



Plate 5. Pile of manure usually available in many homes.



Plate 6. *Mucuna* fallow for soil replenishment (improvement).

- However, for commercial farmers (>5 ha) broadcasting after harrowing (before ridging) seems to be a good practice. This method has a potential risk in high rainfall areas where the nutrients could be leached before crop establishment.
- If soil is very acidic, apply lime (500–1000 kg/ha). Most soil nutrients required by crops are optimally available when soil alkalinity/acidity is between 6.0 and 7.5.
- Add organic matter (e.g., manure, Plate 5) to the soil (at 8–10 t/ha).

### Pointers when using fertilizers

1. Soils rich in organic matter make more nutrients in fertilizers available to crops.
2. Sandy soils retain less of the elements in fertilizers than clay soils for crop use.
3. The higher the soil fertility, the lower a crop's response to fertilizers. Do not apply fertilizers when there is no need.
4. Under low soil moisture content fertilizers do not reach the rooting zone where they are most needed by crops. Do not apply when the soil is dry.
5. Under high temperatures nitrogen in fertilizers breaks down quickly (nitrification) and leaches from the soil before crops can use it. Apply when the temperature is low.
6. For small-scale farmers, fertilizer should be placed where it is needed, not broadcast.

### B. Recommended cultural practices

- Leave land to fallow, if depleted, for 3 or more years and manage it thereafter for long-term use.
- Plant fast-growing leafy leguminous crops such as *Mucuna* as live mulch to cover a degraded soil. It is a form of fallow which achieves good results (Plate 6) in 1–2 years. This also adds nitrogen to soil.
- Rotate crops on your land. Do not plant maize after maize or cassava after cassava on the same piece of land. Instead, plant cowpea after cassava or maize after yam the following year.

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# Managing soils for sustainable cassava production





Plate 1. A typical soil pit with rich topsoil.



Plate 2. Luxuriant cassava crop supported by fertile soil.



Plate 3. Poor cassava crop growing on poor soil.

Crops continually remove large amounts of nutrients from the soil. Soil destruction (erosion) and the removal of nutrients from top soil (leaching) reduce soil fertility more quickly. Therefore, we need to put back nutrient supplies naturally or by chemical methods through sound soil and crop management practices.

This extension publication provides a guide for extension officers, NGOs, and farmers on how to manage soils for sustainable cassava production.

## What makes a soil fertile?

- Large amounts of topsoil (Plate 1).
- Rich in macronutrients (nitrogen, phosphorus and potassium) and micronutrients (boron, cobalt, copper, iron, manganese, magnesium, molybdenum, sulphur, zinc, etc.)
- Soil acidity/alkalinity between 6.0 and 7.5.
- Large amounts of organic matter which improve soil structure and nutrient and moisture retention; good soil structure for drainage and aeration.
- Presence of organisms that support plant growth.

## How can you identify a fertile soil?

1. Vegetative growth; A fertile soil supports good crop growth (Plate 2). Yield is low in a poor soil and plant growth is stunted (Plate 3).
2. Soil analysis.
3. Visual symptoms or signs of nutrient deficiencies.
4. Visual symptoms or signs of active biological activities on the soil surface (e.g., worm casts).

## What makes a soil lose its fertility?

- Deforestation (cutting down trees) - exposes the soil to the harsh effects of rainfall and sunshine leading to soil erosion and removal of nutrients.
- Excessive tillage or cultivation - damages soil structure leading to increased erosion and leaching or removal of nutrients.
- Continuous cultivation - removes large quantities of nutrients from the soil within a short time.
- Bush burning - kills soil organisms, destroys soil structure, and enhances loss of nutrients from the soil.
- Wrong use of heavy machinery - leads to soil compaction or damage and their consequences.
- Improper use of inputs (fertilizers and herbicides) leaves residues, which inhibit activities of soil organisms and can make a soil poor.

## How do you restore soil fertility?

### A. Recommended chemicals

- Apply fertilizer to replace or supplement what crops will remove. Unless your soil analysis indicates otherwise, adding 400 kg or 8 bags of N:P:K 15:15:15 ha is good, based on national soil mapping and testing.
- Apply NPK micronutrient-based fertilizer or add 4-5 kg/ha agrolyser into non-micronutrient fertilizer.
- A combination of 200 kg NPK plus 2 t/ha of poultry hectare plus agrolyser can also be applied.
- Apply fertilizer at the recommended period, e.g., 6-8 weeks after planting.
- For small-scale farmers, apply fertilizer in rings around the cassava stand or band on both sides of the stand (Plate 4). One match-box full of fertilizer is enough for one stand. One level small Peak milk container holds enough for five stands.



Plate 4. Ring application of fertilizer on young cassava plant.