

# SOLID WASTE MANAGEMENT

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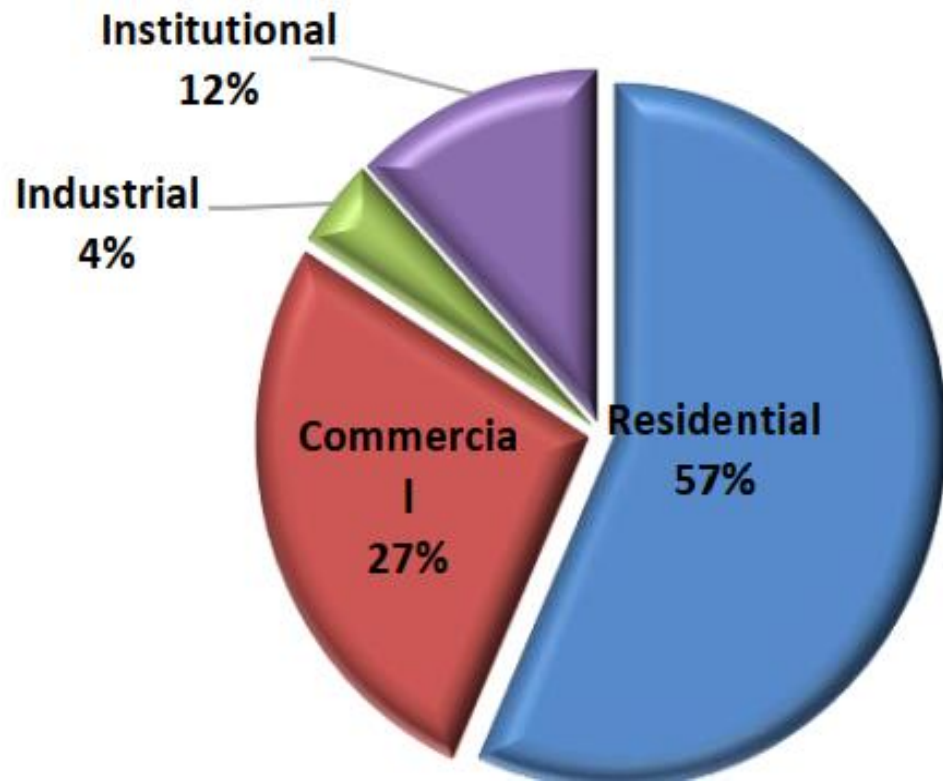
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- **40,087.45 tons**

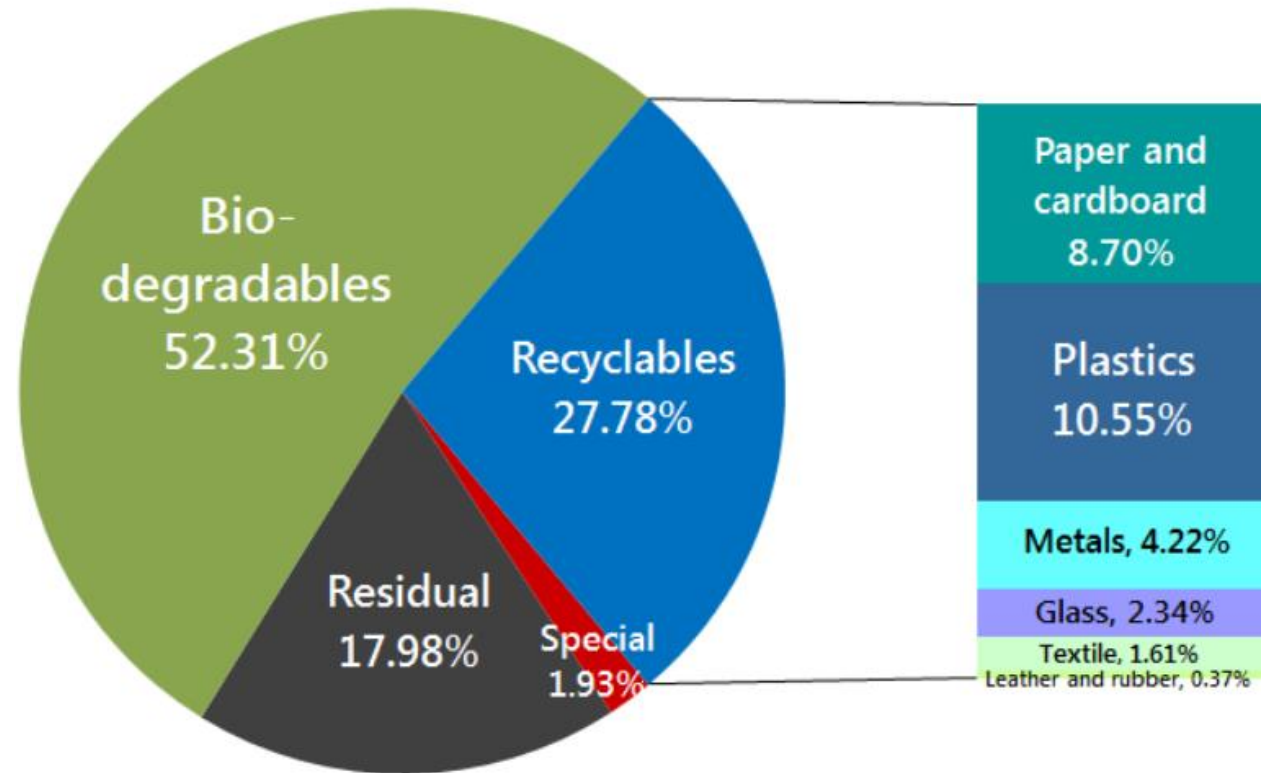
**The total volume (in tons) of solid waste that the Philippines generates daily**

- **77, 776 tons**

**The total volume (in tons) of solid waste that the Philippines will generate by 2025**



Solid wastes sources, 2013 , Philippine Solid Waste at a Glance



Composition of municipal solid waste in the Philippines, 2008-2013

- **Solid waste** shall refer to all discarded household, commercial waste, non-hazardous institutional and industrial waste, street sweepings, construction debris, agricultural waste, and other non-hazardous/non-toxic solid waste.
- **Garbage**- refers to the wastes or rejected food constituents which have been produced during the preparation, cooking or storage of meat, fruit, vegetable and other food materials

# Composition of wastes

- Biodegradable waste
  - > these are any material that can be reduced into finer particles by microbiological organisms or enzymes
- Recyclable waste-
  - > any waste material that can be retrieved and re-used as feeds, factory returnable, fuel, fermentables, fine crafts and filling materials.
- Non biodegradable- refers to non-compostable wastes

# Sources of wastes

- **Agricultural wastes** – waste generated from planting or harvesting of crops, trimming or prawning of plants and wastes or run off materials from farms or fields
- **Domestic refuse-** refuse from households
- **General wastes** – these are domestic type of waste and other waste materials or substances that do not require special handling.
- **Hazardous wastes-** these are any wastes that is potentially dangerous to environment and health because of chemical, reactivity, flammability and explosiveness.

# Sources of wastes

- **Industrial refuse-** wastes results from industrial processes and manufacturing operations (e.g. food processing wastes, metal scraps and shavings)
- **Infectious wastes-** includes cultures and stocks of infectious agents from laboratory work, wastes from surgery, autopsies of pts.with infectious diseases, wastes from infected patients
- **Pharmaceutical waste**– includes spoiled, banned, expired, contaminated or used pharmaceutical products, drugs and chemicals
- **Pathological waste-** includes tissues, organs or body parts from surgical operations, biopsy, and autopsy, aborted fetuses, blood and body fluids

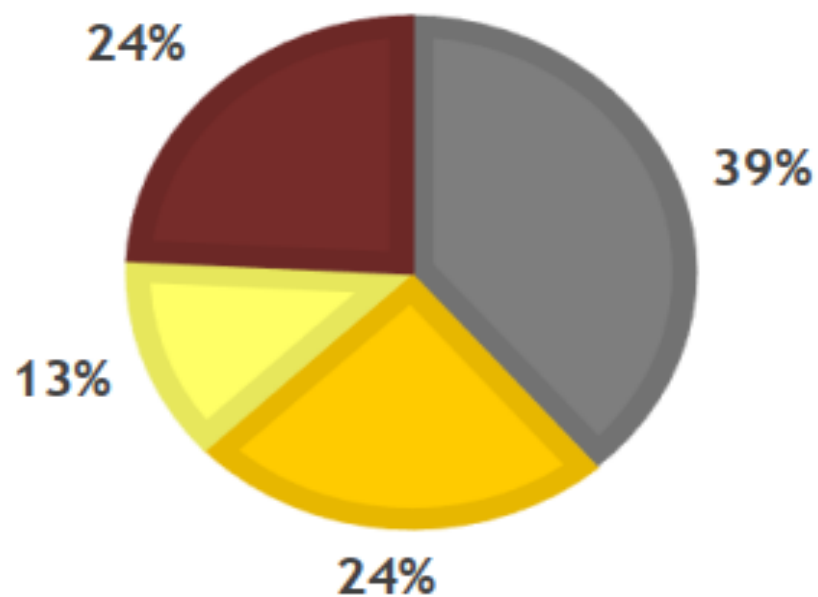
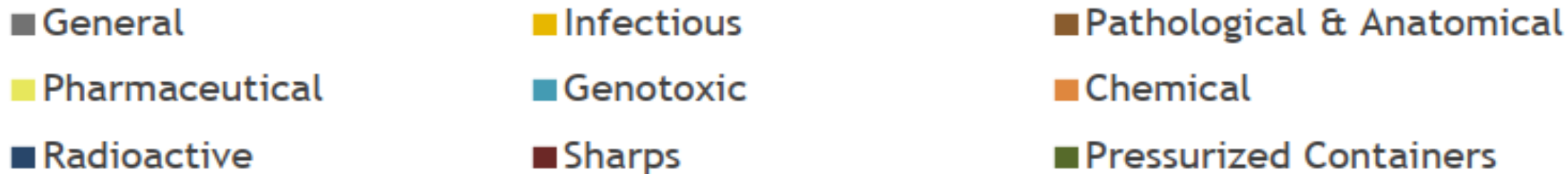


# Sources of wastes

- **“Health care waste”** (HCW) includes all the solid and liquid waste generated as a result of any of the following:
  - Diagnosis, treatment, or immunization of human beings;
  - Research pertaining to the above activities;
  - Research using laboratory animals for the improvement of human health;
  - Production or testing of biological products; and
  - Other activities performed by an HCF defined as an institution that has health care as its core service, function, or business.

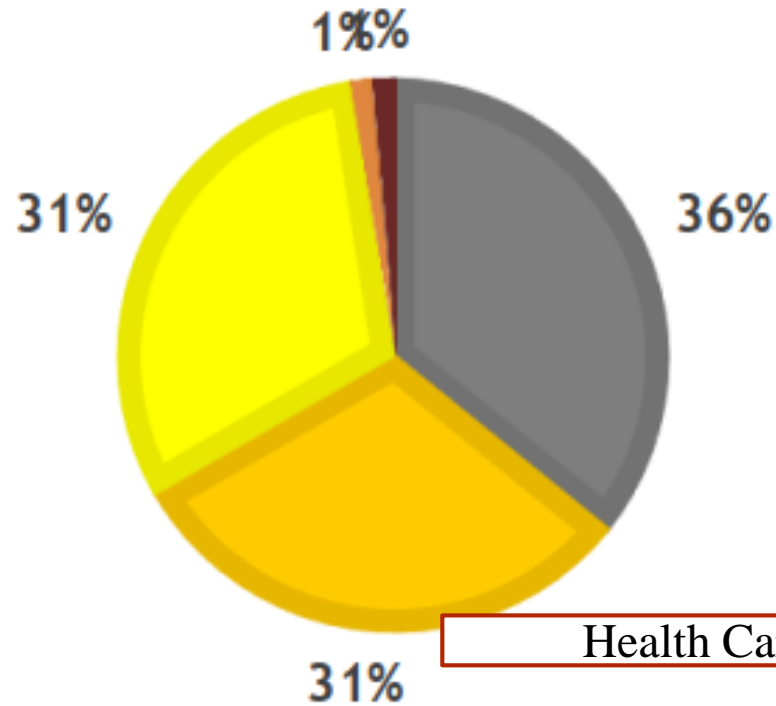
## Comparison of estimated daily waste generation in two types of HCFs

### GENERAL COMPOSITION OF WASTE GENERATED IN AN URBAN HEALTH CENTER (26KG/DAY)

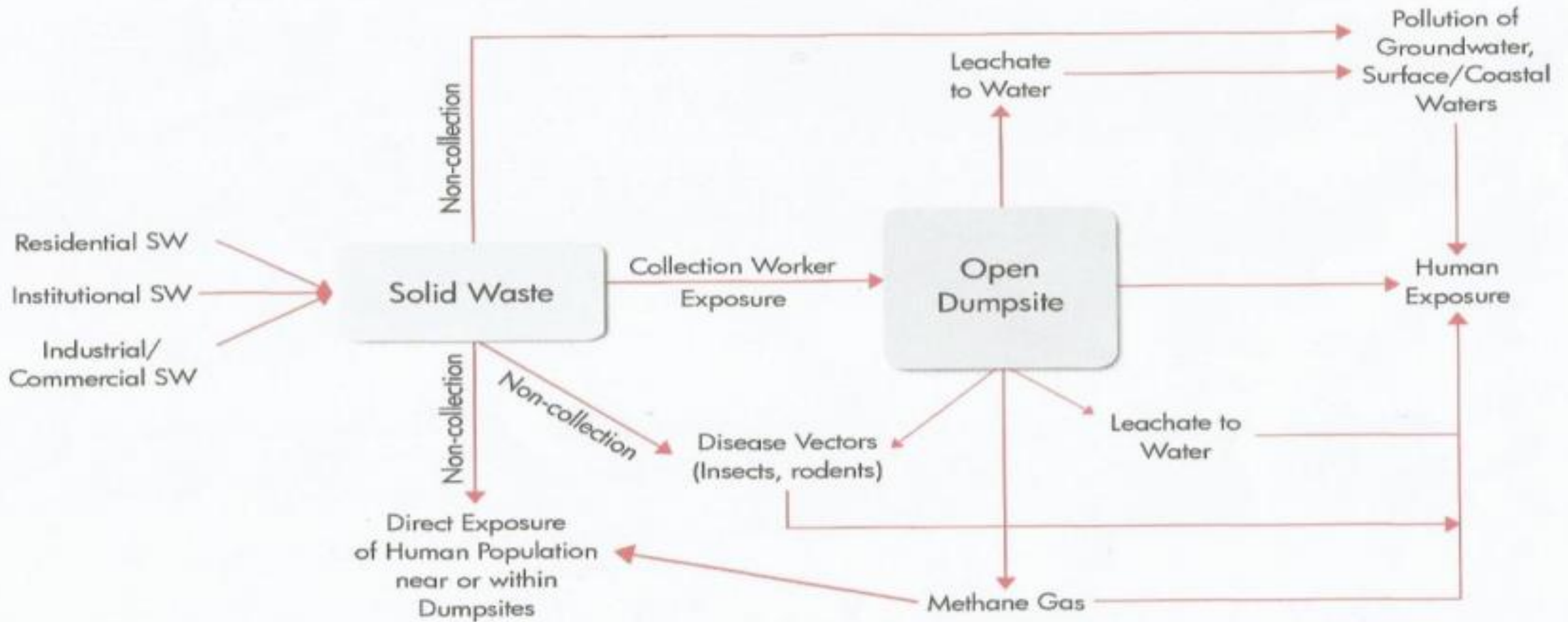


## GENERAL COMPOSITION OF WASTE GENERATED IN A 300-BED CAPACITY TERTIARY CARE HOSPITAL (810KG/DAY)

- General
- Infectious
- Pathological & Anatomical
- Pharmaceutical
- Genotoxic
- Chemical
- Radioactive
- Sharps
- Pressurized Containers



Health Care Waste Management Manual, 2020



**Solid Waste Exposure Pathway**

- Poor solid waste management will result in an unpleasant and often unsafe environment to live or work in.
- In urban areas refuse often ends up in drainage systems, creating drainage problems
- Organic waste from households, restaurants, and markets attracts rats, which are potential hosts for many infections (e.g. leptospirosis, plague).
- Organic waste also serves as food and a place to rest and hide for domestic flies, which can transmit fecal-oral infections and infections spread by direct contact, and cockroaches, which can transmit fecal-oral infections.
- Refuse often includes materials which can collect rainwater, such as tin cans, jars, and old car tires.
- *Aedes* mosquitoes, which transmit filariasis, urban yellow fever, dengue fever, and several other arboviral infections, can breed in these small water-filled vessels.

# WASTE MANAGEMENT

*activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process.”*

*-<https://earthandhuman.org/reduce-reuse-recycle/>*

# Republic Act No. 9003 otherwise known as the “Ecological Solid Waste Management Act of 2000

- enacted on January 26, 2001
- aims to address the growing problem on solid wastes in the country.
- It provides the legal framework for the country’s systematic, comprehensive, and ecological solid waste management program that shall ensure protection of public health and the environment

# **ECOLOGICAL SOLID WASTE MANAGEMENT**

**-refers to systematic administration of activities which provide for segregation at source, segregated transportation, storage, transfer, processing, treatment, disposal of solid waste and all other waster management activities which to not harm the environment**

**-Ecological Solid Waste Management Act of 2000**



# **SOLID WASTE MANAGEMENT**

**-refers to the discipline associated with the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations and that is also responsive to public attitudes**

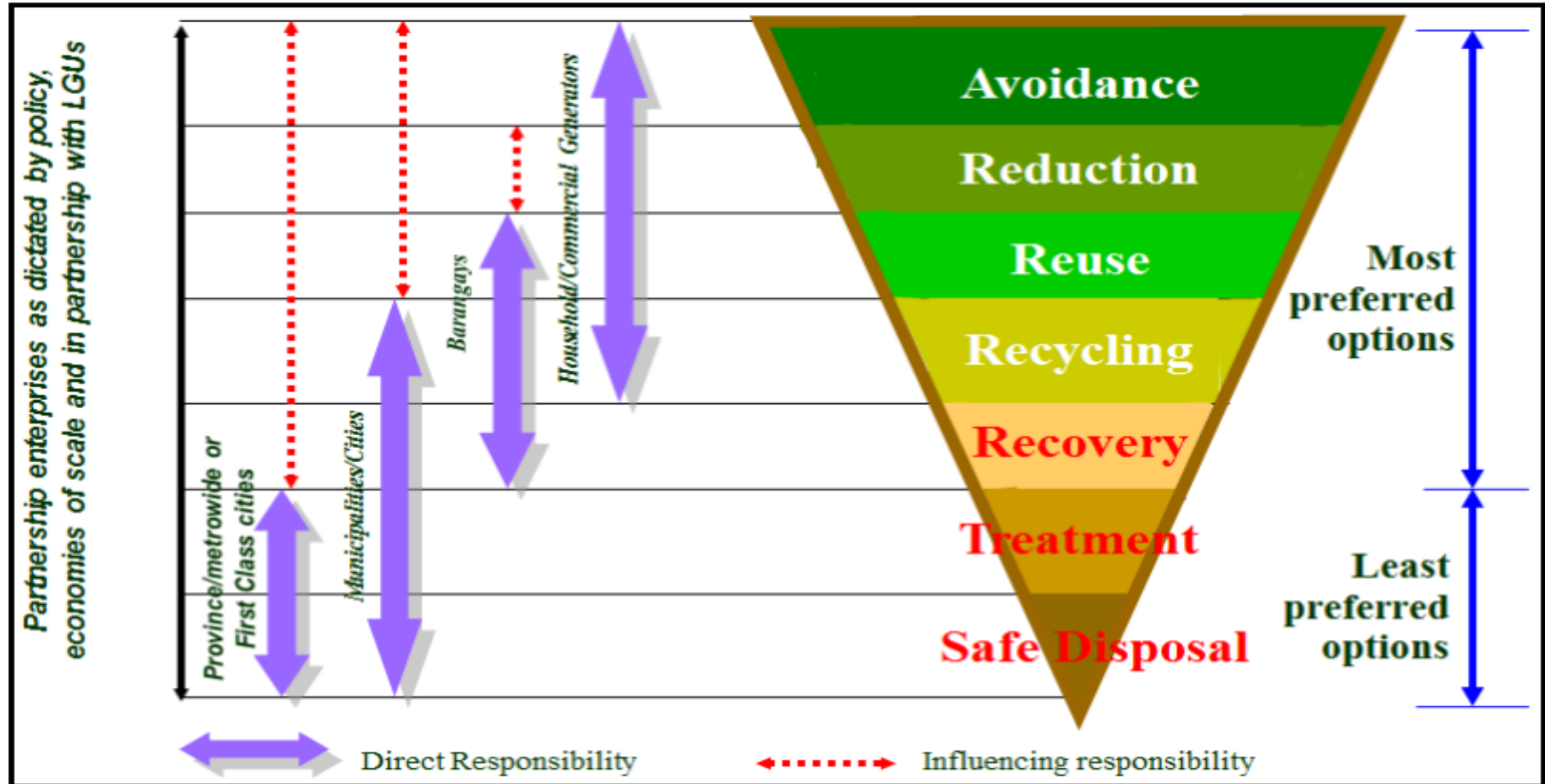
**(RA 9003, Ecological Solid Waste Management Act of 2000)**

# **SOLID WASTE MANAGEMENT**

**-an integrated system, approach or process on the generation, segregation, storage, collection, transport, processing, recycling, recovery, and final disposal/containment of solid waste**

**( P.D. 856 Refuse Disposal)**

# Solid Waste Management



# 3 Rs of Solid Waste Management

- An approach to minimize resource consumption (reduce), use goods and materials until it can't be repaired or fixed to perform its function (reuse), and reprocess the materials that being discarded into new products (recycle).
- An approach that increases resource efficiency and contributes to sustainable consumption and production, and millennium development goals, etc.
- An approach to minimise waste to final disposal site



a) AVOIDANCE

- Avoid disposable goods such as throwaway razors, pens, diapers, etc
- Avoid products that are made from non-renewable resources

b) REDUCE

- Reduce the amount of unnecessary packaging.
- Adopt practices that reduce waste toxicity

c) REUSE

- Consider reusable products.
- Maintain and repair durable products.
- Reuse bags, containers, and other items.
- Borrow, rent, or share items used infrequently.
- Sell or donate goods instead of throwing them out.

d) RECYCLE

- Choose recyclable products and containers and recycle them.
- Select products made from recyclable materials. \* Compost yard trimmings, food scraps and other biodegradable wastes. \* Do not burn

# SEGREGATION OF WASTES

Minimum standards and requirements for segregation and storage of solid waste pending collection:

- (a) There shall be a separate container for each type of waste from all sources
  
- (b) The solid waste container depending on its use shall be properly marked or identified for on-site collection as "compostable", "non-recyclable", "recyclable" or "special waste", or any other classification







**WASTE FOR RICE.** Some plastic bottles filled with shredded plastic waste ready for barter with rice and canned goods in Tarangnan, Samar in this undated photo. Town residents are entitled to two kilograms of rice and some canned goods for every kilo of shredded plastic waste inside a 1.5 liter of plastic bottle. *(Photo courtesy of Tarangnan local government)*  
- *Philippine News Agency, 2021*

# COLLECTION of WASTES

- Collection shall refer to the act of removing solid waste from the source or from a communal storage point
  - (a) All collectors and other personnel directly dealing with collection of solid waste shall be equipped with personal protective equipment to protect them from the hazards of handling wastes;
  - (b) Necessary training shall be given to the collectors and personnel to ensure that the solid wastes are handled properly and in accordance with the guidelines pursuant to this Act; and
  - (c) Collection of solid waste shall be done in a manner which prevents damage to the container and spillage or scattering of solid waste within the collection vicinity
  - (d) The barangay shall be responsible for ensuring that a 100% collection efficiency from residential, commercial, industrial and agricultural sources, where necessary within its area of coverage, is achieved.



# TRANSFER of WASTES

- use of separate collection schedules and/or separate trucks shall be required for specific types of wastes.
- Otherwise, vehicles used for the collection and transport of solid wastes shall have the appropriate compartments to facilitate efficient storing of sorted wastes while in transit.



# MATERIALS RECOVERY FACILITY

- There shall be established a Materials Recovery Facility (MRF) in every barangay or cluster of barangays
  - **Materials recovery facility - includes a solid waste transfer station or sorting station, drop-off center, a composting facility, and a recycling facility;**
- The MRF shall receive mixed waste for final sorting, segregation, composting, and recycling. The resulting residual wastes shall be transferred to a long term storage or disposal facility or sanitary landfill.
- Materials recovery facilities shall be designed to receive, sort, process and store compostable and recyclable material efficiently and in an environmentally sound manner.

# COMPOSTING

- Composting shall refer to the controlled decomposition of organic matter by micro-organisms, mainly bacteria and fungi, into a humus-like product; RA 9003
- A process of biological degradation under controlled condition
- Aerobic composting-decomposition of organic matter in the presence of oxygen with a range temperature beyond 60 degrees Celsius for a certain length of time
- Anaerobic composting –decomposition of organic matter in the absence of oxygen

# DISPOSAL of WASTES

- *Prohibition Against the Use of Open Dumps for Solid Waste*
  - No open dumps shall be established and operated, nor any practice or disposal of solid waste by any person, including LGUs, which constitutes the use of open dumps for solid wastes, be allowed.
- Within three (3) years after the effectivity of RA 9003, every LGU shall convert its open dumps into controlled dumps, in accordance with the guidelines .
- That no controlled dumps shall be allowed five (5) years following the implementation of RA 9003

# DISPOSAL of WASTES

- Burying
  - Shall be only for temporary control such as in households/ camps
  - Only biodegradable solid wastes shall be allowed to be buried
  - May be practiced provided that refuse deposited in the pit shall not be less than 1 meter deep covered with soil to prevent excavation of refuse
- Hog feeding/ feeding to animals
  - Allowed only if the food is thoroughly cooked
  - No leftover shall be shipped from one town to another for hog feeding unless first cooked at 100 degrees Celsius for 30 minutes

# DISPOSAL of WASTES

- Open dump shall refer to a disposal area wherein the solid wastes are indiscriminately thrown or disposed of without due planning and consideration for environmental and Health standards
- Controlled dump shall refer to a disposal site at which solid waste is deposited in accordance with the minimum prescribed standards of site operation;
- Sanitary landfill shall refer to a waste disposal site designed, constructed, operated and maintained in a manner that exerts engineering control over significant potential environment impacts arising from the development and operation of the facility

# REQS for SANITARY DISPOSAL AREAS

- No DISPOSAL AREA shall be allowed without an operating permit
- The entire disposal area shall be adequate to hold all refuse accepted for the entire period of time during which it is proposed to operate
- There shall be no dwelling unit closer than 200 meter to any portion of the premises designated as landfill
- No person shall be permitted to occupy the premises designated as a disposal area

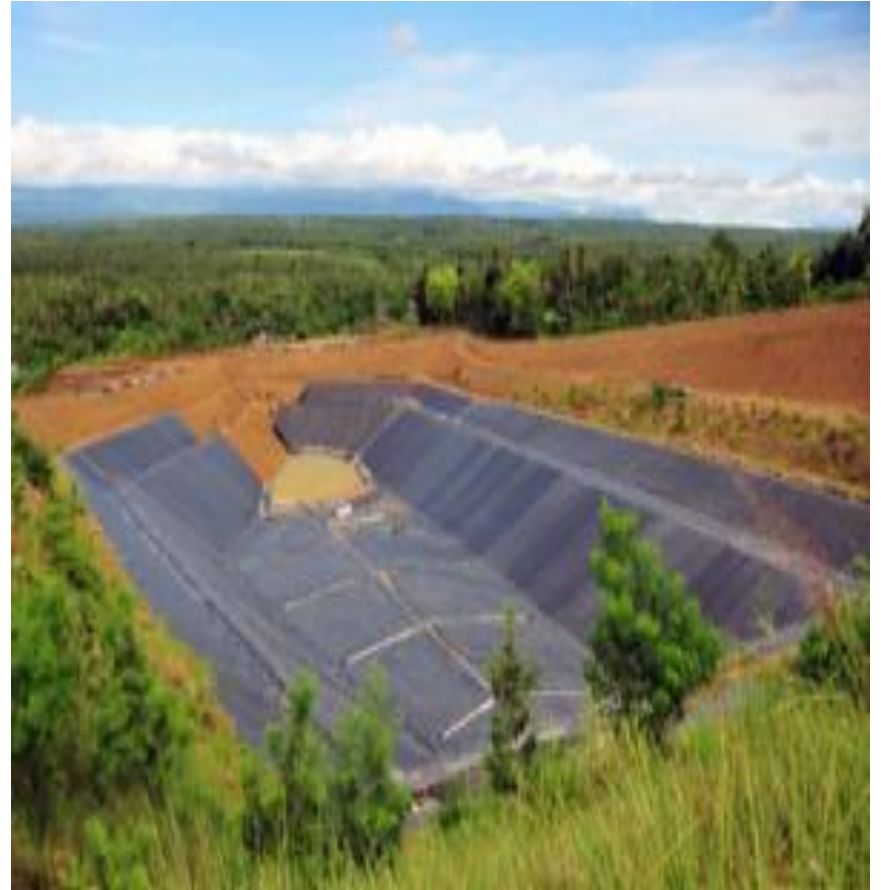
# CRITERIA for SITING A SLF

- The site must be accessible from major roadways or thoroughfares;
- The site should have an adequate quantity of earth cover material that is easily handled and compacted
- The site chosen should facilitate developing a landfill that will satisfy budgetary constraints, including site development, operation for many years, closure, post-closure care and possible remediation costs
- The site should be large enough to accommodate the community's wastes for a period of five (5) years during which people must internalize the value of environmentally sound and sustainable solid waste disposal;
- The site must be located in an area where the landfill's operation will not detrimentally affect environmentally sensitive resources such as aquifer, groundwater reservoir or watershed area;



- “We now have about 186 sanitary landfills servicing about 407 local government units (LGUs),” Salazar said, adding that the number represents only 25 percent of the total number of LGUs that need sanitary landfills.
- At present, some 331 illegal dumps are in operation despite several closures

- [The Manila Times, February 2021](#)



# Health Care Waste Segregation, Collection, Storage and Transport

- The following general principles relate to the control of waste flow from generation to disposal:
  - HCW is generated in a medical area and should be segregated into different fractions, based on their potential hazard and disposal route, by the person who produces each waste item.
  - HCW must be segregated, collected, stored, and transported in a safe manner considering the risk and occupational safety and in accordance with existing laws, policies, and guidelines.
  - Hazardous and general waste must not be mixed during collection, transport, and storage.
  - Separate containers should be available in each medical area for each segregated waste fraction.

# Health Care Waste Segregation, Collection, Storage and Transport

- Appropriate labelling, signage, route, and segregation system must be established. Waste containers when filled should be labelled to help managers control waste production.
- Plastic liners preferably containing three-quarters full of waste must be sealed when transported from waste generating source to the storage area.
- The storage area must be designed based on the volume of waste generated by the HCF and must be provided with compartments for general, hazardous, and recyclable wastes. Closed local storage inside or near to a medical area may be needed if wastes are not collected frequently.
- A separate storage area for phase-out mercury containing devices and products must be provided (as per DOH AO 2008-21 and DM 2011-0145).

# Three-bin System

(Basic healthcare waste categories)

## Non-Infectious Waste

- Paper/Packaging material
- Bottles/Cans
- Food



**Black Lined container**

## Infectious Waste

- Gauze/Dressing
- Blood/IV giving sets
- Gloves
- Pharmaceutical waste



**Yellow Lined Container**

## Sharps Waste

- Infusion needles
- Broken slides
- Broken vial
- Broken ampoules
- Lancet
- Retractable
- Scalpels
- Blades
- Needles



*If classification of a waste item is uncertain, as a precaution it should be placed into container used for hazardous HCW. Waste that has been poorly segregated should never be re-sorted, but instead should be treated as the most hazardous type of waste in the container.*

*Immunization activities generate sharps and infectious non-sharp wastes that should be properly managed on-site to avoid or reduce its negative health impacts on the community and the personnel working.*

#### ***Waste Segregation and Packaging***

- Always segregate sharps from non-sharps at the source*
- Immediately after use, discard entire syringe with needle into a safety box without recapping needles*
- Put safety boxes into plastic bags closed hermetically when full to avoid any leakage during transportation. Mark the bag clearly.*
- Put empty vials into waste containers with plastic lining to avoid leakage. Seal/mark clearly when full.*

#### ***Waste Treatment and Final Disposal***

*For Sharps (needles with syringe)*

- Prepare sufficient number of sharps safety boxes for the day;*
- Discard entire syringe and needle immediately after vaccination in safety box without recapping;*
- When the sharps safety box is three-quarters full, put it aside and make sure that waste handlers close, seal it with adhesive tape and mark it before putting it in a plastic bag.*
- Place plastic bags carefully in storage area or take to disposal system if ready to process immediately.*

*For Infectious non-sharps (empty or expired vials)*

- Prepare sufficient numbers of waste containers with plastic lining for the day;*
- Put empty vaccine flasks and cotton swabs in the waste container;*
- Once nearly full, put it aside and make sure that waste handlers close, seal it with adhesive tape and mark it before taking it away to the storage or disposal area*