

# GreenVETAfrica

Training of Trainers Programme



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GreenVETAfrica mission is to offer an innovative capacity building programme on Green Waste Management in Nigeria and Ghana

# UNIT ONE

# WASTE MANAGEMENT EQUIPMENT AND MACHINERY

# Objectives

- ❑ Gain an overview of waste management equipment and machinery employed throughout the value chain.
- ❑ Understand the purpose and functionality of various waste management tools and technologies.

# Overview of Waste Management Equipment

- ❑ Waste management equipment are highly essential in various stages of waste handling, from generation to disposal.
- ❑ These equipment types include bins, containers, garbage trucks, compactors, balers, shredders, conveyor systems, etc.
- ❑ Each equipment type serves a specific purpose in streamlining waste management processes and ensuring effective waste handling.

# Equipment Types

- ❑ Waste management equipment can be categorized into distinct types based on their roles.
- ❑ Examples include compactors for reducing waste volume, balers for preparing recyclables, shredders for size reduction, and conveyors for material movement.
- ❑ A detailed understanding of each equipment type enables efficient waste management and resource optimization.

# Technological Advancements in Waste Management Equipment

- ❑ Modern waste management equipment has embraced technological advancements for enhanced efficiency.
- ❑ Automation, sensors, and data analytics are integrated into machinery to improve accuracy and productivity.
- ❑ Technological innovations in waste management equipment contribute to more sustainable waste handling practices

# Enhancing Efficiency and Sustainability through Modern Equipment

- ❑ Modern waste management equipment is designed to enhance efficiency and promote sustainability.
- ❑ Waste-to-energy conversion technologies in equipment contribute to resource optimization.
- ❑ Advanced recycling methods integrated into machinery reduce environmental impact and





# Technologies for Waste Generators in Nigeria

- ❑ Waste Segregation Bins: These are used for separation of different waste streams, such as recyclables, organic waste, and non-recyclables. These bins can be color-coded or labeled to ensure proper waste sorting.
- ❑ Composting Equipment: For decomposition and transformation of organic matter into nutrient-rich compost.
- ❑ Biogas Digesters: To convert organic waste into biogas through anaerobic digestion.



# Waste Segregation Bins

- ❑ Blue Bin: The blue bins are usually used for recyclable materials such as paper, cardboard, plastic bottles, aluminum cans, and glass containers. These materials are sorted and processed to be reused or recycled.
- ❑ Green Bin: Green bins are generally meant for non-recyclable or general waste that cannot be recycled or composted. This waste will likely end up in a landfill or undergo proper waste treatment.



# Machineries and Equipment for Waste Collectors in Nigeria

- ❑ Waste Collection Trucks: For collection and transportation of waste from different sources
- ❑ Collection Bins and Containers: For temporary storage of wastes during collection rounds.
- ❑ Safety Equipment: Waste Collectors require personal protective equipment to ensure their safety while handling waste.





# Waste Collection Trucks



Most of the waste collection trucks are equipped with other equipment to help facilitate efficient transportation of waste. These include

- Collection Cabin
- Compactor Machine
- Hydraulic systems
- Lifting Mechanism
- Disposal compartment



# Waste Collection containers



# Other Technical Tools for Waste Collectors in Nigeria

- ❑ Waste collectors utilize technical tools for route optimization and monitoring [RoadWarrior, Onfleet].
- ❑ GPS and GIS technologies aid in planning efficient waste collection routes.
- ❑ Real-time monitoring tools track collection progress and enable prompt adjustments.





# Machineries and Equipment for Waste Treatment Facilities in Nigeria

- ❑ Landfill Equipment: These are equipment used for maintain landfills. They include bulldozers, excavators, compactors, etc.



# Landfill Equipment





# Machineries and Equipment for Waste Treatment Facilities in Nigeria

- ❑ Landfill Equipment: These are equipment used for maintain landfills. They include bulldozers, excavators, compactors, etc.
- ❑ Composting Equipment: These include shredders, mixers and turners



# Waste Shredders





# Machineries and Equipment for Waste Treatment Facilities in Nigeria

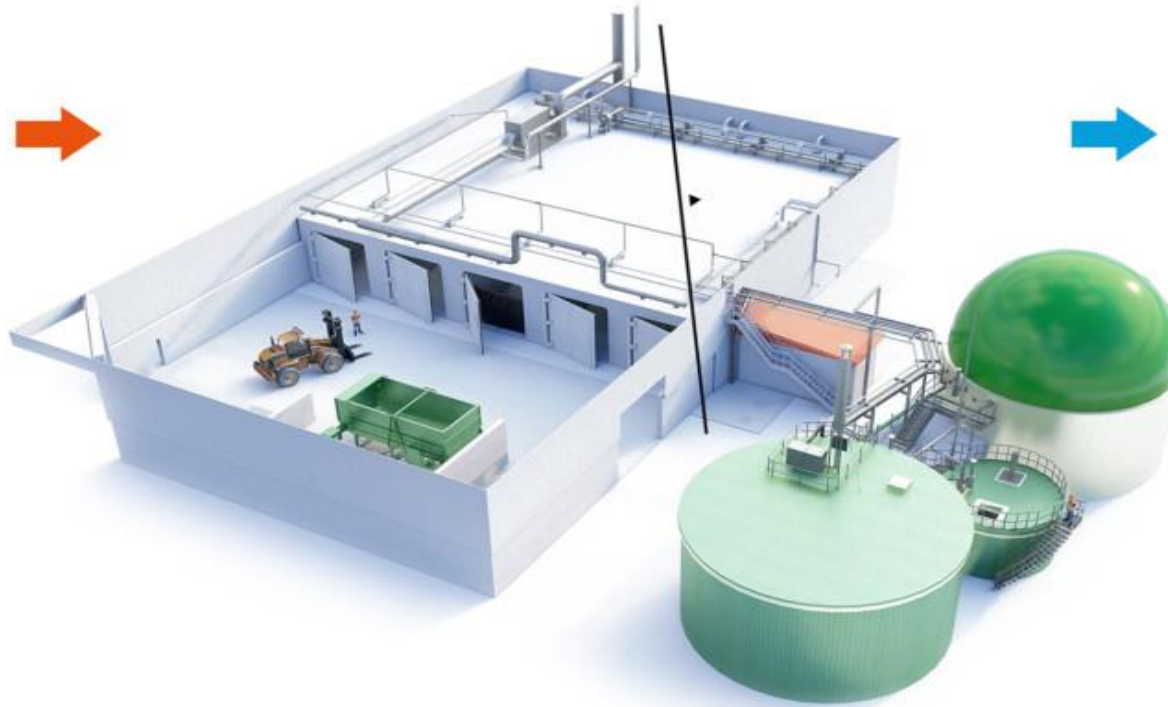
- ❑ Landfill Equipment: These are equipment used for maintain landfills. They include bulldozers, excavators, compactors, etc.
- ❑ Composting Equipment: These include shredders, mixers and turners
- ❑ Anaerobic Digesters: These include pumps , compressors, agitators, etc.








# Anaerobic Digester

## INPUTS FEEDSTOCK

-  Biowaste from households
-  Industrial & commercial organic waste
-  Agricultural organic waste
-  Animal livestock manure (poultry, horse, cattle etc.)
-  Landscaping green waste (municipal, residential, tourism)



## OUTPUTS PRODUCTS

- Electricity 
- Biomethane RNG grid injection 
- Biofuel CNG mobility & transport 
- Heat/cool generation 
- Organic fertilizer 

# Technologies for Waste Treatment Facilities in Nigeria

- ❑ Waste treatment facilities employ advanced technologies for waste processing.
- ❑ Anaerobic digesters convert organic waste into biogas and fertilizers.
- ❑ Thermal treatment technologies like incineration reduce waste volume and generate energy.





# Machineries and Equipment for Recycling Facilities in Nigeria

- ❑ Sorting equipment: These include Trommel screens, magnetic separators, optical sorting machine, eddy current separators.



# Sorting Machine

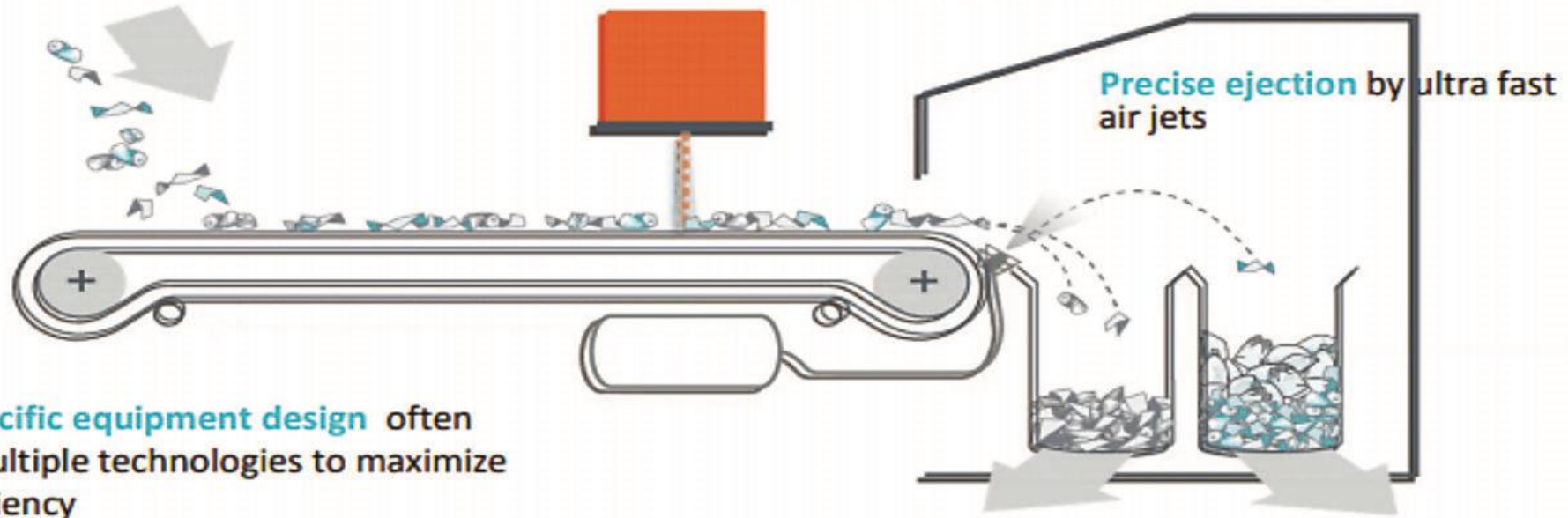




# Sorting Machine

Feeding of unsorted material

High-tech sensors to identify objects



Product specific equipment design often including multiple technologies to maximize sorting efficiency

High-speed processing of information (material, shape, size, color, defect, damage and location of objects)



# Sorting Process



# Machineries and Equipment for Recycling Facilities in Nigeria

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- ❑ Balers and Compactors. These are used to compress and bale recyclable materials.





# Balers and Compactors





# Machineries and Equipment for Recycling Facilities in Nigeria

- ❑ Sorting equipment: These include Trommel screens, magnetic separators, optical sorting machine, eddy current separators.
- ❑ Balers and Compactors. These are used to compress and bale recyclable materials.
- ❑ Shredders and Granulators: They are used to break waste materials into smaller pieces for further processing and recycling.



# Shredders and Granulators





# Shredders



# Machineries and Equipment for Recycling Facilities in Nigeria

- ❑ Washing and Cleaning Equipment: For removing of impurities from waste to prepare them for further processing.
- ❑ Pelletizing Equipment: These are machines used to shape materials like plastic and wood into small and compact pellets. They include plastic pelletizers and wood pelletizers.





# Pelletizing Machine





# Technologies for Recycling Facilities in Nigeria

- ❑ Recycling facilities leverage advanced technologies for effective material recovery.
- ❑ Automated sorting systems separate recyclables based on material type.
- ❑ Plastic shredders and extruders transform waste plastic into reusable products.



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