

#4

SOLID WASTE MANAGEMENT OUTREACH PROGRAMME

BARBADOS

HOME COMPOSTING



**Project Management
Coordination Unit**

DEFINITIONS

Aeration: Exposure to the action of air or to cause air to circulate through.

Aerobic: Requiring the presence of air or free oxygen to sustain life.

Biodegradable: Capable of decaying through the action of living organisms and absorption by the environment.

Compost: The result of aerobic biological decomposition of organic materials. Is often used as a soil conditioner.

Composting: The aerobic biological decomposition of organic material under controlled circumstances to a condition sufficiently stable for nuisance free storage and for safe use of land application.

Decompose: To rot or decay. Breakdown into constituent parts or elements.

Humus: A dark brown or black mass of decomposed and partially decomposed plant and animal matter.

Microbe: A microscopic organism (microorganism).

Municipal Solid Waste: The combined residential and commercial waste material generated in a given municipal area.

INTRODUCTION

Composting is one of the elements of the **Integrated Solid Waste Management Programme (ISWMP)** that was formulated for Barbados through the 1993-1995 feasibility study on **Solid Waste Management (SWM)**. This study provided a long term vision for SWM including physical components, (e.g. sanitary landfill, in-vessel composting facility, transfer station with materials recovery facility and chemical waste storage facility, bulky waste facility, and road infrastructure upgrades), and non-physical components, (e.g. institutional strengthening, legislation, policy development, public education and economic instruments, including cost recovery).

According to the waste characterisation study 2005, Barbados' solid waste stream comprises organics 30 % (both yard waste and non yard waste) and, recyclable paper and paper board (24%). These organic materials account for approximately 47 % of the waste stream and if composted the entire waste stream could be reduced considerably. The remaining waste should then be set out in a prescribed manner for recycling or final disposal. In the context of the ISWMP, final disposal refers to landfilling.

WHAT IS COMPOSTING?

Composting is a specialized form of recycling and forms a critical part of the waste minimization programme based principally on the 3R's:

- Waste Reduction
- Reuse of waste
- Recycling

As an effort to minimize waste, composting would extend the estimated life span of the landfill considerably. This is critical because as a Small Island Developing State Barbados' land space is very limited. Through the ISWMP this resource will be preserved for more productive uses.

There will be two categories under the National Composting Programme, Home Composting and Commercial Composting. Commercial Composting will take place on a large scale, receiving yard waste from a variety of sources and producing high quality compost for sale to agriculture and other sectors. The National Composting Facility will be an in vessel facility located at the Solid Waste Management Center at Vacluse, St. Thomas.

Home Composting as the name implies is composting done 'in your own backyard'. Under the programme every household in Barbados will be encouraged to compost their kitchen scraps and yard waste.

Both Commercial and Home Composting will be promoted through the Education Programme of the ISWMP.

WHY COMPOSTING?

Upon completion of the process the resultant compost is a useful and valuable product. Compost is one of the best sources of organic soil conditioner as it improves both aeration and nutrient content of the soil.

- ◆ For sandy soils, compost helps to hold water and nutrients better.
- ◆ For clay soils, compost improves drainage and aeration, making it easier to work with the soil.

OTHER BENEFITS OF COMPOSTING

Composting can save you money

- ◆ Less money has to be spent to buy plant fertilizers.
- ◆ If lawns and gardens are usually irrigated, it saves on water bills since the resultant compost retains more soil moisture.

Composting can increase plant production by

- ◆ Contributing to soil stabilization.
- ◆ Improving yields
- ◆ Providing a constant source of soil-conditioner.

Composting can contribute to an improved environment because

- ◆ Waste is converted into a valuable and easy to use resource
- ◆ Landfill space is saved because of the waste diverted
- ◆ Nutrients are recycled back into the soil
- ◆ Offensive odors emitted from the landfill are reduced as the amount of decaying organic material in the landfill is reduced.

THE PROCESS OF COMPOSTING

Composting is “organized rotting” where nutrients and moisture are returned to the soil. Rotting is accomplished by microbes, fungi and other organisms 'digesting' the decaying material and converting it into a soil-rich conditioner or compost. If correctly done, compost is free from unpleasant odours, manageable and can be stored for long periods for later use. Composting is not time-consuming and can be done during both the wet and dry season.

Composting can be categorized as passive or active. Passive composting does not involve turning of the compost heap, it must however be kept equally as moist as the active method. Active composting entails much more tending to the compost heap than passive composting. Tending includes periodic turning of the compost pile. Turning blends the different materials present but increases the chance of moisture being lost through evaporation. In passive composting input materials should be placed in a specific order, alternating layers of greens, browns and soil. This can also be done in active composting but it is not as important as in passive composting.

These methods of composting share similar characteristics in that they both require moisture and aeration, (essential for organism to work and survive), and the addition of manure, organic fertilizer, soil or compost to kick-start the decomposition process. The organic additions contain the necessary microbes to decompose the waste. For this reason it is good to have

bottomless outdoor compost bins to facilitate interaction of microbes from the soil and the compost material.

Active Composting decomposes waste much more readily than Passive Composting. Once started, depending on the method being used, the kitchen waste, yard waste and other inputs should be kept as moist as a damp sponge. Aerate by turning with a garden fork or where the passive method is applied, bore holes in the compost heap with a broomstick.

CAN ANYTHING BE COMPOSTED?

Things that are biodegradable can be composted because their molecular structure allows them to decompose rapidly. Non-biodegradable items such as metals, plastics and glass take much longer to decompose and because of this, they are not used for composting.

Other substances such as food scraps, paper, prunings, wood and sawdust are readily composted. The decomposition of some other organic substances are toxic to the environment and thus limits what can be composted.

Recommended Compostable Items Include:-

- ◆ Grains (dry)
- ◆ Vegetable and fruit scraps
- ◆ Kitchen scraps
- ◆ Bread
- ◆ Fruit rinds and peels
- ◆ Tea bags
- ◆ Coffee grounds
- ◆ Sawdust
- ◆ Paper
- ◆ Egg Shells

However, it is recommended that some items not be composted as they may attract animal pest.

Items Not Recommended For Composting Include:

- ◆ Peanut butter
- ◆ Meat
- ◆ Chicken bones or Skin
- ◆ Fish
- ◆ Dairy Products/ Cheese
- ◆ Oily/ Greasy Foods
- ◆ Animal Products
- ◆ Fat

Non-Compostable Items Include:

- ◆ Plastic
- ◆ Glass
- ◆ Aluminium
- ◆ Tetrapak

Composting:-

An activity anyone can do...





Get Involved!!

COMPOST TROUBLESHOOTING

Symptoms	Problems	Solutions
Pile not composting	To Dry	Moisten until slightly damp
	To much woody material	Turn, add fresh nitrogen rich materials e.g. green materials or organic fertilizer
Pile smells rotten and attracts flies	Too wet	Turn, add dry materials
	Non Recommended items present	Remove animal products, grease etc. and turn
Pile smells like ammonia	Too much green material (food wastes) present	Turn, add dry woody materials
Rodents in pile	Food wastes in open bin or compost pile larger than a quarter inch	Make compost bin rodent-proof

COMPOSTING CHOICES

There are several types of composters. You can use a bin or a chamber, but you may also compile a compost heap in an inconspicuous area around the house or leave grass trimmings on the lawn. Chamber systems or bins can be used in both methods of composting.

Types of compost bins

To the right is an example of a compost bin constructed from plastic using the passive method of composting. It is completely animal proof, has a lid, small ventilation holes and is firmly anchored on the ground.



To the left is an example of a single chamber system. It may be made from wooden palettes and can be used for both means of composting (active or passive).



The double chamber system to the right allows for both active and passive methods of composting. Using the passive method compostables are left to rot in one chamber until completely filled before starting to fill the second chamber. Under the active method the heap is periodically transferred from one

chamber to the other.

Chamber systems can be assembled from wooden pallets, wire mesh, air bricks or a combination, whereas compost bins can be made from metal or plastic barrels. As seen in diagrams above, all chamber systems and bins have ventilation holes because aerobic microbes are dependent on air for survival.

Passive methods of composting include leaving grass trimmings, leaves and prunings on the ground to produce a foliage covering or 'mulch' therefore retaining moisture. This prevents excess evaporation or erosion and enriches the soil during the dry months.



Getting started

To start composting actively or passively commence with a layer of dampened carbon rich waste obtained from shredded paper, cardboard or dry leaves and add a thin layer of compost. Then add dampened nitrogen rich waste obtained from, fresh farm animal manure, grass clippings or if necessary sulphate of ammonia or urea. Continue to add waste in alternating layers of carbon and nitrogen rich products for best results. *Note that each layer should be no thicker than six inches.*

Maintaining your compost

Utilizing the active method turn and water the compost heap once a week. Under the passive method simply wet once a week. All 'passive' compost bins should have a trap door at the bottom, to access the finished compost as the finished compost is always at the bottom of the bin.

When is compost “ready”?

Finished compost is black in colour and has an 'earthy' smell. It is the same temperature as the soil. It may need sieving because all things placed in the composter may not decompose totally in the same time frame.

THE SCIENCE OF COMPOSTING

In order for composting to be successful, the environment (e.g compost bin) must provide the correct conditions and be stocked with the correct materials to promote the growth of microbes. It is the microbes which will breakdown the material to produce the finished product – compost.

- **Microbes** are microscopic organisms such as bacteria and fungi present in the waste stream that are capable of decomposing organic material. They consume organic material and produce heat, carbon dioxide, water vapour and compost.

- The most essential **nutrients** for the microbes are carbon and nitrogen. Woody materials tend to be high in carbon and green materials tend to be high in nitrogen. The optimum carbon to nitrogen ration for composting is about 25:1.

- The metabolic activity of the microbes when digesting the organic material causes the temperature of the compost pile to rise. The optimum **temperature** for composting is about 38 55 degrees celcius. Once the organic matter is consumed the temperature of the pile cools off.

- Aerobic microbes (those that require **oxygen**) compost at a much faster rate than anaerobic microbes (those that do not require oxygen). If oxygen levels fall below five percent the aerobic microbes die and the rate of decomposition slows considerably. A slow rate of decomposition can result in serious odour problems.

- The compost pile should have the consistency of a damp sponge. The optimal **moisture** level for composting is 40 60 percent, by weight. If the pile is too dry the availability of nutrients is limited. Conversely, if the pile is too moist the amount of oxygen available is reduced.

- During composting the pile first becomes slightly acid, then strongly alkaline and is nearly neutral when finished. The **pH** of finished compost is usually about 7.0 - 7.5.

- The **time** taken to produce finished compost varies with the conditions, nutrients supplied and the amount of care. Under active composting the process may take as little as one month, while utilizing the passive process it may take six months to a year until finished compost is produced.

COMPOSTING TIPS

- Dicing or shredding the organic material greatly reduces volume and decreases the decomposition time. However, material used in any composting process should not be too fine or it will become matted and will make it difficult for air to enter the pile.

- Do not place roots of invasive plants (e.g. crab grass, morning glory) in the composter since they survive the composting process and may take root where the finished compost is used.

- Do not add cat or dog waste to your compost bin or heap since they may contain parasites and hence the resultant compost may contain these damaging microbes also.

- Do not add diseased plants to any composting process. The harmful microbes survive the composting process and will harm any plant which the resultant compost contacts.

- If you have sprayed your lawn, shrubs or trees with pesticides do not use their trimmings as mulch or place these trimmings in compost systems and bins. This is because the concentration of chemicals present in the pesticides will affect the microbes in the soil and compost heaps. Use of the trimmings can resume after two 'lawn mowings' or 'prunings'.

- To make bins animal proof consider the following:

- Line the compost bins with wire mesh.
- Add a secure or airtight lid.
- Make ventilation holes no bigger than a quarter inch.

- Avoid pets and children playing in or near the compost heap, or bins to avoid germs being spread around the household.

- Compost bins are more advantageous than compost heaps because their enclosure discourages animals and they tend to look tidier.

- It is better that you construct compost systems from materials such as plastic which can withstand harsh weather conditions.

- When using grass trimmings as mulch cut the grass when it is no higher than four inches and mow the grass no lower than two inches. The grass trimmings do not provide minerals to the soil, only prevent evaporation of moisture from the soil so lawns may still need to be fertilized.

Make your own compost bin

You need

- plastic drum
- drill
- saw
- chicken wire
- two concrete blocks

1. Saw bin - Saw off bottom of the bin



2. Drill bin - Drill 1/4 inch holes around the bin to allow for aeration during composting



3. Place bricks - Place two cement bricks on the ground about the diameter of the bin and place a mesh on top of the bricks. This will act as a seive for the finished compost



4. Assemble - Place the bin on top of the blocks and mesh



Retain the lid of the bin to cover the bin once organic material is placed in the composter. You are now ready to compost.

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