

Dear reader,

YOUTH ARE GRADUALLY taking up space in the agricultural sector, with groundbreaking innovations that save time, and costs, while maximizing productivity.

In Kiambu County, young graduates have come together to create affordable, and accessible solutions for soil testing and soil amendment technologies with unprecedented impact. Technology is slowly transforming agriculture, bridging the farmer to fast information and less labour intensive solutions. For instance, Artificial Intelligence has finally made its way into the farm; with a simple photo click of your crop using a smartphone,

you can get a diagnosis of the disease affecting the crop and recommendations on what treatment to apply.

Organic farming has been made easier by a popular biopesticide, Agripest 75 EC, which is affordable and accessible. This edition features testimonials from farmers using it.

Are you a poultry keeper, worried that your chicken will contract the deadly Newcastle Disease? A poultry expert gives a breakdown of steps you should take to protect your chickens early, before the outbreak season hits. Read on for these and much more.

IN THIS EDITION

- **Agripest Organic 75 EC;** affordable effective and accessible biopesticide for common pests
- **Shift your mindset;** better planning boosts farm yields
- **AI in the farm:** Technology eases farming activities
- **New innovations boosting farm productivity:** biochar and soil testing kit

Are you treating your farming enterprise like a gamble or a business?

Here is how to change your mindset for guaranteed profits

By **Miriam Muiruri**

WHEN YOU ASK any farmer in Kenya why they farm, the answer is usually quick and straightforward: "To earn an income." Farming remains the backbone of Kenya's rural economy, and for most smallholder farmers, it is their primary source of livelihood. Yet, many farmers continue to struggle to make meaningful profits from their efforts. The reality on the ground is that a majority barely produce enough to feed their families, let alone generate surplus income to cover education, healthcare, or reinvestment in their farms. With shrinking land sizes, unpredictable weather patterns, rising input costs, and market uncertainties, many farmers are left disappointed.

A key challenge is how farming is approached. Most smallholder farmers treat farming as a daily activity rather than a business. Without clear goals, proper planning, record-keeping, or market research, farming becomes a gamble rather than a strategic venture. For farming to become profitable, it must be treated as a business, with all the elements that make any business successful.



Start with a Plan

Farming Needs a Business Approach. A business plan defines what you want to do, how you will do it, the inputs you need, the expected returns, your target market, and the associated risks. This helps to allocate resources effectively and measure performance. For instance, if you decide to go into dairy farming, your business plan should include:

- The number and breed of dairy cows.
- The cost of inputs, housing, and veterinary care.
- Projected milk yields and prices.
- A marketing strategy (e.g., selling to local processors or directly to consumers).

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Controlling Newcastle Disease

The AVIVAX I-2 Newcastle thermostable vaccine proves its efficacy when administered through an eye drop or mixed into drinking water. PAGE 6



PHOTO: Justina Kimuya, from Mutulani Makueni County inspects her onion farm

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Choose a Niche Based on Your Strengths and Market Demand

Small-scale farmers often fall into the trap of diversifying too much, attempting to grow and rear everything that appears profitable based on trends. While it's good to be open to opportunities, copying others without assessing your situation leads to frustration and losses. Choose a niche based on your resources (land, capital, labor), skills and knowledge, and the demand in your local market.

Do your research

Before starting any enterprise, conduct thorough research. Understand the production cycle, cost of inputs, time to maturity, potential diseases, market requirements, and prices. This reduces the risk of failure and prepares you for challenges. A farmer must understand the effort, financial commitment, and time required to produce their selected product successfully. For instance, dairy farming requires knowledge of proper cow breeds suitable for your climate, feeding regimes, milk hygiene, and disease management. Also, consider feed availability. Can you grow your own fodder? Do you have water for zero-grazing? These questions help determine if the enterprise is viable.

Keep Clear and Consistent Records

Just like any business, you must know your numbers. Keep records of all income and expenses, Input usage (feeds, fertilizers, labor), Production volumes, and Veterinary and health records. These records help you analyze your production costs,

profit margins, and break-even points. Understanding cash flows ensures better investment decisions and prevents unnecessary losses. For instance, a poultry farmer who tracks feed usage and egg production can tell whether they're getting value for money. If production drops, they can quickly identify the problem, be it poor feed, disease, or age of layers, and take corrective action.

Start Small and Learn as You Grow

When starting a new enterprise, start small, learn the ropes, and expand as you gain experience. This minimizes losses and helps you refine your practices before making a big investment. For instance, if you are interested in dairy farming, start with one or two cows. Learn about good management, feeding, fodder management, record-keeping, and market access. As you master the process and your income stabilizes, you can expand to more animals.

Identify Reliable Markets Before You Produce

Many farmers produce without a clear idea of where or how they will sell their

products. This often leads to significant losses, especially in perishable goods such as milk, vegetables, or eggs. Before you start, identify potential buyers or market channels such as Local hotels, schools, and hospitals, supplying to cooperatives or processors, the local community, among others

Farming communities

Farming in isolation limits your access to information, training, inputs, and markets. Being part of a farmer group offers many advantages, such as:

- Bulk purchasing of inputs to reduce costs.
- Collective marketing to get higher prices.
- Access to extension services and training.
- Knowledge sharing and exchange of ideas.
- Easier access to credit and grants.

Conclusion

Profitability in farming is not reserved for large-scale farms. Even a farmer with a small piece of land can make a decent living if they treat the farm as a business.

With proper planning, record-keeping, market research, and continuous learning, smallholder farmers can transform their enterprises from bare subsistence to profitable ventures. The journey to agricultural success begins with the right mindset. Think like an entrepreneur. Farm with intention.

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When starting a new enterprise, start small, learn the ropes, and expand as you gain experience. This minimizes losses and helps you refine your practices before making a big investment

Agripest Organic 75 EC farmers' new organic solution against common pests

Safe, affordable, effective biopesticide; available at your local agrovet

Usually, there are application guidelines on how long a farmer must wait before harvesting the crop after applying the pesticide, yet some chemicals do not entirely break down, leaving toxic residues on the produce. In other cases, farmers fail to follow the required post-harvest intervals (PHIs), as they rush to secure immediate markets offering a higher return on their investment.

By Caroline Mwendwa

WHEN FARMERS FACE pest challenges on their farms, they must act quickly to salvage the crop and prevent losses. Often, they will reach for a solution that they are familiar with, and one that they are sure to get immediate results from. Unbeknownst to them, the synthetic pesticide they are used to applying could pose high health risks to the consumers of the produce (often including their own families). Usually, there are application guidelines on how long a farmer must wait before harvesting the crop after applying the pesticide, yet some chemicals do not entirely break down, leaving toxic residues on the produce. In other cases, farmers fail to follow the required post-harvest intervals (PHIs), as they rush to secure immediate markets offering a higher return on their investment.

As a result, cancer cases are on the rise, and this has been linked to intensive use of synthetic chemicals in food production. On the other hand, misinformation about organic farming hinders farmers from adopting it. For example, most farmers believe, without even trying, that organic farm inputs are unavailable, unaffordable, and ineffective. Good news is that KAPI Ltd, a biopesticide manufacturing company based in Nakuru, is proving all these assumptions wrong. Farmers have discovered the efficacy of its products, which are no more expensive

than conventional pesticides. The broad spectrum nature of their products makes it possible for farmers to spend less in production, increasing the quality of the produce whilst maintaining high yields. Through its newly developed product, Agripest Organic 75EC, a broad spectrum biopesticide which is highly effective and affordable even for the small-scale farmers, KAPI is changing the farming landscape for all farmers across the country.

Agripest Organic 75EC, is a game changer as it effectively manages common pests including Tuta absoluta, aphids, thrips, whiteflies and Diamondback Moth, without leaving any residues on the crop. Agripest Organic 75EC, is packaged in a range of small sizes, and retailed in most agrovets in all counties of Kenya. Farmers who have used it, find great relief in its efficacy in managing pests, affordability and accessibility within their local agrovets.

Farmer testimonials

Kennedy Kariuki, a farmer in Nyandarua County, grows organic tomatoes under an 8m by 15m shade net. "I was introduced to organic farming by Veronica Wamiti of Biovision Africa Trust in the year 2016, and I was keen to grow organic vegetables," he says. Growing tomatoes organically requires preparedness, with the right biopesticides, as pests such as Tuta absoluta, can completely wipe out an entire investment. Luckily for Kariuki, he had encountered KAPI Ltd. staff at a farmer field day event, who introduced him to Agripest Organic 75EC.

"When I started growing tomatoes, I needed organic inputs that are undoubtedly effective, and just in the nearest agrovet in my hometown. I found out that KAPI products were available and at very affordable prices," he recalls. Aware of the efficacy of Agripest Organic 75EC, on most of the pests that attack vegetables, Kariuki did not hesitate to purchase it. "At only Ksh160, I acquired 50 mls of Agripest Organic, and it was enough to manage the white flies that had started infesting my vegetable farm." Never has he encountered Tuta absoluta in his farm, as

PHOTO: Kennedy Kariuki harvesting tomatoes from his organic farm



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One outstanding advantage of Agripest Organic 75EC is its effectiveness in managing aphids, whiteflies, thrips, and Diamondback Moths, which are deadly pests that ravage vegetables

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he uses Agripest Organic 75EC. Looking around his garden, one can see bundles of healthy tomatoes dangling heavily on the stems. Kariuki sells his tomatoes through an online app, especially to markets in Nairobi. Danson Mwenda, a farmer from Biashara Ward in Nyandarua County, is an organic vegetable grower who supplies vegetables, including red cabbage, beetroots, white onions, spring onions, and potatoes to a supermarket in Naivasha town.

Mwenda, who had been practicing conventional farming there before, realized that he spent so much money on farm inputs, especially synthetic fertilizers and pesticides, which ate into the little profits he was making.

Even worse is their effect on the soil. "It got to a point where the soil became highly acidic, and could not yield much without fertilizer application," he says. It was at this point that he decided to transition to organic farming. "I have now been trained on compost making and use of biopesticides to manage pests," says Mwenda, who fondly speaks of Agripest Organic 75EC. This biopesticide has become his companion in vegetable production.

"One outstanding advantage of Agripest Organic 75EC is its effectiveness in managing aphids, whiteflies, thrips, and Diamondback Moths, which are deadly pests that ravage vegetables," he says, further explaining that a 50ml of Agripest organic biopesticide, goes for Ksh160, which is much less than the cost of synthetic pesticides. The dilution rate for Agripest Organic 75EC is 3mls per litre of water, so a 50ml bottle of Agripest Organic

makes 16 Litres when mixed with water. Additionally, Agripest Organic 75EC has a postharvest interval of just 24 hours, so one can take one's harvest to market, without having to wait for long periods, unlike many synthetic pesticides, which have PHIs of between 7-21 days.

Locally produced

The production of KAPI biopesticides is entirely local, as ingredients are sourced locally from farmers. Agripest Organic 75EC is made from the oil extracted from Croton nuts. Croton Megalocarpus is an indigenous tree in Kenya. "We have collaborated with EcoFix, a croton nut processor, to create a market for croton growers," says Ian Shaw, the CEO of KAPI Ltd.

"This makes the product highly affordable, while creating incomes for local producers of croton. KAPI Ltd is committed to expanding the production of effective, and accessible biopesticides.

"Currently, we have three products in the market: pyrethrum-based Flower Dust, croton-based Agripest Organic, and Neem and Karanja oil-based Biopest. All these products are certified by KilimoHai and EcoCert and are available at 1000 agrovets countrywide. We are still expanding to many more agrovets," says Shaw.

Caroline Mwenda is the Project Officer for TOF Magazine. Email: cmwenda@biovisionafrica.org

PHOTO: Danson Mwenda in his vegetable farm





CERTIFIED ORGANIC BIOPESTICIDES



Controlled by ECOCERT SAS

Product suitable for use in Organic Farming in accordance with Regulations (EU) No 2018/848 and 2021/1165 and the NOP Regulation and the JAS Regulation.

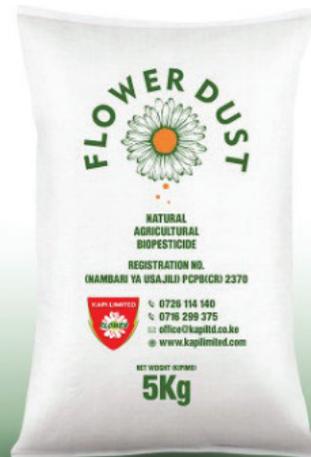
Looking for affordable, safe organic solutions?

Pop in to your local agrovet and ask for KAPI biopesticides

Tulwet Agrovet Kericho, Kavifarm Agrovet Eldoret, Gracewell Alaskam Malindi, Nehema Agrovet Kinangop, Petal Life Science Nyeri, Mosop Agrovet Eldoret, West Farm Agrovet Mariakani, Shamba Pride Machakos, Sepros Agrovet Kiambu



NEW & UNIQUE FORMULATION



#SAFE #EFFECTIVE #POCKET FRIENDLY



Control Newcastle Disease Using Avivax-I-2 Vaccine

The vaccine proves efficacy when administered through eye drop or mixed into drinking water

By Dr Ann Wachira

NEWCASTLE DISEASE HAS a severe impact on local chicken productivity in Kenya. It may wipe out 80-100 % of unvaccinated flocks, and we never know when it strikes.

Farmers are hesitant to invest in local chicken because of this uncertainty. There is no cure for Newcastle disease in chicken. The only way to combat the disease is to prevent the chicken from contracting it.

The most effective method for preventing Newcastle disease in chicken is vaccination. The AVIVAX I-2 Newcastle thermostable vaccine proves its efficacy when administered through an eye drop or mixed into drinking water.

Freeze dried (pellet) AVIVAX I-2 Newcastle disease vaccine should be stored at +2 to +8 degrees Celsius or under refrigeration, away from direct sunlight. The AVIVAX I-2 ND vaccine can maintain its protective capabilities for 8 weeks at 28 degrees Celsius when stored in its freeze-dried form in the dark.

Remember that vaccinations are best performed in the shade or during morning hours.

Once diluted, the vaccine will last for only two hours under field conditions. The Newcastle disease vaccine is best administered using a dropper to place one drop into the eye of the chicken.

The dropper should be purchased with the vaccine and should be calibrated to ensure that the drop is the correct size and that the plastic material will not destroy the vaccine.

Reconstituting the vaccine

The correct reconstitution of the vaccine is important. Boil local water and leave to cool in a covered container.

- Do not use metal containers to store boiled water.
- Do not use treated tap water because the chemicals in the water will destroy the vaccine (If alternative water sources are unavailable, let the tap water stand overnight to allow the evaporation of chlorine).
- Remove the aluminium seal from the vaccine vial.
- Utilize a syringe to measure 10 ml of prepared water for a 100-dose vial or 5 ml for a 50-dose vial, adding it to the vaccine vial.
- Gently mix the vaccine by shaking the vial.
- Remove the rubber stopper and, using a dropper, carefully draw the reconstituted vaccine into the dropper.
- Instruct your assistant or the bird's owner to hold the chicken horizontally, with one eye facing you.
- Hold the eye dropper vertically, gently squeezing to allow one drop of the vaccine to fall into the chicken's eye before releasing the bird.
- Ask the vaccine supplier what volume of water is required to dilute the vaccine correctly.
- After diluting the vaccine, use it within one hour.

Always adhere to the manufacturer's recommendations.

After reconstitution:

- The vaccine maintains its potency for two days.
- On the first day, administer one drop per chicken.
- If any reconstituted vaccine remains, store it in a cool box or a refrigerator at +4 to -8 degrees Celsius.
- On the second day, administer two drops during vaccination and discard any remaining vaccine.

Vaccination Guidelines:

- Start vaccination one month before the Newcastle disease outbreak period.
- The dosage, consisting of one eye drop, is the same for chickens of all ages.
- If the initial eye drop does not fully enter the eye, apply a second drop.
- Utilize the eye droppers provided by the vaccine stockists.
- Avoid vaccinating chicken that are sick.
- Chicken may be consumed immediately after vaccination.
- The vaccine does not pose any issues for humans.
- Remember that it takes 7 to 14 days for chicken to develop sufficient protection against Newcastle disease after vaccination.
- Ensure chicken are vaccinated every 4 months, as their level of vaccine protection starts to diminish after this period.

Maintaining eye droppers is crucial for effective vaccination. After use, clean them with

non-chlorinated water, avoiding soap.

Store them securely, inspecting for everyday wear and tear. Regular maintenance ensures their readiness for future use, contributing to successful vaccination procedures.

Control Measures During an Outbreak:

- Do not sell or give away sick birds, as the disease can spread between farms through the movement of infected birds.
- Recognize that the disease can also be transmitted via the movement of people, vehicles, other animals, and parts and products of infected birds (such as eggs, feathers, offal, etc.).
- Isolate sick chicken from healthy ones and ensure that water and food are provided for the sick birds.
- In cases of severe illness, it is advisable to sacrifice the affected bird.
- Burn or bury dead birds and any unused parts of the chicken.
- Avoid vaccinating sick birds.
- During the initial stages of a Newcastle disease outbreak on a farm, vaccination is not recommended, as it is challenging to identify birds that may be incubating the disease without displaying signs of illness.
- After an outbreak, wait for at least one month following the death of the last chicken before introducing new birds.
- Always reach out to the local Veterinary Services, Extension Service, or your community livestock worker when birds exhibit signs of illness or when there are concerns about poor production.

Vaccinations are best performed in the shade or during morning hours. Once diluted, the vaccine will last for only two hours under field conditions. The Newcastle disease vaccine is best administered using a dropper to place one drop into the eye of the chicken. The dropper should be purchased with the vaccine and should be calibrated to ensure that the drop is the correct size and that the plastic material will not destroy the vaccine.

Key Benefits of AVIVAX I-2 ND Vaccine

Characteristic	Benefits
Thermostability	The vaccine remains effective even when exposed to varying temperatures
Multipurpose Administration	It can be administered through eye or nose drops and in drinking water. It can also be mixed with specific feeds or injected into the bird.
User-Friendly	Easy administration makes it suitable for use by farmers
Contact Transmission	The vaccine strain can be transmitted by contact from vaccinated to non-vaccinated birds
Safe for All Ages	It is avirulent and can be safely given to chicken of any age, from day-old chicks to adults
Biological Safety	Has demonstrated superior biological safety compared to other living ND vaccine strains such as B1 or La Sota.

Is your soil dead? Bring it to life with biochar

Young engineers make farmers' dreams come true with biochar technology

By Caroline Mwendwa

ON GRADUATING WITH a Bachelor of Science degree in Agricultural Engineering, Dennis Murithi worked with farmers offering extension services in installing irrigation systems and vertical garden technologies to improve crop yields. From experience, even after installing these technologies, most farmers still faced challenges in low crop yields, caused mainly by soil infertility, highly characterized by low organic matter in the soil. Driven by the desire to provide a solution to this challenge, Dennis collaborated with his friend, Derrick Ngigi, and together they founded Pure Plant Organic Ltd. This company offers soil amendment solutions to farmers. They began by conducting research on existing technologies that aim to sustainably enrich the soil with organic matter.

"We found that farmers who have embraced organic farming practices such as vermicomposting, rearing black soldier flies for animal feed as well as organic manure, and other composting technologies, struggle less with soil fertility," says Murithi. Further research led them to identify a solution that lasts longer in the soil, biochar technology.

Biochar technology

Biochar is a solution for improving soil health. Its primary purpose is to amend the soil so that it is conducive to microorganisms' activity, allowing them to multiply and aid the process of nutrient absorption by plants.

The process of making biochar

To make biochar, one requires biomass such as rice husks or macadamia shells. Muriithi acquires his biomass from rice millers in Mwea, Kirinyaga County, which is then taken through the pyrolysis process, whereby they are burnt in the absence of oxygen, at different temperatures. A milling machine then crushes the burnt material to reduce the size of the particles into fine granules, which are then inoculated with organic fertilizers. The final material is highly effective, and can be applied alone, without the need to add other types of fertilizer.

How biochar works

Since the soil contains living microorganisms, the continued use of synthetic fertilizers and herbicides kills them, leaving the soil dead and unproductive. Avoidance of these synthetics and replacing them with organic manure restores the presence of microorganisms. When biochar is added to such soil, it acts as a point for these microorganisms to multiply due to the porous nature of biochar. This porousness also enhances the aeration of



the soil and moisture retention, conditions that boost soil productivity. Additionally, biochar helps in balancing the soil PH.

"Biochar does not decompose, since due to the process of pyrolysis, it retains a stable carbon compound that lasts permanently in soil," he says.

How to determine the quantity of application

Before applying biochar on the farm, a soil test is recommended to determine the condition of the soil. The type of soil also determines the amount and frequency of application. For example, clay soil requires more biochar due to its characteristic of forming hard pans.

"The greatest advantage of biochar is that it does not decompose, and farmers who grow crops at a small scale may not need to apply additional manure after applying biochar," says Muriithi. Commercial producers, on the other hand, might need to add other biofertilizers, but in smaller quantities, once biochar has been applied.

Pure Plant Organics has recorded success stories from farmers who have applied biochar to their previously dilapidated farms. "For example, a farmer in Mwea, used to harvest 7 bags of rice in 3 seasons, but is now harvesting 20 bags of rice after applying biochar on her farm," he says. In areas where the soils are clay, farmers

who could not grow crops due to hard pans can now grow crops and harvest satisfactorily, having amended the soil with biochar.

"Landscapers also form a huge part of our clientele, given that home compound grass requires conditioning after 3 months of planting, and instead of using compost manure, which comes with an unpleasant smell, they apply biochar," he quips.

Availability to farmers

Pure Plant Organics packages biochar in various quantities. A 5 kg pack goes for Ksh 250, 10 kg pack goes for Ksh 500, 25 kg pack goes for Ksh 1,500 and a 50 kg pack goes for Ksh 2,200. "Our outlet is based in Nairobi, but we supply to customers across the country.

We are already serving farmers in the Central, Western, and Rift Valley regions of Kenya. We do not just send the biochar, but walk the journey with the farmer, right from conducting soil testing to guiding the farmer on quantities to apply and following up to check the improvement of the soil and its productivity," he says.

Muriithi encourages farmers to adopt new technologies that offer solutions to the challenges they face. He asserts that biochar from Pure Plant Organics is certified by KEBS, Kilimo Hai, and ECO Cert.

Challenges

One major challenge faced by the duo is the misinformation that comes with a new product in the market and the gaps in regulation.

"Secondly, farmers do not differentiate between biochar and charcoal dust, but we are working with the organic input manufacturers association to create more awareness on biochar."

Looking ahead

To scale up the enterprise, Pure Plant Organics is working to increase production capacity from the current 70 tonnes per month to 100 tonnes. To achieve this, they are already constructing a dryer, to spread out the pyrolyzed biomass powder, to dry so that it does not absorb moisture, as it awaits milling.

Establishing collaborations is another approach they have adopted to reach more clients. "Since urban and peri-urban dwellers with kitchen gardens and backyard plants are our regular customers, we have partnered with Killicycle.

This is an organization that encourages families in the urban areas to recycle organic waste by selling them composting bags to put all organic waste and produce vermijuce to use in their gardens. Once in a while, we take the excess waste in exchange for biochar," says Muriithi.

With the passion to enable farmers to produce optimally, these young entrepreneurs are changing the soil fertilizer space with sustainable soil amendment solutions.

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Shambah Assistant- gives you soil test results in just 15 minutes

Mobile app to test soil nutrients and provide tailored recommendations

By Erdly Agona

IN JULY 2024, Pure Plant Organics, in partnership with Shamba Solutions, launched a portable soil testing kit called the Shambah Assistant to address the challenges faced by small-scale farmers across Kenya. Designed to deliver results in just 15 minutes, the device uses a mobile app to test for soil nutrients and provide tailored recommendations at only Ksh 1,000. Shambah Assistant is a downloadable app for mobile phones, and the test is conducted on a wet soil sample. The soil sample is mixed with water, as water acts as an activating agent. The device's sensor is then dipped into the soil-water mixture and connected to the phone via the app. Once connected, the app prompts for information to be keyed in, which includes farmer's details along with the crop and crop variety intended for planting. The app then analyzes the soil and provides tailored recommendations based on the specific crop selected.

Pure Plant Organics developed a model that not only ensures accessibility of the technology by rural small-scale farmers in far-flung areas, but also creates an income-generating activity for youths. "The gadgets are mostly purchased by young people seeking employment. We sell the gadgets at Ksh15,000, so with about 15 farmers, one can recoup the investment," says Ngige, emphasizing that they mostly work with agronomists, whom they train on how to use the machine and collect samples. "We also give brochures that inform farmers on how to collect samples," he says. The agronomists pay a fee of Ksh 200, to Pure Plant Organics for every soil test performed.

Derrick also emphasized the impact of the technology, saying, "We have had case studies where farmers realized that the issue with their soil wasn't nitrogen or potassium, but pH imbalance. Once they corrected the pH, their production costs significantly reduced. On the other hand, youths are using this technology to offer services to farmers, as they earn an average of between Ksh 15,000 to Ksh 20,000 per month."

Since its launch in July 2024, the soil testing kit has reached 15 counties, with 60 units sold and more than 3,000 farmers already benefiting from its use. Kenyan small-scale farmers are adopting affordable field-ready tools like Shambah Assistant to manage their soils.



Shambah Assistant is a downloadable app for mobile phones, and the test is conducted on a wet soil sample. The soil sample is mixed with water, as water acts as an activating agent. The device's sensor is then dipped into the soil-water mixture and connected to the phone via the app.

Extensionists providing soil testing services using the Kit

Name	Contact	County
Samuel Mwangi	0706652483	Kiambu
Lawrence Mungai	0705412823	Kiambu
David Kioko	0707323166	Machakos
Ferdinand Wafula	0711270905	Vihiga
Kelly Kemboi	0708374554	Uasin Gishu
Edna Kinyua	0792397205	Nyeri
Ian Kanika	0796325851	Murang'a
Aron Kibira	0711678525	Meru
Loise Kabuti	0746424437	Murang'a
Joel Ngari	0718607137	Nyahururu
Eugene Ndwiga	0721518182	Kiambu
John Maina	0723617322	Nakuru
Eli Njenga	0724762306	Nakuru
Annie Lenana	0712345678	Kiambu
Kennedy Muriuki	0790221571	Kirinyaga
Jonte Wizzy	0706606819	Kiambu
Cyrus Kirui	0794377191	Nakuru
Erick Omondi	0706629193	Nairobi
Elizabeth Muia	0791159922	Kiambu
Daniel Wainaina	0790970738	Kitui
Oyieki Cuxton	0718905663	Nyandarua
Gregory Chebungei	0700588830	Tharaka Nithi

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Farm AI: Photo-to-answers instantly

By Vincent Kipyegon

THE DISRUPTION OF evolving technology has impacted all sectors of our daily lives, and as it continues to evolve, technology keeps boosting production at work. Artificial intelligence, referred to as AI, is an emerging technology consisting of computer programs that mimic human-level intelligence in learning, reasoning, and problem-solving capabilities.

AI tools are available for end users as chat interfaces via web browsers or smartphone mobile application. Users can seamlessly interact with them by writing text-based questions, uploading images, and files accompanied with prompts.

In the agricultural sector, the application of artificial intelligence presents endless opportunities in improving crop yield and boosting production across the sector, from seed planting to market. AI plays a vital role in value addition, providing valuable insights based on the existing processes.

A particular section where AI plays a vital role is crop disease detection and management, where these programs have been fed with millions of information on crop diseases so that they can ingest them and provide meaningful information important to farmers in identifying diseases affecting crops.

As a farmer, during one of the frequent farm inspections, you spot an abnormality in your crops; you take a picture using your phone and upload it to one of the AI tools, prompt it to identify the issue, the tool searches through its system and returns with results.

Google Gemini is a freely available web-based AI tool for users with Gmail accounts to interact with AI. The chatbot-based tool enables users to interact with it, upload files and images, and request a response. An example is a picture of capsicum fruit, commonly referred to as pili pili hoho, with a disease that a farmer wanted to identify and prevent. The picture was uploaded to Gemini and prompted as below.

Identify the disease on this capsicum crop and advise on...



Gemini returned the response that the capsicum had developed blossom end rot, a physiological disorder affecting peppers and tomatoes that is primarily caused by a deficiency of calcium in the developing fruit. According to Gemini, blossom-end rot (BER) has the following symptoms:

1. Dark and leathery spots on the blossom end of the fruit.
2. The affected area may start as a watery-soaked spot that quickly turns black.
3. Dry rot in the blossom end of the capsicum fruit, which in severe cases causes the entire end of the fruit to rot.

Finally, it provided treatment and prevention measures for managing the disease.



The capsicum crop in the image shows **blossom-end rot (BER)**, a common physiological disorder affecting peppers and tomatoes. ▾

Since most AI tools are not opinionated, they do not recommend specific pesticides and drugs but rather adjust to default recommendations, organic ways of disease prevention and treatment.

1. Proper fertilization – use balanced fertilizer targeting the fruiting stage of capsicum crops and avoid excessive use of nitrogen-based fertilizer. Apply foliar sprays that contain sufficient but not excess calcium supplements to the leaves and the developing fruits. Use compost manure to improve soil structure and water retention.
2. Conduct a soil test to determine the soil pH and nutrient levels. Recommended soil pH for capsicum is 6-6.8
3. Frequent watering of plants to maintain even soil moisture.
4. Observe proper farm hygiene and sanitation by removing affected plants from the farm to prevent further spreading.
5. Plant certified seeds, ensuring proper spacing of 45 cm by 60 cm.
6. Avoid root damage during transplanting, as this can impede the absorption of calcium.

The integration of AI in agricultural processes can lead to increased farmer knowledge, resulting in a boost in farm yields, environmental conservation, improved human and animal health, and increased revenue due to higher farm produce, which in turn improves livelihoods and alleviates poverty.

Through weekly Kiswahili and local languages radio programmes, TOF Radio helps to improve awareness and knowledge of sound agroecological practices, strengthen the link between researchers and farmers to enhance food security, reduce poverty and increase household incomes among farmers in Kenya.

TOF Radio Stations

Emuria FM	Monday and Friday -10-11AM
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TOF ANSWERS YOUR QUESTIONS

Facts you may not know about honey

By Erdly Agona

The world marked World Bee Day on May 20th, with TOF Radio airing several talk shows aimed at raising awareness of good beekeeping practices and highlighting their importance for food security and environmental health. These shows attracted numerous listener questions, underscoring the public's interest in understanding that bees are not just kept for honey, but are also indispensable pollinators. Below are some common questions about bees and honey:

I was told honey is medicine; is that true?

Yes, it's true! Honey has been used as a medicinal agent for thousands of years across various cultures. It has antibacterial and antifungal properties, helps reduce inflammation (anti-inflammatory), and aids in faster wound healing. It's often used to soothe coughs and sore throats and can also help with digestive issues.

How can I tell if honey is genuine or fake?

Distinguishing real honey from fake can be challenging, but there are a few methods to help you:

Water Test: Put a spoonful of honey into a glass of water. Real honey will settle at the bottom without dissolving immediately, while fake honey will start to dissolve quickly.

Fire Test: Dip a small cotton swab into the honey and try to light it. Real honey will burn easily, whereas fake honey will melt and might not catch fire.

Texture: Real honey is usually thick and flows slowly when poured. Fake honey is often thinner and flows more quickly.

Smell and Taste: Real honey has a distinct smell and taste depending on the flowers the bees visited. Fake honey often lacks a strong scent and might have an overly sugary taste.

Crystallization: Real honey, especially over time, will start to crystallize and form solid sugar crystals. This is a good sign of authentic honey. Fake honey rarely crystallizes.

How much honey should you use per day? And are there any side effects if you use too much?

The recommended amount for adults is between one and two tablespoons (approximately 10-20 grams) per day. Yes, if you use too much, there are side effects. While honey has many benefits, it's still high in sugar. Consuming too much honey can lead to:

- Weight gain** - due to its calorie and sugar content.
- Increased blood sugar** - especially for people with diabetes.
- Dental problems** - occur because of its acidity and sugar content.
- Digestive issues** - such as diarrhea or gas, in some individuals.

There's honey with no taste, what's the problem?

Honey with little to no taste or a very faint taste could be a sign of the following issues:

Fake/Adulterated Honey: This is the primary culprit. Honey that has been mixed with sugar syrups (like corn syrup or rice syrup) or water will lose its natural flavor and aroma.

Overheating: When honey is heated to high temperatures, some of its volatile compounds that give it flavor and aroma can be destroyed or lost.

Immature Honey: Sometimes, honey might be harvested before it has fully matured in the hive. The bees haven't yet evaporated all the water and added the enzymes that give it its unique flavor and properties.

Floral Source: While less common, some flowers produce nectar with a very mild flavor. However, this doesn't mean it has no taste at all; its flavor might be very subtle, depending on the region.

How do I get started with beekeeping?

Get Training: Look for beekeeping mentors or local beekeeping groups to learn more. There are also experts willing to train farmers on the whole process of apiculture.

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