

CTA Practical Guide Series, No. 7

Enriched Compost for Higher Yields



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In Eastern Africa, reduced soil fertility has led to declining crop yields on many small-scale farms causing food insecurity and greater poverty. Throughout the region, soils are generally low in nitrogen and phosphorus – which are essential for crops to grow well. Soil fertility can be increased by use of chemical fertilizers but these are too expensive for many farmers and are not always available. A more affordable alternative is to make your own good-quality compost using waste materials from your farm and household.

What is compost?

Compost is decomposed (rotted) material obtained from plant waste alone or in combination with animal and other waste.

How composting works

Composting depends on providing the right conditions to support the growth of tiny living creatures – micro-organisms (bacteria and fungi which can be seen only by using a microscope). As these micro-organisms break down the plant and animal waste materials, heat is produced. After a few days your compost heap will feel hot and when opened up it will even give off steam. As the waste materials break down they release nutrients in a form that can be used by crops.

Compost can be made using different methods, for example:

- Crop residues and organic household wastes can simply be thrown into pits and left to decompose for three to four months, after which the compost is ready for use.
- Alternatively, the waste materials can be heaped under a shady tree and left to decompose.

Though both these methods produce compost, the quality is usually low. This leaflet shows you how to make better quality compost, called enriched compost, which has higher organic matter and contains more nutrients. Use of enriched compost will enable you to increase your crop yields without applying costly chemical fertilizers.



Benefits of making enriched compost

- Turns waste products, such as crop residues, animal manure, garden weeds, grass, hedge cuttings, kitchen and household waste, and other organic wastes into a valuable, useful product
- Nutrients are immediately available as plant food without the need for further breakdown in the soil.
- Increases crop yields
- Increases the amount of water the soil can hold, so it does not dry out fast
- Improves the soil texture so the crop's roots can push through it more easily
- Releases nutrients gradually and continues to improve the soil in the following seasons
- Helps to increase beneficial soil micro-organisms and increase the soil's organic matter, which is good for your crops and the environment
- Reduces weed growth as weed seeds are destroyed by the heat produced during composting
- Many people now prefer to eat foods that are grown without the use of chemicals and artificial fertilizers. Home-made compost helps you to produce such foods
- You can sell surplus compost to your neighbours
- Can be made with little or no financial input.

What you require to make enriched compost

- Machete (panga) and sticks
- A watering can
- Fork or spade
- A space at least 2.5 metres long by 2 metres wide for the heap and extra space to turn the material. More space should be provided depending on how much waste material you have and how much compost you need.
- Crop residues from cereals (maize, sorghum, millet, wheat) and legumes (bean, cowpea, groundnut and green gram).
- Any other types of waste plant material.
- Use of green manures, such as tithonia, glyricidia, leucaena, sesbania, crotalaria and lantana leaves, will increase the compost's nitrogen content.



- Cattle, chicken, sheep or goat manure and urine, or biogas slurry, to speed-up the process of decomposition.
- Wood ashes or charcoal dust.

How to make enriched compost in 3-4 months

Step 1: Making a heap

1. Measure out an area at least 2.5 metres long and 2 metres wide in a convenient place, such as near your field. Allow a similar sized area for turning the heap.
2. Mark the corners of the heap with sticks.
3. Chop crop residues into pieces about 30 cm long to increase surface area for decomposition and make a layer about 15 cm deep.
4. Sprinkle a thin layer of animal manure, about 2 cm deep, to cover the first layer.
5. Add a second layer of plant material, preferably including green manures, such as agro-forestry shrubs (not thick branches), to a depth of about 15 cm.
6. Sprinkle wood ash or charcoal dust on the top of the green vegetation.
7. If the weather is dry, sprinkle with about 4 litres of water to make the layer damp.
8. Repeat the above steps until you have five layers each about 30 cm deep. This will make your heap about 1.5 metres tall.
9. Cover the heap with 10 cm of top soil to prevent loss of nutrients.

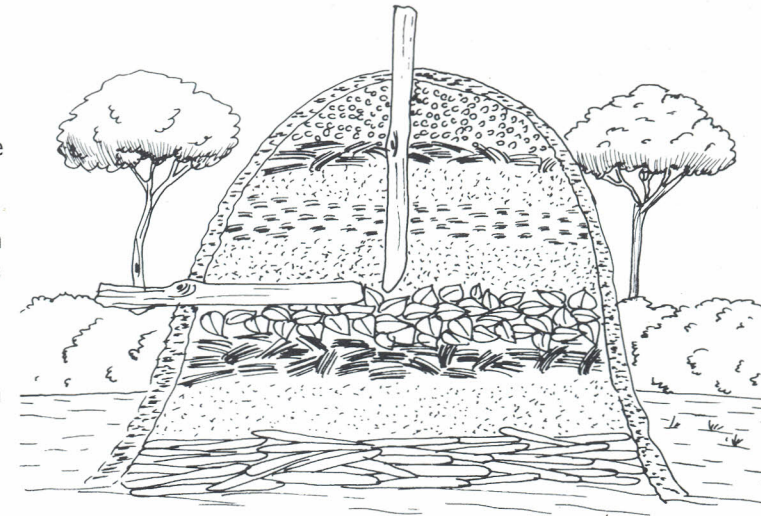


Step 2: Turning the compost

- Turn the heap using a fork after one month.
- Move material from the top and sides of heap to the middle of a new heap.
- If dry, sprinkle with water to ensure heap is damp.
- Turn the heap every 2 weeks until the compost becomes dark grey in colour.

Step 3: Monitoring progress

- From about 8 days onwards, push a stick into the middle of the heap. Pull the stick out. If the stick feels hot this is a good sign that decomposition is occurring.
- The compost is ready for use when it becomes dark greyish in colour. This usually takes around 3 to 4 months.
- One heap, 2.5 metres x 2 metres, will give you about 200 to 300 kg of enriched compost, which will have a much higher organic matter content and contain more nutrients than normal compost. This is enough for use on 0.5 hectares of land.



How to make enriched compost in just 14 days

A more rapid method of making compost has been developed in Asia. The decomposition process is speeded-up by adding large amounts of fresh animal manure and by frequently turning the heap. Chicken manure is superior to other manures.

To do this:

1. Chop the plant waste materials (dry or green or both).
2. Thoroughly mix these with equal amounts of fresh animal manure.
3. Pile the mixture into a heap at least one metre high and one metre wide and allow a similar sized area to turn the heap.
4. Cover the heap with banana leaves or old sacks to reduce heat loss.
5. By the third or fourth day, the inside of the heap should be hot. If not, add more manure and mix with the other materials.
6. From the third or fourth day onwards, turn the heap every two days so that the materials from the sides and top are moved to the centre.
7. In 14 to 18 days, the compost should be ready for use.

How to use your enriched compost

1. Dig planting holes about 10 cm deep along rows. For maize, the rows should be spaced 75 cm apart with planting holes spaced at 30 cm along rows.
2. Apply about one handful of compost to each planting hole and mix well with the soil.
3. Place the seed into the hole and cover with soil.
4. Compost can also be scattered or broadcast evenly and incorporated into the seedbed before planting the seeds.
5. If you are not ready to use your compost immediately, store it in a shade or cover heap with 10 cm of top soil to stop loss of nutrients.

What can go wrong

Problem	Cause	What to do
Slow decomposition	Too much water	Ensure heap is not too wet
	Heap not turned	Turn the materials as recommended
	Too small or too large heap	Do not make heaps too small or too large
	Heap not hot enough	Check temperature in middle of heap using a stick, especially during the first month
	Not enough animal manure	Add recommended amounts of animal manure
Heap catches fire	Heap gets too hot	This is very unusual
		Avoid by applying water to maintain correct moisture level – damp not dry or wet
		Do not make heap too large – use several smaller heaps
Soil contamination	Polluted materials used in heap	Do not use materials that might contaminate the soil, such as industrial wastes that may contain metals.

Loss of vegetation cover on farm and surrounding land	Excessive collection of natural plants	Use crop residues, garden weeds, household waste, hedge clippings and other materials produced on your farm in a sustainable way. Only use natural plant materials such as tithonia, that grow fast and take care not to destroy parent plant.
Crop yields low despite use of enriched compost	Not using enough compost Not following full package of recommended crop husbandry practices	Use recommended amount of compost (one handful per planting hole; 400-600 kg per hectare) In addition to using enough compost, follow other recommended practices such as preparation of a good seedbed, timely planting of improved seed, weeding and disease and pest control measures.

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Case study

Mr. Bwibo grows maize intercropped with groundnuts on his 5-hectare farm in Bumala location, Busia District, Kenya. Over the years, he became increasingly concerned about his low yields: a total of just eight bags of maize and two bags of groundnuts per hectare for the two growing seasons in 2001. Towards the end of that year he was taught how to make enriched compost by SACRED Africa, a non-governmental organization, which works closely with Moi University.

In 2002, he applied his first enriched compost to about one hectare of his land at the beginning of the first rains. That year his yield was much higher. He obtained a total of 20 bags of maize and six bags of groundnuts. From this bumper harvest, he kept five bags of maize and one bag of groundnuts for his family and sold 15 bags of maize and five bags of groundnuts, which gave him a total income of more than US\$300. In 2003, he continued making enriched compost and applied it to even more land – about 3 hectares.

With the extra income from his increased yields he has been able to build a semi-permanent house for the family. Now, Mr. Bwibo is showing his neighbouring farmers how to make enriched compost so they too can share in his success.

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