The Organic Farmer

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Intercropping maize and beans is practiced by many farmers in East Africa due to lack of land. However the practice has advantages if the crops are well managed. Beans help in fixing nitrogen and also help diversify the range of crops planted by farmers increasing both yields and income. Farmers should take advantage of the short rains to grow both

Maize and beans suitable for the short rains

Peter Kamau | The short rains season is just about to start. It is important that farmers start preparing their land after harvesting maize and beans in the months of July and August 2019 in areas with two rain seasons (medium altitude areas).

Farmers need to grow adequate maize and beans for their own home consumption and also be able to sell if the current maize shortage persists.

Good prices due to shortage

Already, most of the maize harvested in the months of July, August and September 2019 may have been exhausted due to the demand caused by the shortages. In places where the maize has matured such as parts of Western Kenya, farmers tend to sell their maize as green maize, which fetches a higher price than dry maize. So there is need to prepare early so that they are ready for planting as soon as the rains start in October. This will replenish their maize stocks if they manage their crop well.

The following are maize and bean varieties that farmers can plant for the short rains. For beans, there are new varieties that are fortified with iron and zinc, which means that they are quite nutritious and we encourage farmers to buy them (They will in the market in September just in time for planting (see below):

Maize varieties suitable for the short rains in medium altitude areas:

- **Kenya Seed Company:** H513, H515, H516, H517, H518, H520, H521, H522.
- **Western Seed Company:** WH507, WH505, WH403.
- **African Seed Company:** SC Tembo 73, Punda milia 529.
- **Seedco Company:** Duma SC 403.

Low altitude areas:

- **Elgon Kenya Ltd:** Prestige 02, WE 1101.
- **Seedco Ltd:** SC Sungura 30, Tosheka MH 401.

Dry land varieties: DH01, DH03, DH04, KDV-6, KDV-1, Katumani composite **(KALRO)**.

New bean varieties (fortified with, Iron and zinc)

Angaza variety (East African Highlands) Mobile: **0733 333 161, 0722 207 207.**

Faida variety (East African Seed Company) Mobile: **0733 333 161, 0722 207 207**

Nyota variety (KALRO Katumani) Mobile: **0710 906 600**

More information on Page 3 and 6.

Dear farmer,

Farmers are eager to start preparing for the short rains expected later next month or early October 2019. Although it is increasingly becoming difficult to make accurate weather predictions by Meteorological Department, farmers are advised to plant a portion of their land early before the rains, say in late September and the other portion when the rains start. This method has worked very well for some farmers because when the crop fails in one portion, the maize second portion will survive helping them to save the cost of seeds, fertilizer and labour.

It is advisable for farmers to go for maize varieties they know will do well in their areas. When trying a new variety, it is wise to plant a few lines in a marked portion of your land. It is only when you observe its qualities that you can plant it in large-scale (the varieties we give here are just a guide on varieties farmers can choose from).

As for beans, many farmers recycle beans they planted the previous season. While this is okay because beans are self pollinating, they lack growth vigour since they may be diseased, shriveled or infested with pests. Proper selection and even dressing with organic fungicides and biopesticides will help minimize disease and pest attacks before they germinate. Bean yields are very low in Kenya with most farmers harvesting 2 to 4 bags an acre instead of 8 to 10 bags due to inferior quality seed and poor management. Buying certified bean seeds can help farmers to increase yields significantly.

For farmers who want to plant beans for sale, new regulations by the Agriculture and Food Authority (AFA) now require that farmers should only sell one variety and not mixed varieties as they have done before. If you are selling Angaza Variety, it should be Angaza variety only *(see page 6)*.

Soil fertility is very important if farmers are to improve the productivity of their land. One way to do this is to apply compost manure. Farmers are advised to keep making compost every time they have enough materials for its preparation. Unfortunately, many farmers do not know how to make good quality compost and this makes them lose their valuable soil nutrients through leaching and evaporation. We hope farmers will follow the guidelines we have given in this issue to ensure they get high quality compost that improves soil fertility for good yields and income. *(See page 4)*

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Get seedlings for planting and sale from your own nursery

Farmers can earn extra income by establishing tree nurseries for planting and for sale to other farmers. Always buy certified seed from government forests and certified tree nurseries.

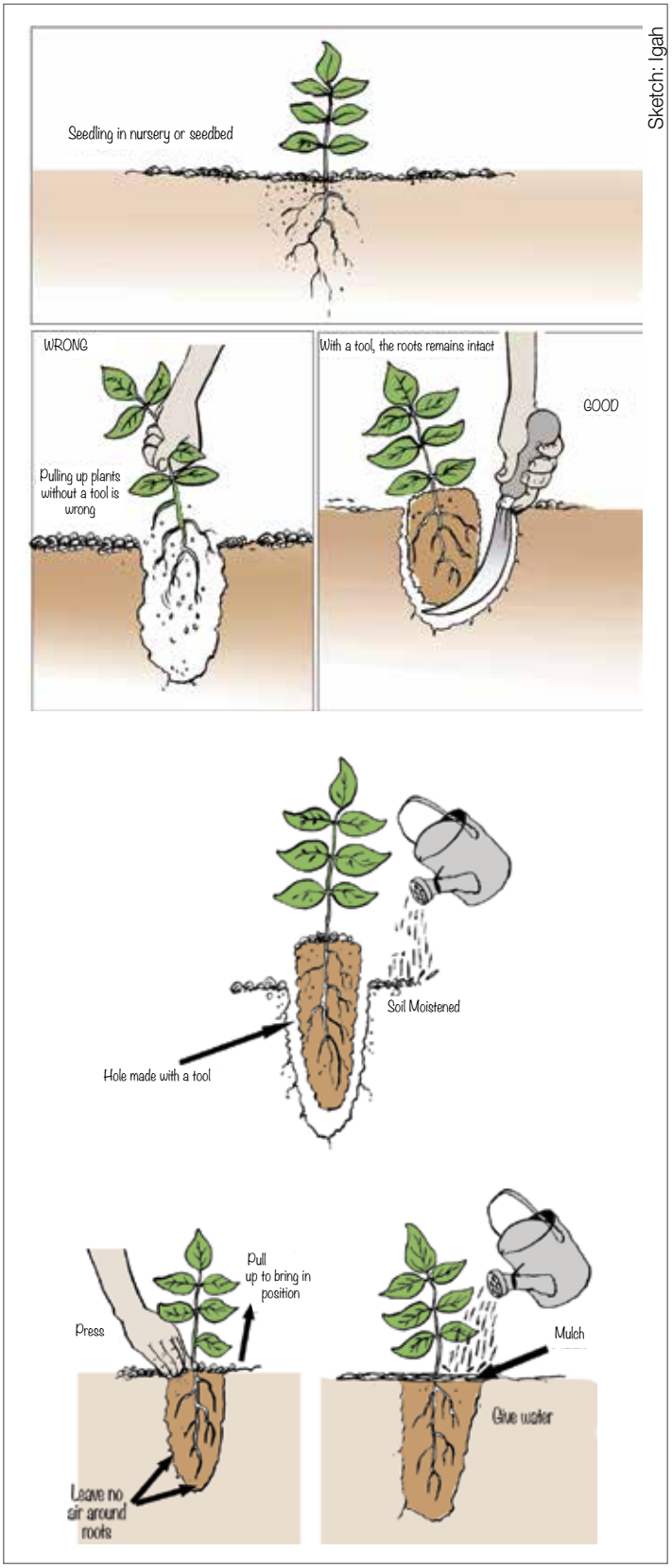
Lilian Maina | A tree nursery is an area where seeds are nurtured into young trees ready for planting in the field. This can be a temporary nursery; used for a single season or a permanent nursery where seedlings are nurtured year after year. The size of the nursery depends on the number of seedlings required either for their own use or for sale. If the seedlings are for sale, one has to analyze the availability of market and tree species they intend to grow or sell.

Site identification: When deciding where to put up a tree nursery, one should consider the following key factors:

A reliable water supply source: Tree seedlings require a lot of water while in the nursery. An ideal location for a tree nursery should have a permanent source of water e.g. near stream, river or piped water. A bore hole is ideal but may not be reliable at all times. This ensures that the seedlings are easily watered as required.

Easy accessibility: The nursery site should be easily accessible by both foot and by vehicles. This is necessary for nursery material delivery and need for workers to access the site when transferring the seedlings ready for transplanting.

Gently slopping and well-drained soil: The most ideal site for a nursery is a level or gently sloping ground. It is advisable to surround your nursery site with a live fence (hedge). This type of fence helps in reducing water loss from seedlings by acting as a wind break. If a farmer is establishing a nursery and all their land is on a slope, they may terrace the slope to have a level site with trees on the leeward side to act as windbreak.



Sketch: Igah

A standard nursery site should have a shed, a seed sowing bed, soil storage area, soil mixing area and a seedling bed. If the nursery is far out in the field, one should consider having a store for keeping working tools, equipment and nursery materials.

Selecting seed

A farmer needs to decide what type of seeds they want to grow. This depends on a number of factors:

- The purpose of planting; the specific type should fulfil their purpose for example soil and water conservation (in catchment areas), improvement of soil fertility (supply of mulching materials, green manure), animal fodder, timber, firewood or charcoal, crafts material or for fruits or even providing shade.
- The environment; consider the environment that support the growth of specific species. These factors include altitude, soil type and the climate conditions.
- Ability of the tree type in providing a range of purposes.

After deciding on the species to be planted, the farmer then has to consider the availability of good quality seeds. One can either buy or collect seeds for sowing. When buying ensure seeds are of high standard, have been recently tested for germination and the percentage indicating any pre-sowing treatment or any special propagation conditions needed. Read the label carefully. Ask for advice from a tree seed expert about the storage and pretreatment requirements if necessary.

Collect healthy seeds

A farmer can also collect seeds for sowing. Collect seeds when trees are at pick of production. Collect from healthy trees as health characteristics are passed from parent tree to the seeds. Do not collect damp seeds as they are hard to store and they tend to rot often. Store seeds in a cool well

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The Organic Farmer is an independent magazine produced monthly for the East African farming community. It promotes organic farming and supports discussions on all aspects of sustainable development.

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Plant the right maize variety for your region

All maize varieties are developed for particular climatic regions depending on rainfall, altitude, type of soil and temperatures. For farmers to get good yields, they must plant varieties relevant to their climate regions. Below we provide information on types of seeds for various growing areas.

Medium maturing varieties

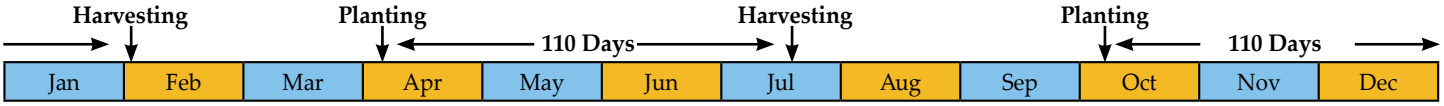
Medium maturing varieties are more suitable for mid to high altitudes which have two rain seasons permitting two well-defined growing seasons.

Variety	Company	Days to maturity
H513, H515, H516, H517, H518, H519, H520, H521, H522, H524, H525, H526, H624,	Kenya Seed Co.	120-180
WH403, WH502, WH504, WH505	Western Seed Co.	135-165
Simba61, Duma41, Duma43	Seedco	100-140
WH507	Western Seed Co	120-150
WH402	Western Seed Co	130-160

Source: *USAID Maize Improvement Programme.*

All the above varieties can be planted in the following areas: Kakamega, Busia,Kisii, Homa Bay, Suba, Bungoma, Bondo, Nandi, Kericho, Bomet, Narok, Sotik, Trans-Mara, Muranga,Kiambu, Kirinyaga, Embu, Meru,Machakos, Kitui and Mwingi.

Early maturing varieties



Variety	Company	Days to maturity
PH1, PH4, Katumani B, DLC1, DH01, DH02, DH03, DH04	Kenya Seed Co.	75-120
WS103, WS909, WS202	Western Seed Co.	100-120
Duma41, Duma43	Seedco	100-120

Source: *USAID Maize Improvement Programme.*

All the above maize varieties can be grown in the following areas: Taita Taveta, Mwatate, Lamu, Mpeketoni, Homa Bay, Ugunja and Siaya.

Be careful when buying seeds

Farmers also need to be careful when buying seed because there are lots of fake seed in the market. Farmers should keep to the following guidelines to avoid being cheated:

- Buy your maize seed from well-known stockists and reputable seed merchants. Every seed stockist has a licence from the Kenya Plant Health Inspectorate Service (KEPHIS).
- Buy your maize seed early enough when all the popular varieties are available or when stockists have adequate seed; fake seed vendors mainly cheat farmers when there is shortage of popular seed varieties. They repackage commercial maize and sell it to farmers as genuine seed.
- Sometimes, seed stockists sell maize seed that is expired, hence farmers should check expiry dates to ensure the seed they buy is not expired.
- All genuine seed has company and inspection labels from KEPHIS inside the seed bag. Immediately you open the seed bag, check the tags to make sure that the seed is genuine.
- Always stock the seeds in a cool dry place to ensure they remain free of moisture, humidity or excess sunlight.
- Ensure that your maize is well-managed throughout the production period. Poor management such as late weeding poor soils, or late land preparation will always lead to poor harvest.

Farmers plant maize in Kapcherop, Elgeyo Marakwet County

How to make compost in your organic farm

Even for farmers with a few animals, compost making should be a continous process. Make small heaps and always cover your compost to preserve nutrient loss through evaporation and leaching.

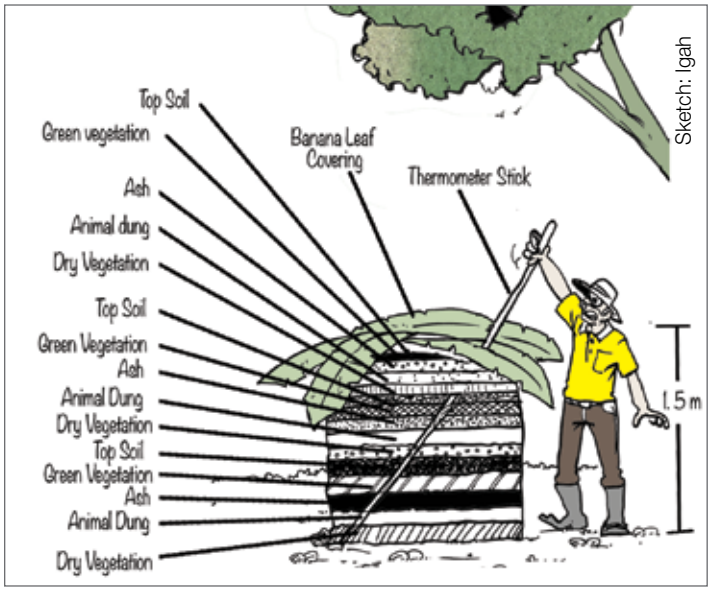
Teresia Njuguna | One of the most important things in compost making is the selection of composting materials. This should be done when one has a variety of materials that are rich in nutrients. In the next issue, you will find a list of materials that can be used in composting and their nutrient values.

Factors to consider

Compost heaps require three conditions to mature successfully. That is air, water and heat. It is however important for farmers to know that composting method should be selected according to the climate type in the composting area. Hot climate makes organisms more active thus organic materials are broken down faster than in cold climate.

Composting method suitable for areas with high rainfall

- Select a location close to where you want to use the compost to make transportation easy. The location should be sheltered from wind, rain, sun and runoff water.
- Measure a rectangle of 120cm (4 feet) wide and 150cm (5 feet) length or more. The length depends on the amount of compostng material you have. **Note:** The rectangle should not be wider than 120 cm. This is because you must be able to work on the compost without stepping on it.
- Being a rainy area, the compost can be made above the ground to ensure it is safe from flooding or below the ground depending on the chosen area. If constructed above the ground, scrub the grass and loosen the top few centimetres of soil with a *jembe* (hoe).
- Dig a shallow pit about 30 cm (1 foot) deep. Put the soil on one side, you will need it later.
- Chop up any materials that are too big to fit into the pile and decompose easily. Begin building a compost pile by putting a bottom layer of rough materials such as maize stalks and hedge cuttings in the pit. This layer should be about 30 cm thick. Sprinkle some water on this layer.
- Add a second layer of dry vegetation, hedge cuttings or grass. This layer should be about 15 cm thick (6 inches). Sprinkle water on this and to ensure it is moist throughout.
- Put on a third layer of animal manure. The manure contains micro-organisms which are vital for decomposition.
- Sprinkle some ash or dust on this layer. The ashes contain valuable mineral including potassium, phosphorus, calcium and magnesium. The ashes also neutralise the acids produced during decomposition, especially by the animal manure.
- The next layer should be green leaves from high-protein leguminous trees like *calliandra, leucaena* and *sesbania*. You can also use hedge cuttings of plants like tithonia.
- Sprinkle on a little topsoil or old compost. The topsoil contains bacteria which are useful in the decomposition process.
- Add more layers in turn, starting with dry vegetative materials, then animal manure or biogas slurry, followed by wood ash, green vegetation and topsoil. Remember to sprinkle water on every layer. Build the pile up to 1.5 m (5 feet) high. A well-made pile has almost vertical sides and a flat top.
- To complete the pile, cover it all over with a layer of topsoil about 10 cm (4 inches) thick. This layer prevents plant nutrients from escaping from the compost pile. Lastly, cover the whole with dry vegetation such as banana leaves to reduce moisture and nitrogen loss through evaporation.
- Take a long, sharp, pointed stick and drive it in at an angle so that it passes through the pile from top to bottom. This stick will act as your "thermometer". After 3 days, the decomposition will have started in the pile, and the stick will be warm when you pull it out.
- Pull the "thermometer-stick" out from time to time to check the progress of the pile. You can also tell from the thermometer how dry or wet the pile is: It should be moist but not wet.
- Sprinkle water on the pile occasionally (about every 3 days, depending on the weather). If it has been raining, you may not need to water the pile.
- The compost should be ready after 4 weeks. Check the temperature of the pile to make sure the compost is ready- if the pile is still hot, this means the decomposition process is still going on and the compost is therefore not ready. Finished compost should have a fresh, earthy (like soil) smell and should contain no grass, leaves, or animal manure.
- You can store compost by covering it with a layer of banana leaves or polyethylene paper.



Note: If you have few animals (hens cows, sheep pigs or goats) make small heaps of compost and keep working them into the soil. This way, you will gradually build your soil fertility and improve crop yields and income.

Composting method suitable for dry areas

The pit method of making compost conserves moisture, so it is useful in areas with low rainfall and a long dry season. Do not use it in wet areas, as the compost may become waterlogged.

- Dig a pit 1.2 m (4 feet) wide and 0.6 m (2 feet) deep, and as long as you need for the amount of materials you have.
- Build a pile in the pit, using the same method as in the pile method (see above).
- Add a layer of wood ash (if available) along with urine and mud.
- Next spread a 5cm layer of bedding with cattle dung and soil. Sprinkle with water until moist.
- Continue adding layers until the material is 30 cm above ground level and sprinkle water.
- Turn over the heap three times. Moisten with water each time. Decomposition needs proper mixing as well as circulation of water and air. You can ensure this by turning over the material three times:
- Remember the heap will shrink as it decomposes.

Farmers should always cover their farmyard manure to stop loss of nutrients through evaporation and leaching when it rains

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FAO has set diet guidelines for healthy living

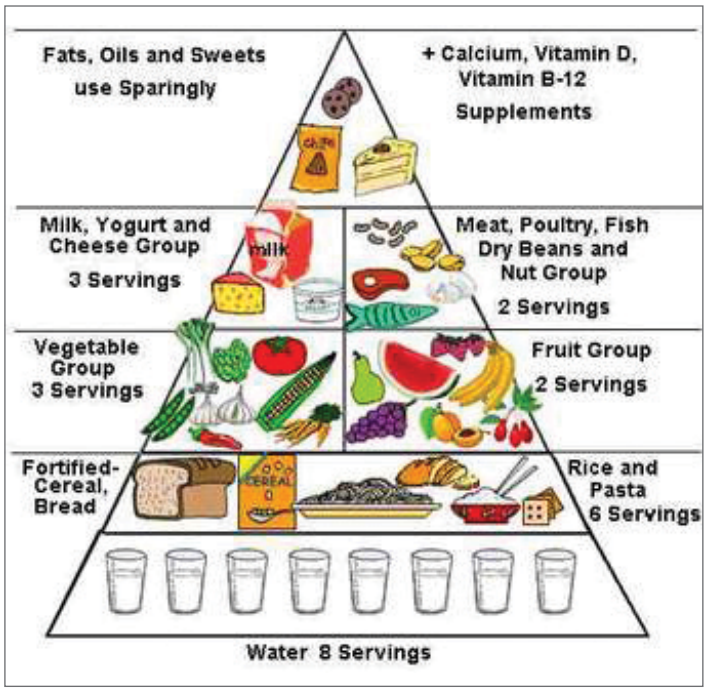
On a daily basis, an adult should eat about half a kilo of fruits and vegetables. About one third of total energy foods should come from fish, avocados, nuts, sunflower or soybean oil and very limited amount of salt. Children below 6 months should entirely depend on mother's milk.

Mary Mutisya | The consumption of a healthy diet throughout the life course of an individual not only helps prevent malnutrition in all its forms, but also assists in the management of life-style diseases and related medical conditions.

For these reasons, therefore, the United Nations Food and Agriculture Organization (FAO) has come up with food based dietary guidelines for various countries to improve healthy eating habits and lifestyles. The guidelines consist of food groups in the suggested proportions for a good diet as well as messages about lifestyle, such as recommendations of regular exercise and warnings to avoid excessive alcohol consumption.

Food-based dietary guidelines should also be protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources. Through FAO, the member countries are guided on how to develop, revise and implement the guidelines in line with most current scientific evidence.

Currently, more than 100 countries in the world have developed their own food-based dietary guidelines which in most cases are determined by the country's nutrition status, food availability, food preparation in various cultures and eating habits. Different countries have specific food guides, which in most cases, are culturally specific for the population and most times act as an important symbol in the nation's nutrition communication and education strategy.



Food guidelines are in most cases developed for all healthy individuals over two years of age with specific guidelines for children under two years and people with special nutritional needs, such as pregnant, breastfeeding mothers and the elderly.

Eating habits should take into account issues such as age, gender, lifestyle and the degree of an individual's rate of physical activity, culture, food customs. Locally available foods should always be considered as a priority when deciding what to eat.

For the majority of countries, a healthy diet is guided by the following considerations:

Basic food-based dietary guidelines for adults

- It should contain at least about half a kilogramme of fruits and vegetables per day excluding potatoes, sweet potatoes, cassava and other starchy foods.
- Less than 10% of the total energy intake should be from free sugars (added sugars such as those found in processed juices, chocolate, biscuits cakes etc) which is equivalent to 50g (or about 12 level teaspoons) for a person of healthy body weight consuming about half a kilogram (500g) of carbohydrates per day.
- Less than one third of total food that provides energy should come from fats. Unsaturated fats such as that found in fish, avocado and nuts, sunflower, soybean, canola and olive oils, are preferable to saturated fats (found in fatty meat, butter, palm and coconut oil, cream, cheese, ghee and fat from pigs). Intake of trans-fats (which increase bad cholesterol in the blood like those found in baked and fried foods, pre-packaged snacks, pizzas, pies, cookies, biscuits, wafers, cooking oils and spreads should be taken in small quanties. Saturated fats such as those found in meat, dairy products from sheep, goats and camels should also be taken sparingly.
- It is suggested that the intake of saturated fats be reduced to less than 10% of total energy intake and trans-fats to less than 1% of total energy intake. Industrially-produced trans-fats are not part of a healthy diet and should be avoided.
- The diet should contain less than 5g of salt (equivalent to about one teaspoon) per day. The salt should be iodized to assist in the prevention of goiter.

For children below two years

Exclusive breast feeding should be carried out through the first 6 months after birth. Breast milk is wholesome and is able to supply the baby with all the nutrients they need. Mothers should thus be highly encouraged to breast feed for as much as they can. Afterwards, weaning should follow using healthy foods. Parents should not overfeed their small ones as their bodies have a mechanism of auto regulating the number of calories they need per day.

Fore more information on healthy food https://www.infonet-biovision.org/healthy_food

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- First turning: 10-15 days after filling the pit
- Second turning: 15 days later
- Third turning: After 2 months.

At the third turning, you can take it out of the pit and put it back in. This helps the bacteria to get nitrogen out of the air.

How can you tell your compost is mature?

Maturity in compost means the composting process is complete and the biological activity has slowed down. It is crucial for compost makers to ensure it is mature before it is applied to the soil. Immature compost or compost that is not ready can harm your plants by consuming certain resources.

The high level of microbial activity in unfinished compost requires large intake of oxygen. This oxygen is obtained from the surrounding soil thereby suffocating the roots. Also the high level of carbon to nitrogen ratio (C:N ratio) of immature compost means that, as the carbon compounds continue to breakdown, it will draw nitrogen from the soil leaving it with a deficiency. You do not want to cause harm to your plants by using immature compost.

Here are a few characteristics of mature compost that can help you.

- It is crumbly, loose and humus like.
- It is dark brown in colour.
- It has a rich earthy smell (No unpleasant smell).
- The original feedstock or used materials are not readily recognized.
- The compost pile has shrunk to about 1/3 of the original volume.

Fore more information on How to make compost in your organic farm. For more information on composting https://www.infonet-biovision.org/PlantHealth/Composting

Using right bean varieties and care increases bean yields

Farmers can harvest up to 12 Bags of beans per acre if they managed their crop well. Choosing the right bean varieties including certified seeds can also help farmers to produce more.

Faith Kiptim | Beans are an important food source of protein to many Kenyan families especially in rural areas where most of the people depend on farming for a living. Beans are a leguminous crop and thus fix nitrogen into the soil which improves soil structure and fertility. Intercropping of beans with other crops such as maize benefits such crops from the nitrogen fixed into the soil. With good management and choice of the right varieties, farmers can get up to 12 bags of beans per acre. Growing the right varieties for specific areas, ensuring early land preparation, timely planting, weeding at the right time and proper pest and disease management can enable a farmer achieve an impressive yield.

Conditions for beans to grow well

Altitude: Depending on the variety, beans do well between 1000-2000m above sea level. They grow and mature faster in low altitude areas.

Rainfall: Beans grow best in well distributed rainfall areas. Too much rains cause rotting and difficulty in harvesting and longer dry spells strain the crop leading to lower or reduced yields.

Soil type: Beans require well drained soils which have high organic matter and a pH of 6-7. Beans do not thrive in water logged soils because they require aerated soils. Water logged soils may cause root rotting and leaching of nutrients.

Land preparation: Land preparation should be done before the start of the rains, unwanted plants should be dug and used as mulch during the dry season. The land should be deeply ploughed and compost manure added if the land is not fertile.

Seed quality: It is advisable to buy and plant certified seeds from recognized seed agents. Most local farmers prefer selecting seeds to plants from their stock. They should be careful not to select seeds which are damaged, diseased and wrinkled. Before seeds germinate, they are prone to diseases and pests. To prevent this, seeds should be treated with organic fungicides and pesticides before planting.

Inoculation: This is the process of mixing bean seeds with nitrogen-fixing bacteria called rhizobium (Farmers can contact Mea Ltd, Nakuru on Tel. **0725 143 996** and ask where they can buy rhizobium in their regions). Rhizobium enables the crop to take in more nitrogen which is a major nutrient for growing beans. It is mixed with seeds before they are planted. Inoculation helps improve yields. Mixing bean seeds with soil from fields previously planted using rhizobium also inoculates the seeds.

Good management can increase bean yields and income for farmers

Planting: Beans should be planted when the rains start. Planting later than this will result in low yields or crop failure.

Spacing: If the beans are monocropped, they should be planted in rows of 50cm by 10cm (one seed per hill). If weeding will be done by machine or animal drawn weeders, right spacing should be considered. If they are intercropped with maize, plant two rows of beans 15cm between the rows of maize (one seed per hill). Alternatively, plant one bean row with two seeds per hole.

Seed rate: Depending on the variety planted, the amount of seed required for a given area will vary. The bigger the size of the seed, the more the quantity of the seed required.

Fertilizer application: Decomposed compost or farmyard manure is highly recommended in areas where soils are low in organic matter. The manure should be mixed with top soil at least one week before planting. 2.5 tons (about 15 wheelbarrows) of Farm Yard Manure or compost should be applied for every one acre.

Weed control: When beans are planted alone, first weeding should be done 2-3 weeks after they sprout and second weeding three weeks later before they start flowering. Avoid cultivation when the crops flower and when the field is wet to avoid spread of diseases.

Harvesting: Harvesting should be done on time when all pods have turned brown and hard before they start shattering seeds. Before threshing, spread them out after harvesting and let them dry in the sun.

Storage: Beans should be stored in a cool dry and clean place which is well ventilated in airtight bags.

Fore more information on beans https://www.infonet-biovision.org/PlantHealth/Crops/Beans

Farmers can buy newly released bean varieties

Angaza variety

Characteristics:

- Speckled sugar type, and kidney-shaped.
- Bush bean type.

- Has light pink flowers.
- Flowers in 40 to 42 days.
- Matures in 80-84 days.
- Yields in 6-12 bags an acre.
- Sweet grains, releases less gas.
- Resistant to bacterial blight (CBB)rust, Bean common mosaic virus and angular leaf spot.
- High grain iron (>97ppm) and zinc (>57ppm) content.
- Has low phytic acid.
- Cooks fast.

Nyota variety

Attributes:

- Brilliant red mottled.
- Has light pink flowers.
- Flowers in 30-40 days.
- Matures in 60-70 days.
- Yields 6-10 bags an acre.
- Drought tolerant (suitable for Arid and semi-arid areas.
- High iron (>95ppm) and zinc (>39ppm) content.
- Low phytic acid.
- Cooks faster than most beans.
- Good for bean flour making.

Faida variety

Characteristics:

- Red mottled /mottled and speckled
- A semi-climber (has tendrils).
- Has white flowers
- Flowers in 45-46 days
- Matures in 84-85 days
- Yields in 6-9 bags
- Tolerant to Common Bacterial Blight (CBB)rust, Bean Common Mosaic Virus BCMV) and Angular Leaf Spot (ALS).
- Has high Zinc Content (>56ppm).
- Fast cooking.

(See page 1 for where to buy these varieties).

Sand or grit is very important for digestion in chickens

What causes chicken to eat sand?

Birds do not have teeth, unlike animals that depend on teeth to break down food to digestible particles. In order to digest their feed, birds swallow small stones (grit) which go into the crop (a storage pouch) at first and then move to the gizzard where the small stones break it further through a grinding process. The ingested feeds then move to the stomach where it is mixed with digestive juices and enzymes which soften it up for digestion.

Breakdown of feed happens in gizzard

The gizzard has powerful muscles, hence when feeds get into the gizzard, these powerful muscles contract grinding the now soft feeds against the grit breaking them into small digestible pieces. From here, the feed continues through to the intestinal track. Grit acts as chickens' teeth. Over time, grit wears down therefore birds need to continuously swallow more small stones to replenish the worn out ones. Chickens know when they need grit and will swallow a few stones from time to time.

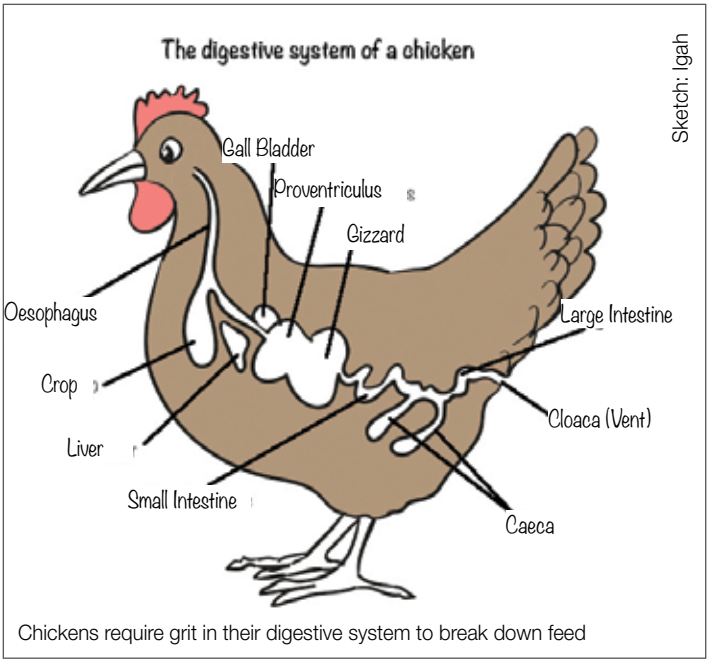
Chickens that are free to roam in the field often are able to acquire grit easily unlike the ones confined in a coop (chicken shed). It is advisable for the farmer to have sand readily available so that the chickens can replenish the grit when they require it. The sand should have different sizes of stones ranging from tiny particle to sizable ones to cater for small and larger chickens.

Provide enough grit for chickens

Instead of using plain sand, a farmer can also add shell grit which is made up of ground up oyster shells/cockle shells and or limestone. Shell grit provides calcium that is important in strengthening bones and developing strong eggshell. The shell grit gradually dissolves producing calcium which is absorbed in the digestive track. On the other hand, the small stones on the grit last longer aiding in digestion of feeds.

Lack of grit interferes with digestion

The lack of grit can lead to digestive blockage, poor feed conversion, discomfort and may even lead to death. Chickens that strictly feed on commercially produced feeds do not require grit. This is because commercially produced feeds easily dissolve in the digestive track hence there is no need to be broken down. Grit is important for any bird that consumes large particles of food e.g. whole grains, insects, grass weeds etc. Grit should be made available to chickens immediately they leave the brooder and start to feed on feeds that are not strictly pellet or when the farmers start feeding the chickens with whole grains.



Chickens require grit in their digestive system to break down feed

Answers by Elkanah Isaboke

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ventilated room. There are seeds that have to be stored before sowing, put them in well labelled canvas sacks or paper bags (avoid using polythene bags because seeds may rot).

Pretreatment of seeds: Each seed type requires a different treatment before sowing. There are types that germinate after burning, others after being eaten by animals. This can be achieved by soaking in either cold or hot water, nicking and piercing, chipping, cracking, burning or letting animals ingest the seeds then collecting from their droppings.

Establishing a seed sowing bed: A seed sowing bed or seed bed facilitates the growth of fine seeds. These are seed species that cannot be individually sown into separate container. Large seeds however, can be directly sown into individual containers.

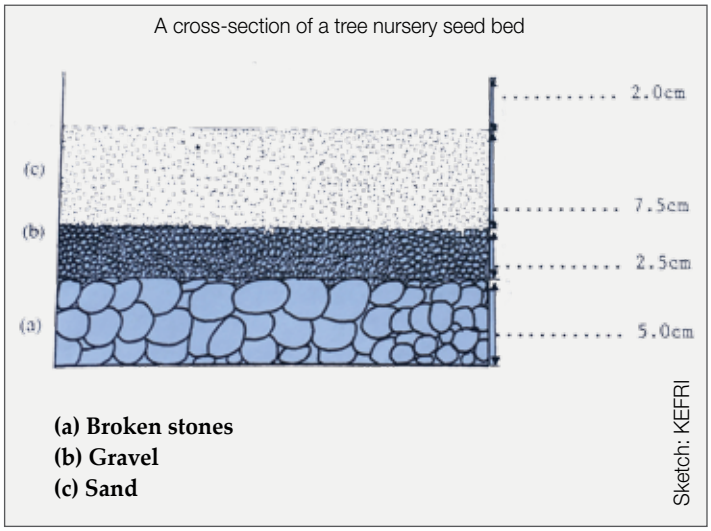
Preparing a seedbed: The first step is to do a thorough clearance of the site; cut/ trim trees, uproot shrubs and grass, destroy termite mounds if any, dig the field and allow time for air circulation. Then protect the site by fencing it off. The sides of a seed bed should be 15cm high above the ground. The first layer 5cm is filled with broken stones, followed by 2.5cm of gravel layer. The top 7.5cm is filled with 50% sand mixed with 50% black forest or top soil. The forest soil gives sufficient moisture holding capacity that promotes germination. The sand ensures a porous texture soil necessary for root penetration and allows easy pricking.

Sawn timber or logs at least 17cm wide are laid parallel on the ground about 1m apart, and at both ends similar logs are laid to make the seedbed of a desired length. Wooden pegs are used on the outside to hold the logs in place.

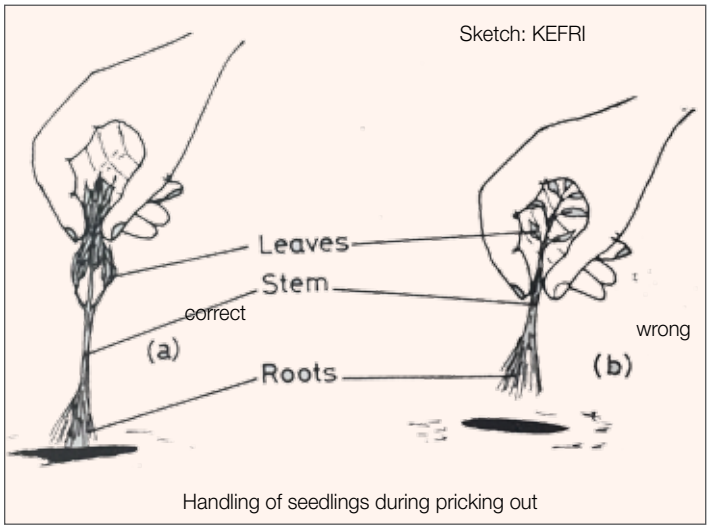
Using soil on the seedbed is discouraged as it may result in water logging, thus killing the seedlings. If sand is not available charcoal or saw dust may be used to make the soil porous.

Sources:

1. *A Manual for Tree Nursery Management (KEFRI).*
2. *Growing Trees and Gardens for Life (World Agroforestry Centre)*



(a) Broken stones
(b) Gravel
(c) Sand



Handling of seedlings during pricking out

TOF Radio answers your questions

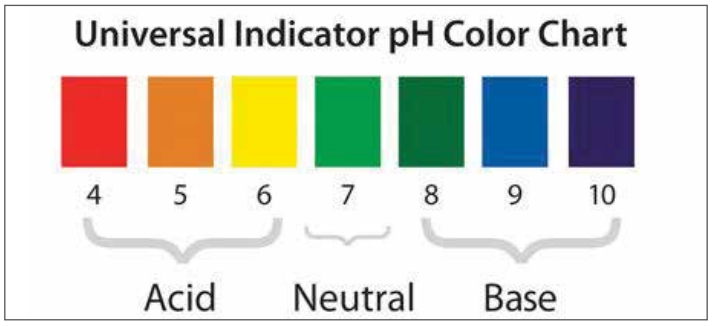
TOFRadio is broadcast on KBC on Thursday at 7:30pm and Mbaitu FM on Friday at 8.30pm. Tune in and listen to farmer experiences and expert advice on agribusiness and eco-friendly farming methods. On this page, we respond to some of the issues raised by farmers in their correspondence to the radio program. Send your questions and comments via SMS 0715 422 460, email: admin@theorganicfarmer.org

Always test your soils to know what it is missing

Charles Kimani and John Mungai | Wendell Berry powerfully states in his book, "The soil is the great connector of lives, the source and destination of all. It is the healer, restorer and resurrected or, by which disease passes into health, age into youth, and death into life. Without proper care for it we can have no community, because we can have no life," he states.

Essentially, all life depends on the soil. A study by the State Department of Agriculture and the Kenya Agricultural and Livestock Research Organization (KALRO) found out that the country's soil pH in many farming areas ranges mostly from moderate to highly acidic, which has negative impact on production. This is attributed to the use of poor farming practices and rampant use of chemical fertilizers which increase soil acidity.

Soil fertility is the ability of a soil to make plant nutrients available to plants. Nutrient availability is determined by among other factors; acidity level, clay content, organic matter, aeration, soil moisture, microorganisms and soil temperature. These and other factors must be kept at an ideal equilibrium, a healthy balance that enables nutrient uptake by plants. This balance is made possible through knowing one's soil status, the foundation of which is soil testing.



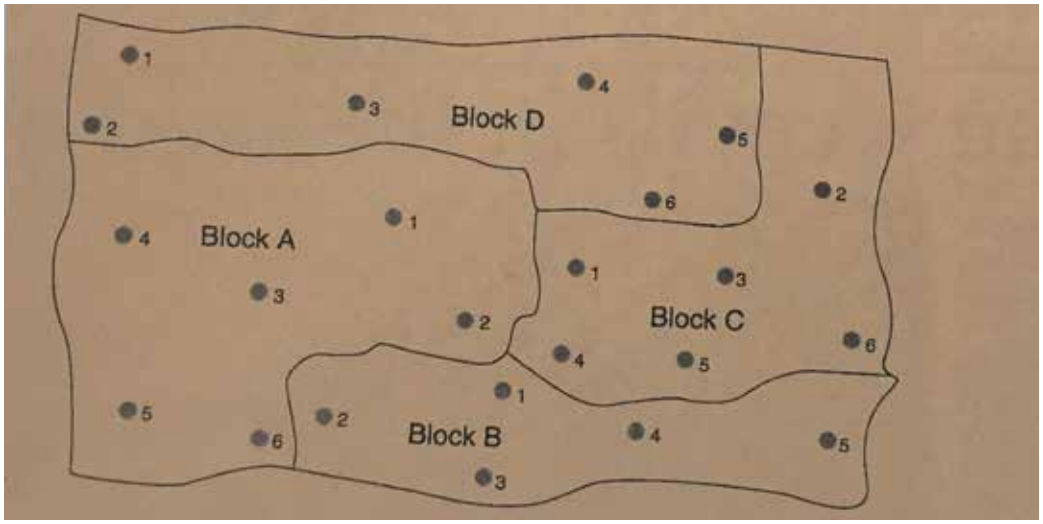
Due to use of chemical fertilizers and lack of good farming practices, harvestable yield quantities have been on a steep decrease. Neglect by many farmers has been one of the main factors responsible for declining soil fertility in many parts of the country. Soils continue to be abused through indiscriminate use of fertilizers, pesticides, erosion, mono-cropping and many other factors.

Farmers need to know and understand their soils better by having them tested regularly to know what nutrients are missing in order to correct deficiencies before they plant any crop. Soil tests should be carried out every 2-3 years. Soil analysis is the basis of understanding soil fertility and soil capabilities.

Laboratory analysis of soil allows soil and agriculture experts to advise farmers on the best possible approaches for correcting soil nutrient deficiencies. Through soil analysis, farmers get to know the following:

- Status reports of their farms, showing the nutrient levels, deficiencies and excesses in order to balance nutrients for ease of uptake by different crops.
- Advise of amendment or correction of soil to best exploit its potential. Soil ameliorants are advised including the 'how' and 'when' to apply and for what or which reasons.
- Crop and site specific nutrient management plans, with realistic yield targets.
- Soil sampling enables the farmer to know which nutrients are missing in every part of the farm (see sketch below).

There are numerous benefits to soil testing that farmers stand to gain including economic and environmental waste reduction, guidance of field activities from a professionally known point and sustainable farming practices.



Soil samples should be taken from different parts of the farm to capture the general condition of the soil

Quick mandatory questions farmers must ask themselves before seasonal planning and planting are:

- What do my soil test results say?
- Do I understand the recommendations and where can I source for recommended inputs?
- What inputs do I need to apply?
- Do I have a crop rotation calendar or plan?
- There are several companies and research organisations that can do soil tests such as KALRO, SoilCare, Cropnut and SGS that offer soil testing services with prices ranging from Kshs 1000- Kshs 2500. As you start planning on the next planting season remember better yields can only be achieved through proper soil management. Call KALRO **0722 996 633** for soil test.

Fore more information on soil monitoring https://www.infonet-biovision.org/EnvironmentalHealth/Soil-monitoring-Know-your-soil

Radio Taifa frequencies for our TOFRadio programmes

TOWN	FM FREQUENCIES	MW (MEDIUM WAVE FREQUENCIES)
Nairobi	92.9 MHZ	
Mombasa	100.8 MHZ	
Kisumu	104.5 MHZ	
Kakamega	104.5 MHZ	
Bungoma	104.5 MHZ	
Eldoret	88.6 MHZ	
Nakuru	104.1 MHZ	
Meru	90.4 MHZ	
Nyeri	87.6 MHZ	
Kisii	103.3 MHZ	
Malindi	90.1 MHZ	
Kapenguria	93.3 MHZ	
Kitale 9	3.3 MHZ	
Voi/Kibwezi	96.9 MHZ	
Namanga	89.9 MHZ	
Lodwar	88.6 MHZ	
Lokichoggio	89.3 MHZ	
Garsen	93.1 MHZ	
Kajiado	92.9 MHZ	
Kitui	92.9 MHZ	
Lamu	96.3 MHZ	
Maralal		1107 KHZ
Wajir		1152 KHZ
Marsabit		675 KHZ
Garissa		567 KHZ