

## **SOIL FERTILITY MANAGEMENT PRACTICES FOR BETTER SOILS**

The principles of organic agriculture are based on a simple premise: “Feed the soil, to feed the plants”. As such, one of the most important tasks in organic farming and sustainable agricultural production is to increase the level of soil fertility. To be successful, farmers need to adopt practices that focus on improving soil productivity on their farms.

These include;

### **Minimum tillage**

Soil and water are the most important productive factor for crops. It is a living system. Therefore, soil cultivation should aim at minimum disturbance of the soil life. The most important reasons for cultivating the soil are to:

- Loosen the soil to facilitate the penetration of plant roots
- Improve aeration (oxygen and nitrogen from the air)
- Encourage activity of soil organisms
- Prepare the site for seeds
- Increase infiltration of water, reduce evaporation
- Incorporate crop residues and manures into the soil

### **Let the soil breath**

Like humans, soil organisms are required for healthy soils. Plant roots also need oxygen to breathe. Mixing mulch, compost or manure into the soil is important, they improve

aeration. Micro-organisms, insects, worms and other animals improve air circulation in the soil.

### **Mulching conserves water and enriches soil**

Mulching is a method to protect and to feed the soil. It is the process of covering topsoil with plant material such as leaves, grass, twigs, crop residues, straw etc. Mulch protects the soil from wind and water erosion, it improves the infiltration of rain water, no crust is formed and keeps the soil moist by reducing evaporation. While decomposing, organic mulch material continuously releases its nutrients thus fertilizing the soil. Apart from these, mulch is transformed to humus. If the process of decomposing is to be accelerated, organic manures such as animal dung may be spread on top of the mulch, thus increasing the nitrogen content.

Mulching has a lot of advantages, but it can be problematic if not done well. For example, green vegetative matter should not be used as it may encourage pests and diseases. Harmful organisms such as stem-borers may survive in crop residues. Plant material infected with viral or fungal diseases should not be used if there is a risk of a disease being transmitted to the next crop. Crop rotation is the best way to avoid these risks.

### **Take care of water**

Water is a blessing, but too much water is detrimental to plant growth. Soil erosion is a serious threat to soil fertility. It carries away topsoil, the most fertile parts of the soil.

- Contour planting reduces the speed of the water.
- Hedges planted along contour lines contribute to terracing and leveling the site over the years as eroded soil gets accumulated at the hedges.

- On steep slopes, walls or trenches are the only sufficient way to prevent soil erosion. Combined with plants such as fodder grass (e.g. Napier), they prevent erosion and also provide fodder for livestock.

Apart from mulching, cover crops are the most effective method of stopping soil erosion. The water drops reach the soil with less speed and therefore have a lesser smashing affect on soil crumbles, reducing the possibility of a run-off.

At the same time, cover crops act like a sun shade. Every plant which covers the soil and improves soil fertility can be a cover crop. For instance, leguminous plants enrich the soil with nitrogen: A crop like cowpea is drought tolerant, can fix nitrogen, yields eatable grains and can be used as an animal feed which is rich in protein. In addition, it is resistant to pest attacks.

### **Feed the soil to feed the plant**

This is the most important task for every farmer: to feed the soil with compost, manure and green manure (leguminous plants). Overused and unfed soils are dead soils.

### **Crop rotation**

Crop rotation is planting of different crops in the same field in consecutive seasons. If, for example, the land has been planted with maize and beans one year, the farmers can rotate these by planting another crop the following year or in the next season. The most suitable crops for rotations are legumes or fodder crops such as Lucerne, Desmodium, Mustard e.t.c, which help improve soil fertility.