Enriched compost for higher yields, Kenya

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Summary

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 the 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. The following shows you how to make better quality compost, called enriched compost, which has higher organic matter and contains more nutrients. The use of enriched compost will enable you to increase your crop yields without applying costly chemical fertilizers.

Description

1. Compost

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

2. Composting conditions

Composting depends on 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.

3. Different methods to make compost

- 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 of 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.

4. Benefits of making enriched compost

- Turns waste products, such as crop residues, animal manure, garden weeds, grass, hedge cuttings, kitchen waste, and other organic wastes into a valuable, useful product.

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- 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.

4.1 Requirements to make enriched compost

The following are needed to make enriched compost:

- a machete (panga) and sticks;
- a watering can;
- fork or spade;
- 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; and
- a space of at least 2.5 m long by 2 m 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.

5. Steps to make enriched compost in three to four months

5.1 First step: making a heap

- Measure out an area at least 2.5 m long and 2 m wide in a convenient place, such as near your field. Allow a similar sized area for turning the heap.
- Mark the corners of the heap with sticks.
- Chop crop residues into pieces about 30 cm long to increase surface area for decomposition and make a layer about 15 cm deep.
- Sprinkle a thin layer of animal manure, about 2 cm deep, to cover the first layer.
- 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.
- Sprinkle wood ash or charcoal dust on the top of the green vegetation.
- If the weather is dry, sprinkle with about 4 litres of water to make the layer damp.
- Repeat the above steps until you have five layers each about 30 cm deep. This will make your heap about 1.5 m tall.
- Cover the heap with 10 cm of top soil to prevent loss of nutrients.

5.2 Second step: 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 two weeks until the compost becomes dark grey in colour.

5.3 Third step: monitoring progress

- From about eight 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 three to four months.
- One heap, 2.5 m x 2 m, 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.

6. Steps 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.

The following explains this more rapid method.

- Chop the plant waste materials (dry or green or both).
- Thoroughly mix these with equal amounts of fresh animal manure.
- 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.
- Cover the heap with banana leaves or old sacks to reduce heat loss.
- 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.
- 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.
- In 14 to 18 days, the compost should be ready for use.

7. Ways in which enriched compost can be used

- 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.
- Apply about one handful of compost to each planting hole and mix well with the soil.
- Place the seed into the hole and cover with soil.
- Compost can also be scattered or broadcast evenly and incorporated into the seedbed before planting the seeds.
- 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.

8. Agro-ecological zones

- Tropics, warm

9. Objectives fulfilled by the project

9.1 Resource use efficiency

The technology uses plant and animal waste to increase soil fertility, allowing for the increase in organic matter in the soil and improved crop growth.

9.2 Pro-poor technology

Thanks to increased soil fertility, the technology allows for an increase in crop yields for small-scale farms. The technology is doesnt require high costs.

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