



## HOME COMPOSTING GUIDELINE



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## 1. BACKGROUND

Approximately 30% of all household waste being disposed of at landfill consists of organic waste that could potentially be diverted from landfill by means of household composting.

The organic waste stream in municipal areas is increasingly becoming a challenge to manage. Growth in population densities, new environmental legislation, limitations in the sustained availability of disposal space and public pressure to accept a more environmentally friendly approach has led to an increased awareness on local government level of the role that organic waste materials play in Waste Management.

The sudden increase in the cost of energy during the recent years has led to a renewed interest in the use of waste materials as energy resources. However, waste to energy technologies available are unaffordable and require high volumes to make it economically feasible to operate. Operation of these technologies is highly technical and requires specialists to operate.

Continuous developments in the agricultural industry have led to a renewed awareness of the importance of the restoration of the organic material content of soil.

Global warming in essence is believed to be the result of too much carbon that is being removed from a "stored" resource and released into the atmosphere. The decomposition of the organic materials in the landfills results in the production of methane gas and leachate that further contributes to global warming and the pollution of underground water, respectively.

The Western Cape Provincial Department of Environmental Affairs and Development Planning are also in the process of implementing and enforcing an organic waste to landfill ban. This will entail 50% organic waste diversion from landfill within 5 years and a total organic waste to landfill ban within 10 years.

With the above aspects taken in consideration, the timing has never been better to motivate municipal councils and residence of the Eden District Municipal area of practical at source solutions to redirect organic waste from landfill.

Compost is the single most important supplement you can give garden soil. Composting is a simple way to add nutrient-rich humus to fuel plant growth and restores vitality to depleted soil. It's also free, easy to make and good for the environment.

## 2. BENEFITS OF COMPOSTING

**Soil conditioner:** With compost, you are creating rich humus for your garden. This adds nutrients to your plants and helps retain moisture in the soil.

**Recycling kitchen and garden waste:** composting can divert as much as 30% of household waste away from the garbage bin.

**Reduce landfill waste:** Most landfills in the Garden Route District are closed and those remaining are quickly filling up. Diverting organic waste from landfill will extend the lifespan of landfills and will reduce transport costs.

**Introduce beneficial organisms to the soil:** microscopic organisms in compost help aerate the soil, break down organic material for plant use and ward off plant diseases.

**Good for the environment:** composting offers a natural alternative to chemical fertilizers.

**Cost saving:** No need to purchase compost or fertilizers.

## 3. WHAT TO COMPOST

All compostable materials are either carbon (dry, brown items) or nitrogen-based (wet, green items), to varying degrees. To create ideal conditions for composting, try to include roughly equal parts of both and mix the materials. A mix with more carbon-based materials will still turn to compost but will take longer. A mix with more nitrogen bases materials may generate odors.

Material	Carbon/ Nitrogen	Information
Table scraps	Nitrogen	Add with dry carbon items
Fruit & vegetable scraps	Nitrogen	Add with dry carbon items
Eggshells	Neutral	Best when crushed
Fallen leaves	Carbon	Leaves break down faster when shredded
Green leaves	Nitrogen	Leaves break down faster when shredded
Grass clippings	Nitrogen	Mix in with a fork so they don't mat into clumps
Garden plants	Nitrogen/ Carbon	Use disease-free plants only
Lawn & garden weeds	Nitrogen	Only use weeds which have not gone to seed
Shrub pruning's	Carbon	Woody pruning's are slow to break down. Rather chip or cut to small pieces
Wood ash	Carbon	Only use ash from clean materials and mix in with a fork
Coffee grounds	Nitrogen	Filters can also be included
Tea leaves	Nitrogen	Loose or in bags
Manure	Nitrogen	Excellent compost activator
Newspaper& shredded paper	Carbon	Avoid using glossy paper and colored inks
Cardboard	Carbon	Shred material to avoid matting and mix in.
Sawdust& wood chips	Carbon	Avoid using material from treated wood

## 4. WHAT NOT TO COMPOST

- Anything containing meat, oil, fat or grease.
- Diseased plant material.
- Sawdust or woodchips from treated wood.
- Dog or cat feces.
- Weeds that have seeds.
- Dairy products.
- Coal ash.
- Cooked foods.
- Nappies and used tissues.
- Glossy or Colored paper.

## 4. TYPES OF COMPOSTING

### 4.1 Cold Composting

Cold composting is as simple as collecting garden waste or taking out the organic materials in your trash and then corralling them in a bin or pile. Over the course of a year or so, the material will decompose.

### 4.2 Hot Composting

Hot composting is for the more serious gardener but a much faster process, you will get compost in one to three months during warm weather. Four ingredients are required for fast-cooking hot compost: nitrogen, carbon, oxygen and water. Together, these items feed microorganisms, which speed up the process of decomposing.

### 4.3 Worm Composting (Vermi-composting)

Another method of composting is with worms. The worms eat your food scraps and release castings, which are rich in nitrogen. The worms also produce "worm tea" which is an excellent organic fertilizer which inhibits some diseases, reduces insect infestations and promotes nitrogen fixation in the soil. You cannot use any earthworm; you need Red Worms (*Eiseniafetida*) also known as "Red-Wigglers". These worms can be purchased inexpensively online, or at a garden supplier or breeder.

## 5. HOW TO COMPOST

### 5.1 Bin composting

Composting bins are enclosed on the sides and top with a lid, and open on the bottom so they can sit directly on the ground. These are common composting units for homes in residential areas where composting material is scarce. The enclosed sides and lid discourage pests and odors.

#### Step 1: Find the right spot

Position the bin directly on soil or grass as this allows insect, earth worms and other microorganisms to access the contents which assist in breaking down the waste material. Choose an area where there is enough shade to prevent the bin content to dry out and kill the microorganisms.

#### Step 2: Set the compost bin

Secure the bin to the ground by digging a hole approximately 8cm deep, then place the bin onto the hole and cover the outside lip with soil to secure in place.



Figure 1: A set compost bin in ideal shaded area on bare earth

#### Step 3: Add compost material

Chop or shred plant debris and waste materials into small pieces and place them into the compost bin. When starting, it is best to layer the nitrogen- and carbon-based materials and add soil.



Figure 2: Compost materials added in layers with added soil

#### **Step 4: Add moisture**

With a composting bin it is not necessary to add water as the nitrogen-based material will add enough moisture to create a sufficient environment for the microbes to work. If the contents do dry out or look dry you can add water. Do not over saturate the mix as the microbes will die and result in odors. The pile should be damp enough that when a sample taken from the interior is squeezed by hand, a few drops of moisture will appear.

#### **Step 5: Aerate**

You can produce compost faster and prevent odours by aerating or turning the pile more often. Aerating once or twice a week with a stick or garden fork will provide the necessary oxygen for decomposition and significantly hasten the composting process. A well-mixed compost pile will also reach higher temperatures which will help destroy weed seeds and unwanted bacteria.



Figure 3: Aerated compost pile

#### **Step 6: Harvest**

If aerated sufficiently, compost is typically ready to use after about 2 - 4 months when it is dark brown, crumbly and earthy-smelling. Harvest your compost by

opening the door and removing the compost with a shovel. You may use a wire screen to strain out large pieces and unfinished compost.

## **5.2 Composting pile**

### **Step 1: Start compost pile on bare earth**

Select a dry, shaded spot and start your compost pile on bare earth. This allows worms and other beneficial organisms to aerate the compost and be transported to your garden beds. Lay twigs or straw in layers a few centimeters deep. This aids drainage and helps to aerate the pile.



Figure 4: Bottom layer of twigs

### **Step 2: Add compost materials in layers**

Add compost materials in layers, alternating between nitrogen- (wet, green items) and carbon-based (dry, brown items).

### **Step 3: Add moisture**

Spray or lightly pour water over waste materials until damp, but not sodden or soggy.

### **Step 4: Cover compost pile**

Covering the compost pile helps retain moisture and heat, two essentials for decomposing. Covering also prevents the compost from being overwatered by rain.





Figure 5: Covered compost pile

### Step 5: Aerate

Every few weeks give the pile a quick turn with a fork or shovel. This aerates the pile. Oxygen is required for the process to work, and turning, adds oxygen. Once your compost pile is established, add new materials by mixing them in, rather than by adding them in layers. Mixing or turning the compost pile is key to aerating the composting materials and speeding the process to completion.

### Step 6: Harvest

When the compost no longer gives off heat and becomes dry, brown, and crumbly, it is ready to use in your garden. Some gardeners make what is known as compost tea with some of their finished compost. This involves allowing fully formed compost to steep in water for several days, then straining it to use as a home liquid fertilizer.

### 5.2.1 Troubleshooting Guide for Composting

Symptom	Problem	Solution
Unpleasant odour	Compacted	Aerate
	Too wet	Add dry ingredients and aerate
Compost is damp and warm only in the middle	Pile too small	Add more compost material
Pile not warm	Not enough water	Moist and aerate
	Not enough oxygen	Aerate
	Lack of Nitrogen	Add "green" nitrogen material

### 5.3 Worm Composting (Vermi-composting)

Worm compost is made in a container filled with moistened bedding, red worms and food scraps. Vermi-composting is a natural method for recycling nutrient-rich kitchen food scraps without any resulting odor. The resulting compost, called worm castings, is an excellent soil conditioner for house plants, patio containers and gardens.

#### 5.3.1 What to add to your worm farm

- ✓ Raw vegetable scraps
- ✓ Fruit scraps and pips
- ✓ Crushed Eggshells
- ✓ Used tea leaves / bags
- ✓ Coffee grounds
- ✓ Bread (mouldy or not)
- ✓ Shredded cardboard & newspaper

#### 5.3.2 What not to add to your worm farm

- x Citrus
- x Acidic foods (tomatoes, pineapples etc.)
- x Onion / garlic family
- x Meat & fish
- x Greasy / oily foods
- x Dog or cat faeces
- x Dairy products

#### 5.3.3 Four easy steps to start Vermi-Composting

##### Step 1: Get yourself a container

Get a wooden, plastic or metal bin with tight-fitting lid. A 45litre containersize is sufficient for a 2–3-person household disposing an average of 2.6kg food scraps per week. The top container must have drainage holes in the bottom and sufficient air vents on the side. The top container is placed into the second; ensure that there is sufficient space at the bottom of second container for collection of worm tea. Worm farms can be kept in a garden shed, garage and balcony or on the kitchen counter. Remember not to place the container in direct sun light. Worms enjoy temperatures between 4.4°C and 27°C.



Figure 6: Two 45 litre plastic containers



Figure 7: Air vents and drainage holes in top container



Figure 8: Vermi-composting container

## Step 2: Add moist, drained bedding to the bin

Bedding must be able to retain both moisture and air while providing a place for the worms to hide until they are ready to eat your kitchen scraps. Shredded newspaper (shredded in strips by hand) and shredded corrugated cardboard, shredded dry leaves and chopped up straw and dried grass can be used as bedding. Moisten the bedding and squeeze out the excess water. Fluff the bedding and lay down on the bottom of the upper bin with the drainage holes. Fit the upper bin inside the second bin which will collect the worm-tea. Now your bin is ready to house your worms. Add a handful of soil or sand to the bedding. Sand and soil provide grit to assist with the worm's digestion of food.

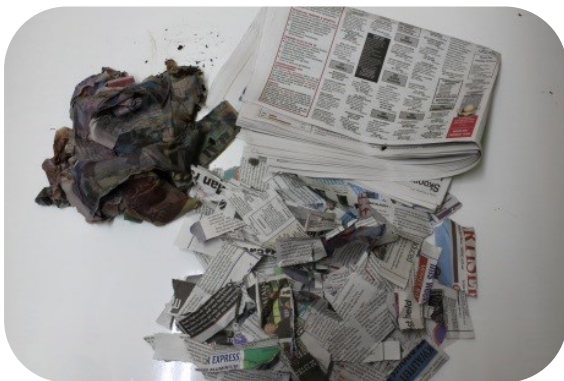


Figure 9: Shredded newspaper bedding material (moist) Figure 10: Moist bedding material in container

### Step3: Add Red Worms to the bin

The worms used in vermin-composting are called red worms (*Eiseniafetida*) also known as red wigglers. Do not make the mistake of using earthworms out of your garden for your bin. They love to tunnel through soil and will die off in your worm farm. You will need 500 worms per half a kilogram of kitchen scraps for you worms to be in full production from day one.

You can start out with less than 500 worms; just adjust the amount of kitchen scraps you feed them to the estimated worm population in your bin. Provided you give them adequate food and a good home, they can double in population in 90 days. To add worms to the bin, simply scatter them over the bedding. The skin of the worm reacts to light, and they will immediately work their way down into the bedding to get away from the light.

### Step 4: Add Food Scraps to the bin

At first divide your worm bin into two sections by simply pulling back a small amount of the bedding in one side and dumping in the scraps. Then cover the scraps with the bedding. From now on you can simply spread the food scraps in thin layers on top of the bedding. The red worms will come to the surface from inside the bedding and feed on the scraps or pull them down into the bedding. Keep the one side clear of food scraps to use later on when you need to harvest your worm castings. Cover the food scraps with a cloth to keep the worms moist and sheltered from any light getting into the bin.

Worm composting takes a little practice and planning at first. At first add small quantities of scraps until the worms in your bin can digest the scraps in 6-9 days. Your worms will double in 90 days. Increase your quantity of food scraps gradually to match the increase in worms.



Figure 11: Food scraps and worms on bedding material



Figure 12: Damp cloth covering over contents

### 5.3.4 Harvesting the worm castings and worm tea

A natural by-product of worm composting is the production of a liquid leachate, better known as worm tea. Worm tea will leach through the holes in the bottom of the top container that will gather in the lower bin. To harvest the tea just remove the

top bin and pour the tea out in a container. Dilute the tea with water and use as liquid fertilizer. A tap can also be installed to ease the tea harvesting.

To keep your bin going, you will need to remove the casting from time to time and there are several ways to go about it.

**Gather castings from the top:** Shine a bright light into the bin, worms are sensitive to light and will move to the lower layers of the bin. Remove the top layer of castings with your hand. As you remove the layers of castings the worms will keep moving to the bottom of the bin. From the removed castings, pick out any worms or worm eggs (small, opaque cocoons) and return them to the bin. Keep a layer of castings at the bottom and start adding food scraps again.

**Sort through castings on a plastic liner:** Dump the contents of the worm bin onto a plastic liner. Sort through the pile, pushing the castings into a separate pile. Place the worms in another pile with some of the left-over castings and undigested food scraps. Before putting them back in the worm bin add moist bedding again and then add the worms, leftover castings and undigested food scraps. Start adding food scraps again.

**Two side worm composting:** The easiest way to separate worm castings from your worms is by starting with a process where you only uses half of your bin to compost your food scraps. As soon as the one half is nearly filled to the rim of the bin, add moist bedding to second half and start adding fresh food scraps to the second half. As soon as the food runs out in the first half worms will migrate to the second half with the fresh food scraps. After roughly three weeks start taking out the worm castings from the first half. From the removed castings, pick out any worms or worm eggs (small, opaque cocoons) and return them to the bin.

### 5.3.5 Troubleshooting Guide for your Worm Farm

Problem	Solution
Odour	<ul style="list-style-type: none"> <li>• Aerate the bedding</li> <li>• Avoid noxious scraps</li> <li>• Make sure food is buried</li> <li>• Add food less frequently</li> </ul>
Scraps don't break down	<ul style="list-style-type: none"> <li>• Check that worms still alive &amp; active</li> <li>• Chop scraps into smaller pieces</li> <li>• Avoid spicy food</li> </ul>
Worms are dying	<ul style="list-style-type: none"> <li>• Keep temperature between 15 - 25°C</li> <li>• Check moisture: add dry bedding or mist as needed</li> <li>• Aerate</li> <li>• Avoid citrus scraps</li> </ul>

	<ul style="list-style-type: none"> <li>• Add food, unless not being consumed - add less</li> </ul>
Worms are trying to escape	<ul style="list-style-type: none"> <li>• Check moisture; add dry bedding if too wet</li> <li>• Make sure they have adequate food</li> <li>• Put bin under light to encourage burrowing</li> </ul>
Too many worms!	<ul style="list-style-type: none"> <li>• Help a friend start a bin with extra worms</li> <li>• Let them die back on their own</li> </ul>
Ants	<ul style="list-style-type: none"> <li>• Be sure to bury food</li> <li>• Add screen over ventilation holes</li> </ul>
Mites	<ul style="list-style-type: none"> <li>• Remove and discard any mite-covered scraps</li> </ul>
Fruit flies	<ul style="list-style-type: none"> <li>• Be sure to bury food</li> <li>• Add dry bedding</li> <li>• Wash fruit peels</li> <li>• Use fruit fly traps</li> </ul>

*For any further enquiries, please do not hesitate to contact George Municipality's Waste Management Section on 044 802 2900.*