

Wastewor(l)d



**Not Really Waste**  
(A guide to composting)

Wastewor(l)d Series

# Not Really Waste

(A guide to composting)

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**Stree Mukti Sanghatana**



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The views expressed in this publication do not necessarily reflect the views of the European Commission

## Introduction

The booklet series Wastewor(l)d, is an effort to disseminate our knowhow in the field of solid waste management. Since 1975 Stree Mukti Sanghatana (SMS) is working towards the empowerment of women. With the objectives to realise the ideals of equality and social justice, SMS consciously began working amongst the waste pickers in Mumbai, from 1999. SMS's Parisar Vikas programme aims to address the problems of waste picking women who are engaged in the 'menial' tasks of 'cleaning waste'. Additionally, Parisar Vikas addresses the problem of waste management engulfing our urban existence. Prima facie waste management is an environmental and health issue but poverty, equity, power, caste, gender, human behaviour, political will and good governance are also associated with waste management. Following the principles of environmental justice is the key component in our work, as we strive towards zero waste. Therefore, our emphasis is to highlight the socio cultural dimensions of environmental issues. SMS has introduced these issues in each booklet of this series.

These books discuss many aspects of solid waste management, a few solutions and good practices. Publication of this series is possible with the support from European Union.

Looking forward to your feedback!

## Foreword

Nature gives us free air, food and water. But we treat leftovers as garbage – waste. We can process our wet waste, leftover food by using simple methods. The first step towards this is to segregate our waste at the source. Then only can the wet waste be converted into organic fertilizer for use in the gardening and farming. Composting is nature's way of recycling food waste, manure, leaves, green waste and other compostable material and turn it into a valuable organic fertilizer. Composting is a natural biological process, carried out under controlled aerobic (in the presence of air) conditions. The effectiveness of the composting process is dependent upon the environmental conditions present within the composting system i.e. oxygen, temperature, moisture, material disturbance, organic matter and the size and activity of microbial populations. Food contains a source of energy, so does the wet waste. The nutrients taken away from soil in the form of food could be returned to soil in the form of compost. There are various methods of composting like simple composting in home composting baskets, various types of pits, tumblers etc. In this booklet we will learn about different types of composting.

– Jyoti Mhapsekar

Ideal waste management is achieved when the waste is transformed into a useful resource without exploiting the planet or the people. The current waste management system involves a non-cyclic process of extraction, production, consumption and dumping, This results in greenhouse gas emissions, ground water pollution and an ever-increasing strain on natural resources. We must try to transform this non-cyclic process into a cyclic process through a decentralized waste management system. In doing so we can reduce the expenditure of a centralized process and the increasing strain on our natural resources. We get our food grains, fruits, flowers from our farms. Therefore, fertility of the land is an important factor along with water which is important in the production of our food. We use fertilizers to increase the fertility of the soil. All crops deplete nutrients from the soil and it is necessary to replenish them. Fertilizers containing Carbon, Nitrogen, Phosphorus and Potassium are essential for plant growth and are easily depleted from the soil. Sugarcane, cotton and rice deplete nutrients to the greatest extent. These days replenishment is commonly done by adding chemical fertilizers to the soil. But, the continuous use of chemical fertilizers decreases this fertility of the soil, over the years. On the other hand, organic fertilizers (like compost)


promote the growth of micro-organisms which replenishes essential elements in the soil. This has a two-fold benefit as it helps to retain the moisture in the soil, which means the soil needs less irrigation. Traditionally in India, animal/human excreta has been used as manure for centuries. For this reason, herders of sheep and goats are invited to keep their animals on farm land.

According to the government 62 million tons of waste is generated annually in India, out of which 5.6 million tons is plastic and 0.17 million tons is biomedical waste. Hazardous waste generation is 7.90 million tons per annum and 15 lakh tons are e-waste. Out of this total waste, 31 million tons is compostable or wet waste. And so, when we fail to convert it into fertilizer we waste a valuable resource. In India, an urban family of four, generates between 500 and 750 grams of compostable waste daily. Composting requires little training and anybody can do it individually or at community level.

We squander this valuable resource out of ignorance and apathy.

## Usage and effects of fertilizers

### Table of Chemical fertilizer and compost

<b>Chemical fertilizers</b> 	<b>Compost</b> 
Made in factory by adding chemicals	Can be made anywhere
Needs capital, space, labour, technology	Needs lesser space, capital, labour and technology
Much talked after 'Green Revolution'	Has been practised worldwide for centuries
Chemical residues are traced in produce, soil and groundwater	Rich in nutritional value. Does not pollute on the contrary conserves and enriches the soil and groundwater.
Easily available	Operates on 'demand and supply' principle and is not available in required quantity.
Standardized product	No standardization yet

In April 2016, the Ministry of Environment, Forest and Climate Change issued Solid Waste Management (SWM) Rules and for the first time put the responsibility on the generators – means all of us - to segregate waste into three categories: Wet or compostable, Dry and Hazardous Waste. Today, there is a growing awareness about segregation and the kinds of waste, but waste is not yet properly segregated. Majority of waste is still collected and transported to dumping yards. This results in

1. Locking of invaluable resources on dumping yard.
2. Proliferation of pathogens and stray animals (dogs, rats etc.)
3. Pollution caused by transport vehicles
4. Generation of Methane gas which contributes to global warming,
5. Soil, groundwater, and air pollution
6. Wastage of taxpayer's money.

Composting near the place where waste is generated is an effective solution to this problem.



## What does composting mean?

Composting means conversion of organic material or wet waste into humus like material with the help of micro organisms. This is a microbiological and non-polluting process. During the process, water content of the wet waste is evaporated and the end product is 10 to 15% of the original quantity.

### Organic waste that can be composted.

Fallen leaves, vegetable stalk and peels, fruit peels and seeds, dried flowers, sawdust, finger-nails, hair, leftover food, bones, fish bones, coconut shell, tender coconut etc.



## Benefits of decentralised composting

1. Avoids large scale methane production and leachate formation in dumping yards.
2. In the composting process, the final volume of wet waste reduces to 15% and saves the space
3. Composting process produces high temperature which sterilizes weed seeds, kills pathogens and pests in the waste
4. Decentralized composting reduces the transport cost of local governments and reduces emissions caused by transport vehicles.

People think that composting creates bad odour, they fear it proliferates pests and other animals, that it is an eyesore, etc. But these are all misconceptions.

In this book we will learn different methods of composting.

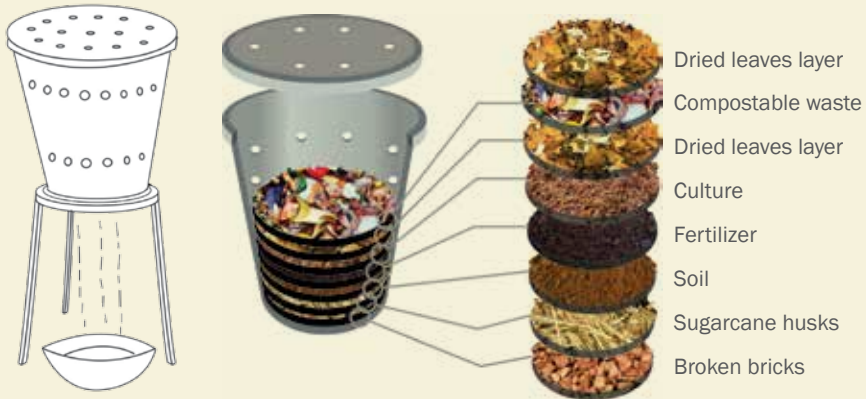
## Balance of elements

Composting is a natural process and there is no need to use any machines per se. All that is needed is to ensure that the balance of elements – air, water, and heat - is maintained correctly. Be it an individual or a community endeavor, the process should take place in a shed. Care has to be taken that rain water does not enter the composters - baskets, drums or pits. To prevent animals from entering into the composters one must use covers/ lids. The surrounding area should allow enough air passage to accelerate the process.

## Composting at individual level

Every family can collect compostable waste in a bucket. After about 45 days with the addition of suitable agents and in presence of air, the compostable waste gradually loses the water content and gets converted into fertilizer. The created compost is reduced to about 10 - 15% of the starting material.

## Magic bucket for family use. Make your own.



Material needed: Plastic or Earthen pot with holes at the bottom, Broken bricks, Soil, Fertilizer (micro-organisms or commercially available EM culture), Dried leaves and compostable waste, A small vessel to collect the seepage, Tripod stand, Lid.

## Selection of bucket

A 35 Liters bucket is sufficient for a family of four. It should have holes on the sides and bottom as depicted in the picture. The holes at the bottom are necessary for draining excess water and effluent generated. The side holes enables ventilation.

## Filling the bucket

- Add 2" thick bottom layer of broken bricks.
- Cover the brick pieces completely with soil.
- Add a layer of compostable waste to fully cover the soil.
- Evenly distribute the culture on this layer.
- Add dried leaves to cover the compostable waste & culture.
- Now start adding compostable waste to this prepared bucket. Rake after every addition.

## Compostable waste for addition to the bucket

- Cut the waste into tiny pieces and spread it evenly in the bucket.
- Rake the material in such manner that the feed goes at the bottom.
- Add only vegetable and fruit waste during the first month. Cooked food, citrus fruits should be added in next month.
- Do not add egg-shells, bones or coconut shells as these take a long time to degrade and the bucket fills up faster.
- Fruits with high water content like watermelons and papaya should be cut into small pieces before addition.

## Waste handling capacity of bucket

The quantity of waste that the bucket can handle depends on its size.

- Do not add more than 500 g waste per day in a 16 Lts bucket.
- Do not add more than 1 kg waste per day in a 35 Lts bucket.
- Do not add more than 1.5 kg waste per day in a 50 Lts bucket.

## Care to be taken during processing of the waste

- Keep the bucket elevated from the ground on a few bricks.
- Place a shallow collection dish below it to collect drained water. You can reuse this water for potted plants.
- If the waste is too dry, sprinkle some water in the bucket.
- Remove the lid on the bucket for at least one hour every day.
- Strain and remove the water before adding material like curry/gravy.
- Spread 2 spoonfuls of magic powder twice a week.
- If insects or worms are seen, add medicated soil.
- If flies are attracted, dip a camphor tablet in oil and keep it at the edge of the bucket and also apply it at the holes on the side.
- If worms are seen sprinkle red chilly powder or salt around them.
- Take care that rain water does not enter in the bucket.
- Keep the magic bucket in a well ventilated area. The better the air, less the smell.
- Place camphor tablets around the pit to keep red ants away.

If there are any snails if present, you can get rid of them by wetting half a cup of tobacco and sprinkling it on the pit.

## Identifying complete conversion of waste to fertilizer

The bucket fills up as we add waste to it. However, the micro-organisms convert it to fertilizer and material losses water as vapour, and the waste level in the bucket decreases. This goes on as we add fresh waste to the top of the bucket. At the end, the contents are converted into what looks like black soil and has no bad odour. The fertilizer is now ready.



### Identifying the quality of the fertilizer

- Appearance: Black, fine, uniform granules.
- Flowability: It is dry and any lumps can be easily broken by hand. It is free flowing.
- Extraneous matter: It does not contain dry waste.



- Density: Sinks in water.
- Smell: It does not have foul smell and does not attract flies.

### **Identifying poor quality fertilizer**

- Appearance: Tinge of white, ash or brown colour, possibly with a fungal layer. Also contains large sized portions.
- Flowability: Has high water content and does not flow or too dry and lumpy.
- Extraneous matter: Paper, plastic and other non-compostable material present.
- Density: Floats on water.
- Smell: It has a foul smell, as it is partly decayed and worms may be present.

### **Magic baskets**

Composting baskets are readily available in the market for those who don't want to make their own. One such composter is named Magic Basket and is shown in the image below. This basket is suitable for a family of 4 persons

and can digest up to 0.5 to 0.6 kg of waste every day. The basket contains a rake and composting culture in it.

This basket has enough aeration and is layered with mosquito netting from the inside in order to protect the compost. Care should be taken to protect it from direct sunlight, rain water and rodents.

Add the compostable and rake the mixture thoroughly so that the feed goes at the bottom. And a layer of culture remains on the top. Repeat the procedure for every addition. A very high-quality manure which appears in granular and shiny form will be ready after 45 days. The ready compost from the middle layer should be collected for use. Keep the uppermost and lower layers intact. After the removal of manure start the process again.

If you want to know more about this process, please write us at- [smscooperative2015@](mailto:smscooperative2015@)



gmail.com. A cooperative of waste picker women which earns their livelihoods from preparing and selling composting baskets and is a new venture undertaken by us.

These baskets are simple to use. Spread the culture evenly at the bottom and add compostable waste. Rake the mixture. And after removing the compost, start the cycle again.



Whether you purchase such a basket or prepare our own composting bucket, the composting procedure and care remains the same.

## Jeevika

Jeevika is a solution of micro-organisms. These are bacteria required to enhance the composting process. This mixture is available in the market by different brand names. Add about 2 capfuls to 1 Lt of water and sprinkle it on the entire surface of the compost pit.

Rake the contents of the pit from bottom till the top. Spread Jeevika mixture uniformly to accelerate the composting. One Lt. of the mixture is sufficient for about 2 tons of waste.

## **Magic powder**

Use magic powder if the waste begins to give off a bad smell. This ash coloured powder is made by mixing stone powder and slaked lime in appropriate proportion. Four to five teaspoons of this powder are sufficient for a 5 x 3 x 2 feet pit. This powder absorbs excess water in the pit.

### **Care to be taken when using magic powder -**

1. The powder should be spread uniformly so that its benefit is available to the contents of the entire pit. Rake the contents and the foul odour will disappear.
2. Do not add micro-organisms or water while adding magic powder. If the smell does not subside, add the powder for two consecutive days.

## Medicated soil

This is used to reduce worms that may develop when the waste is being processed. This contains soil, slaked lime and bacterial culture in required proportion. About 500 gms of this soil are needed for a 5 x 3 x 2 feet sized pit. Add it uniformly all over and rake the contents so that all the worms in the pit are killed. Do not add micro-organisms (Jeevika) or water for one day after addition of medicated soil.

Jeevika, magic powder and medicated soil are names of the products made by waste picker members of Stree Mukti Sanghatana.

## Composting at community level

The process of composting can be followed in similar manner at the community level by using big composters like drums or pits.

The first step towards this is to assess the quantity of waste available for composting. This can be done by a simple waste audit, on 3 different days to ensure the amount of waste generated. Check that the waste is properly segregated and weigh it. The quantity will help us to choose the space and

type of composter.

## 1. Material required for waste audit

Weighing scale, paper, pen, hand gloves, mask to cover mouth and nose, apron

Date	Amount of Wet and Biodegradable waste (In Kgs)		Dry waste /Recyclable waste (In Kgs)			Hazardous waste (In Kgs)	
	Food and other kitchen waste	Green waste	Metal, Plastics, Paper, Glass etc.	E-waste	Construction waste	Broken glass, bulbs, tube lights acid bottles etc.	Sanitary napkins, diapers, used medicines etc.
<b>Total</b>							

## Composter 1 Tumbler

For the housing societies generating around 10 to 20 kg. (20 to 40 households) of compostable waste, the tumbler system is the most suitable.

Tumbler is a plastic drum, fixed on a sturdy metallic stand and rotating smoothly around an axis. Two vertical pipes in the drum are perforated to enable aeration. Two drums of 125 litres with detachable lids are enough for a community of 25 families.



## **The following material is needed to make compost in tumblers:**

Rake with a long handle, weighing scale, bucket, mug, tarpaulin sheet, coco peat or dried and crushed leaves or saw dust or dried manure. A specially made culture can be used. But in the absence of the same naturally made compost can be used to start the process.

## **Process for composting**

First and foremost, ensure that the feed (compostable waste) has been properly segregated before putting it into the tumbler. Ensure no metal, plastic, rubber etc goes in the tumbler. For every 10 kg of waste one kg of coco peat has to be added.

Initiation: Take two kg culture/ compost and spread it at the bottom of the tumbler.

Add 1 cup of water to one cup of curds and mix it thoroughly with culture. Close the lid and do not disturb it for 2 days.







## Day 4

Spread the feed (wet waste), around 10 kg per day on the tarpaulin sheet, add 1 kg coco peat to it and mix it well using the rake. Take care while mixing with rake, otherwise the tarpaulin sheet can get damaged. Add this feed to the tumbler.



Now Tumbler needs to be rotated. 10 rotations at a time and three times a day. Every rotation aerates the tumbler and enhances composting. If the coco peat is not available, dried and crushed leaves or saw dust or dried manure or cow dung cake can be used for mixing in the feed.

## Day 5

Prepare the feed as described above for third day. Put it in the first tumbler. Rotate again 3 times with 10 rotations at a time. Repeat this process till the first tumbler is full. If every day 10 kg of feed/wet waste is added then it will take approximately 25 days to fill first tumbler. Add 1/4 kg curd with equal amount of water to this mixture every week before rotating the tumbler.

## After 23 days

Take second tumbler and start the process again. Spread at the bottom 2 kg culture /compost mixed with 1 cup of curd and 1 cup of water (buttermilk).

On 26th day start putting the feed mixed with coco peat (10:1) in this tumbler for 25 days. Now rotate both the tumblers three times every day, Each time 10 rotations. After 50 days, the compost in the first tumbler will be ready. Take it out, sieve it and keep in the gunny bags. Remainder after sieving can be used instead of coco peat for mixing it with the feed when the process in the first tumbler starts again. In this way both the tumblers can be used alternatively.

## Compost pits

Compost pits require more space and construction. They are ideal where the quantity of compostable is more than 50 kg per day. These pits can be made of different materials and also of different dimensions depending on the quantity of compostable waste. This compost pit should be installed in an accessible area. It is necessary to cover the pit with a steel or iron mesh to keep rodents, dogs and birds away. A shed or cover is required to protect the process from rain water and excessive sunlight. Composting is a natural and simple process. After a short training anyone is able to manage it. Let us see how this is done for a community of 25 to 100 families.

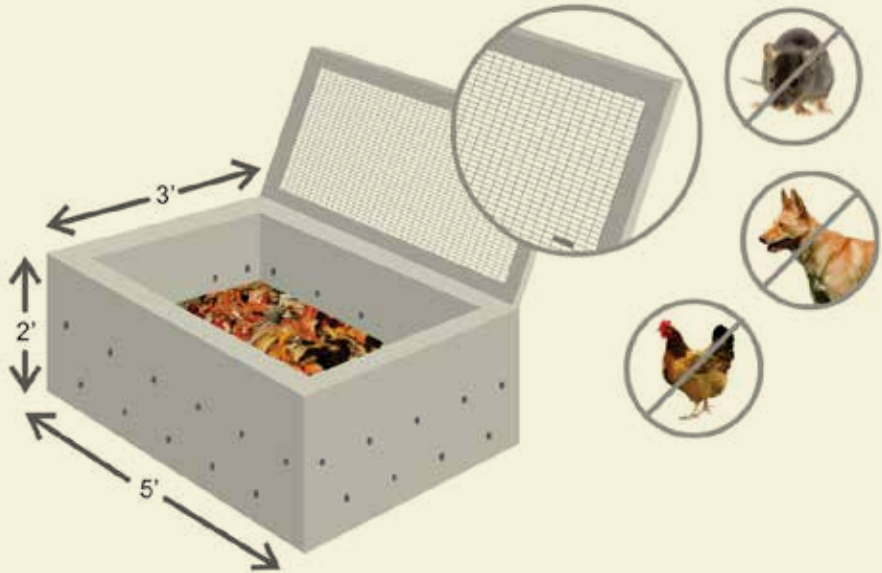
Use safety gears while handling the waste.

Apron, mask, hand gloves, shoes, scarf, etc.

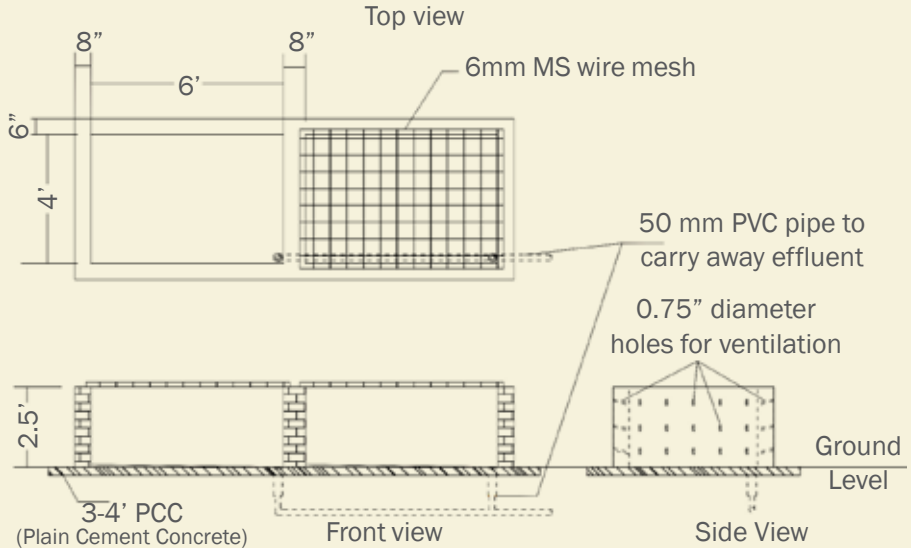




Composting Pit at Ramnarain Ruia College, Matunga, Mumbai



## Diagram : Compost Pit



## **Material for compost pit:**

Bricks, cement, shahabadi tiles or stone, steel mesh, corrugated sheets or tarpaulin for roof

**Other material :** Rake, bucket, mug, weighing scale, sieve, safety gears such as apron, mask, gloves, tarpaulin sheet

## **Construction of the compost pit:**

The size of the pit depends on the amount of waste to be added daily and also on the space available (3 pits of 5 x 3 x 2 ft required for 100 families).

Lay the foundation at least 5" below ground level, to reduce the nuisance of mice and rats. The base should be of cement concrete and should be suitably sloped to drain excess water.

Compost pit needs holes on the walls as well as at the bottom to facilitate drainage of excess water and allow ingress of air (these holes should be small enough to prevent entry of mice/ rats. The holes should be 1 foot apart) A sliding steel mesh cover will prevent entry of animals and birds (like rats,

dogs, hens). The mesh cover should be light and easy to slide completely to one side. There should be no cross bars in the opening as it hinders the motions of a shovel or rake to mix the waste periodically.

Painting the mesh will protect it from rust. Take care that pits are maintained properly.

A corrugated roof or tarpaulin cover on the compost pit is necessary as the fertilizer can dry out during summer, while in the monsoon it can accumulate water and generate a foul odour. In both situations the compost becomes substandard. To avoid the problems in processing and for a good quality fertilizer it is necessary to build the compost pit carefully.

### **Layering in the compost pit and its advantages**

**First layer** should be 1-2” thick at the bottom. Use bagasse or dried leaves. These do not decay easily and prevent the choking of the holes which could otherwise would have choked with happen due to the waste or fertilizer.

**Second layer** should be about 2” thick and ideally of cow-dung. Alternately



ready or partially processed fertilizer may be used. These materials contain a large cache of micro-organisms, which are ever hungry for food. They immediately start devouring the waste and converting it into fertilizer.

Both these layers have an important role in the proper working of the compost pit.

### **Preparation of waste for addition to pit**

The compostable waste is often a mix of heterogeneous wastes like leftover cooked food, decaying raw food, discarded portions of raw and cooked food. Micro organisms will take longer time to degrade large pieces of fruits like watermelon, bones etc. They must be chopped or shredded. Hard material like bones & coconut shells take longer time to degrade (it is advisable to treat these in a separate container/pit).

### **Process for composting**

Add the compostable waste uniformly on the second layer in the pit. Rake the contents to mix. The seeding material starts the process of converting to the fertilizer.

During this process the temperature of the compost can rise to 60° - 70° C. Control the temperature by sprinkling 1 litre of water (or as required, described immediately below) on the compost and rake it.

Add 2 capful of Jeevika to 1 litre of water every week and sprinkle this solution on the compost pit. Rake the material. Moisture is essential for survival of the micro-organisms in the fertilizer so do not let it dry.

Take care that soil or any dry waste does not mix with the composting material.

When the fertilizer is ready (described later in this section) it may be packed in gunny bags and stored in cool & dry place.

## Use of water

It is important to maintain the water content for the process to go smoothly.

**Summer:** Add upto 4 or 5 litres of water otherwise the micro-organisms can die. A compostable gunny bag spread on the pit will also help retain moisture. Buttermilk (same as tumbler system) also can be added to the pit.

**Monsoon:** Excess water generates a foul odour. Keep rain water out by a corrugated sheet roof or a tarpaulin cover.

**Winter:** Water added while seeding the micro-organisms is sufficient.

## **Raking the compost pit**

Raking the contents of the pit on alternate days enables aeration and supplies oxygen needed for the process.

However, the contents should not be raked for the first two days.

## **FRP (Fibre Reinforced Polymer Compost pits)**

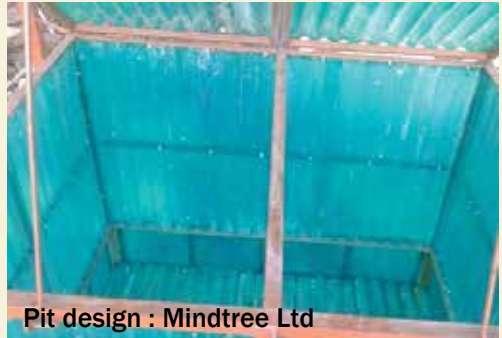
Material required for the pit : metal frame, small ladder, FRP sheets, Tarpaulin roof or shed.

Other material: Rake, bucket, mug, weighing scale, sieve, safety gear such as apron, mask, gloves, tarpaulin sheet, coco peat

1. These pits are made of fibre, are cost effective and durable. They can be preferred over cement pits. 5' X 4' X 4' sized pit is suitable for 30 kgs of

waste and 10' X 4' X 4' sized pit for 50 kgs. Check the amount of waste that is generated and then decide the size and number of containers that would be needed.

2. Using metal frames, shape the pit like a big quadrangular trunk, as shown in the photo. Ensure that the lid of the box is smooth in operations.
3. The bottom and sides of this pit should have holes so excess water drains out. Make small windows on sides of the wall at the bottom. These



Pit design : Mindtree Ltd

windows serve as outlets for the retrieval of ready compost. Open them at the time of retrieval. Ensure that they remain close otherwise. A small metal ladder near the pit enables the feeding.

## Initiation of small FRP pit

Take 5 kgs of manure, culture and coco peat each and mix everything together on the tarpaulin sheet. Prepare buttermilk (1/2 kg curd + 1/2 lt water) and add to this mixture. Spread this mixture evenly as the bottom-most layer in



the pit. It takes about 4 days for this mixture to solidify at the bottom. For a bigger pit, double the above measures.

Start adding waste after 4 days. For 10 kgs of compostable waste, add 1 kg of coco peat. Spread the feed on the tarpaulin sheet, ensure there is no plastic, metal, rubber etc. in the feed. Start spreading this mix evenly in the pit. Repeat the process at every feeding.

If coco peat is not available, dried leaves, sawdust, dry compost can be used. These items (except compost) are used to draw out excess water and keep the container ventilated.

Follow all the instructions mentioned above very carefully, completely and thoroughly. After 2 months the first batch of compost will be ready to retrieve. Open the windows of the pit and obtain the compost by using rake. Sieve it





and use for gardening. Add the leftover compost into the pit with equal volume of coco peat for next cycle. The ready compost also can be used as substitute for the coco peat.

In this pit, it is not necessary to cut or grind the compostable waste, or stir it every day. It is however, very important to use the right amount of coco peat and mix it properly to the feed.

30 kgs of wet waste can be put in the FRP 5x4x4 feet pits and 50 kgs in 10x4x4 feet pits daily. Do not put more than the above-mentioned quantity.

Do not panic or worry if you see worms and/or insects in the composters at early stage. This is part of the natural, expected and needed process. Within a month these worms/insects will disappear.

Sometimes, excess water flows out from the pit. Collect this excess water and use it in the garden. For each one spoon of this effluent add 10 spoons of plain water and dilute it. This solution is rich in nutrients.

The process is successfully completed if the container is properly ventilated and appropriate temperature is consistent. Though it is possible to open the lid it is not possible to check the temperature inside the pit, as the pit is large in size. There is a simple method for checking the temperature. Place your hand on the outside wall of the pit. If you feel it warm and there is no foul odour you can conclude that the process is running smoothly. The cool walls



Retrieval of compost from windows.



are indicators of some hindrance in the process. Sprinkle one mug of water inside the pit, where the wall felt cool.

You can add cooked food, curd, fruit peels, spicy and oily food as well as non-veg left over in this pit. Ensure there is less water in the feed. For this food with more watery content can be filtered and all the excess water should be drained and only remainder in the sieve should be added to the pit.

### **How to identify good quality compost?**

1. The compost is black in colour
2. It smells exactly like soil after the first rain
3. It feels light when you lift it
4. It can be rolled into a laddoo (round balls) and when squeezed slightly, it breaks easily and does not stick to the hand
5. When put in water, it sinks immediately

### **How to identify bad quality compost?**

1. The compost has a tinge of grey or brown colour

2. It smells damp and musty – like an unopened room in monsoons
3. It's heavy and lumpy just like mud
4. It contains dry waste
5. When put in water it floats and does not sink

Vermicompost is another method of composting which involves earthworms. Earthworms convert the organic waste into a high-quality compost.

### **Pit for vermicompost**

The construction of the compost pit for this method is the same as for the organic fertilizer described earlier.

Base layer: Broken bricks or pebbles followed by soil, then dried leaves. Each layer to be 2 - 3" thick. Sprinkle cow-dung slurry on this.

Processing layer: Add plenty of dried partially processed fertilizer and finally fill the pit with pre-dried compostable waste and close it with a gunny bag.

The pit is filled with waste, closed and allowed to stand undisturbed for at

least 8 days, allowing the heat generated to be released. After the waste has cooled, live earthworms of a particular specie are introduced into the pit. At least 3 kg of earthworms are needed for a pit sized 5 x 3 x 2 ft.

The earthworms will burrow deep down into the pit and none will be visible on top.

### **Care for vermicomposting**

- Unsegregated waste can be harmful to the vermiculture.
- Non-uniform or very thick layers of waste, can raise the temperature and destroy the vermiculture.
- It is important to maintain temperature, moisture and air inside the composting pit. The culture is also sensitive to direct sunlight.
- If necessary, sprinkle water in the pit and on the gunny bags covering the top. Check at least once a week.
- Do not rake the pit.

When the fertilizer is ready, some earthworms begin to adhere to the gunny

bags as there is no food available for them in the pit. This process takes about 1 - 1½ months and forms a high-quality fertilizer.

**Vermicompost:** Never rake this fertilizer as this will injure the earthworms. Carefully empty the pit and arrange the fertilizer in a heap. The earthworms will burrow inside due to the sunlight. This helps in easy separation of the fertilizer and the worms. The worms can be used in the next batch of compost.

The quality of fertilizer prepared by using micro-organisms can also be improved by re-processing it with vermiculture.

## Process description of Organic Waste Converter System (OWC)

You must have learnt by now that composting is a natural process and a short training is enough to follow it. Role of technology or machinery is almost negligible in the methods we learnt so far. But composting is possible with the help of OWC (Organic Waste Converter) machine. OWC is specially designed to do the process using technology. Technology facilitates ease, reduces

duration but requires electricity and capital investment. One needs training to operate the machine. The machines are available in different sizes depending upon the need.

After meticulous segregation the feed is pulverized, aerated and fluidized in the machine. The half ready granular, free flowing compost is matured and cured. The machine saves the space but curing requires large area to obtain final product. The trays, crates used in the process need to be maintained with care.

### **On a final note**

People generally hesitate to compost as there are several misconceptions regarding waste and waste is always seen as an eye sore. Conscious efforts should be



made to change people's mindset and misconceptions about composting. The surroundings of composters will look beautiful by planting trees, bushes and vines. Plants will always blossom on the compost and effluent. Trees like neem can also be cultivated, the leaves of which can be used in the composting process. This will enhance nitrogen levels in the fertilizer. Training of terrace/kitchen gardening given to the compost worker can add value to their work. Thus, composting in a decentralised manner can promote urban farming.

Our country needs 600 lakh tons of organic fertilizer which is quite possible to obtain from our waste and biomass. But ignorance and apathy are the greatest obstacles. Today, only about 35 to 40 lakh tons of fertilizer is generated. If composting is done at its source, a lot of unnecessary expenses on handling, transportation and pollution can be avoided, and the space occupied by landfills will be saved. We believe that the government should subsidize production of organic fertilizer as they do for chemical fertilizers. Our neighbouring countries including Pakistan, Bangladesh and Sri Lanka give such subsidies and encourage the production of organic fertilizers. In India, change in the situation can only be brought about by political will, public awareness and education.

## CREDITS

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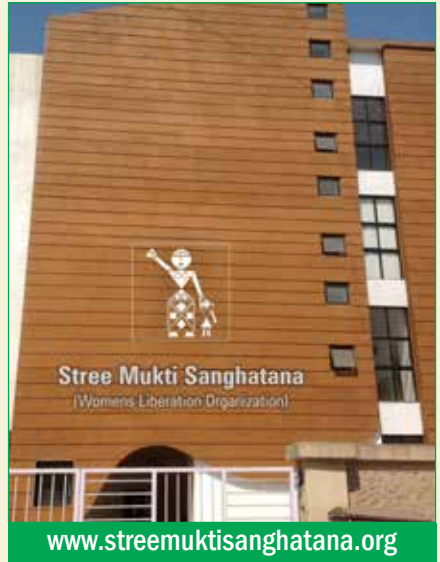
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