

SOLID WASTE Management

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Philippine Context

NEWS REVIEW: Daily Millionaires

- Read
 - <https://www.philstar.com/headlines/2023/08/06/2286595/philippines-produces-61000-million-metric-tons-waste-daily>
 - <https://www.igi-global.com/chapter/waste-management-in-the-philippines/240080>
 - <https://www.philstar.com/headlines/2023/07/13/2280656/27-percent-pinoy-dispose-garbage-burning>
- What are the **challenges** being encountered in the Philippines terms of solid waste management?

1. Solid Waste Management

- discipline on control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes
 - **SOLID WASTES: all discarded waste** (household, commercial, nonhazardous institutional and industrial, street sweepings, construction debris, agriculture, non-hazardous/non-toxic)
- accord with **best principles** of public health, economics, engineering, conservation, aesthetics, environmental considerations

RA 9003 : Ecological Solid Waste Management Act of 2000

2. Refuse & Garbage

REFUSE	
<ul style="list-style-type: none"> • nonhazardous solid waste from a community • requires collection & transport to processing/disposal site 	
GARBAGE	RUBBISH
<ul style="list-style-type: none"> • mostly decomposable food waste 	<ul style="list-style-type: none"> • mostly dry material (not decomposable)

3. Sources & Composition

4 MAJOR TYPES / CLASSIFICATIONS OF WASTE (Waste Analysis and Characterization Study Guide)

- **Biodegradable**
 - can be **decomposed** by microorganisms into humus-like products
 - ex. kitchen/food waste, garden waste, agricultural waste, livestock waste

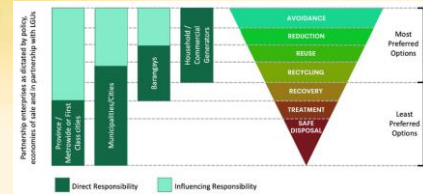
- **Recyclable** - can be **diverted and used** for other purposes
 - ex. paper, plastics, glass, metals
- **Special** - must be collected **with care**; treated and disposed of properly
 - **3 Major Types:**
 - **Hazardous** - from manufacturing operations
 - **Healthcare** - from hospitals, clinics, other health institutions
 - **Bulky** - cannot be placed in separate containers due to size, shape, or other properties
- **Residual** - generated **after implementation of 3Rs** (Reduce, Reuse, Recycle), with **2 categories:**
 - with potential to be **recycled** but are not currently saleable in local junk shops
 - for **disposal** in sanitary landfills

Anonas, Samuel & Eugenio, Francis & Flores, BenDeMar-Hope & Balite, Paul & Tomacruz, Jan & Limjuco, Lawrence & Ocon, Joey. (2023). From Waste to Renewable Energy: A Policy Review on Waste-to-Energy in the Philippines. Sustainability, 15, 12963. 10.3390/su15172963.

SOURCES

- **Agricultural** - from planting, harvesting, trimming, run offs
- **Domestic** - from households
- **Health care** - from diagnosis, treatment, immunization
- **Industrial** - from processes, manufacturing operations
- **Infectious** - from laboratory, surgery, autopsy, infected patients
- **Pharmaceutical** - from products, drugs, chemicals

4. Processes



The **Philippine Waste Management Hierarchy** based on RA 9003 (**Ecological Solid Waste Management Act**) as adapted from the **National Solid Waste Management Framework**. The hierarchy also shows the **responsibilities of local government units**.

Processes

- **Waste Avoidance and Reduction - PREFERRED CHOICE**
 - **Waste avoidance is the first preferred option in the waste management hierarchy.**
 - Aim: Minimize amount of waste
 - **Source reduction:** reduce by product design, materials substitution, materials reuse, packaging restrictions
 - **Resource conservation:** reduce overall resource consumption
- **Reuse** - recovering materials intended for **same or different purpose** without alteration of physical and chemical characteristics

NATIONAL SOLID WASTE MANAGEMENT STRATEGY 2012 - 2016

• Recycling

- making used/waste materials **suitable for beneficial use and for other purposes**
- includes transforming into new products (original may lose identity & may be used as **raw materials** for other goods or services)

• Recovery

- collection, extraction or recovery of recyclable materials for recycling, generating energy or producing product suitable for beneficial use

NATIONAL SOLID WASTE MANAGEMENT STRATEGY 2012 - 2016

5. Methods of Disposal

- **Burying**
 - only **biodegradable** solid wastes; only for temporary control
 - shall not be less than **1 meter** deep covered with soil: to **prevent excavation** of refuse
- **Hog Feeding / Feeding to Animals**
 - only if food is **thoroughly cooked**
- **Composting** - controlled **decomposition** by microorganisms, mainly bacteria and fungi
 - aerobic (in presence of oxygen); anaerobic (absence)
- **Garbage Collection**

6. Laws / Policies

• RA 9003 : Ecological Solid Waste Management Act of 2000

- for systematic, comprehensive, ecological solid waste management program to ensure **protection of public health and environment**
- all LGUs shall prepare 10-yr plan and divert at least 25% of all waste from waste disposal facilities through **reusing, recycling, composting**

- **RA 6969: Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990**

- regulatory measures on hazardous wastes / substances which **pose threats** to human and/or environmental health, as well as risk of disasters like fires or explosions
- prohibits entry, transport, and disposal of hazardous and nuclear wastes into the Philippine territory

- **RA 7160: Local Government Code of 1991 - devolved powers** to LGUs: enforcement of laws, cleanliness and sanitation, solid waste management

- **RA 8749: Clean Air Act of 1999** - directs all government agencies to adopt integrated air quality framework
 - "polluters must pay" principle
 - prohibition of **incineration** method (burning -> emit fumes)

NATIONAL SOLID WASTE MANAGEMENT STRATEGY 2012 - 2016

7. Components of Solid Waste Management

- **Waste Characterization**

- **identify** constituent materials (**volume, percentage in weight, type, source**) which comprise solid waste generated within jurisdiction of LGU
- determine whether or not wastes will be **compatible** with containment features and other wastes, and whether or not wastes are required to be **managed as hazardous** wastes under RA 6969

RA 9003 : Ecological Solid Waste Management Act of 2000

- **Collection and Transfer**

- ensure 100% collection efficiency
 - properly designed containers/receptacles in selected collection points for **temporary** storage while awaiting collection and transfer to processing sites / final disposal sites
 - **segregation** for reuse, recycling, composting
 - **ordinances** for collection system in barangay
 - properly **trained** officers and workers to handle solid waste disposal
- collectors and personnel shall be equipped with personal protective equipment
- prevent damage, spillage, scattering

RA 9003 : Ecological Solid Waste Management Act of 2000

- **Processing**

- use of **intermediate treatment facilities** for composting, recycling, conversion

- **Source Reduction**

- reduce volume of solid waste generated at source
 - replace disposable materials and products with **reusable** materials and products
 - **reduce** packaging
 - increase **efficiency** of using paper, cardboard, glass, metal

RA 9003 : Ecological Solid Waste Management Act of 2000

- **Recycling**

- in combination with source reduction and composting, to reduce sufficient amount of solid waste
- describe types of materials, methods, facilities

- **Composting**

- in combination with source reduction and recycling, to reduce sufficient amount of solid waste
- describe types of materials, methods, facilities

RA 9003 : Ecological Solid Waste Management Act of 2000

- **Solid Waste Facility Capacity and Final Disposal**
 - identify existing & proposed disposal sites & waste management facilities
 - reduce adverse impact on health and environment; extend life span and capacity
 - **Open dump sites shall not be allowed as final disposal sites.**

 - Closure or eventual phase out of those existing
 - As alternative, **sanitary landfill sites** shall be developed and operated as **final disposal site** for solid and, eventually, residual wastes of a municipality or city or a cluster of municipalities and/or cities

RA 9003 : Ecological Solid Waste Management Act of 2000


- **Education and Public Information**
 - source reduction, recycling, composting
 - waste collection services, solid waste management, related health and environmental concerns
- **Mandatory Segregation of Solid Wastes**
 - primarily at the **source** (household, institution, industry)
 - separate container for each type of waste
 - properly marked: "compostable", "non-recyclable", "recyclable", "special waste"

RA 9003 : Ecological Solid Waste Management Act of 2000

8. Guidelines in Proper Disposal

- There shall be established **Materials Recovery Facility (MRF)** in every barangay or cluster of barangays.

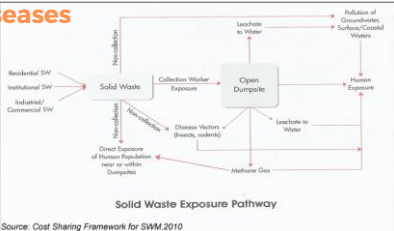
RA 9003 : Ecological Solid Waste Management Act of 2000




- Sanitary Landfills must be **accessible** from major roadways and must be chosen with regard for the sensitivities of the **community's residents**. These shall **not detrimentally affect** environmentally sensitive resources, such as aquifer, groundwater reservoir or watershed area. These should accommodate community's wastes for a period of **five years**.

RA 9003 : Ecological Solid Waste Management Act of 2000

9. Diseases



Source: Cost Sharing Framework for SWM, 2010

Solid Waste Exposure Pathway
National Solid Waste Management Status Report 2008-2018

- Leachate can **contaminate** groundwater tables and surface waters.
- Insects and pests in open dumpsites are disease **vectors**.
- **Methane** gases from dumpsites can affect the health of exposed populations and contribute to global warming.
- Coastal and **marine** litter affects aesthetics, causes pollution, and harms marine organisms.
- Poor water quality, sanitation, and hygiene cause 100% of **cholera** cases, 100% of **helminthiasis** cases, 50% of **hepatitis** cases, and 50% of **typhoid and paratyphoid fever** cases.

National Solid Waste Management Status Report 2008-2018

10. Implications to Nurses' Care of Families

- **AVOIDANCE:** Avoid goods that are disposable and products that are made from non-renewable resources.
 - Most important but challenging component in the waste management hierarchy
 - **The key to a successful waste avoidance program is a change in the people's attitude** (NSWM 2012-2016).
- **REDUCTION:** Reduce unnecessary packaging and toxicity.
 - Take own shopping bag. Avoid individually wrapped products. Use refillable packaging. Buy long-lasting products. Buy in bulk.
 - Before buying, think 'Do I really need it?'
- **REUSE:** Reuse bags, containers. Repair durable products. Borrow, rent, share items. Sell, donate instead of throwing.
- **RECYCLING:** Choose recyclable products and containers. Compost biodegradable wastes.
- Segregate into separate containers.