Session 4: COMPOSTING

Objectives
1. To understand how composting improves the soil.
2. To know how to make and use compost.

What does compost mean?

Composting is, in simple terms, the biological reduction of organic material to humus. Compost is a decomposed mixture of organic material. It is made from residues of plants and/or animals that are piled, moistened and allowed to decompose. This break down is helped by bacteria, insects and worms in the pile.

Well decomposed compost is a dark, crumbly mass, that we call humus. Do you remember why humus is so important?

WE CALL SOIL WHICH CONTAINS HUMUS “A LIVING SOIL”.

Purpose of composting

Composting in heaps is an intensification of a process that is going on almost everywhere in nature. When a crop is harvested, the trash/straw that is left on fields after harvesting decays into humus. Leaves that fall turn the forest floor into a compost area.

Farming disrupts the natural pattern of the return of plant matter to the soil, especially where burning is used. If we prepare our fields using fire, we break the cycle of nature and hence valuable food for our crops is lost.
What are the benefits of adding compost instead of using chemical fertilizers, mulching or manure?

Advantages of compost

Composting is especially useful because certain materials such as manure and kitchen wastes may not be easy to handle if used directly on the fields. After composting, these materials would be free of unpleasant smells.

Composting is very suitable for drier areas where crop residues decompose very slowly in the field. In this situation composting provides greater yields for the farmer. In very dry areas composting can be difficult because water and organic materials are scarce. However, compost is still a good alternative to mulching in these areas because mulching often results in an invasion of termites. Even rats and mice can rest in thick layers of leaves or mulch. This problem is avoided when applying compost.

Another advantage of compost is that diseases, pests and weed seeds are destroyed during the composting process.

Compost gives better results than chemical fertilizer because its chemical composition is richer and more balanced. Compost also increases the capacity of the soil to hold water and it improves soil structure.

On the negative side, compost demands a lot of labour. But considering the advantages you will get from using compost it will probably be worthwhile, especially if you build the compost pile when there is not much other work to be done.
If we apply compost to our fields, we strengthen nature’s cycle and ensure that organic matter returns to the soil.

**Building the compost pile**

To function properly, a compost pile needs the following ingredients:
- Air
- Water
- Nitrogen-rich materials (manure, green plant material, vegetable wastes)
- Carbon-rich materials (maize stover, groundnut shells, dry grass).

To get an active, heat-generating compost pile that will give good compost free of most weed seeds and disease organisms, mix nitrogen- and carbon-rich materials so that the final ratio of carbon to nitrogen is 30:1. As a rule of thumb, use 1 part manure to 3 parts plant waste. If there is no manure, use as much old as young plant material when building the compost pile. If there is too little carbon then there will be a loss of nitrogen and the pile might smell like cat urine. This can be remedied by adding earth or sawdust. If there is too little nitrogen the temperature will be low and decomposition will be very slow.

The compost heap should be made in one day. Once you have made the heap do not add new material to it.

**Step by step process of making compost**

1. Collect all the material to be used in the compost pile. You may use manure or topsoil, dry grass or stover, green grass or leaves, vegetable wastes and water. Wet the material before you start building the pile.

Manure is a valuable addition since it brings soil organisms to the compost. Animal manure will speed up the process. If manure is not available you can use topsoil or humus from another
compost. Topsoil and humus also contain soil organisms.

You can also add eggshells and bone which contain calcium and phosphate, or wood ash that contains potassium.

Do not add plastic, metal, thick twigs or branches.

2. Mark the area where you are making the pile using pegs. It is advisable that the pile is 1 - 1.5 metres wide. Remember that you will need space to turn the compost pile. The pile should be placed in the shade or under a roof to prevent it from drying out. A shed is best because it also prevents nutrients from being leached by heavy rainfall. The pile can be any length. The length depends on the area and quantity of materials or the desired volume of compost to be made.

3. Cut the larger, coarser material such as stover into smaller pieces. The pieces should be at most 15 to 20 cm long.

4. For the first layer, put down a 30 cm thick layer of material like twigs or maize stalks. Water with a fine spray until it is very moist.

5. The second layer will be of dry materials such as leaves and grass, 20 cm thick. Moisten with a fine spray of water.

6. The third layer will be of green material, 10 cm thick. On top of the green material, place a 1 cm layer of top soil or manure.

7. Repeat steps 5, and 6 until the pile is about 1.5 metres high. The pile should not be higher than 1.5 metres or wider than 1.5 meters because the temperature can then become too high. It is also difficult to properly ventilate large compost piles. Cover the whole pile with a 5 cm layer of topsoil or manure.
8. Take a long, sharp, pointed stick and drive it into the pile at an angle. Use the stick to make air holes in the pile. After two to three days, decomposition should have started in the pile. The heap should get very hot inside.

9. The stick, when removed, will be warm. The stick also helps you to check on the condition of the pile from time to time. It will show when the pile is wet or dry. Check the pile regularly to make sure it is not too dry. The pile should be kept moist as a wet sponge. If it is too wet, the pile will rot. If it is too dry, the pile will not decompose sufficiently. Cover the heap with old sacks or plastic bags to conserve moisture if needed.

10. Within a week of completing the compost heap, the centre should have warmed up to its maximum temperature (around 60-70°) A little steam should be seen rising out of the hole left by the stick serving as a thermometer. If it is not hot you need to add some more manure or green plant material.

11. After a week or two, the pile will begin to cool. This is the time to turn the pile over and mix the layers together. After the first turn, you should turn the heap regularly. The materials will decompose faster if the compost pile is turned on a regular basis (once a week or once every two weeks).

Turning is done by putting the top layers down (following the opposite sequence when building the pile). Turn the material in the centre outward while the outside material should go towards the centre. This mixes the materials and adds air, which is essential for good decomposition. There is need for a spray of water as you are turning the heap. The compost would be ready after the fourth turning or six to eight weeks.

12. During the rainy season, cover the pile with grass or make the pile under trees or shade to prevent rain from leaching nutrients.
How to make compost

1. LEAVES, GREEN GRASS, MANURE, TOPSOIL, WATER

2. 1-1.5 metres

3. 15-20 cm

4. 30 cm

5. 20 cm

6. 10 cm
How to make compost (continued)
When to prepare compost

Compost can be prepared anytime during the year as materials become available. Try to make a compost heap each month. In the rainy season it can be achieved by cutting green vegetation, piling it and letting it dry. In this case, the compost pile should be protected from losing its nutrients when it is finally ready. This may be done by putting a plastic sheet or cover it with grass to prevent water getting into it and leaching valuable nutrients.

If you do not have enough organic material, you can plant green manure plants which you can harvest and include into the compost.

When to apply compost

On our soil, there can never be too much compost. Compost can be applied at any time of the plant’s growth as it is a complete fertiliser with all of the nutrients in it. For example, apply just before planting your seed and/or a few weeks after emergence. Vegetable gardens and nurseries need a good supply of compost all year around.

How to apply compost

There are different ways compost can be applied. In the vegetable garden or fields, it can be spread on the soil surface. To get a good effect using this method, apply 5 - 10 oxcart loads (5-10 tonnes) per hectare. You need less compost if you apply it directly in ripper lines or potholes.

Well decomposed compost can be dug-in. Never dig-in immature compost.
1. What materials are available locally to make compost?

2. What beneficial effect does the process of composting have?

3. What problems are you likely to meet when composting?