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Dear reader,

Climate change is taking a toll on the agricultural sector, and everyone is bearing the brunt of the high cost of food. In the last month, for instance, wholesale maize prices ranged from Ksh3,177 to Ksh4,050 per 90kg bag, with retail prices ranging from Ksh40 to Ksh45 per kg. Most farmers especially in the Rift valley region are holding their maize hoping to sell at even higher prices.

According to The Kenya Food Security Steering Group (KFSSG), households especially in marginal agricultural regions of Kilifi, Kwale, Taita Taveta, and Tharaka Nithi, have one to two months of food stocks compared to an ideal situation where farmers have reserves for two to four months ahead of the next harvest. The situation is worse in pastoralist communities where farmers are grappling with the loss of livestock, below-average milk production, and declining goat-to-maize terms-of-trade across northern and eastern Kenya. Additionally, farm inputs such as fertilizer have become unaffordable to the small scale farmers.

This edition details various techniques of making farmyard manure for your farm. Read on for more information on soil testing that many farmers have been inquiring about in the past two months.



Kericho farmer finds fortune in vegetable nursery and sustainable agriculture

Vincent Kipyegon

The practice of agribusiness has gained traction among youths over the last few years. It has been adopted as a profession and means of livelihood.

Youths graduating with Agribusiness related courses have settled on agribusiness by devising innovative income generation ideas.

In Kericho County, Gideon Cheres, 27, an innovative nursery farmer, has ventured into vegetable nursery farming as a business. His nursery contains the following family of vegetable seedlings.

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How diet can be used to prevent and manage non-communicable diseases

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FAMILY	VEGETABLES
<i>Brassica</i>	<i>Broccoli, Cauliflower, Spinach, Kales, Cabbage (green, red, purple), kales, turnips</i>
<i>Night shade</i>	<i>Propagated tomatoes, capsicum, eggplant, sweet potatoes, black night shade (managu), pepper, etc.</i>
<i>Cucurbits</i>	<i>Cucumbers, pumpkins, butternuts, beetroots, Cojets</i>
<i>Leeks</i>	<i>Leeks, bulb and spring onions</i>
<i>Legumes</i>	<i>Beans, French beans, Green grams, peas</i>
<i>Medicinal herbs</i>	<i>Rosemary, mint, lavender, pepper, Aloe Vera</i>

He says he was motivated to venture into vegetable nursery agribusiness after discovering that most people starting agriculture encounter problems at the nursery level. His aim is to assist farmers to focus on preparing their lands while worrying less on buying seeds and developing of seed nursery.

He owns two greenhouses within Kericho County with the capacity of producing 200,000 vegetable seedlings. "I believe that my agribusiness practice can act as a starting point for people venturing into farming," says Mr. Cheres pointing at one of his green house. He sells his seedlings from as low as Ksh 4 and makes a decent income from the nurseries and open field farming.

His target markets are smallholder farmers and youths looking to venture into agribusiness with minimum capital and skills. His customers span across the country from Kericho, Nakuru, Eldoret, Kisumu, lower-Nyanza region and Nairobi.

Organic farming

Mr. Cheres prepares seedlings using seed trays and cocopeat which is from coconut husks and is rich in phosphorus and grows them in a green house.

Using seed trays, he says, ensures the maximum growth of seedlings and eradicates the risk of soil-borne diseases and pest attacks on the seedlings.

He believes that organic farming is a sustainable farming practice of protecting the ecosystem; soil, living organisms and crop consumers that has the potential to solve problems facing the modern farmer and the environment. "I am in the process of transitioning from synthetic chemicals to organic chemicals as the greenhouse conditions are favorable to organic farming. He anticipates that soon there will be a distinction in the market between organic and inorganic products.

Sustainable agriculture and technology

Mr. Cheres undertakes frequent soil testing analyses to determine the fertility of the farm and test the acidity of the soil. This serves to determine the organic elements required to enrich the soil.

He has installed a drip irrigation system in his greenhouses and farms. "Irrigation is a necessary component in any form of agriculture where rainfall is not reliable", he notes.



Farmyard Manure

Mourice Barasa

Farmyard manure is a composition of animal wastes (dung and urine), litter, and roughage leftovers mainly from animal fodder and can also be prepared by mixing animal beddings, which often comprise biodegradable materials mixed with dung and urine. It is one of the oldest organic manures used by farmers in the production of various crops. Its affordability and accessibility over time have made it to be one of the integrated nutrient management approaches. Farmyard manure has essential nutrients such as Nitrogen (N), Phosphate, and Potassium which help in improving crop yields.

Farmyard manure can be prepared using three different approaches:

Pit Method

Dig a square pit measuring two meters wide by one meter deep. It should be on high ground to avoid the entry of surface water. Make sure the bottom is slightly sloping. Add an absorbent layer of straw to the bottom of the pit with a three to five-kilogram rate per animal. Fill the pit daily with the mixture of dung, urine, and straw for up to 30 cm until the pit is full. Ensure that the daily 30 cm layer is pressed well to remove air, moistened for easy compaction, and well covered by a three-centimeter layer of fertile ground soil.

Trench Method

Locate a high area and make a trench measuring 8 m by 2 m with a depth of 1.3 m. Fill the trench using the mixture of dung, urine, and litter for up to 50cm above the ground

He applies organic fertilizers through fertigation where soluble fertilizers are added to tanks that supply water to drips.

Fertigation ensures that every crop in the greenhouse receives sufficient nutrients. It also reduces the labour of applying fertilizers and ensures the crops receive sufficient nutrients necessary without additional interruption to the farm and nursery. It also prevents fungal diseases and soil-borne diseases from getting into the farm.

A mulching bag has been installed around his propagated tomato farm. The mulching bag, a reusable canvas bag filled with soil and tomato plants, aids in preventing moisture loss and creating the necessary temperatures for the tomatoes to grow.

Training and consultancy services

Over time, Mr. Cheres noted that most farmers were interested in modern farming practices that maximize production.

He decided to provide additional training and consultancy services to his customers as an orientation platform for modern farming practices.

"Farmers not only visit Cheres farm to purchase seedlings but to also learn about the planting methods and drip irrigation system in my farm," says Gideon Cheres showcasing his irrigation drip system installed in his farm.

He also has a WhatsApp group as a communication platform dedicated to assisting his customers whenever they encounter challenges on their farms. The platform is made up of experts on agriculture, farmers and marketers. He uses the platform to connect farmers to potential markets and farm input suppliers. "I use the platform to ensure that the farmers continue to nurture their crops from production and sometimes link them to the market. I would like to ensure that the youths get a ready market for their produce in the end," he says.

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Future of vegetable nursery business and sustainable agriculture

On the issue of completely shifting to organic farming, Mr. Cheres believes that organic farming is the way to go. It is a sustainable agricultural practice that is profitable, environment friendly and easy to start for both beginners and experienced farmers.

He intends to seek certification of his nursery business, provide full time training and consultancy services to farmers looking for marketable crops as well as expand his green houses to provide a capacity of 400,000 seedlings.

<https://infonet-biovision.org/EnvironmentalHealth/What-Organic-Agriculture>

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level. Cover the mixture with a 50 cm soil or wood ash layer. Add other layers until the trench is filled. Then using the cow dung slurry, ensure the heap is well plastered to form a dome-shaped structure. Leave the plastered heap for 4 or 5 months for manure to become rich and ready for use.

Heap Method

Locate a central, convenient area with minimal runoff. Dispose of all the daily sweepings, cow dung, and other litter at the same fixed area until it forms a 1 m height heap above the ground. Allow the manure to decompose for about five months. After the period, the rotten waste will form compacted manure that will be ready for use.

The main disadvantage of using the heap method is that most of the nutrients leach away as the process continues.

Factors to Consider when Preparing Farmyard Manure

- Consider the age of the animal as older animals provide more waste than young and nursing animals due to the complex differences in digestive systems. Young, female, and more active animals retain most nutrients in the feeds, producing wastes with fewer nutrient components than old and downgraded animals. For example, nitrogen is retained to enhance the formation of milk for cows.

- The nutrient content of the manure depends on the type of food given to the animal. Feeds with high plant ingredients provides high nutrient level from animal wastes. The ratio of nutrient content provided by the excreta is proportional to the animal feed's nutrient content.

- The choice of litter depends on the nutrient content you, as the farmer, want. The application of leguminous plant wastes and cereals produces manure with enough nitrogen content.

- The richness of the manure and its bulkiness depends on the time it takes to decompose. Therefore, the longer the time, the richer and bulky the manure is produced.

<https://infonet-biovision.org/AnimalHealth/Manure>

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How diet can be used to prevent and manage non-communicable diseases

Mary Mutisya

In many low and middle-income countries like Kenya, diet-related non-communicable diseases (NCDs) are on the rise. Annually, NCDs (Non-communicable Diseases) have been reported to cause about 70% of total deaths majorly in Sub-Saharan Africa.

What are Non-communicable Diseases?

According to FAO, non-communicable/chronic diseases are non-infectious health conditions whose progression is slow, usually lasting over a long period of time and cannot be transferred from one person to the other. Some of the most common NCDs are:

- Obesity
- Diabetes
- Cardiovascular diseases
- Cancer
- Osteoporosis
- Arthritis

Non-Communicable Diseases can be caused by metabolic factors or behavioral risk factors.

Metabolic/diet related factors:

- Being overweight
- Hyperglycemia (high blood glucose levels)
- Raised blood pressure
- Hyperlipidemia (high fat levels in the blood)
- Smoking tobacco
- Excess salt/sodium intake
- Excess alcohol consumption
- Insufficient/lack of physical activity

Currently, no cure or single approach to the prevention and management of Non-communicable diseases has been identified. Rather, a combination of various practices is being recommended.

Good nutrition and healthy eating especially consumption of organically produced foods is one of them. From research, functional foods (foods that offer additional health benefits beyond their nutritional value) have been proven to contain dietary active compounds that can halt, control and manage many NCDs. These foods include;

Spices and herbs-

There is a need to encourage the consumption of organically grown spices such as garlic, ginger and turmeric. Garlic is a good source of vitamins B6 and C, manganese, selenium and fiber. It is therefore effective in reducing blood cholesterol and pressure and supporting immune functions.

Ginger is rich in antioxidants, particularly gingerol and has been recommended in the management of nausea and pain associated with acute inflammatory conditions. It also reduces the risk of heart diseases, dementia and certain types of cancers. Turmeric contains an active compound called curcumin which has potent antioxidant and anti-inflammatory effects. Studies show that it can be used in the treatment and prevention of cancer and diabetes, as well as pain reduction and wound healing. Herbs such as peppermint help reduce bloating and stomach upset. The best way to tap on the nutritional/functional benefits of herbs and spices could be by consuming them fresh and unprocessed, mainly by dissolving them in warm water to make herbal drinks.



Berries-

Studies show that berries are packed with vitamins, minerals, and fiber. Their high antioxidant content has been associated with reduced risks of heart diseases, inflammatory conditions and certain cancers. They are also very effective in treating digestive and immune-related disorders when used together with medical therapies.

Cereals and legumes-

Cereals contain a lot of fiber, are loaded with a lot of vitamins and minerals and for this reason they have a double benefit to their consumers as fiber from cereal products not only lowers the risk of type 2 diabetes but also other cardiovascular (heart) diseases.

Fermented products-

These include products as yoghurt. They are rich in probiotics and they help reduce body cholesterol, blood pressure, improve digestion and alleviate inflammation. The lactose in most fermented products is broken down during the fermentation process making them friendly to people who are lactose intolerant.

Also, some of the modifiable behaviors and habits that can be adopted to prevent and manage NCDs are:

Avoiding the use of tobacco-

Most chronic diseases and more specifically cancers have been associated with the smoking of tobacco. Avoiding smoking by preventing initiation or by cessation for those who already smoke is the single most important way to prevent cancer and cardiovascular diseases. Avoiding the use of smokeless tobacco also helps prevent oral cancer.

Maintaining a healthy body weight-

For a normal individual, the body mass index (BMI) which is calculated by dividing the weight (kg) of a person by their height (m²) should be between 18.5 and 25.



Fowl Pox

Susan Wanjiru

A couple of years ago, I ventured into poultry rearing. I began with ten chicks, and all seemed to be going well until one morning one of the birds suddenly had lesions with pus on its skin. One of its eyes was sealed shut. In the next few days, other birds developed similar symptoms with some dying.

I called a veterinary doctor who diagnosed Fowl pox. Fowl pox is a disease that often affects chickens and often leads to death of poultry.

It is caused by viruses of the Poxviridae family and the genus Avipoxvirus.

The disease can manifest in two different forms: dry fowl pox and wet fowl pox. In dry fowl pox, your chicken will have scabs and pimples on the beak, and parts of the skin with no feathers. Wet fowl pox causes lesions that ooze around the eyes, in the mouth, the trachea and the oesophagus.

The disease spreads through contact between sick birds and those that are not infected. Insects such as mosquitoes enhance transmission within the flock when they settle on the lesions on a sick bird and fly to a bird that is not infected.

The disease also spreads through inhalation of the virus which causes a diphtheritic membrane to form in the mouth (a false membrane formed on mucous surfaces), esophagus and sometimes the trachea. The diagnosis for this type of spreading is difficult. It can infect birds of all ages. There is no treatment for infected birds.



Some of the signs of infection include:

- *White lesions or sores appear on the skin of the bird where there are no feathers. These progress into black wart-like scabs or swellings.*
- *The sores will sometimes ooze (wet form). They mostly appear around the eyes, the vents, corners of the mouth or the legs. The eyes fill with fluid and may appear sealed shut.*
- *Thoroughly clean and disinfect your chicken houses before new batches of chicks are introduced. If infection strikes, disinfect your coops immediately, while containing the disease.*
- *If you have many chickens, consider moving them to another house to allow you to vaccinate the contaminated coop.*

To avoid sores and scabs getting infected, treat with natural ointments such as Aloe Vera where possible.

- *Vaccinate your birds with a fowlpox vaccine, administered on the wing web through wing stab. It is available in most agro-vets and is given at 12-16 weeks. Observe your birds after vaccination and provide them with vitamin supplements.*
 - *Keep the floors of your chicken coop dry and clean all the time. Most disease-causing organisms thrive in wet and dirty conditions.*
 - *Build and position your chicken coops to allow ample sunlight to penetrate for as long as possible.*
 - *Finally, try to ensure that your birds do not mix with others, for example, the neighbours. If his birds are infected, they will spread the infection to your birds when they interact.*
- It is important to note that though birds may recover from a fowlpox attack, performance may sometimes get compromised. They may produce fewer eggs or grow slower for the rest of their lifetime. Vaccination before the disease strikes is crucial.*

<https://infonet-biovision.org/AnimalHealth/Chicken>

Any BMI that is below 18.5 is considered underweight while that between 25 and 30 is overweight. A BMI of over 30 is considered to be obese.

Obesity is rapidly increasing in the world, and this is elevating the risks of many chronic diseases. Obese people are twice or thrice more likely to develop chronic diseases, particularly diabetes and hypertension.

Another key aspect linked to a healthy weight is the waist circumference which although not known to many is a silent killer and is critical in exposing people to chronic diseases. In healthy women and men, a waist circumference of approximately 88cm and 100cm respectively is considered to be optimal.

Therefore, those already affected by chronic diseases and those not yet affected should all focus on maintaining the appropriate body weight as well as waist circumference by eating healthy and exercising frequently (for farmers, being physically active in the farm provides enough exercise).

Maintaining daily physical activity-

Increased urbanization, living standards and mechanization have remarkably reduced people's opportunities of using the excess energy that is not required by the body. When it comes to preventing and managing chronic diseases, regular physical activity is key as it not only helps people in maintaining a healthy weight but it also helps reduce the risk of type 2 diabetes, stroke, breast and colon cancer, osteoporotic fractures, erectile dysfunction and depression.

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https://infonet-biovision.org/nutrition_related_diseases

Aphids on green leafy vegetables

By Grace Kinyanjui

The most common green leafy vegetables in Kenya include kales, cabbage, spinach, black nightshade and amaranthus. They are very important to human health because they provide essential vitamins, minerals and dietary fibre.

However, successful farming of these vegetables is threatened by crop damages and yield losses caused by insect pests such as aphids. These are small sap-sucking bugs with colours varying from green, grey, yellow, dark brown to black, depending on the species. Heavy infestations cause yellowing and curling of leaves and the growth of sooty mould. Infested vegetables become unattractive to consumers and unmarketable.

Crop damages can be minimized by adopting organic and ecologically sustainable pest management methods.

Rich organic soils form the foundation of organic farming. They provide a nutrient-rich medium for plant growth and produce healthy vegetables. Therefore, always plant your vegetables on soils with high organic matter and compost.

After planting, regular monitoring is essential as aphids reproduce very quickly. A small population can become a full-blown infestation within a short time. Make frequent farm visits and check aphids underneath leaves and their damage symptoms of leaf curls and yellowing.

Also, yellow sticky traps and roller traps are useful in monitoring and suppressing the populations of aphids and other flying insect pests.

Polyculture farming plays a key role in suppressing pest populations. This is a diversified cropping system of multiple crops in an agroecosystem. Increased crop diversity leads to an ecological balance of pests and their natural enemies, and therefore an effective natural regulation of pest populations.

The common natural enemies of aphids include lady beetles, lacewing and hoverfly larvae, damsel bugs and parasitic wasps.

Interplanting vegetables with companion plants that act as natural repellents of aphids also helps to reduce infestation. For example, an interplant of spring onions in between and around kales keeps them naturally free from aphids.

Other aphid repellent crops include garlic, leeks and Mexican marigold. In addition, native vegetation and farmscape increase biodiversity on the farms and enhance biological control of crop pests. Farmers should thus consider adding hedgerows, live mulches, insectary plants, windbreaks, woody plants and water reservoirs in their vegetable agroecosystems. It is unwise to have an entire farm planted with one type of vegetable e.g. cabbages or kales because it creates a hotbed of crop pests.

- Mechanical control of aphids at the very early stages of infestation.

Aphids usually occur in colonies, making it easier to crush the emerging populations using fingers or a wet cloth. The heavily infested leaves can also be removed and destroyed.

Biopesticides are very effective against large populations of aphids. Fungal-based biopesticides include Mazao Supreme®, Beauvitech®WP and Lecatech®WP.

Neem-based biopesticides kill aphids and other small soft-bodied insects present on vegetables. Examples include Nimbecidine® and Neemazal 1.2EC.

There are several homemade organic pesticides that can be used to fight aphids. Examples include soap sprays, wood ash, flour preparations, baking soda and extracts of neem, garlic and onion.

Mostly, they are mixed with water, vegetable oil and dish wash liquid soap to increase their efficacy. Concentration should be mild as highly concentrated homemade biopesticides can affect the plants negatively. Test on a few infested leaves before full scale application.

When implemented together, these pest control strategies can result in reduced aphid damages and contribute to sustainable production of safe, healthy and high quality green leafy vegetables.

Note: Yellow sticky traps and Yellow roller trap can be purchased from Twiga Chemicals Industries Ltd, Koppert Biological Systems and Real IPM. Fungal-based biopesticides are available at Dudutech and Real IPM. Neem-based biopesticides are available at Osho Chemicals Industries Ltd and Twiga Chemical Industries Ltd.

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<https://infonet-biovision.org/PlantHealth/Pests/Aphids>



Prevention and Treatment of Newcastle Disease

By Jean Paul Mackio

Of late, there has been a daunting outbreak of Newcastle disease affecting poultry farmers.

Newcastle disease also known as pneumoencephalitis is a contagious and viral infection affecting both wild and domestic birds. This year, the disease has caused significant losses to farmers, especially those in rural areas.

This article provides information on identification, prevention and treatment of Newcastle disease. Newcastle disease often appears in three forms namely:

- *Severe/very virulent*
- *Moderate/velogenic*
- *Mild/lentogenic*

The strain of the virus often attacks the digestive, respiratory or nervous systems of the affected chicken.

Symptoms of Newcastle Disease -

Very virulent forms of the infection often lead to sudden death with no noticeable symptoms.

Spreading of the Newcastle Disease

The virus is spread mainly through secretions and droppings from birds that are infected. The virus can also be shed into the air by the infected birds which can be taken in by healthy birds within the flock. The infection spreads swiftly in confined areas.

The signs of the disease appear within the poultry flock within two to twelve days after being exposed to the virus in the air. However, the spread of the virus is much slower through oral or faecal matter. The virus can survive for some weeks in humid and warm milieus such as manure and feathers.

Symptoms:

- Nasal discharge*
- Sneezing*



- Coughing*
- Watery and greenish diarrhoea*
- Depression*
- A sudden decrease in egg production in layers*
- Eggs having thin shells*
- Eggs having watery egg white (albumen)*
- Drooping wings*
- Muscle tremors and paralysis*
- Circling*
- Swelling of the neck or eyes*

Given its viral nature, Newcastle disease does not currently have any treatment. Antibiotics are normally used to control the secondary infections that are a result of Newcastle disease. A vaccine is currently available and is regularly used to reduce the severity of the illness. However, it does not entirely avert infection.

The best way of ensuring that poultry flocks are not infected with Newcastle disease is ensuring strict biosecurity. This can be done through:

- Place new poultry in quarantine – New members of the poultry flock should be kept away for a minimum of four weeks to avoid infection.*
- Avoiding contact with other birds – Anyone who has come into contact with other flocks for instance in markets should stay away from the flock.*
- Put a perimeter in place to prevent contact with other flocks.*
- Thorough cleaning of equipment and tools.*
- Keeping wild birds and rodents away.*
- Establishing place waste management areas.*

Laboratory testing is recommended as these symptoms closely resemble those of avian influenza.

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<https://infonet-biovision.org/AnimalHealth/New-Castle-disease>



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

Tuko Mbele Pamoja!

Soil Testing

Charles Kimani

As farmers get ready for the planting season, soil testing is essential to ensure productivity of crops. Soil testing refers to the analysis of soil to determine its composition, nutrient content, and other properties like pH level. With this information, farmers can tell what their soil requires and focus resources on enriching it with these nutrients.

Here are some of the benefits of soil testing:

1. *Enhances soil fertility - soil testing shows the soil's nutrient levels and deficiencies, and so the farmer is informed on the necessary inputs to help improve its fertility.*
2. *Soil testing allows the farmer to identify the best crop to plant depending on the nutrient composition of the soil.*
3. *Efficient use of resources - after soil-testing, the farmer plans for resources aware of the requirements ahead of planting. For example, in composting, if the soil lacks nutrients available in certain crops, the farmer can add up material dense with those nutrients.*

An example is use of *Tithonia* as a source of phosphorous in making compost.

To get accurate results, the timing of soil sampling, sampling technique and the type of analysis should be put into consideration.

The process of soil testing:



(i) Contacting the soil testing service provider

In Kenya, there are a few credible service providers for soil testing. Some of them are provided below with contact information detailed. The first step is contacting the service provider to explain your need for soil testing.

The service provider will advise you on what type of test is appropriate for your field. Different categories vary with prices depending on how detailed the analysis required is. Prices range from Kes1,500 to Kes 5,000.

Once you have agreed on the kind of testing required for your field, you will be required to collect soil samples as guided by the service provider.

(ii) Collecting soil sample

Collecting soil samples from your farm is something you can do on your own,

- *To take a sample, you will require: an auger, a bucket, collection bags, labels and a pen. An auger is highly recommended but, in its absence, a machete or a shovel can be used.*

- *To make up one sample, take between 20-25 sub-samples from the entire field in a zigzag pattern, from the soil surface down to a depth of 20cm-30cm if one intends to plant shallow rooted crops or 0.5-1m for deep rooted plants.*

- *To ensure that the soil collected is a true reflection of the farm, avoid spots such as anthills, manure heaps and crop residue.*

- *Place it in a collection bag, seal it and send it to the lab. Depending on the lab, you should get the results within a week (7 days).*

- *Record your personal details and attach to the sample before sending it to the laboratory.*

There are a number of institutions/companies in Kenya where you can take your soil samples for testing. Some of the soil testing institutions in Kenya include:

- *Kenya Agricultural & Livestock Research Organization (KALRO) with offices in all counties (0111010100).*
- *Crop Nutrition Laboratory Services Ltd (Cropnuts) located in Limuru (0711094444).*
- *SGS Kenya with branches located across the country (0709 633 000).*

<https://infonet-biovision.org/EnvironmentalHealth/Soil-monitoring-Know-your-soil>

FARMERS' FORUM

Are you looking to buy bee wax to make products such as candles? Danniell Biwott from Eldoret is selling it at an affordable price.

Would you have seedlings of the *Gliricidia Sepium* tree? Richard Rotich from Eladma Ravine is looking to buy.

David Biwott from South Nandi, Kapkule, is selling freshly harvested dhania.

To get their contacts, call: 0715 422 460

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