Naturally Fast and Efficient Composting Methods

FOR PANTRY, GARDEN, FARM AND INDUSTRIAL FOOD WASTE

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FOR PANTRY, GARDEN, FARM AND INDUSTRIAL FOOD WASTE.

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Introduction

This paper discusses making compost at home, garden, farm, and industrial zones with zero cost. The naturally fast-composting methods are cost-effective and easy to operate on a small or large scale. Moreover, the final product, organic fertiliser, can be utilised for growing crops and selling and generating income while keeping our environment clean.

When everyone can shift toward the following methods in their home, garden, farm, and industrial zones, they can assist not only the current waste stream problems but also help to restore a greener and cleaner environment for our community. Choosing a compatible composting strategy is an effective practice system of using resources and materials and a practical way of moving toward a sustainable future and appreciating nature.

The advantages of composting are it can save money on municipal trash removal costs and fertiliser or yard waste removal costs, save landfill (landfills everywhere are running out of room), improve the soil absorbency and water preservation capacity, increase resistance to erosion by wind and water, reduce the water demand of plants, compost can replace the petrochemical fertilisers and produce healthy food products, etc.

The disadvantages of composting are that the composting pile can generate emissions, such as leachates, odours, and dust. The process takes time and space, and no substantial organic compost market is available as chemical fertiliser.

In contrast, people are starting to appreciate and demand organic products and food. Hence, practising naturally fast composting methods can create the perfect opportunity to conserve the environment and our health.

Understanding C: N ratios is one of the fundamental steps of composting materials with their respective carbon to nitrogen. For instance, it can be identified or considered as 'Browns' colour and 'Greens'. The 'Browns' materials contain higher amounts of carbon but are low in nitrogen; however, the 'Greens' contain higher amounts of nitrogen.

Table 1 displays carbon to nitrogen ratio materials the user can apply to balance the C: N ratios for the composting practices.

Browns = High Carbon	*C: N*
Wood chips	400:1
Cardboard, shredded	350:1
Sawdust	325:1
Newspaper, shredded	175:1
Pine needles	80:1
Corn stalks	75:1
Straw	75:1
Leaves	60:1
Fruit waste	35:1
Peanut shells	35:1
Ashes, wood	25:1
Greens = High Nitrogen	**C: N**
Garden waste	30:1
Weeds	30:1
Green Wood	25:1
Hay	25:1
Vegetable scraps	25:1
Clover	23:1
Coffee grounds	20:1
Food waste	20:1
Grass clippings	20:1
Seaweed	19:1
Horse Manure	18:1
Cow Manure	16:1
Alfalfa	12:1
Chicken Manure	12:1
Pigeon Manure	10:1
Fish	7:1
Urine	1:1

Table 1 *shows the various types of materials of carbon to nitrogen ratios.*

(Sources: deepgreenpermaculture.com)

Pantry Waste Composting Method

Pantry Waste Composting: Step by Step Instructions

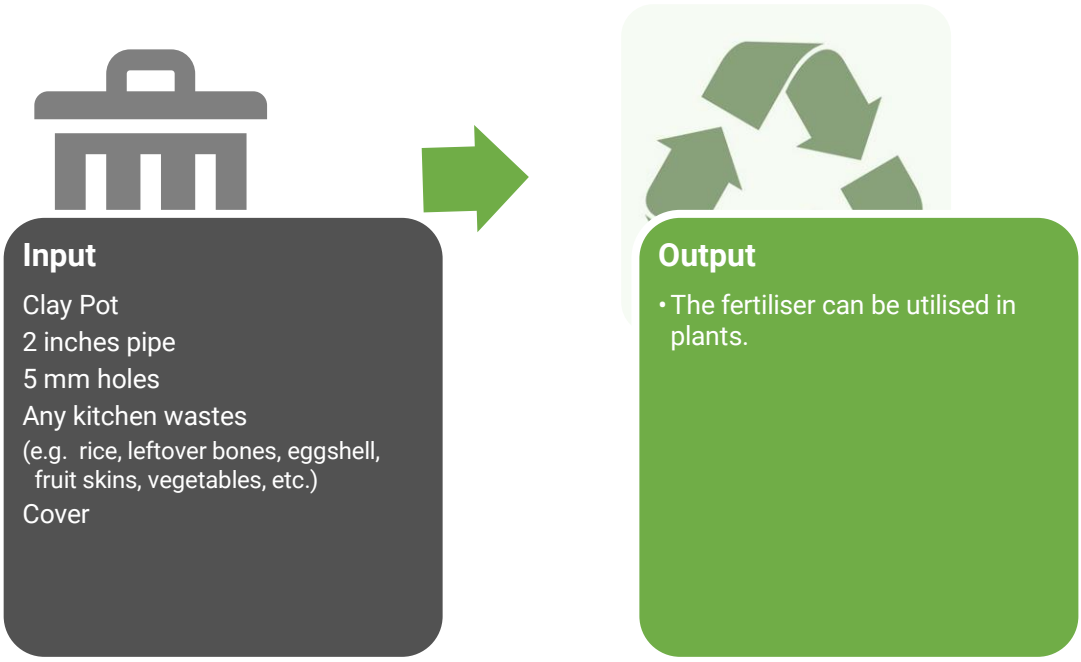
The following instructions detail the steps required to build a compost household system which will produce finished compost in around 30-60 days.

The three naturally fast composting methods are utilised based on the below materials to balance the carbon to nitrogen ratios.

Browns = High Carbon	***C: N***
Leaves	60:1
Ashes	25:1
Fruit waste	35:1
Straw	75:1
Greens = High Nitrogen	**C: N**
Garden Waste	30:1
Weed	30:1
Vegetable scraps	25:1
Straw	75:1
Grass clipping	20:1
Cow Manure	16:1
Chicken manure	12:1
Ashes	25:1

Table 2 *shows the materials used during the naturally fast composting methods.*

The requirements for the Pantry Waste Composting method are as follows:



Time Taken

- This process will take up to 20-40 days.
- It took seven days to fill the pot. The process will be accounted for after the pot is filled.

Note: This method does NOT require adding water; however, when the pot is filled, it must be sealed/covered. It can stay under the sun or shade for 30-60 days.

Step 1: – Construct and prepare for the pot and 17 inches (43 cm) long pipe with 5 mm holes.

Step 2: Place the pot outside possible so that smell will not be bothered then it can be begun to add kitchen waste.

Step 3: Mix ingredients by the pipe then covered it up so that the air can move within in the pot.



After 14 days later, the bacteria and microorganisms will consume the food inside the pot. The process will take up to 30-60 days depend on the size and amount of the food waste.



After 21 days later, the bacteria and microorganisms consumed majority the food inside the pot.

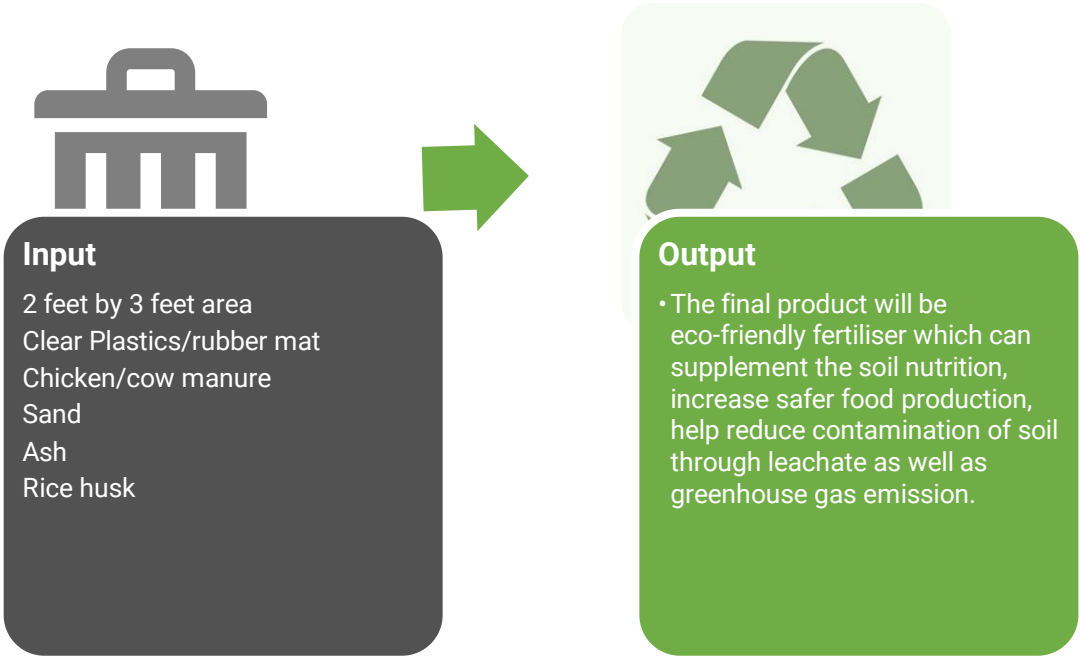

After 45 days later, the final product can be utilised in gardening.

Farm Waste Composing Method

Farm Waste Composting: Step by Step Instructions

Every layer must be compacted with the same ratios as the previous layer. For example, when the 'Browns' materials layer is a thickness of 6 inches (15 cm), the 'Greens' materials must be 6 inches (15 cm) on top of it. This process will repeat until the materials are gone.

The requirements for the manure composting method are as follows:



Time Taken

- Remainder: the pile needs to turn in once a month.
- The process will take 2-3 months to utilise as fertiliser.

Note: This method requires adding water every day to compost faster.

Step 1: Clear the areas of 2 feet by 3 feet and place the clear plastic to prevent leachate

Step 2: Add a basket of water before placing the dry leave layers then press with your feet.

Step 3: Add a basket of wet/dry cow manure on the top then pours 2 litters of water.

Step 4: Add a basket of sand on the top then 2 litters of water.

Step 5: Add a basket of rice husk ash on the top to supplement soil nutrients.

Step 6: Add a basket of rice husk on the top to maintain the moisture.

Step 7: Finally, the pile requires to cover with rubber mat/clear plastics to keep heat within the pile.

After a month, the materials decompose by 35% of their materials. The process can see how the colour of the materials has changed and how the process is going.

Before *After one Month*

After three months later, the final compost will be ready to fertilise in the flower plants, gardens, and farms. The final compost colour will be dark brown.

After 1st Month

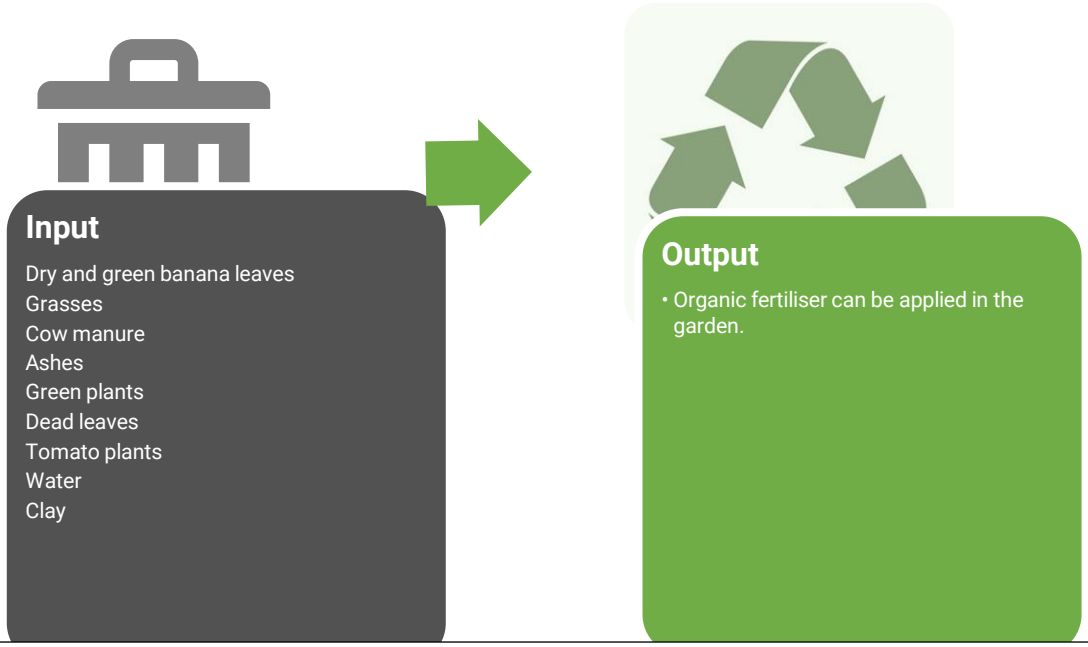
Finished Compost

Garden Waste Composing Method

Garden Waste Composting: Step by Step Instructions

This method will require the same method as the previous method. For example, when the 'Browns' materials layer is 6 inches (15 cm), the 'Greens' materials must be the thickness of 6 inches on top of it. This method can save the land areas and odours because it is placed underground and does not need to worry about attracting pests and insets. Since the composting is underground, materials will decompose faster. The main challenge is turning the pile will be more complex, but it is doable.

The requirements for the Garden Waste Composting method are as follows:



Time Taken

- Reminder: the pile needs to turn in once a month.
- This method requires sun heat and water to compost faster. It will take 2-3 months process to utilise as if fertiliser.
- The first should take place after a month and the second turn after another one month.
- The process will take 2-3 months to utilise as fertiliser.

Note: This method requires adding water to compost faster.

Step 1: Dig 3 feet x 7 feet x 4 feet (91 cm x 213 cm x 121 cm) demission whole in the ground and place dry and green banana leaves on the bottom.



Step 2: Add a second layer of grass clipping, dry leaves, and ashes on top of it.


Step 3: Add a third layer cow manure to cover it up.

Step 4: Add a dead tomato plants and chili plants then press with feet to be flat

Step 5: Add water to fill up the tank then let it sit for 48 hours.

Step 6: Fill up the fill tank again to maintain the moisture.

Step 7: Add clay layer on top of the plants and add the water to level up with clay layer.



Step 8: Add dry leaves and green leaves on cover the clay layer and fill with water.


Step 9: Let it sit for a month until its first turn

The pile has to turn once a month. The materials were composted quickly after the first turn; however, completing the process will take two more turns.

BEFORE	AFTER 1ST TURN
	

The Final turn will be on May 28th, 2021. The materials are fully composted, and it has been utilised in the garden to grow seeds.

Industrial Food Waste Composting Method

The Baseline survey showed that the industrial organic food waste sector is the highest and most significant number of landfilled materials in Myanmar, especially from Industrial Zones. It can lead to an increased environmental and human health risk when improperly disposed of. The first approach should implement the waste segregation practices within industries before initiating this composting method.

Hence, the Windrow composting method is a successful and operational composting option which can be applied in Industrial Zones areas. Windrow composting methods is commonly used on a farm scale to turn animal manure and crop residues into compost. Each composting process requires several weeks to a year and space to complete depending on the method used. Windrow Composting method is a fair and functioning practice in current Myanmar's situation.

Windrow Composting Method

The windrow Composting method uses a long pile of stacked raw materials. Ventilation of the material is crucial because the oxygen needs to be replenished as it is consumed. Otherwise, the banks go anaerobic in the centre and can experience different decomposition processes such as producing foul odours, and attracting bugs, insects, and rats. This method is suited to treating large volumes of bio-waste and producing large volumes of compost.

This Windrow method of composting approach is genuinely effective and easy to adapt to a large farm. It is a low-cost and precious possible solution for the current situation in Myanmar. Collaborating with local farmers who are eager to the composting method could be beneficial for both parties. The farmers can use the compost while renting their land to apply this method. For instance, the waste generators pay collection fees and tipping fees for their daily waste to the local collection service. Instead, they'd pay those fees for the farmers to rent spaces annually for composting. Then, the final product is also sold back to the local farmers, gardeners, and households. The investment will return in the year, and their soil will be furnished for another year to grow healthy crops.

Figure 1 shows the Windrow composting structure of raw materials. |
(Image Source: www.revital.co.nz)

The advantages of the Windrow composting method are relatively low capital costs and low maintenance. It is economically and technically attractive due to its relatively simple equipment requirement and brings economic and environmental profits. It also helps to minimise the number of organic materials in landfills. It requires low energy input and a simple method to operate. It can handle a large volume of materials and uses fewer resources.

The disadvantages of the Windrow composting method are that it requires a large amount of land, and the windrows have sloped sides and cannot be put too close together. The leachate contaminated surfaces and groundwater. It is highly affected by weather (can build a shelter but can increase costs). It ranks medium when it comes to the time needed for the composting process, and it is labour-intensive. It also has a high potential odour or generation during turning; difficult to contain air for treatment. Turning equipment/labours are required and vulnerable to climate changes.

Windrow Composting Method: Step by Step Instructions

Tools and Materials


Gloves


Shovels


Facemasks


Boots

Climate or Seasonal Consideration:

In warm, dry climate conditions, Windrow composting is often covered or placed under a shelter to prevent water from evaporating. Still, in rainy seasons, the pile requires protection from water runoff and minimises leachate issues.

Step 1: Collect all/the canteen scraps or industrial organic waste in bins/containers to place food waste in the compost. (Introduce organic waste collection containers bins for each ward, street common collection points)

Step 2: Deliver/pick up the materials to the location and set up a compost pile with triangular piles 7 feet high and 6-10 feet wide at the base (the length can be depended on the available area).

Step 3: Begin setting up the compost Addle adds dry light brown leaves and dry materials from the garden and put it first. Suppose you do not have them. Just add some dry garden soil or any existing compost soil. Make sure larger pieces are chopped or shredded.

Step 4: Next is putting the green materials that are high in nitrogen and can be used to activate the heating process in your compost. Fruit vegetables, coffee grounds, manure etc., all can be added at this stage or the so-called second layer of the compost yard. Make sure to place the same layer of materials as the previous layers. It cannot add a large quantity, and there is a space for them to breath and have enough oxygen and space and microbes to develop and decompose.

Step 5: Then, the layers must be balanced to decompose faster. It is a pattern of brown materials and green materials. It repeats the cycle of 6-7 layers of light brown to dark brown to green in thin layers.

Step 6: The pile needs to be covered with general garden waste. Covering is essential because compost piles attract many insects and animals and generate bad smells.

For instance, they are considering covering it with black cloth to raise the temperature, directly affecting microbial activity with increased nitrogen inside.

Step 7: Ensure the compost pile is moist for the organic materials to break down quickly. For example, add water lightly and make sure that the pile is moisturised (20-30%) all the time, but it is not too wet nor too dry to create a balance.

Step 8: The primary obligation is to turn the pile twice every Month to mix the matter and try to bring out matter that is tied inside and do some tossing and turning.

Step 9: When the compost turns into a dark brown colour, and it no longer gets warm, and you can see that things are almost broken down and then is less activity happing, then you should stop putting more and finish it off. It usually takes 3-4 months to get it done, and it also depends on the volume of material.

Passively Aerated Windrows Method:

This method consists of perforated pipes within the bio-waste pile, promoting convicted airflow throughout the material. The air that gets into the pile brings the oxygen the microorganisms require. The pipes can be in different dispositions as shown in the picture.

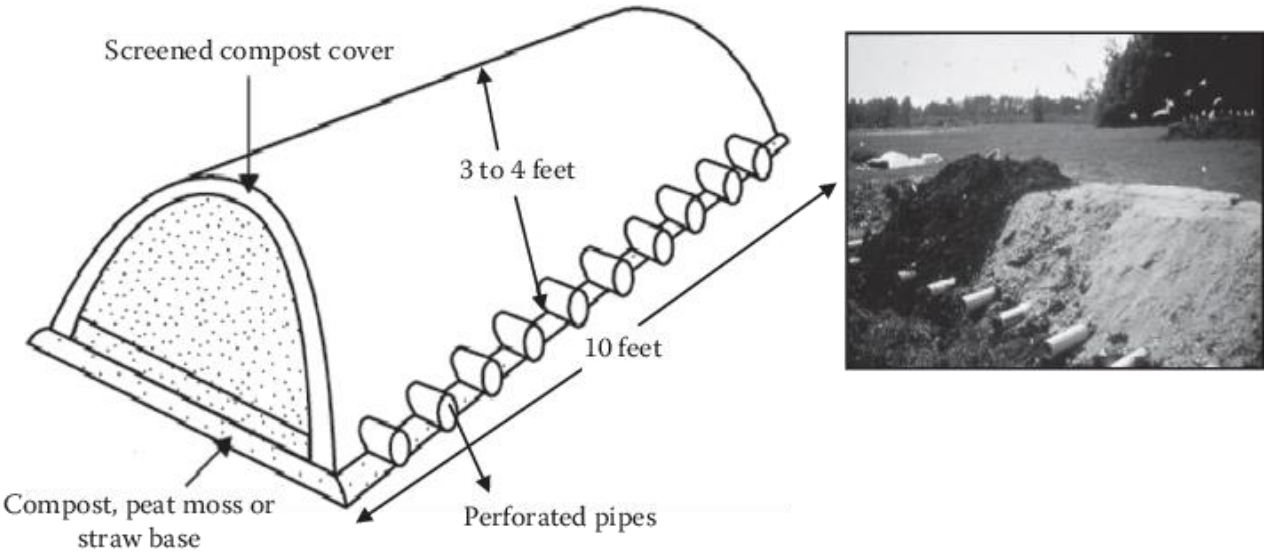


Figure 2 shows the illustration of a passively aerated windrow composting structure.

(Image Source: www.reserachgate.com)

The different composting methods are briefly compared to the operational process in Table 3.

	Investment	**Maintenance**	**Space**	**Time**	**Labour**
Windrow Composting	Small	Small	High	Medium	High
Passively Aerated Windrows	Medium	Medium	High	Medium	Small
Pantry Waste Composting	Small	Small	Small	Small	Small
Garden Waste Composting	Small	Small	Small	Small	Small
Farm Waste Composting	Small	Small	Small	Small	Small

Table 3 *shows the comparison of how each method is in the operational stage.*

Conclusion

Although people are concerned about smell and insets that are properly and appropriately managed well, it is simple and easy to do in our backyard. Composting is the most natural way to grow food and gardens, enriching soil nutrients. It can be operated on a small scale or large scale; however, the method is applied in the same process.

Composting our food waste is a responsible consumer that you return a favour to mother earth. And it can benefit the ecosystem by conserving the plant nutrients and reducing pesticide and chemical fertiliser use. You will find joy in composting especially recognising that you already helped to reroute the organic waste from ending up in landfills.

The naturally and fast composting methods are effective and operational techniques applied in households, gardens, farming, and industrial food waste that can turn into waste-to-resources. The fertilisers are supplements in gardens to germinate seeds and flower plants. The garden waste turns into fertiliser and can be recycled back into the soil again. It is a remarkable process of minimising waste and saving pesticide costs.



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