

Dear Reader,

As climate change takes effect, seasons have been badly disrupted, leaving farmers grappling with many uncertainties. However, with accurate forecasts, farmers can prepare better for their ventures. According to the Kenya Meteorological Department, in October, November, and December, several parts of the country are likely to get lower amounts of rainfall than expected. Farmers are, therefore, advised to plant early-maturing seeds. In this issue, we

feature suitable bean varieties that you can plant depending on your climatic region. Also, learn about the symptoms to look out for to know if your livestock are suffering from anthrax and the remedies to take.

Are you wondering what alternatives there are to the expensive fuel you use to run your household and farm machinery? Find out what it takes to instal a biogas unit your home. It helps to recycle bio waste and can save you some money in the long run.

In the previous issue, we provided information on cattle feeding and fodder conservation by making hay. This month, we give a detailed guide on quality silage preparation.

Also, read the inspiring story of a farmers' group in Kiambu County that has grown into an industrial enterprise, making chicken feeds and delivering them at a low cost to farmers in the region. Finally, learn about worms, their importance and why they are of great benefit to your farm.

## Tips for making quality silage

By Alex Gathii

Making good silage is not easy. However, the following tips can help to improve your silage quality:

Whole-plant maize silage in dairy cattle feeding rations is preferred, not only because of its natural high-energy value and good supply of fibre, but also because the whole plant is harvested, maximizing the yield. It also has up to 50 per cent more energy than dried maize kernels.

### How to ensile

Napier grass, maize, sorghum, and sugarcane are the most commonly used forages. However, other products such as pineapple waste, briachiara grass, and so on, can also work.

The container used to make silage can be a trench, a pit, a drum or empty fertiliser bags with polythene linings, polythene tubes and plastic shopping bags. The container is called a silo.

**Step 1:** Build the silo before the end of the green season, when there is still plenty of green fodder available. The pit silo should be located on high ground so that no water will run into it when it rains. The pit should be smaller at the bottom than at the top, so taper in the sides a little. This will make the struc-



ture stronger.

**Step 2:** Cut the crop just before flowering, as the protein content is high just before that stage. Leave the freshly cut fodder to dry in the sun for two to three hours, then chop the green fodder into small pieces about 1 to 2cm in size.

**Step 3:** Place plastic sheeting on the bottom and on the sides to prevent the fodder from touching the soil. Seal the pit to prevent air and water from getting in.

**Step 4:** Place the chopped material into the plastic-lined pit. Spread uniformly into layers, 30cm thick and compact each time by using a suitable

weight to expel air. Over the top of each layer you should spread evenly a handful of salt and some molasses (for 1,000kg of green material you need 15-20kg molasses). Molasses is a thick syrup produced as a by-product in sugar making. It provides readily available energy and minerals.

**Step 5:** When the pit is full, add some paddy straw and cover it with a plastic sheet or some gunny sacks. Finally, you should cover the whole pile with a thick layer of mud to prevent air and water from getting in.

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## Installing a biogas system

Biogas is an environmentally friendly renewable fuel, that is cost efficient and also an alternative clean source of energy. **Story on Page 3**

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The silage, if properly made, should be ready for use in about three weeks. Good silage smells fresh and fruity and is light yellow brown or green. If the silage smells rotten and is black and slimy, then it is not good for your cow's consumption. If this happens, it means that something went wrong and the silage should not be fed to the animals. After the pit has been opened, keep it covered with gunnysacks or a plastic sheet to keep the silage in good condition.

### For plastic silos:

Harvested fodder is chopped into 1" lengths, mixed with molasses diluted in water (1:2);

The mixture is then packed into a polythene tubing;

When the tube is filled, both ends are tightly tied;

The bag is then placed in an airtight container for the fermentation to occur.

The advantage of plastic silos is that they are low cost and can be moved easily. The quality of silage obtained, with maximised nutrient preservation, depends on the quality of the fodder used, the ensiling and use of molasses. For example, Napier grass should be ensiled when a metre in length (101 days after planting). Properly ensiled material can be stored for up to one year without losing quality. Bad silage can cause diseases in your animals that can sometimes lead to death.

### Tips to help you produce high quality silage:

#### Moisture levels of the crop used

One of the most critical factors affecting fermentation is the moisture in the crop at the time of ensiling. A drier plant will not permit air to be excluded from the silos, leading to aerobic fermentation of undesired bacteria and yeasts;

Plants with excess moisture levels will lead to clostridia fermentation, rotting and production of smelly compounds. Thus, controlling silage moisture at harvest is the key to complete air exclusion

that allows lactic acid producing bacteria to begin the desirable fermentation.

You can test by making a fodder ball. If the fodder ball falls apart quickly, it means it is too dry and you must add a bit of water to the fodder before putting it in the pit. If the ball falls apart slowly and there is no water left in your hand, then it is ready to be put in the silo.

### Proper management

Because making silage requires anaerobic conditions, rapid and effective filling and sealing of the silo is critical. Minimise the air that gets into the silo. How this is done will depend on the type of silo used. Minimise disturbance to the silage face (the part of the silage that is outermost) to prevent air from getting into it. Silage cutters (also known as shear grabs or block cutters) are an excellent tool for reducing waste at feed-out. They should be well maintained to ensure they cut and don't tear.

Keeping the silage faces clean and free of spoilage is also essential. These can become reservoirs of heat and spoilage organisms, if left close to the silo. Plastic sheeting/film is normally used to seal horizontal silos. This plastic should be removed only as the silage is used.

### Harvesting mature corn

Harvest maize that is mature but not dry, as it has enough sugars for proper fermentation. Lactic acid bacteria cannot break down starch, but rather needs simple sugars. Immature kernels have only starch.

Energy, nutrient yield, and silage quality are maximised when the plant reaches maturity. This is when the kernels start to develop the "black layer" at their bases. Harvest time will differ depending on the maize variety and the field conditions. It is important to not only depend on generic instructions from the seed supplier, but also to consult an agronomist, especially when changing maize varieties.

### Using additives

Additives enhance silage quality above what can be achieved by sound silage management methods. Adding molas-

ses, for example, improves lactic acid fermentation. Lactic acid bacteria consume energy compounds, that is sugars.

Thus, before they die off when the pH reaches 4, they continuously reduce the energy content of your silage. To prevent this, add other acids such as propionic acid, which reduces yeast and mould growth in silage. If the silage quality remains low despite all of the above, then other additives can be applied.

Urea is an inexpensive source of readily available nitrogen. Adding urea to corn silage improves its protein content, enabling lactic acid bacteria to grow and thrive. This is not a sure measure to improve silage quality, but certainly one that is used frequently in the field.

Additives should not replace the basic principles of silage preparation. Not following these principles is likely to lead to the search for additives to repair the otherwise avoidable damage. It is advisable that you make smaller silos rather than one big one. This will keep the unused silage untouched as you open the silos you intend to use.

### Feeding livestock using silage

A grade cow may eat up to 40kg of silage per day. To avoid bad flavours in milk, feed silage after morning milking and at least three hours before afternoon milking. Do not feed calves below six months with silage. This is because the rumen in small calves is not yet well-developed, thus, they do not have enough microbes in the stomach to digest silage.

Feeding such calves with silage will cause them to have 'distended stomachs', which in the long run, adversely affects their growth. Instead, feed them on hay, milk, water, pellets, or dairy meal. Introduce all the products from the first day of birth to allow your calf to interact and get used to them.

*Mr Gathii is a Certified Cow Signals Expert and USAid champion of change.*

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<https://www.infonet-biovision.org/Animal-Health/Silage-making>



### Correction

In the rabbit rearing article that appeared in August edition 181 of the TOF magazine, we indicated that you should take the buck (male rabbit) to the doe's (female rabbit) quarters. Please note that the correct information is that you should always take the doe to the bucks quarters for mating.



Mr Solomon Njuguna demonstrates how to build a biogas biodigester

## Why you should consider installing a biogas system to power your farm

Many people are now opting to install biogas systems to avoid high electricity costs

By Clifford Akumu

The cost of running farm machines can be very high, depending on the kind of fuel used. Biogas an environmentally friendly renewable fuel, is cost efficient not only for low-income earners, who cannot access electricity, but also farmers looking for an alternative clean source of energy.

Biogas is a by-product of anaerobic (without oxygen) breakdown of organic matter such as animal manure, crop and kitchen waste, and garden weeds. Anaerobic digestion is a fermentation in which waste is digested by microbes to produce methane gas (or biogas).

Mr Solomon Njuguna, the founder of Ngerwa Final Solution, a company that constructs biogas units, says that very many people are now opting to install biogas systems to avoid high electricity costs. Biogas consists of 60 per cent methane and 40 per cent carbodioxide, with low levels of hydrogen sulphide and other gases. It can generate electricity for cooking, lighting, heating water, refrigeration and can run engines such as chaff-cutters. Materials needed for biogas production such as livestock manure and others, including feed, food processing and slaughterhouse waste, corn silage, industrial waste and sewage sludge, are readily available on the farm. Setting up a biogas system involves several requirements thus, you must engage a reputable biogas expert to avoid disappointments.

“Always engage a qualified digester designer, builder or equipment supplier, to install your biogas system,” cautions Mr Njuguna. A complete biogas unit for four cows, costs from Ksh50,000 to Ksh150,000. The charges vary depending on the size and location of the biogas plant.

“The cost of biogas installation also varies depending on the components chosen such as the foundation, digester effluent storage, roof, gas pump, boiler, hydra-ram and manure pump,” he adds.

According to Mr Njuguna, the capacity of the smallest biogas unit is 6m<sup>3</sup>. One or two cows or five to eight pigs should provide enough manure to run a biogas unit for a household of four people.

### A biogas plant comprises of three sections:

- **Inlet** - Here the biogas unit is fed with water and cow dung. This mixture is stirred with a stick until it forms the slurry.
- **Digester** - This is an airtight tank or container where biological requirements of anaerobic digestion are controlled to hasten digestion and optimise biogas production. Here, acid-forming bacteria decompose organic materials and release methane and carbon dioxide.
- **Outlet** - This is where the digested slurry leaves the digester into the storage to be used as fertiliser.

### Working of the biogas unit:

Kitchen waste (food remains, vegetable stalks) and fodder (Napier grass,

## Vermiculture: The role worms play on the farm

Red earthworms feed and convert organic matter into compost faster than other earth-worms

By Silke Bollmohr

One of the marks that distinguish a good organic farmer is the ability to acknowledge that not all small organisms on the farm are pests that, in fact, some are precious and highly beneficial. Earthworms fall into this category of beneficial organisms.

There are over 1,000 species of earthworms in the world, with different physical appearances and colours. Red earthworms are most commonly used in vermicomposting as they can feed and convert organic matter into compost faster than other earth-worms.



They also adapt to new environment much faster. They can eat as much as their own body weight each day, and provide solid and liquid nutrient-dense waste, which nourishes plants. As earthworms eat and digest plant material, they mix organic and mineral soil particles.

The organic matter is enriched and then passed out of the worm's body in the form of casts, which are the richest and finest quality of humus. In this way, they help build and maintain the soil structure. Their casts (waste) contain nitrogen, phosphorus, potassium, magnesium, and calcium.

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## Anthrax: What you need to know

### What are the causes?

Anthrax is a zoonotic disease, as it can be transmitted from animals to humans. It is caused by a bacterium *Bacillus anthracis* that stays in the soil and forms spores if the environment is favourable enough (warm and humid weather). These spores cause infection when ingested by grazing animals.

### Which animals are affected?

All mammals can contract anthrax. Interestingly, birds are resistant due to their high body temperatures. However, there have been reports of infections in some birds such as ostriches and rheas. Grazing animals (herbivores) are more likely to contract the disease. Humans contract the disease through contact with infected animals or animal products.

### How is it transmitted?

Animals ingest bacterial spores when grazing, while humans contract it through contact with infected animals or when they inhale the spores from contaminated animal products.

### What are the clinical signs?

In animals, anthrax often causes sudden death that is not preceded by any discernible signs. For acute anthrax in cattle and sheep, there is an abrupt fever and a period of excitement followed by depression, stupor, respiratory distress, staggering, convulsions, and finally death. The carcass of infected animals oozes blood from all body orifices, is bloated and lacks the stiffness associated with death (rigor mortis).

### What do I do in suspected cases?

Never touch the remains of any animal that dies suddenly. Instead, inform your local veterinary officer or sub-county veterinary office. Under the laws of Kenya (Animal Diseases Act), anthrax is a notifiable disease. This means that any person who fails to report its occurrence is guilty of an offence.

### How do I treat or prevent?

In most cases, animals infected with anthrax die, as there is no known treatment. However, it can be prevented through vaccination. Wild animals are vaccinated by the wildlife service during severe outbreaks. Incinerate (destroy by burning) the carcass and disinfect all the grounds thoroughly.

<https://www.infonet-biovision.org/Animal-Health/Zoonotic-diseases>

## Why you should consider installing biogas system to power your farm

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brachiaria, purple guinea grass) or zero-grazing unit waste flow to the biogas digester, where the farmer adds a bucketful of water before stirring. Compared with other feedstocks, grass has suitable and promising characteristics as an energy crop for biogas production.

The quantity of gas produced from a biodigester depends on the type of feeds given to the cow. If a cow is given quality feed, the digester will yield more gas. Dry feeds produce more bacteria inside the cow than wet feeds and manure from animals fed on such feeds will process the gas faster, inside the digester.

Farmers can opt to put in 2kg of food waste each day. This will produce enough gas to cook with twice a day. A biogas digester requires extra water for anaerobic digestion so when water supply is limited you can harvest rainwater, recycle domestic water or practise aquaculture.

Remove any fodder and other waste materials such as pampers and sanitary pads that can cause blockages. Use a shovel or special metal called a D8. The system requires seven days for the gas to build up. Thereafter, it will continuously produce enough gas.

### For optimum performance, the biogas unit should have the following qualities:

- Be arranged to minimise heat loss;
- Provide a simple flow path for material through the system;
- Be as automated as possible and be accessible for maintenance and repairs;
- All pipes and gas lines should be made large enough to provide access for cleaning devices.

### Safety measures include:

- Equipment should be designed not to let biogas in or out and should be resistant to corrosion;
- Electrical installations must comply with standards and regulations. The constituent materials, in particular digesters or combustion units, must

be non-combustible;

- When handling waste material, use personal protective equipment to avoid contact;
- Wash hands before eating, drinking and before touching the eyes or nose;
- Safety valves; digesters and biogas storage tanks must be equipped with safety devices that prevent excessive vacuum and overpressure;
- Provide two sluice gates in the digester just in case one of them breaks down;

The digester inlet should have a check valve to prevent the biogas from flowing back. A good biogas unit lasts for at least 30 years.

### Benefits of biogas and bio slurry:

- It is affordable and safe to use;
- It conserves trees and reduces greenhouse gas emissions;
- Biogas is smoke and soot-free, reducing respiratory health problems. This also reduces indoor air pollution;
- Biogas reduces fuel expenses for cooking and saves money and time. Sale of bio slurry can be a source of extra income;
- Farm productivity increases from using bio slurry as a liquid manure and an animal feed supplement.

### Disadvantages of Biogas:

- Less suitable for dense metropolitan areas.

### Biogas expenses:

Though the initial cost of biogas plant installation has been a deterrent to some farmers, in counties such as Kiambu, a Pay-As-You-Go model allows farmers to purchase the biogas units through affordable payments.

In this model, biogas companies absorb the initial installation cost and recover it, plus their profit, by charging farmers for every unit of power used. Consumers can pre-purchase energy units via M-Pesa or Airtel Money using their meters.

Solomon Njuguna

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Kiambu County Poultry Farmers Group Co-ordinator Mr Zachary Munyambu (centre), Chair Lady Ms Ann Wanjiku (right) and Feed Production Manager Mr John Mwaniki, explain the production process at the group's factory

## Kiambu Poultry Farmers' Cooperative: The power of a vibrant, visionary group

**While a bag of feeds costs about Ksh2,700 when buying from a regular supplier, the cooperative supplies each at Ksh2,500, and delivers it to the farmers' free of charge**

**By Caroline Mwendwa**

When egg prices dropped in November 2018 due to imports flooding the Kenyan market, local farmers were hit hard. They had nowhere to take their eggs, and some had to sell them at throwaway prices. Kiambu, just like other places across the country, was badly affected.

To counter this adversity, the farmers got together and formed the Kiambu Farmers Poultry Group. This would be the beginning of a remarkable journey along which the farmers have won many battles. The Organic Farmer (TOF) team visited the group to find out how they have been faring, barely a year since registering the co-operative.

"It was necessity that pulled us together. We sent messages informing farmers of a meeting, and the turnout was overwhelming. In fact, farmers from other counties heard of the meeting and they came in numbers," said Mr Zachary Munyambu, the group's coordinator.

This was an indication that many other farmers were facing similar problems. Since the group could not absorb all the farmers, they agreed that each county would form its own group. Rules and regulations were set to ensure order and decorum. A mandatory Ksh500 registration fee and a share capital of Ksh2,000 were agreed and 700 mem-

bers registered. The poultry group took off and today holds regular weekly meetings.

"We realised that farmers faced three major challenges: Markets, feeds for their chickens, and poultry diseases," said Mr Munyambu.

The group first tackled the most pressing of these problems, which was finding a market. After investigations into poor pricing and lack of markets for eggs, it became apparent they were dealing with a much bigger problem. Unscrupulous traders would prompt the importation of eggs, which retailed locally at very low prices.

The group had to devise ways to fight this. They considered public demonstrations and picketing to get the attention of policy makers but, following advice from the authorities, sought audience from the area MP Patrick Wainaina. With his assistance, the group was able to secure an appointment with the Cabinet Secretary (CS), Ministry of Agriculture at the time.

"Just when we were crying foul over flooded markets, the notion that there was inadequate local supply of chickens and their products was created, with the CS being urged to authorise imports," recalled Mr Munyambu.

This timely grievance halted the process and instead of authorising imports,



**We realised that farmers faced three major challenges: Markets, feeds for their chickens, and poultry diseases**

the Agriculture CS stopped importation of all chicken products. This was a great relief for many poultry farmers. This would lead to eggs prices stabilising due to the availability of markets.

The group later registered itself as a cooperative society, increasing its influence in solving challenges of obtaining quality chicken feeds and controlling poultry diseases.

"We wanted to name ourselves as Kiambu County Poultry Farmers Co-operative Society, because our membership cut-across the entire Kiambu County. Adopting the name 'County' was not easy, but we were determined, and eventually, we became a certified county cooperative society."

### **Making chicken feeds**

With the newly acquired status, and markets available for their products, the newly registered cooperative society began providing chicken feeds to members at lower prices.

"We did not have the equipment to make our own feeds and started by contracting another miller to make the feeds on our behalf."

In the first month, the cooperative sold 3,000 bags of chicken feeds.

"We decided to start our own factory to make the chicken feeds," he said.

They identified a supplier of the equipment, packaging bags and raw materials. The group took a loan of Ksh2.5 million, which was their starting capital.

"Initially, we rented a warehouse at Ksh120,000 per month and later leased a plot at Ksh40,000 per month," he added. The group currently produces 3,850 bags of feeds per month, which it sells to both its members and non-members.

The cooperative society has hired a production expert, who does the feed formulations and manages the processing. While a bag of feeds costs about Ksh2,700 when buying from a regular supplier, the cooperative supplies each at Ksh2,500, and delivers it to the farmers' free of charge.

### **Chicken-feed ingredients**

They import raw materials such as soya, cotton, sunflower, and omena from Uganda and Tanzania, except maize, which is locally available.

"To boost the nutritional quality of our feeds, we add crushed bones from the Kenya Meat Commission, which increases the calcium and animal fat

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# Kiambu Poultry Farmers' Cooperative: The power of a vibrant, visionary group

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content,” said Mr John Mwaniki, the feed production manager.

The factory has 16 employees. The group has grown in leaps and bounds and has assets worth Ksh4.5 million, including the equipment, warehouse, and the produced material. It has expanded and is also making dairy feeds.

“We observed that every time we delivered a bag of chicken feed, the farmer would request for a bag of dairy meal so we started processing the dairy meal, too,” says Munyambu.

## Challenges

Things were not always easy and the thriving cooperative has faced many challenges. “Often, importing raw materials from neighboring countries is expensive as a slight change in price per unit raises the cost of the bulk material. This reflects on the price of feeds, which can turn away farmers,” explains Mr Mwaniki.

Another challenge is lack of coordination between the counties.

“Some counties can produce these raw materials in plenty so that feed companies do not have to import. This would be a source of income for farmers in these counties but this is yet to be

initiated by the county government,” he adds. He also points out that if the sector is effectively coordinated, and producers linked directly to consumers, cartels would be eliminated.

Farmers also lack knowledge and sufficient training in crop production for animal feed formulation, yet it would be a great opportunity as the feeds are constantly in high demand, Mr Mwaniki explains.

Also, when farmers are struggling with disease outbreaks, there is no one to provide information on how to deal with them. Research from the relevant institutions can be beneficial to the farmer by offering solutions to such challenges.

## Future plans

The group plans to create a centralised market for eggs, where farmers and buyers can meet for convenient business. It is also looking to lease a godown for members to store their products. They currently hire transport to deliver feeds to buyers, and plan to buy their own trucks soon.

“We also plan to establish our own slaughterhouse for the retired layers and broilers, where we will package

chicken for sale,” he adds.

On value addition, the group seeks to partner with bakeries and provide ready-to-use, processed eggs, for pastry making.

## Lessons

There are many things other farmers can learn from Kiambu County Poultry Farmers' Cooperative. The strides they have made so far and their potential for growth can only be achieved through shared goals and unity among group members, coupled with visionary leadership. If you are a farmer struggling with challenges, there is a possibility that other farmers in your area face similar problems. Groups have greater potential in providing solutions. It is time you took your group aspirations higher and created opportunities for growth, and generating income.

Ms Ann Wanjiku, the group's chairperson, has been rearing chickens for 15 years. She currently has 1,500 chickens and eight cattle. She advises that farmers should not be discouraged by challenges in chicken rearing.

“Chickens are a dependable source of income, and groups are advantageous. Do not keep poultry on your own. Form groups to find markets and seek solutions. Let members have a platform where they can tell others what they are selling or buying, ensuring that markets are always available.”



# Vermiculture: The role worms play on the farm

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## Habitats that earthworms like

Humus is food for worms. Soils rich in humus will naturally attract earthworms. Therefore, to attract them, ensure that your farm is rich in humus. Worms dislike too much sun and mulch prevents their direct exposure to the sun's powerful rays, which enables them to be comfortable and to focus on breaking down the humus. Therefore, mulch your soil.

## Benefits of earthworms

Earthworms like burrowing themselves beneath the soil, leaving little channels that loosen and improve soil aeration

and drainage. Soils with poor aeration and water drainage suffocate the roots of plants resulting in poor growth.

Their castings improve soil structure by cementing soils into aggregates (soil particles that are bound together) that retain moisture for longer, without breaking apart.

Soils with earthworms are better yielding than those without and farmers should consider rearing worms in addition to having them on the farm in the soil as they provide worm juice, worm castings, and food for chicken and fish. You can also sell the worms to other farmers.

Materials required to rear earthworms:

- A plastic open drum or a wooden box measuring 60 cm deep, 180 cm long and 120 cm wide
- Topsoil with some worms
- Fresh dung or droppings from cattle, sheep, goats, pigs or rabbits

- Dry materials, e.g. grass
- A suitable cover, e.g. a sisal sack
- Some water

## Procedure

**Step 1:** Mix all the top soil, dung/droppings, grass and some water thoroughly in the open drum or box. Do not use too much water to avoid making the growth medium too wet and therefore unsuitable for worm rearing.

**Step 2:** Cover the mixture of topsoil, dung etc, with a sisal sack and place the drum or box in the shade. Make sure that moist conditions predominate in the growth medium all the time.

**Step 3:** Harvesting. In two weeks, the worms have grown and multiplied. The big worms can be harvested by sieving them with a wire mesh. Place them in a separate container for use according to the desired purpose. They can be used to make vermicompost, or they can be fed to chickens and fish.



# TOF Radio answers farmers' questions

## Use the right beans variety for better yields

By Charles Kimani

As the short rains approach, farmers are naturally getting ready to plant. In this Issue, we feature beans varieties suitable for the season.

### Identifying the right seed

The Kenya Plant Health Inspectorate Service (KEPHIS) has put in place measures to ensure that farmers buy quality seeds. Every packet of certified seeds has a clearly visible strip, which when scratched reveals a short code underneath.

Send the code as SMS to No. 1393, and await a confirmation SMS, which will give detailed information on the type of crop, company promoting the seed, date when the seed was tested and other relevant information.

### Characteristics of good seeds

- Uniform variety;
- Viable (ability to germinate);
- Free from seed-borne diseases and pest damage;
- Free from foreign materials;
- Not shriveled, mouldy or cracked; and
- Not rotten or discolored.

### Bean varieties

Dry beans are the second most important food crop after maize in Kenya. Beans are nutritious and contain protein, fibre, complex carbohydrates, vitamins and micronutrients. For good yields, farmers should grow varieties that are suitable for their areas and adopt good farming practices.

### Bean variety for dry lands

Varieties from Kalro - Katumani



### Nyota Bean (Western Region)

**Characteristics:** Flowers in 30 to 40 days; matures in 60 to 70 days; high zinc grain content; fast cooking; has light pink flowers; is drought-resistant hence suitable for arid and semi-arid lands.

### Katumani Bean 1(KAT-B1)-Kathika (Arid and Semiarid Regions)

**Characteristics:** Has pink flowers; flowers within 30 to 31 days; matures in 60 to -65 days; yields 1400-1900 kg/ha or 7-9 bags/acre; sweet grain taste and less flatulence (accumulation of gas in the gut); highly tolerant to heat and grows well under tree/banana shades.

### Katumani Bean 9(KAT B9)-Gacuma

**Characteristics:** Has light pink flowers; flowers in 30 to 40 days; has a uniform flowering period; matures within 60 to 65 days; is brilliant red and gives an Irish brown color when cooked with maize; yields 1,400-1,900kg/ha or 7-9 bags/acre.

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### How to make vermicompost

Vermicomposting is the use of earthworms to transform organic materials into rich, organic fertilisers. The production of vermicompost requires three to six months.

1. Prepare a bed with a concrete, wood or plastic sheet bottom and construct walls 20 to 30 cm in height using wood, logs or stone. On one end put a ½ inch drainage pipe, that allows for collection of juice. Place a wooden board across the bottom and line with chicken wire for better handling and aeration.
2. Place a 10 to 15 cm layer of coarse organic materials such as banana waste, maize stover, coffee husks and other crop residues on top of the chicken wire. The material must not contain poultry manure as this is harmful to worms.
3. Place a 5 to 10 cm layer of manure on top of the coarse material. Cattle, pig, sheep or goat manure are suitable. Green manure, such as tree leaves



or grass cuttings may be substituted. Add organic matter such as potato peelings, vegetable remains, grasses, crop and any material that can break down easily like fruit and vegetable peels to ensure the earthworms have enough organic matter to feed on. Sprinkle some water thoroughly in the open drum or

box. Do not use too much water to avoid making the growth medium too wet and therefore unsuitable for worm rearing. Sufficient water should be applied so that no pockets of dried material remain. Wet materials such as banana trash and fresh manure need little watering, while dried materials may require as much as 30 liters of water per m<sup>2</sup> of bed.

4. Release the earthworms into the moist bed. Avoid handling individual worms, rather place small handfuls of material rich in earthworms (clusters) into 'holes' spaced about 0.5 m apart.
5. Cover the bed with banana leaves or dark polythene plastic. Apply additional organic wastes periodically. Vermicompost is ready after three to six months.

<https://www.infonet-biovision.org/EnvironmentalHealth/How-improve-soil-fertility>



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Location	Frequency
Nairobi	102.7
Kakamega	91.5
Bungoma	
Busia	
Malindi	106.3
Location	Frequency
Webuye	95.9
Garissa	88.7

Location	Frequency
Taita	107.4
Narok	102.3
Nyeri	105.7
Machakos	93.8
Makueni	
Kitui	
Meru	105.1
Marsabit	88.3

Location	Frequency
Nakuru	104.5
Gilgil	
Kisii	91.3
Kisumu	105.3
Mombasa	105.1
Kericho	90.5
Eldoret	91.1

Tuko Mbele Pamoja!

## Continued from page 7

### Katamani X-56 (KAT X-56)

**Characteristics:** Has light pink flowers; flowers in 30 to 35 days; matures within 60 to 65 days; grains are dark red; long and oblong (irregular flat shape with one side larger than the other); yields 1,400-2,000kg/ha or 7-10 bags/acre; mature pods ready for harvest are not damaged by heavy rains.

### Katamani X-69 (KAT X-69)

**Characteristics:** Has white flowers; flowers in 30 to 35 days and matures within 60 to 65 days. The grains are long, oblong, resembling rosecoco in colour with dark redshades. Potential yields range between 1,400-2,000kg/ha or 7-10 bags/acre.

However, it's susceptible to lodging due to heavy bearing and tall plants; resistant to rust (*Uromyces* sp.), common bean mosaic virus (CBMV), angular leaf spot and charcoal rot.

## VARIETIES FROM KENYA SEED COMPANY

### Wairimu Dwarf (North Rift Region)

**Characteristics:** Performs well in most ecological zones but it is suited to medium to dry areas. It has excellent eating quality and it's good for intercropping and matures within 70 days.

### GLP 1004 Mwezi Moja (Eastern Region)

**Characteristics:** Matures within 80 to 90 days; large beige or light brown speckled purple. It has long broad pods; is a medium yielder and performs best in warmer areas.

The following are some of the beans varieties recommended for farmers in medium altitude areas including **Western Kenya**- Kakamega, Bungoma, Busia, Kisii; **Nyanza Region**- Homa Bay, Suba, Migori, Rongo, Siaya and Bondo. **South Rift**- Tinderet, Nandi, Kericho, Bomet, Narok, Sotik, and Trans-Mara. **Central region** - Murang'a, Kiambu and Kirinyaga and **Eastern region** - Embu, Meru, Machakos, Kitui and Mwingi.

## VARIETIES FROM KENYA SEED COMPANY

### Mwitmania

**Characteristics:** Cream seeds with black-brown spots; have a spreading growth habit; nearly flat pods, which contain oval seeds and are tolerant to drought and halo blight (*a bacterial disease affecting beans*).

## EAST AFRICAN SEED COMPANY

### Angaza

**Characteristics:** Has light-pink flowers and flowers within 40 to 42 days; matures after 80 to 84 days; tolerant to blight, mosaic virus, and angular leaf spot.

### Faida

**Characteristics:** Flowers within 45 to 46 days; matures in 84 to 85 days; seeds are large and kidney-shaped; have a white/greenish pericarp, which changes to red mottled with age.

## Western Seed Company

### ROSEKOKO

**Characteristics:** Has deep-pink colour; skin is flecked with beige and brown; is tolerant to root rot disease.

This list is not all-inclusive. For more information, visit and inquire from seed companies and research institutions like Kalro <https://www.kalro.org/>.

### Farmers can also contact:

1. **Kenya Seed Company:** 0726 141 856 or <http://www.kenyaseed.com/>;
2. **East African Seed Company:** 020 6652101, <http://www.easeed.com/>;
3. **Western Seed Company:** 020891868, <https://westernseedcompany.com/>.

## Farmers' Forum

Looking for organically grown spinach?

Contact Margaret Karanja on 0721588047

I am selling a cow. Call 0746587195 for details

I am looking for seeds of Africa fox tail grass.  
If selling call Kimani Kamogo at 0724161033

In need of freshly harvested chilli?  
Call Mr Muteti on 0705993933

I am looking for banana seedlings.  
If selling call me at 0710421182

If you are looking for white oyster mushrooms  
call JKUAT Juja campus at 0721167244



### Partner organizations



To contact us on the "tusemezane" platform or ask a question, kindly call or sms +254 715422460. Mail to: [feedback@biovisionafrica.org](mailto:feedback@biovisionafrica.org)

### TOF partners on the web:

- [mkulimambunifu.org](http://mkulimambunifu.org) | [infonet-biovision.org](http://infonet-biovision.org)
- [facebook.com/theorganicfarmer](https://facebook.com/theorganicfarmer)
- [@TofOrganic](https://twitter.com/TofOrganic)