refusal), is the intentional refusal to generate waste. This occurs when you decide to stop generating a particular type of waste and instead find a smart and green way to live without the material that generates the waste



Waste Minimisation

Waste Minimisation (also called Reduce), is the intentional reduction in waste generation. This occurs when you decide to reduce waste generation in day-to-day activities like eating, shopping, working etc. This leads to a reduction of waste that ends up being disposed



Waste Reuse

Waste reuse is the creative repurposing of what is supposed to be waste. An example is when you use your soda PET bottle to store something else like liquid soap or oil. Despite having served its primary purpose, through reuse it has been put to serve a secondary purpose rather than outright disposal



Waste Recycling

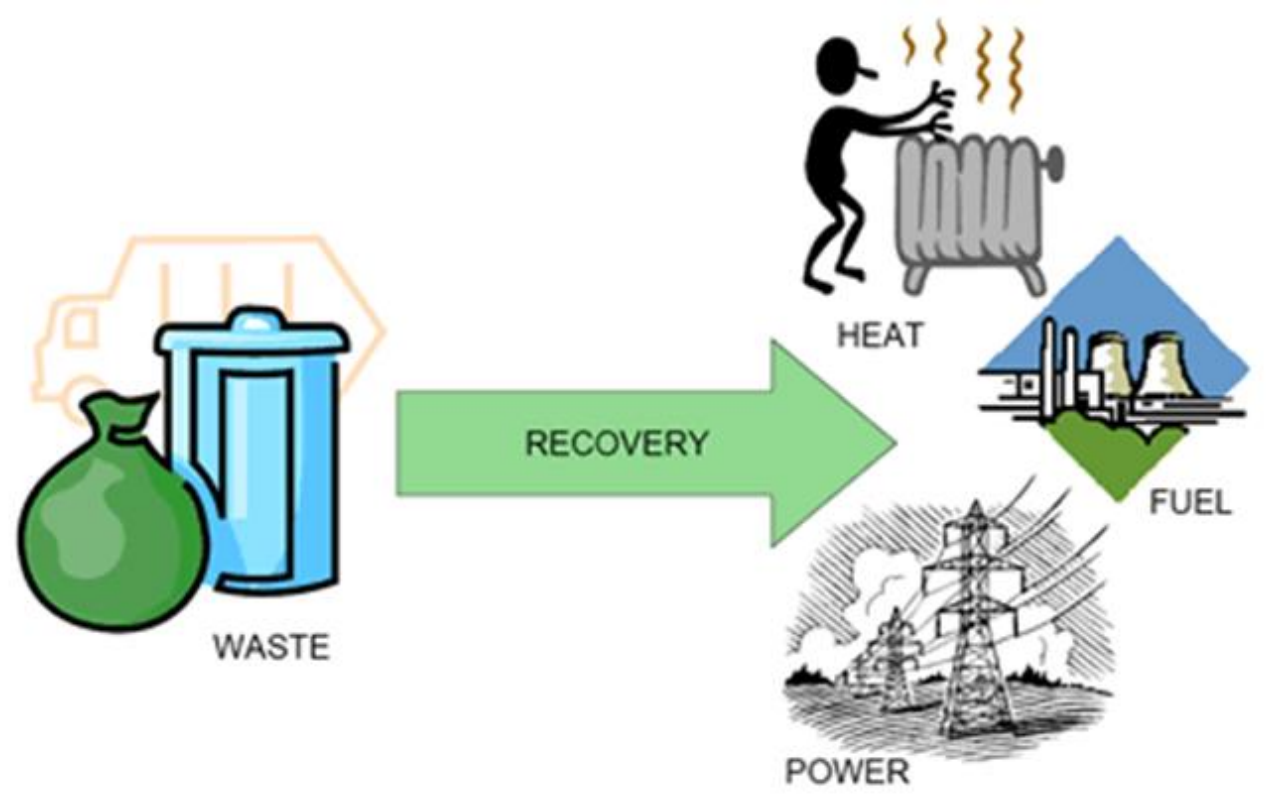
Waste recycling is the transformation of waste materials into useful and valuable materials or products. This occurs through a breakdown and rebuild of the initial material e.g: PET to Fibre, Tyres to diesel and organic waste to compost

Other important concepts to note are upcycling and downcycling.



Recovery

Energy recovery refers to the process of converting non-recyclable waste materials into different forms of energy like heat, electricity, or fuel through a variety of processes, including combustion, gasification, pyrolyzation, anaerobic digestion and landfill gas recovery.



Waste Disposal

Waste Disposal occurs when all other avenue of waste management has been explored. In a linear economy, after consumption, the waste is collected, transported and disposed. One of the goals of the waste management hierarchy is to ensure that other avenues for waste management is explored leading to a more circular and sustainable approach to waste management



CONCLUSION

“If it can’t be reduced, reused, repaired, rebuilt, refurbished, refinished, resold, recycled, or composted, then it should be restricted, designed or removed from production.”

Pete Seeger, Folk Singer & Social Activist



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RECYCLING



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OBJECTIVES

Participants will be acquainted with the concept of recycling, the value chain, types of Recyclables and their management



OUTLINE

Introduction to Recycling

The Informal Sector

Plastic, Paper/Carton
Management

Tyre Recycling

Metal/Can Recycling

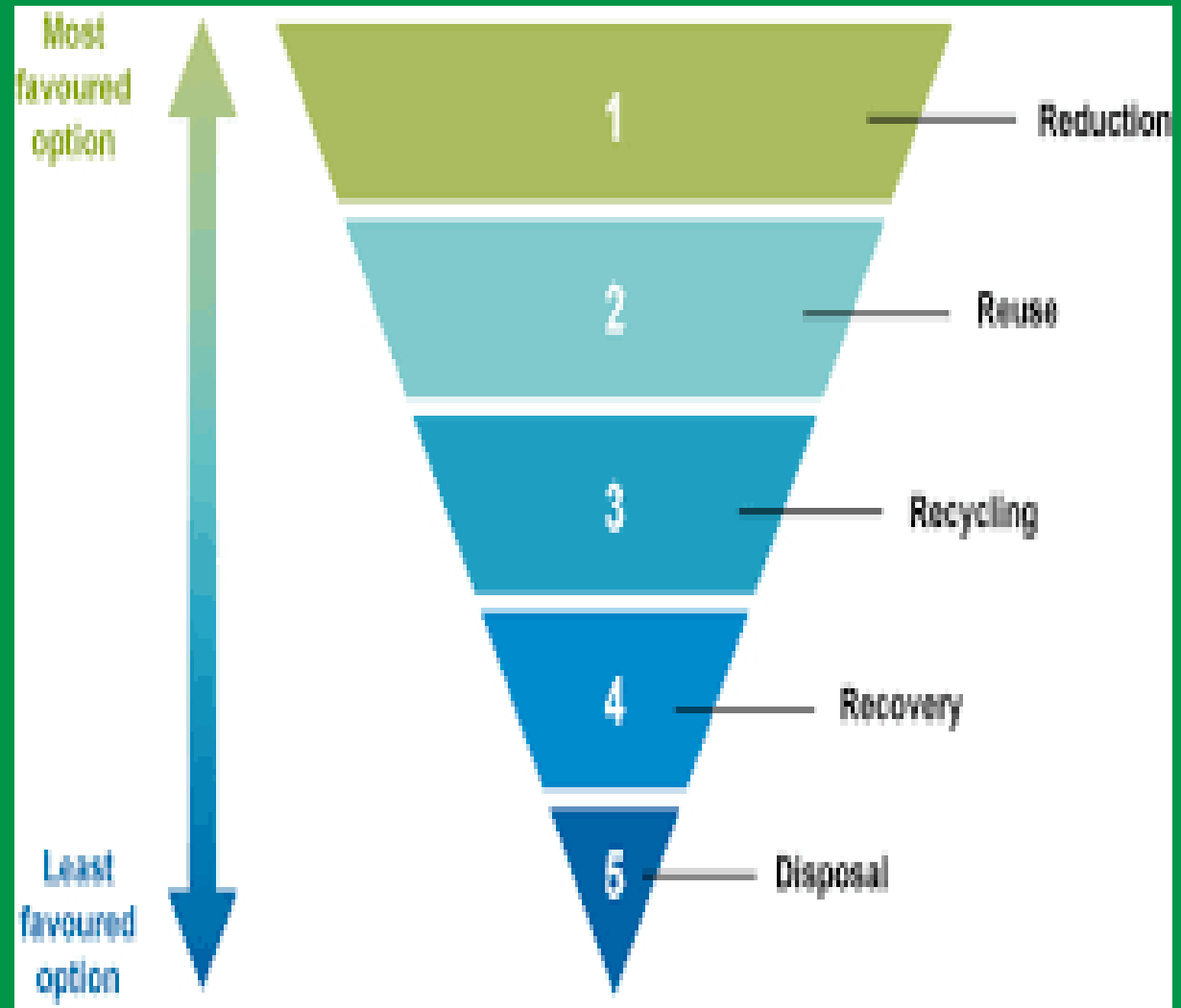
E-Waste Recycling

Upcycling and
Downcycling



WASTE MANAGEMENT HIERARCHY

The waste management hierarchy is a concept that promotes waste avoidance ahead of recycling and disposal. The shortened version of the hierarchy, ‘reduce reuse recycle’ is frequently used in community education campaigns and has become a well-recognised slogan for waste reduction and resource recovery.



WASTE SEGREGATION

Waste segregation is the separating and sorting of waste to facilitate recycling. Waste Segregation means to group Waste into different Categories. Each waste goes into its category at the point of dumping or collection. Segregation of waste ensures pure quality material. Segregating waste on site into separate material streams can help minimise costs and maximise the opportunities for recovery and recycling



RECYCLING

Recycling is the process of converting waste materials into new materials and objects. It also involves collecting waste materials and converting them into raw materials that can be reused to form other valuable products.

It's alternative to conventional waste disposal which save material and help lower green house gas emissions.

**REDUCE,
REUSE,
RECYCLE**



TYPE OF RECYCLABLE MATERIALS

- Plastics (PET Bottles, HDPE, PP, LDPE, PVC,)
- Sacks and related materials (This is also a plastic, specifically Polypropylene)
- Carton
- Paper
- Aluminum Can
- Iron
- Copper, Brass, Zinc, etc
- Tyres
- Food Waste, etc

RECYCLING VALUE CHAIN



- **The value chain in recycling includes recycling and the commercialization of the recycled materials. The recycling value chain include:**
 - ❖ **Recyclable Collection:** This involves the collection of recyclable materials, sorting, de-labelling and baling of the items collected. This comprises majorly informal sector
 - ❖ **Pre-processing:** This activity involve different operations and investment which include crushing, grinding, pelletizing, etc
 - ❖ **Processing:** Recyclable processing requires more investment than collection and pre-processing, and this include conversion of recyclable materials into finished products.

The Informal Sector

The informal recycling sector exists in most cities in developing countries. It consists of individuals, groups, and small businesses that perform peripheral collection and sale of recyclables and reusable materials. The sector may fill a gap where disposal, collection, or segregation options are lacking. Informal sector workers often operate in unsafe conditions, without employment benefits accorded to those in formal employment, and experience income disparity. Entire families, including young children, may participate in recycling activities and depend on it as a sole source of income. Informal sector workers are often marginalized by society and may be referred to by unfavorable terms, including “scavengers,” “rag pickers,” and “waste pickers.”

INFORMAL SECTOR



Aug 23, 2022 12:40:38 PM
Apapa
Lagos



479a Lagos - Badagry Expressway
Road
Amuwo Odofin
Lagos
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Plastic Management

Plastic management includes the ways in which the plastic are been collected, transported and recycling. The plastics are non-biodegradable as carbon-based products and other polymers. This process is performed in the following six steps: collecting waste, sorting, or arranging into categories, washing to remove impurities, shredding and resizing, identifying and separating plastics, and compounding

There are two major categories of plastic which are:

- Thermoplastics
- Thermosetting plastics (Thermosets)



Fibre from PET Bottles

Types of Plastic



PS



PET



Styrofoam



PP



PVC



HDPE



LDPE

Paper Management

Paper Recycling Process: This requires paper to be separated into types and grades. The paper is then washed to remove any film, glue, ink and other contaminants using soapy water. Once the paper is washed, it is then transferred to a large container, where it is mixed with water to create a pulp. The pulp is then pressed, dried and rolled into thin sheets of recycled paper.



Recycled Paper

Carton Management

The process of creating cartons varies depending on their intended use. For example, drinks cartons often require extra insulation to ensure the product is safe for consumption. The general process to make cartons is Sheets of paperboard are cut to size and dried. The paperboard is then pulled through rollers, which apply both heat and pressure to the paper, stretching it out. During this process, a thin polythene film is created, which is layered over the paperboard.



Used cartons as form of packaging waste



TYRE RECYCLING

Tyre recycling is the process of recycling waste tires that are no longer suitable for use on vehicles due to wear or irreparable damage. These tires are a challenging source of waste, due to the large volume produced, the durability of the tires, and the components in the tire that are ecologically problematic



TYRE SHREDDING



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Tyre Chunks to produce Carbon black which is mixed with asphalt for road construction.

Pyrolysis of used tyres to diesel



Iron is sold to off taker



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Metal/Can Recycling

SWAP



Steel and aluminum can be recycled time and time again without losing any quality and more and more people are recycling their cans which helps to conserve non-renewable fossil fuels, reduce the consumption of energy and the emission of gasses like carbon dioxide into the atmosphere.



TYPES OF METAL





E-WASTE

Electronic waste or “e-waste” refers to all types of electrical electronic equipment (EEE) and its parts that have become obsolete and have been discarded without intention for reuse. This definition includes used electronics which are destined for reuse, resale, recycling, or disposal. Examples of electronic waste include, but not limited to: TVs, computer monitors, printers, scanners, keyboards, cables, circuit boards, lamps, clocks, flashlight, calculators, phones, cameras, radios, MP3 and CD players.



CATEGORIES OF E-WASTE

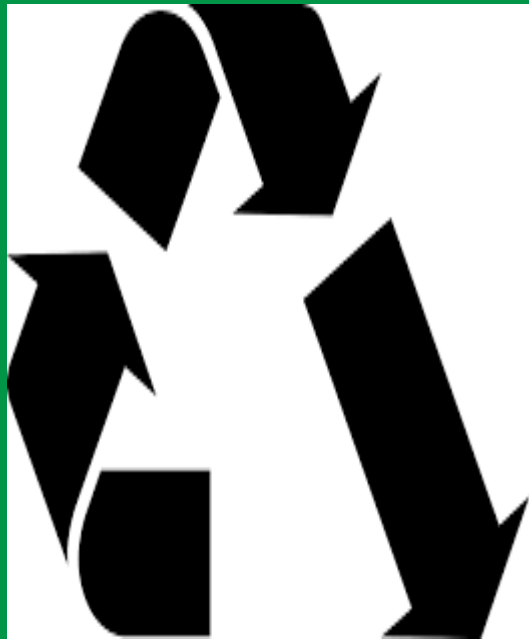
CATEGORY	TYPICAL ELECTRICAL ELECTRONIC EQUIPMENT COVERED
Cooling and freezing equipment	Refrigerators, freezers, air conditioners, central cooling.
Screens and monitors	Televisions, monitors, laptops, notebooks, and tablets.
Lamps	Fluorescent lamps, high intensity discharge lamps, and LED lamps.
Large equipment	Large printing machines, copying equipment, desktops and telecommunication equipment, central heating, PV panels, large IT (servers, routers, copiers), professional luminaries, tools, medical equipment.
Small equipment	Microwave ovens, electrical and electronic toys, small electrical and electronic tools, irons, kitchen appliances, electric toothbrushes and hair removal devices.
Small IT and telecommunication equipment	Mobile phones, pocket calculators, personal computers, printers, telephones.

UPCYCLING

Upcycling also known as creative reuse, is the process of transforming by-products, waste materials, useless, or unwanted products into new materials or products perceived to be of greater quality, such as artistic value or environmental value.



DOWNCYCLING



Downcycling is the recycling of waste where the recycled material is of lower quality and functionality than the original material. Often, this is due to the accumulation of tramp elements in secondary metals, which may exclude the latter from high-quality applications. For example, steel scrap from end-of-life vehicles is often contaminated with copper from wires and tin from coating.



BENEFIT OF RECYCLING

- **It reduces the negative impact that human activities have on the environment**
- **Reduces the amount of waste sent to landfills and incinerators.**
- **Conserves nature resources**
- **Increases economic security by tapping a domestic source of materials**
- **Prevent pollution by reducing the need to collect new raw materials.**
- **Saves energy**

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