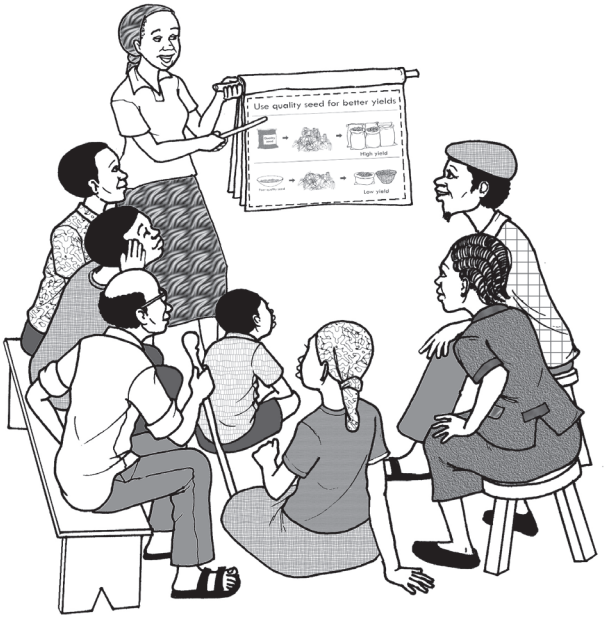
Cowpea
(Vigna unguiculata)
Seed Production
Module Training Set



FACILITATOR'S GUIDE

This guide will help you use the **Cowpea Seed Production Module Training Set**. The set is designed to encourage group discusson as well as provide information on production techniques of malakwang. As the facilitator, read through and familiarize yourself with the entire guide before facilitating any discussion for the first time.

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Using Visual Aids and Participatory Learning

We know that people learn better if they are actively engaged in the learning process. Studies have shown that we remember only 20% of the information we hear and 40% of the information we see and hear. However, when we see ideas represented visually and also actively engage with the information through discussion, debates, role-plays or other participatory teaching methods, learners retain 80% or more of the information that is presented to them.

Clearly as facilitators, it is worth the time and effort to create participatory, multi-sensory presentations. The **Cowpea Seed Production Module Training Set** is a tool designed to assist you in this effort. There is no one way to use it. We are always interested in improving our product, so if you have suggestions, comments, or questions please contact us.

This facilitator's guide is written in English but depending on your audience, you may need to make your presentation in the local language. Read through the guide and consider how you translate concepts into the local language.

PART 1. TRAINING CHECKLIST

Make sure you can answer YES to each question before beginning the session.

- ❑ Did you gather background information about the group you are going to train?
- ❑ Did you review the facilitator's guide and charts?
- ❑ Do you understand the key issues to cover for each chart?
- ❑ Does the venue have enough seats and space?
- ❑ Do you have all the materials you need for the activities and discussions?

Outline of a training session:

1. Welcome and introductions (5 minutes)
2. Review of the session objectives (5 minutes)
3. Large group presentation and discussion of the charts in the training module (Approximately 5 minutes per chart)
4. Ice breaker (5 minutes)
5. Break into small groups and answer the following: (20 minutes)
   - What are 3 things I learnt today?
   - What is 1 action I will take as a result of this training?
   - What questions do I still have about the topic?
6. Sharing of small group discussions in the large group (10 minutes)
7. Summarize and conclude the session (15 minutes)

PART 2. OBJECTIVES FOR THE TRAINING

By the end of this training, participants will have learnt:

- The benefits of using quality seeds
- To conduct a germination test
- To select a good site for cowpea seed growing
- To prepare land for planting
- To prepare and apply fertilizer/manure
- To plant cowpea seed
- When and how to weed
- To manage pests and diseases
- To carry out proper harvesting
- To process cowpea seed

PART 3. HOW TO USE THE TRAINING SET

- Show the first chart to the participants.
- Read the title of the chart.
- Ask participants to answer the question and explain what they know about the topic
- Reinforce accurate information given and correct wrong information.
- Read the tagline on the chart.
- Ask participants if they have any questions about what has been discussed.
- Go to the next chart.

PART 4. THE DISCUSSION SESSION

A) INTRODUCTION-SEED PRODUCTION

If you want to grow cowpea seed as a business, you should consider:

- Profitability compared to other seed crops
- Capital and skills required
- Available market and current weather conditions
- Registration process by the seed certified agencies

Seed production rules

Farmer-seed field registration process

As a seed grower, you must ensure the following:

- Apply and register with an official seed certification agency e.g. National Seed Certification Services (NSCS).
- The certification agency will review your application and send you a reply.
- Prepare a field map showing the location of the seed crop field.
- Use seed of a known variety with well defined descriptors (unique/different characteristics from other varieties and distinguished from the rest of the varieties which can be obtained from an official agency like a research station - NaCRRI, Namulonge.
- Register the field crop for inspection within the recommended time as per seed regulations.
- All contract seed producers must be linked to registered seed companies e.g Simlaw Seeds Uganda Limited, Victoria Seeds Limited or East African Seeds Limited

Field inspection

As a seed grower, you must register your crop for inspection. The inspection will look into the following:

- Previous cropping history
- Isolation distance from other crops of same species
- True to type of the crop variety grown
- Pests: insect pests, diseases and environmental pollution/ contaminations
- Proper crop husbandry practices

Farmers trained in basic knowledge in seed production and technologies qualify for registration as seed growers.

Suggested time for conducting field inspection

Time	Proposed stage of inspection	Factors assessed during inspection
First	At vegetative stage through flowering	• Rouge out other crop varieties, off-types, plants of other crop species, diseased and weak plants. • Assess variety purity as specified in the crop descriptor • Check for presence of noxious weeds.
Second	At maturity of the crop and before harvesting	• Assess variety purity as specified in the crop descriptor including morphological characteristics such as colour of seeds and pods. • Check disease incidence and pest infestation at maturity of the seed crop. • Check general conditions of the seed crop including estimated expected yield.
Additional	At any time or stage of crop growth	• Assess any other aspect that needs to be corrected following previous inspection, e.g. confirm rouging if done as required, follow-up on the disease or pest situation, correction of isolation.

PART 5: THE DISCUSSION SESSION

B) SEED PRODUCTION CHART SET

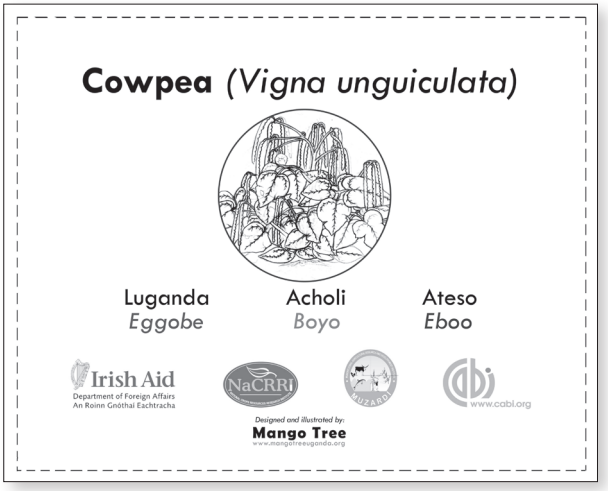

CHART 1: Logo chart*

Cowpea is known by different names across the country: in Luganda *Eggobe*, in Acholi *Boyo,* and in Ateso *Eboo*. The scientific name for cowpea is ***vigna unguiculata*.**

The cowpea leaves are usually picked when green and eaten as a vegetable.

**** This is a logo chart.***

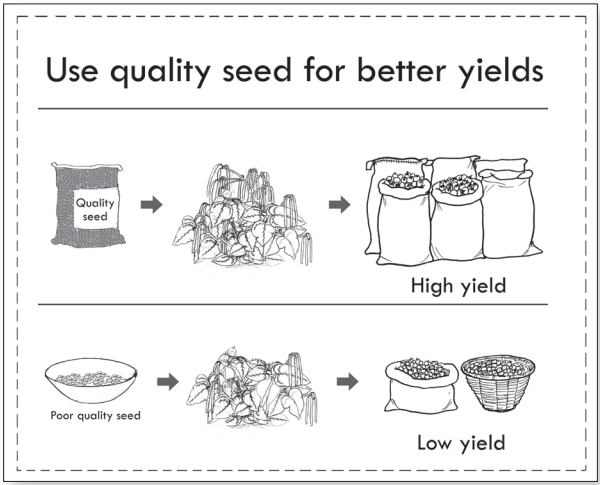

CHART 2: Use quality seed for better yields

Use quality seeds of a recommended variety. Quality seeds are a fundamental requirement for good production. Home processed seed can also be of good quality if it is well processed and stored. Using quality seeds ensures:

- Lower seeding rate
- Higher seedling emergence, usually above 85%
- Vigorous seedlings
- More uniform plant stand
- Faster growth rate
- Better resistance to pests and diseases
- Uniformity in maturity
- The plant is more tolerant to drought

Quality seed should be of uniform size, colour and shape. It should also be free of foreign matter such as weed seed, chaff and should be pest and disease free.

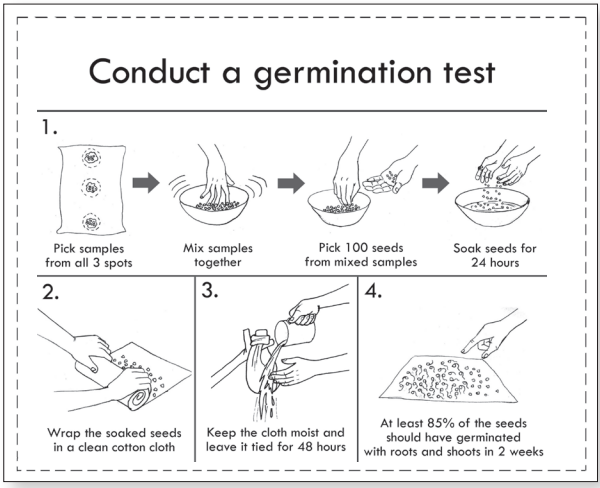

CHART 3: Conduct a germination test

Before sowing, test seeds for viability and germination potential by conducting a quick germination test. Follow the steps below:

- Get representative samples of seeds from the top, middle and bottom of the bag.
- Mix the sample seeds and count 100 seeds to use for the test (for small seed available, farmers can count 20 seeds).
- Put the seeds in a container of water for 24 hours. Later, drain off the water and wrap the seeds in the soaked cotton cloth and create a bag holding the seeds.
- Tie the cloth bag to a piece of stick. Tilt the stick to encourage drainage from the cloth bag. Keep the cloth moist by watering 3 times a day. Leave it tied for 48 hours.
- Then, untie the cloth bag and count the number of seeds that have fully germinated (both the shoot and roots have emerged).
- If 85 of the 100 seeds or 17 of the 20 seeds or more have both the shoot and root emerged within 2 weeks, then it is quality seed for planting.
- If the percentage is slightly less than 85 of the 100 seeds, increase the seed rate at planting. If the percentage is less than 40%, discard the seed. Do not use the seed because it will have poor yields.

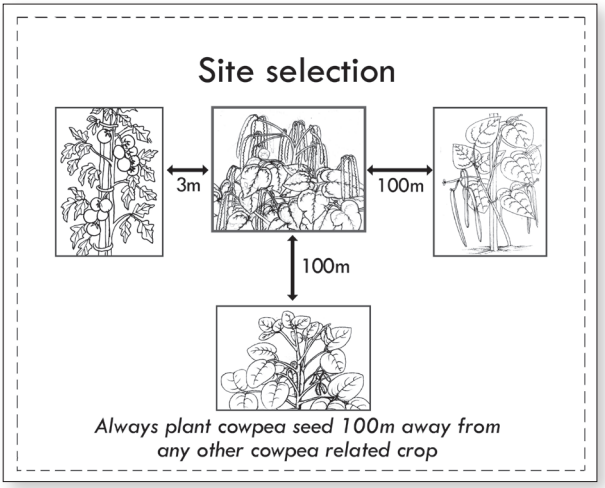

CHART 4: Site selection

- An open field is recommended as it will promote maximum flowering and fruiting.
- The field should be at least 100 meters away from any vigna unguiculata or cowpea relative crop. Isolation can be achieved by planting crops at different times to avoid an overlap of the flowering periods.
- In lowlands (wetlands), dig channels to drain or divert excessive water. Seeds grow well in lowlands (wetlands) during the dry season.
- Deep well drained fertile loam soil is best for growing seed.
- The site should not have tree shades as some trees have pests and diseases. Some times trees habour pests and diseases for the seed, .
- Loam soils are the best soils for growing seed. The soils should be fertile or fertilizer/manure should be added.
- Seed producers must ensure the seed crop is inspected during the vegetative stage through flowering, at maturity of the crop, and before harvesting.

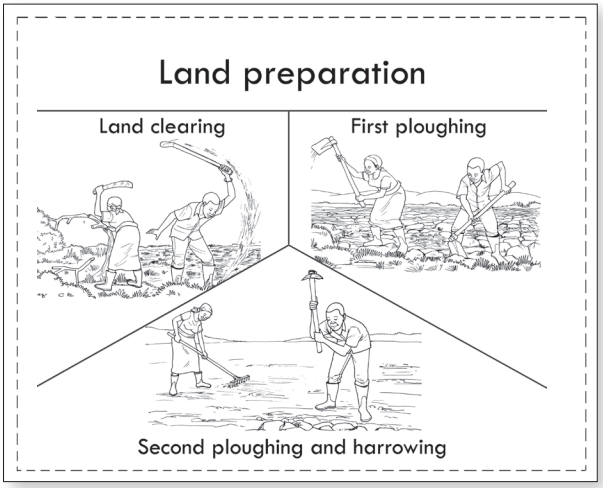

CHART 5: Land preparation

- Land preparation starts with clearing or cutting of all the tall grasses, removing trees including stumps, cutting down bushes, and removing stones and other obstacles from the field. This is done to ease the ploughing processes and all other farming activities.
- Do not burn the bushes because burning exposes the soil to erosion and also reduces soil fertility due to loss of nutrients.
- After clearing the land, plough the field for the first time and ensure that the soil has very small debris.
- If the field has perennial weeds (e.g couch grass, wondering jew, star grass and spear grass), spray with glyphosate herbicide such as weedmaster or round up. Remember to contact an agriculture extension worker for guidance on herbicide.
- A second ploughing is followed by harrowing until the soil makes fine tilth (very small particles).

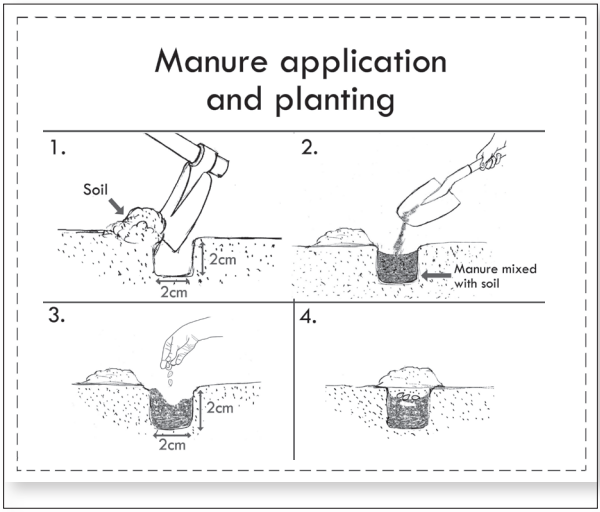

CHART 6: Manure application and planting

- Farmers are encouraged to apply organic fertilizer to improve the soil fertility. This will result in higher yields.

Note: *Other fertilizers can also be good as long as these are also decomposed. Inorganic fertilizers e.g UREA, NPK can also be used but only after advice from your agriculture extension worker or agrodealer.*

Cowpea are planted by direct seeding.

- Space cowpea at 50cm x 20cm.
- Dig a hole of 2cm x 2cm. Fill the hole with manure/fertilizer.
- Open a hole of about 1cm
- Place 3 seeds in the hole and then cover lightly.

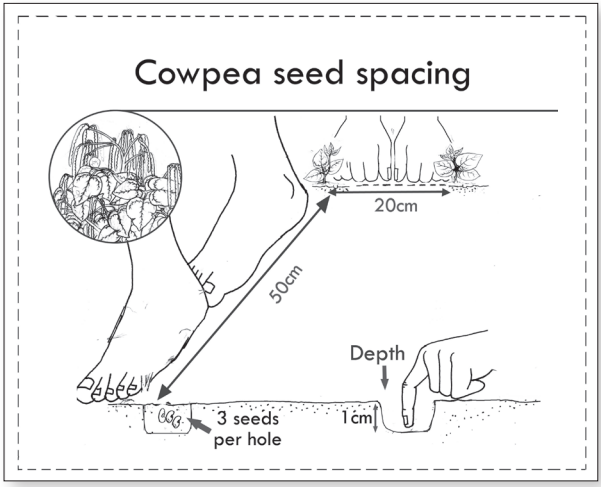

CHART 7: Cowpea seed spacing

Cowpeas are planted by direct seeding. The following factors are important to consider when planting:

- Plant a maximum of 3 seeds in each hole.
- Spacing should be at 50cm between rows and 20cm between plants at a depth of 1cm.
- After the seedlings emerge, thin to leave only 2 strong plants.

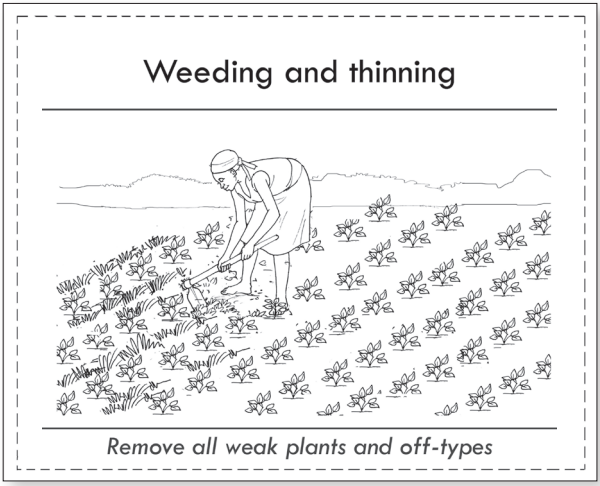

CHART 8: Weeding and thinning

- Timely weeding is important because it will lead to increases in the yield.
- Timely weeding minimizes competition for food and light between weeds and cowpea. It will give pumpkin better conditions to grow.
- Weeding also reduces pest and disease infestation at the early stages which will lead to increased yields.
- Weeding should be done as soon as weeds emerge and before they flower. This will reduce the risk of weeds spreading.
- Thinning is done at the time of weeding. During thinning the less vigorous, off-types, and diseased plants are removed. The good quality thinned plants can be sold or consumed at home.

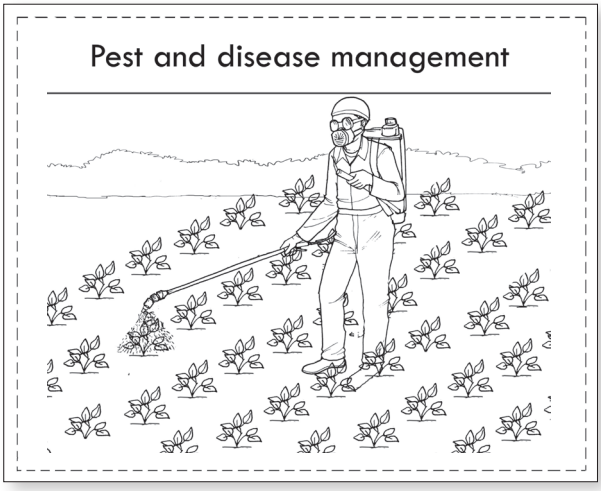

CHART 9: Pest and disease management

- Pest and disease management should be a continous effort by the farmer to ensure early intervention in case of an outbreak.
- Both organic and inorganic pestcides can be used to control pests and diseases.
- It is recommended to always seek advise from an agricultural extension worker on pest and disease identification and management.

Note: *The farmer should monitor the field to ensure quick action is taken in case of an out break of pests and diseases.*

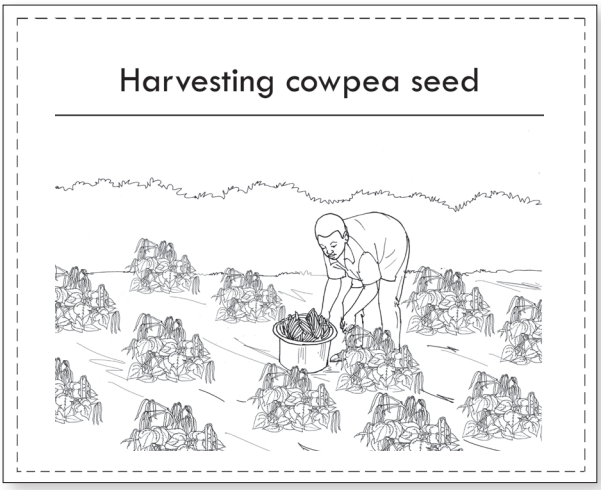

CHART 10: Harvesting cowpea seed

- Cowpea seed is ready for harvesting within 50-55 days after planting.
- You can know that the seeds are ready for harvesting when the plant turns a light shade of brown and the leaves start falling off.
- It is recommended to hand pick pods since there is uneven maturity of pods and seed for most indigenous vegetables.
- Delayed harvesting causes loss in seed quality, damage by pests, rain damage, and secondary disease infestation.

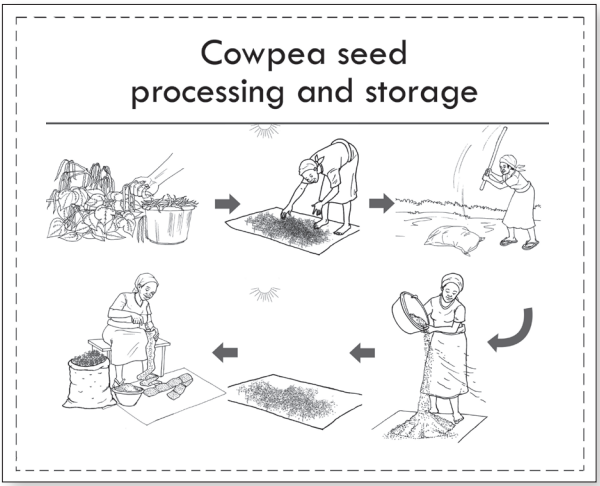

CHART 11: Cowpea seed processing and storage

Follow the steps below to extract cowpea seed:

Step 1: The pods are ready for harvesting when the plant turns a light shade of brown and the leaves start falling off. Pluck the pods off the stalk with hands.

Step 2: Place the harvested pods on a flat surface under the sun for drying. This will take 1-3 days depending on the weather.

Step 3: Put dry pods in a bag and thresh by gently beating on the bag using a wooden stick.

Step 4: Carry out winnowing to remove the chaff.

Step 5: Put back seed into the sun to dry for 1-2 days depending on weather.

Seeds are ready for storage at 6-8 % moisture content. To determine if seeds are properly dry, pinch with fingers or use the salt method to determine the moisture content as follows:

- Take 20g (3 bottle tops) of salt and 160g (one handful) of seeds.
- Mix the two together and put in a plastic, glass, or any other

transparent bottle and seal completely with a bottle top (you can also use polythene bag without any holes which will need to be tied to make it airtight).

- Shake vigorously for 2 minutes.
- Allow to settle for 15 – 30 minutes.
- If the walls of the bottle or polythene bag become foggy or cloudy then the moisture content is still more than 15%.
- Continue drying the seeds.

Step 6: Store seed on a raised platform in a cool, dry, well ventilated place.

- The main factors determining the storage life of seed are the moisture content and temperature.
- Seed may be treated to protect it against infestation by insects and infection by seed-borne and/or soil-borne diseases causing micro-organisms (plant pathogens) prior to and during germination and seedling establishment.This operation is referred to as seed dressing or seed treatment. The ideal chemical for seed treatment should be:
  - Highly effective against pathogenic organisms and insects.
  - Relatively non-toxic to plants.
  - Stable for a relatively long period of time during seed storage.
  - Easy to use.
  - Cost effective.

Packaging, labelling and sealing

- Packaging material should be durable, free from defects and allow seed to retain viability.
- Treated seeds are packaged in clean bags and containers of various sizes according to the customers demand.
- Seeds of all classes must bear the official label on to each bag or container, which shows the lot number, type of crop, name of variety, class of seed, germination and purity levels and the packing date and possible expiry date.

- Containers should be fastened or sealed according to national requirements.

Note: *Poor methods of storage contribute to rapid seed detoriation for example storing of seed on a flat ground ,beating of harvested fruits and storing them on wet floor.*

Facilitator's Notes

How to make compost manure

Materials:

Dry materials: Sorghum, maize, millet straws, bean, soybean, groundnut haulms, napier grass

Green materials: Weeds, hedge trimmings and food peelings

Animal wastes: Cow dung, poultry litter, goat and sheep droppings

Covers: Top soil, wood, plastic sheeting, carpet scraps and dry grass

Mixer: Water and a turn stick

1. Prepare a pit of reasonable depth. It can be any length depending on the amount of materials available.
2. Lay twigs or chopped dry materials at the bottom.
3. Add compost materials in layers, alternating moist and dry. Moist ingredients: food scraps, tea bags and seaweed. Dry materials: straw, leaves, sawdust pellets and wood ashes.
4. Add manure, green manure (napier grass and grass clippings) or any nitrogen source.
5. Keep compost moist. Water occasionally, or let rain do the job.
6. Cover with anything you have - wood, plastic sheeting, carpet scraps, topsoil or dry grass/straw to keep it moist, but not soaked and sodden.
7. Turn every few weeks give the pile a quick turn with a pitchfork or shovel.
8. Once your compost pile is established, add new materials by mixing them in, rather than by adding them in layers. Mixing or turning the compost pile is key to aerating the composting materials and speeding the process to completion.

Note: *If you want to buy a composter rather than build your own compost pile, you may consider buying a rotating compost tumbler which makes it easy to mix the compost regularly.*

References:

Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA-2012); Production of Quality Seed of African Indigenous Vegetables - ***Training Manual***

National Agricultural Research Organisation; Nakati (Solanum aethiopicum) - ***Seed Production Brochure***.

Acknowledgements:
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