

Dear reader,

WE PRESENT TO you yet another edition of TOF Magazine packed with informational articles that will inspire you to change the way you do things in your farm.

Have you foregone a portion of your land due to unproductivity? Florence Mwakavi's story on restoring a depleted land is a testimony that knowledge on regenerative agriculture is all you need to transform the parched soil to fertility. We not only tell you her story, but we also guide you on how to employ the techniques that helped transform her farm.

This edition breaks down the process of establishing swales that divert all run off water into a farm and tips on how to retain the water for long periods; even long after rains have gone.

With the increasing cost of living, it is important to think of income generating activities. Have you ever thought of growing garlic onions for the market? Read to find out the process of growing them and diversify your income.

Sylvia's Diary this month reckons the importance of connecting with your customers. If you are a commercial farmer and have been wondering how to make more from your work, Sylvia, an organic farmer and vegetable shop owner shares her experience in connecting with customers for better gain business wise and improved social values.

These and many more in this month's edition. *Enjoy the read!*



IN SEASON

Fighting Fall armyworm the organic way

Use of pesticidal plants such as *Tagetes minuta* is an organic-based pest management technique and this sparked my interest to tap this indigenous technical knowledge practised to fight FAW

By Grace Kinyanjui

FIGHTING FALL ARMYWORM the organic way by use of - *Tagetes minuta* (wild marigold)

While conducting a field survey in Murungai village within Laikipia County, I met Wanjiku wa Kinyua with a 20-litre-Knapsack sprayer on her back spraying the young maize crops on her farm. The spray includes a strong-smelling herb known as wild marigold or *Tagetes minuta* L. This plant

is an invasive weed in Kenya and a farmers' enemy number one because of competing heavily with crops for nutrients. However, *Tagetes minuta* has been Wanjiku's best friend that she uses as a botanical pesticide to manage fall armyworm (FAW) and other insect pests attacking crops on her 2-acre farm. "The use of pesticidal plants such as *Tagetes minuta* is an organic-based pest management technique and this sparked my interest to tap this indigenous technical knowledge practised to fight FAW", says Wanjiku.

Formulation of *Tagetes minuta* pesticide: At the flowering stage, Wanjiku harvests *Tagetes minuta* plants by uprooting. She states that the leaves and flowers are the main components of her botanical pesticide. These plant parts are dried and soaked in water in closed 20-litre plastic containers for five days. Thereafter, her concentrated botanical pesticide solution is filtered using a strainer and is ready for use.

Detecting the presence of FAW:

Wanjiku has a monitoring routine that helps both in the early detection of FAW



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A lucrative agribusiness venture

In garlic is a high-value crop and herb from the onion family used both for medicinal purposes and to spice food.
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IN SEASON

Fighting Fall armyworm the organic way - *Tagetes minuta* (wild marigold)

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infestation and timely management of the pest. "My monitoring programs start as soon as the maize plants germinate and I therefore, encourage all farmers to practice crop scouting around their farms at least once a week", Wanjiku said. The most used sampling pattern while scouting is a predetermined zigzag because it ensures that all regions of the farm are scouted. Farmers should look out for FAW eggs, larvae, and damage symptoms like window panes and elongated holes on the leaves, and whorl (funnel) damage with frass. The presence of FAW on maize plants signals that pest management action should be taken in order to prevent further crop damage.

Application of *Tagetes minuta* pesticide: Wanjiku starts application of the formulation only after the young maize plants have seven fully developed leaves. First, she conducts efficacy trials on a few infested plants to assess the insecticidal activity



against FAW and also to determine the appropriate concentration that will not cause leaf scorch. Highly concentrated formulations are diluted with equal quantities of soapy water. Because the FAW feeding activity is higher during the night, the sprays are usually done late in the evening or very early in

IN SEASON

Harvesting surface-run-off through swales

By Purity Wanjiru

MOST FARMERS IN Kenya depend on rain fed agriculture with poor irrigation to support farming during dry seasons. However, with the skills and capacity required, farmers can make the most out of rainwater by harvesting and storing it.

There are various techniques of water harvesting and storage. This article features a technique used to collect run off water from the land surface during the rain seasons. Surface run off is the water from roads, tank overflow and grey water.

Use of swales

Swales are shallow, long level excavations that run along the contours. Before establishing a swale, consider the sloppiness of the land and the roof capture from the buildings.

Functions of a swale

- To slow down the speed of surface runoff on the land.
- To spread the water according to their length across the land
- To slow down and hold water so that it has time to infiltrate in the soil.
- To recharge depleted water table.

General rules for making swales

- The steeper the slope, the closer together, narrower and deeper they must be.
- Swales are site specific and are carefully designed according to local rainfall, slope and soil type.
- Plant trees and other vegetables to turn water into biomass





Initially I would go to agrovet stores and buy chemical pesticides based on the dealers' recommendation, but now I prepare organic pesticides at my home

the morning when the larvae are active and not hiding. These sprays are applied directly to the whorls and top leaves of all maize plants on the farm, including both infested and healthy plants. Wanjiku said, "A single application of *Tagetes minuta* serves a dual purpose of killing the FAW larvae and protecting the healthy plants from a possible infestation". She has also observed that this botanical pesticide has both quick knockdown activity and long-lasting efficacy against FAW. She added, "Also, I use dilute solutions of *Tagetes minuta* to fight black aphids on beans and whiteflies attacking my potatoes and tomatoes".

Integrating *Tagetes minuta* pesticide with other IPM-based practices:

Wanjiku is well aware that FAW cannot be effectively managed by a single pest control strategy. She, therefore, employs other practices such as intercropping maize and beans to help reduce pest pressure and the physical control method of handpicking and crushing FAW eggs and larvae. Also, she has prepared a

concoction of chili pepper and ash, which she normally applies on the leaf whorl of infested maize plants.

The utilization of such indigenous technical knowledge in pest management will help reduce conventional pesticide usage and associated negative impacts on human and environmental health.

Wanjiku explained, "Initially I would go to agrovet stores and buy chemical pesticides based on the dealers' recommendation, but now I prepare organic pesticides at my home." She also added, "This indigenous practice has resulted in reduced use of synthetic chemicals and contributed to the production of safe and organic food on my farm. My pesticides are homemade, easy to prepare, and the ingredients are easily available, which helps to cut down my production costs".

The key takeaway from Wanjiku is that *Tagetes minuta* has both preventive and curative pest control attributes against a range of insect pests. Therefore, the successful integration of this botanical pesticide into the existing IPM programs will greatly lower FAW infestation and promote organic maize farming. Her parting shot was, "I am encouraging farmers to stop using synthetic chemicals to fight crop pests and instead turn to our indigenous pest management practices because they are effective".

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- and retain soil moisture
- If swales overflow, there are not enough of them.

Instruments used to construct swales

- An A- frame, used for small designs
- An Eyed spirit level, used for large designs

How to make a swale

- If you are digging several swales, you need to determine how far apart to make them.
- They need to be sized and spaced so that all the runoff pouring off the area above each swale can be held by the adjacent swale without overflow.
- The spacing on the swale depends on the amount of rainfall hence the more the rainfall, the closer the swales should be spaced to catch the heavier runoff.
- On steep slopes and for compacted clay soils, runoff will be heavier so the swales should be closer together.
- Then layout the swale lines on the level. You are creating a contour line. For this you will need a leveling device. You can build your own A-frame level. The critical point here is for the swale to be truly level so that water will infiltrate evenly and steadily.
- Dive in pegs to mark the course of your swale. On hilly ground you may need to space your pegs about 6 feet apart to avoid height errors, but on a gentle bumpy ground, space between 10-15 feet.
- Once the course is marked, begin digging. You can dig a rough trench 1 foot deep and about 18 inches wide and mound the excavated soil along the downhill edge of the trench.
- For gentler, less visible swale, dig only about 6 inches deep but 2-3 feet wider and make the downhill berm wider too.
- Check the bottom of the swale using an A-frame to make sure that it is level along its length. If need be, you can dig

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other deep spots in the swale above and put water loving plants to obtain additional water to their roots.

- After the swale is dug you can partially fill it with mulch, which helps to hold and absorb water and make the swale less noticeable.
- Planting along the berm will make the swale more stable and multifunctional. Trees and shrubs are ideal, because their deep roots will hold the berm in place, and the leaves will add humus to the soil. The shade will also slow evaporation.

How to make an A-frame

Making your own leveling tool is very important and very easy. All you need are the following:

- 2 equal lengths of wood about 1.8 meters long.
- 1 piece of wood about 1.1 meters long
- 3 nails or screws for points A, B and C
- 1.5 meters of string
- weight or other well balanced heavy object

Using an A-frame

Place one leg at the beginning of the line to be laid out. Swing the other leg along the ground until the string aligns with the center mark. Mark this on contour spot and continue pivoting and mark until the line is laid out.

Advantages of on farm water harvesting

- It reduces soil erosion, storm water runoff, flooding and pollution of surface water with fertilizers, pesticides and other sediments.
- Water harvesting practices are essential for dry land farming in arid and semi-arid regions.
- It increases the availability of water during dry seasons by increasing the levels of dried boreholes.
- It increases ground water recharge and reduces storm water discharge, mitigates urban flooding and over-loading of sewages.

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THE ENVIRONMENT

Hygiene is key in disease prevention

Hygiene refers to behaviours that can improve cleanliness such as frequent hand washing and lead to good health

By Amos Mutharimi

DISEASES BROUGHT ABOUT by contamination of water and food have been on the rise lately; but what is our community doing wrong? We need to go back to the basics of ensuring good hygiene practices at home and in social set ups.

Hygiene refers to behaviours such as frequent hand washing and facial cleanliness that can improve cleanliness and lead to good health. Proper hygiene practices such as covering your cough and sneezes, proper showering with soap and water, and washing hands after handling animals prevent many diseases.

Sanitation refers to the safe disposal of human waste and sewage, and the provision of adequate services and facilities for that. It involves avoiding human contact with faeces and washing hands with soap. Sanitation systems are designed to preserve human health by creating a clean environment that prevents disease transmission, particularly via the faecal-oral pathway.

Effects of poor sanitation and unhygienic practices

Poor sanitation is linked to the transmission of diarrhoeal diseases such as cholera and dysentery, as well as typhoid, intestinal worm infections and polio among others.

According to World Health Organisation, 829 000 people in low- and middle-income countries die as a result of inadequate water, sanitation, and hygiene each year, representing 60% of total diarrhoeal deaths. Diarrhoea remains a major killer but is largely preventable.

Proper sanitation facilities promote health because they allow people to dispose of their waste appropriately, preventing contamination of their environment and reducing risk to themselves and their neighbours while breaking infection cycles.

Basic hygiene practices

- Cleaning surfaces with commercial cleaners that contain soap or detergent decreases the number of germs on the surfaces and reduces the risk of infection from surfaces in your facility. Cleaning alone removes most types of harmful germs (like viruses, bacteria, parasites, or fungi) from surfaces. Sanitizing reduces the remaining germs on surfaces after cleaning.
- Disinfect surfaces to kill harmful germs that remain after cleaning. By killing germs on a surface after cleaning, disinfecting can lower the risk of spreading disease.
- Maintaining safe diapering and infant feeding practices to avert the spread of germs and protect children and caregivers from getting sick.
- Frequent cleaning (after every meal) of infant feeding items including bottles and the nipples, rings, caps, syringes, medicine cups, spoons, or supplemental nursing system.
- Safe storage of food and drink items.
- Diligently cleaning and trimming fingernails, they may harbor dirt and germs and can contribute to the spread of some infections, such as pinworms.



- Maintaining healthy foot hygiene by washing your feet, clipping your toenails, wearing well-fitting, protective footwear, and regular checks of cuts and swellings on the feet to prevent infections.
- Maintaining facial cleanliness by use of soap and clean, running water to remove dirt, oil, and unwanted debris from your face. Proper care of ears, eyes, contact lenses, mouth, and teeth.
- Maintaining a healthy scalp and hair through good hygiene and proper hair care by using soap and clean water to remove dirt, oil, and unwanted residues in your head helps prevent and control many diseases and conditions.
- Proper disposal of wastewater and fecal sludges. This includes building proper, clean and sanitation facilities such as toilets and latrines while establishing adequate sewer systems in different locations.
- Washing fruits and vegetables thoroughly before consumption.

Key times to wash hands

- Before, during, and after preparing food
- Before and after eating food
- Before and after caring for someone at home who is sick with vomiting or diarrhoea.
- Before and after treating a cut or wound
- After using the toilet
- After changing diapers or cleaning up a child who has used the toilet
- After blowing your nose, coughing, or sneezing
- After touching an animal, animal feed, or animal waste
- After handling pet food or pet treats and
- After touching garbage

Household water treatment

Drinking unsafe water impairs health through illnesses such as diarrhoea, and untreated excreta contaminates groundwater and surface waters used in our communities. The following methods can be used to make water safe from germs.



Boiling

Boiling or heating water is the most widely used and effective method to kill disease-causing germs, including viruses, bacteria, and parasites.

Steps for boiling water:

- Bring clear water to a rolling boil for 1 minute.
- After boiling, allow the water to cool before use.
- Store the boiled water in clean, sanitized containers with tight covers.

Solar disinfection

It is a method of using heat and UV radiation to kill bacteria and parasites in water. Solar disinfection works by placing contaminated water in a transparent container and exposing it to strong sunlight for 6 to 8 hours if sunny, or 2 days (if cloudy). This method is most appropriate when water is clear and clean, and transparent containers for treatment are available.

Slow sand filtration

Slow sand filtration effectively removes turbidity (cloudiness) and microorganisms through various biological and physical processes in a single treatment step. A slow sand filter consists of vertically arranged layers of components. When constructed, the filter consists of a tank, a bed of fine sand, a layer of gravel to support the sand, a system of underdrains to collect the filtered water, and a flow regulator to control the filtration rate. No chemicals are added to aid in this filtration process.

Chlorination

Chlorination is a common chemical disinfection technique that involves adding a chlorine-based product (such as sodium hypochlorite, calcium hypochlorite, or household bleach) to water to kill bacteria and viruses. Other chemical disinfectants, such as iodine and chlorine dioxide, can also be effective for disinfecting water. Using or drinking water with small amounts of chlorine, iodine, or chlorine dioxide does not cause harmful health effects and provides protection against waterborne disease outbreaks. Chlorine products can kill most harmful or disease-causing viruses and bacteria, but most disinfectants are not as effective as boiling for killing more resistant germs, such as the parasites *Cryptosporidium* and *Giardia*.

Sedimentation

When water and flocs undergo the treatment process, they go into sedimentation basins. Here, water moves slowly, making the heavy floc particles settle to the bottom. Floc that accumulates on the bottom is known as sludge. This is carried on to drying lagoons. Direct filtration does not include the sedimentation step and the floc is just removed by filtration.

Choosing a safe water storage container

Safe storage containers prevent contamination of safe water while the water is being transported and stored. When storing safe water, it is best to use a container that is made of durable plastic, ceramic, or metal, has a narrow neck or opening so water can be poured out without hands or objects entering the container. Clean and sanitize water storage containers before use while labelling the water safe for drinking. Keep the stored water in clean areas and under cool temperatures.

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FARMER'S TESTIMONIAL

Makueni farmer turns a barren farm into a thriving food forest

Regenerative agriculture is a sure way to restore degraded land back to productivity, since the farmer employs techniques that feed the soil

By Caroline Mwendwa

FLORENCE MWAKAVI IS a small-scale farmer in Wote, Makueni County. She owns three acres of land where she has been growing maize, cowpeas, beans, and pigeon peas for several years until the land became unfertile. Soil degradation resulted to extremely poor yields to the extent that she had to forfeit a portion of her land. "I was used to planting the same type of crops year in, year out and the farm grew lesser and lesser productive. It got to a point where I left parts of the land uncultivated, since despite the hard work of planting, I ended up not harvesting anything," says Florence.

The part of land that she had left uncultivated had proven unproductive for seasons, and it was covered by a thicket of wild grass. This was until John Mutisya, an extensionist from Biovision Africa Trust, who is based in Machakos County paid her a visit.

"We had just rolled out a project dubbed 'regenerative agriculture' in the lower Eastern, through a collaboration between ENVIU and Biovision Africa Trust, aimed at restoring depleted lands back to productivity. Florence Mwakavi was lucky to be one of the farmers selected for this project," says Mutisya.

According to Mutisya, regenerative agriculture is a sure way to restore degraded land back to productivity, and it works because the farmer employs techniques that feed the soil. What goes into the soil is more than the crops draw from it, and overtime there is accumulation of nutrients season after season, making it sustainably productive.

Steps to land restoration in regenerative agriculture:

Water harvesting

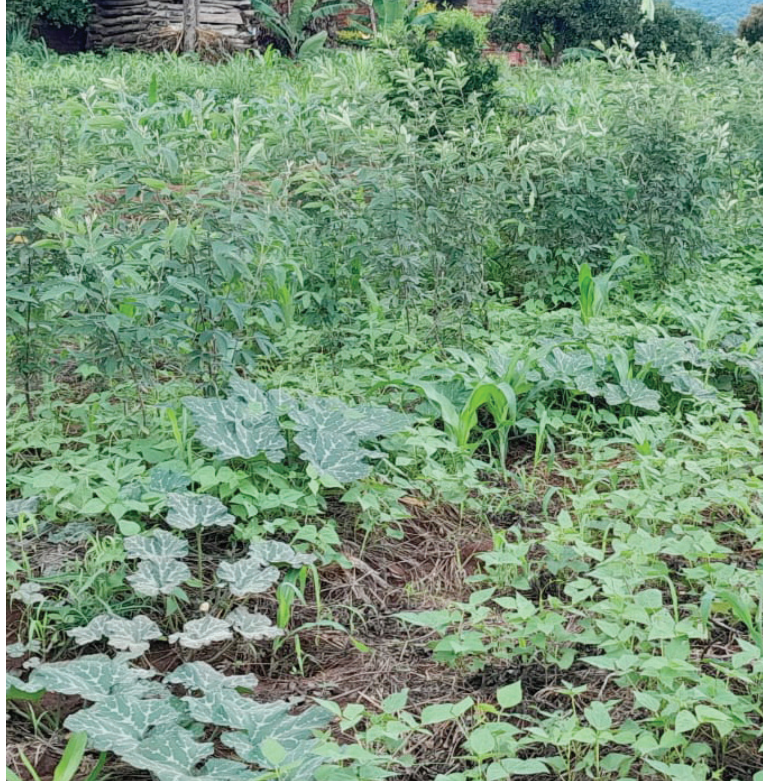
To start off, the farmer has to employ tactics that drive water into the farm and ensure that this water is retained. In Mwakavi's case, during rainy seasons, water used to pass through the deserted piece of land freely and down into the river. The first step therefore was to survey the landscape of the farm and establish bio-swales that channel all the flowing water into the farm.

Creative farm layout

The second step is to create smile berms around each tree in the farm. If there are no trees, a farmer is advised to plant fruit trees in layers in the farm. That is one line of tall trees such as mango trees on the upper part of the farm, followed by a line of shorter trees such as papaya, then maize then pigeon peas.

Around each tree, Florence created a smile berm, whereby a semi-circular basin is dug around the tree, and on the heaped soil made from digging the semi-circular basin, a variety of green vegetables are planted.

These can be beans, cowpeas, amaranth, etc. Inside the basin, plants such as water melons or pumpkins, are planted so that



they can cover the surface around the tree to conserve moisture especially after the rains stop.

Establishing planting holes

The third technology is digging planting holes for planting crops such as maize. These are made by digging a hole 40 cm deep. This ensures that any hardpans that might have formed are broken since hardpans are usually 20 to 30 cm deep from the ground. After digging the planting hole, the next step is to return the soil back into the hole, then mix it with decomposed manure, ash, biochar and any grasses weeded from the farm. The seeds are then to be sowed into this mixture. This process is repeated for every planting hole. No synthetic fertilizers are applied.

Mulching

The fourth step is to ensure that there is no part of the land left bare. To achieve this, Florence planted cover crops between the plants in the farm or used mulch such as leaves from pruned trees, or grasses. This ensures that all the water that the soil receives during rains is used in nourishing the plants in the farm, is retained for continued use and not left to evaporate in the sun.

To ensure the farm receives sunlight, yet it is not exposed to excessive heat, partial shading is done. "We observed the topography of the farm to see which side is strongly hit by the sun especially in the afternoon, and around that part of the farm, we established trees that provide shade, and on the opposite side we planted wind breakers," says Mutisya. This keeps the farm from the heat of the sun and harsh weeds but allows for sunshine especially in the morning hours.

Due to ground cover through planned shading, mulching and cover crops, there is minimal weeds in the farm.



90kg

In the first season of adopting these technologies in her farm, Florence harvested a full 90 Kg bag of maize from the 1/8th of acre piece of land that she had earlier neglected.

Crop diversification

In regenerative agriculture, a piece of land should not have less than ten varieties of crops. Crop diversity enhances productivity as different crops serve different purposes in the soil biology, pest management and shading, etc.

"In my farm now I have over ten varieties of crops including: pigeon peas, beans, cowpeas, sweet potatoes, maize, citrus trees, bananas, papaya, mango trees, fodder trees such as *Leucaena*, *acacia*, and *Sesbania*," says Florence.

The farm that had once been neglected due to poor productivity is now a food forest, with blossoming crops of all types. Florence has a variety of food for her family including cereals, vegetables, fruits tubers and enough fodder to feed her cattle.

After harvesting, all the residue is reused in the farm. Maize stalks and other plant parts remaining are left to cover the ground. By the next planting season, all mulch will have decomposed further enriching the soil with more organic matter. As this process continues, season after season, there will be no need to weed the farm; all the farmer requires to do is to retrace the planting holes and plant the seeds.

Pest management

"I was trained on how to make biopesticides from plant extracts to manage pests in the farm and biofertilizers including manure to enhance soil fertility," says Florence.

In the first season of adopting these technologies in her farm, Florence harvested a full 90 Kg bag of maize from the 1/8th of acre piece of land that she had earlier neglected. Additionally she harvested beans, cowpeas, fruits, and vegetables from the same piece of land.

"I plan to replicate this model of farming to the rest of my farm," she says, affirming that indeed having gained knowledge on how to restore health to her barren land, she has discovered that there is no land that is beyond restoration.

"What we lack is information, that is why the most unproductive piece of land has outdone the entire farm, just by applying the knowledge I acquire from Mutisya and his team," she asserts.

Florence is full of gratitude for having discovered the secret of building soil fertility in her depreciating farm. She is upbeat that once she has regenerated the rest of the farm and adopted the farming techniques she has learnt, she is going to harvest, even more than double of what the land yields.

"Once organic matter accumulates in the soil by repeated practice of these techniques season, after season, Florence's farm will be highly productive, she will never need synthetic fertilizers to grow her crops, as the more she plants, the more the soil acquires organic matter," says Mutisya.

This method of farming has the following benefits to the soil:

- Increased organic matter
- Improved soil biology
- Improved soil PH
- No hard pans
- Accumulated micro-organisms
- Sustained soil moisture content

"Most crops dry up once rains disappear because the soil is left exposed to the sun and water evaporates into the air, leaving the soil dry. Using swales, planting holes, mulching and planting cover crops ensures that the crops do well even long after the rains have gone", says Mutisya.

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LEARNER'S CORNER

Agroecology gives new lease of life to Gesarara Primary School, Kisii County

By Anthony Mukhongo

FOOD SECURITY HAS been under threat as productivity of farms goes down. In Kisii County for instance, since rain patterns were interrupted due to climate change, farmers have been complaining of diminishing yields from their earlier on productive farms.

Through Biovision Africa Trust's resource centre based in Suneka Kisii, farmer groups and schools have benefitted from trainings on how to restore soil health and practice climate smart agriculture to overcome challenges in the farm. Some of these technologies include composting, mulching, zero tillage and integrated pest management approaches.



Gesarara Primary School in Kisii County is one of the schools that has benefitted from these trainings. The school farm had a challenge of low productivity due to degraded soils that could not yield enough, the crops grown there were affected by pests and diseases that the staff did not know how to manage, except by use of synthetic pesticides that had proven unaffordable. "Due to continuity of low production, one of our teachers Mr. Nicholus Ayoti who was in a group of organic farmers (One Step organic farmer group) advised the administration to engage Biovision Africa Trust, which has extensionists in the area to come and build their capacity on how to properly manage the farm," says the school headteacher.

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“When we learnt how we can make better use of our school farm, we were very excited. The trainings have borne fruits as our school farm that used to be bare and mono-cropped is now, habited by diverse varieties of food crops,” he adds.

In the school garden, that had only two varieties of vegetables, I guided them on how to intercrop with plants that enhance pest repellence from the crops and trained them on how to make their own biopesticides from plant extracts and compost fertilizers using materials within the school farm. To enhance productivity the school adopted integrated farming by keeping poultry to provide manure among other benefits such as diversified diet and to provide a source of income by selling eggs to the staff and the community.

“We did not know of some technologies such as making of bokashi, a type of manure that is easy to prepare using locally available material and which can be used within two weeks of preparation. We also learnt various technologies such as planting mandala gardens and using vertical gardens which enhance the farm’s productivity by efficiently utilizing water and other soil resources.”

The school is now enjoying the benefits of agroecology as the farm has fruit trees integrated with other food crops to not only provide shade and serve as wind breakers, but they are also a source of food. In season, pupils enjoy avocados and bananas, which the school also sells to staff and the community to generate an income.

The school community has adopted the technologies I have taught them and have transferred them to their homes. 20 pupils and 6 teachers have adopted the trainings in their homes especially composting and establishing mandala and vertical gardens using containers and sacks in vegetable production.

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How to make meals from starchy roots, tubers and plantain

By Dr Patrick Maundu

Atap (Cassava– finger millet ugali) (Teso)

Ingredients

- 1 cup cassava flour
- 4 cups finger millet
- 6 cups water
- 1 tablespoon lemon juice

Preparation

- Mix the two flours thoroughly
1. Heat the water in a cooking pot
2. Remove 1 cup of the boiling water and put aside
3. Add lemon juice into the remaining boiling water
4. Add flour into the boiling water little at a time stirring vigorously to break the lumps
5. Add the earlier removed boiled water into the mixture, little at a time mixing thoroughly
6. Lower the heat, cover the pan and light cook for 5 minutes, mix again
7. Mix thoroughly till the ugali is well cooked for 20 minutes
8. Place on a serving platter.
9. Dip the spoon mwiko in warm water and use it to mould the ugali to a smooth round shape
10. Serves 4 people

Bada (Cassava ugali) (Digo)

Ingredients

- 3 cups cassava flour
- 1 cup maize flour
- 5 cups of water

Preparation

- Boil water in a cooking pot
- Mix the two flours thoroughly and add into the boiling water little at a time and stir vigorously
- Keep adding flour until it solidifies
- Lower the heat, cover and cook for 5 minutes
- Stir three times and cook for 25 minutes
- Mould it and serve with any stew

(fish, beef or vegetables)

Popularly eaten during lunchtime by Digo community as it is a high energy food

Mushenye (beans and sweet potatoes) (Vihiga)

Ingredients

- 1 Kg beans
- 5 large sized sweet potatoes (red variety)
- Salt to taste (optional)

Preparation

- Sort and clean the beans well
- Peel and clean the sweet potatoes
- Boil beans and sweet potatoes separately
- When ready mix and season to taste
- Mash the mixture to a soft consistency
- Serve warm with any stew or tea

Kimanga (cassava and pulse) (Taita)

Ingredients

- 2 kg of cassava tubers
- ½ Kg of dried pigeon peas
- Salt to taste
- 2 cups of thin coconut milk
- 1 cup of thick coconut milk

Preparation

- Cook pigeon peas till soft
- Peel and slice cassava and put them into the pigeon peas
- Sprinkle them with salt and then thin coconut milk, cover them and continue cooking until the cassava softens and most of the liquid is absorbed
- Add thick coconut milk and mash
- Continue cooking on low heat, stirring constantly until the milk is absorbed
- The mixture should be thick. Serve warm with vegetables or meat stew.



SYLVIA'S DIARY

Who grows your food; Do you know them?

Do we ask ourselves if we know where our food was grown, how it was grown and how it ended up on our plates?

By Sylvia Kuria

IN THIS ISSUE we will be reflecting on the Agroecological principle of Human and Social Values. When we refer to this principle we are basically placing a strong emphasis on values such as dignity, inclusion, equity and general improved livelihoods. We will also be looking at the aspirations of those who produce food, distribute as well as consumers who are an integral part of our food systems. I will be sharing about my aspirations as a farmer and how I connect with consumers in a sustainable way.

When I conduct trainings and interact with farmers and consumers one thing that we always ask and discuss is whether we take time to connect to our food. We ask ourselves if we know where our food was grown, how it was grown and how it ended up on our plates? If you live in the city chances are high that you shop in the local weekly markets near you or in the supermarkets that have replaced farmers markets as convenient "all under one roof" grocery stores. And for us in the country side we try to grow most of our daily greens, but buy other essentials from local markets.

Who feeds the world?

Small holder farmers provide 80% of all the food consumed globally. We always talk about how

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- Provides 6 servings

Quick starchy snacks

Any of the following:

Sweet potato, cassava, yams, green (cooking) bananas, taro

Preparation

- Peel the tubers or starchy fruits
- Wash thoroughly
- Put them in a cooking pot, add water to cover
- Boil (boil cassava twice)
- Drain water once soft
- Let them dry
- Serve with e.g. tea
- Salt to taste (optional)

Other options:

- The starchy foods can also be roasted over low charcoal fire or in an oven with regular turning.
- Except for cassava, the tubers can also be boiled or roasted with coverings intact

Steamed matoke

Ingredients

20 large green (cooking) bananas
5 cups of water
Salt to taste
5 banana leaves (for covering the food while cooking)

Preparation

- Place banana leaves in the sufuria (aluminium pot) to line the bottom and sides
- Put the peeled banana fruits in the sufuria till full, add 3 cups of water and salt to taste then cover with banana leaves again

- Ensure that all the bananas are covered with leaves
- Place the sufuria on fire and let them cook for 1 hour minutes, remove from heat source
- Press the wrapped cooked bananas using hands to mash
- Serve with groundnut sauce, vegetables, or tea

Banana leaves retain the flavour of the bananas and help keep the food warm

Cassava banana fritters

Ingredients

½ cup wheat flour
½ cup cassava flour
1 tbsp baking powder
1tbsp sugar
Enough cooking oil for frying
1 egg
1 cup mashed ripe banana
½ tsp salt
½ cup fresh milk

Preparation

- Sieve the wheat and cassava flours
- Mix the two flours
- Mix the flour with baking powder, sugar and salt
- Beat the egg and mix with milk, add to the mixture
- Add the mashed banana and mix to a thick consistency
- Scoop a spoonful and drop in hot oil 6 spoons at a time. Deep fry till golden brown on both sides
- Drain and sprinkle with little sugar
- Serve warm

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we are reliant on small holder farmer for food security yet in the agricultural value chain they are the most marginalised and make the least income. The irony of this fact, is also that most of the emphasis in terms of developing the value chain has also been on the production aspect, yet the results and real impact to farmers' lives is wanting.

When I started farming 14 years ago, I started with a home garden to provide for the needs of my family. When the produce was too much to consume I then decided to start selling my produce in the local markets and to middle men. I soon realised that I was not in charge of how much money I made for my hard work. The middle man would dictate the prices and because I did not have market intelligence, I had no choice but to accept whatever price I was offered. Because I did not have direct connection with consumers and was making peanuts, my farming venture was not profitable.

How can farmers regain their dignity?

This is the same story for most small holder farmers globally. Small holder farmers have come to accept that they will not make a decent livelihood from their farms. They send their children to schools and make sure their children will never become farmers and suffer as they did. It has become extremely difficult to convince the youth to engage in farming because they watched their parents slaving on the farm and making nothing out of it. The dignity and value of farming is now lost.

I found that I was disconnected to the consumers who are at the farthest end of the agricultural value chain and was getting the short end of the stick. The disconnect of farmers to consumers has also made the consumers not actively think about how and where their food was grown.

Where are the consumers?

When I got tired of enriching middlemen, I decided to seek out for the direct consumer and hopefully make

better income. Delivering home baskets was my first entry point to consumers. I got to learn a few lessons here. Consumers were very happy to receive farm fresh produce from local farmers. They were concerned about the safety of the produce and the issue of trust was major as they wanted to trace where the produce has come from.

When we opened our farm shop Sylvia's Basket, we partnered with small holder farmers from all over the country. For many small holder farmers supplying our shop was the closest they had ever been to consumers. Our model is very simple, farmers deliver the produce to our farm shop and on the same day we sell their produce to consumers.

How do we bring back dignity and improved livelihoods to our food systems?

It is pretty simple. We should look for ways to connect the consumers to farmers. Farmers will have a chance to sell their produce directly to consumers making better incomes and consumers have a chance to enjoy safe organic and fresh produce.

Not every farmer can open a shop or sell in the market, but I would like to encourage farmers to look for innovative ways of accessing consumers. One can share with neighbours that their produce is organic and sell to neighbourhoods. If you have a means of transport like a bicycle there is a possibility of doing home deliveries in your locality.

Consumers can make deliberate choices to source organic produce directly from farmers. If consumers took time to ask how their food got to their plates, they can and will find local farmers in their locality growing safe organic produce. This will close the gaps in the agricultural value chain and bring back dignity and improved livelihoods to all.

Sylvia Kuria is an organic farmer and sole proprietor of Sylvia's Basket. Email: sylviakuria@gmail.com Tel: 0738- 895- 395



TOF ANSWERS YOUR QUESTIONS

TOF Radio answers your questions

My name is Ambrose Matheri Mwinge from Matuu, Machakos County. I am inquiring on how to manage poultry diseases

By Charles Kimani

POULTRY FARMING IS very popular across the country. This can be attributed to the low cost of production and the availability of a ready market. Despite that, like in any other business, poultry farmers face challenges throughout the year due to various factors the most common being diseases, especially during cold seasons.

This is because cold and wet weather conditions affect chicken's ability to produce and lose heat at a balanced rate, and so their immune system is weakened making them more susceptible to diseases.

In this article we share some of the diseases that you may come across in the coming months.

Fowl pox

Fowl pox is transmitted by flies and mosquitoes which are common during the wet season. Signs and symptoms of Fowl include: pimples on the birds' comb, wattle, and eyelids; watery eye discharge; a whizzing sound; and a loss of appetite. The dis-



ease can be controlled by vaccination, elimination of mosquito breeding sites (i.e., stagnant water), clearing bushes around, and maintaining proper hygiene and sanitation.

Coccidiosis

In the cold season, we all want to make sure our windows and doors are locked, presumably to keep the cold away. As farmers, we do the same for our poultry, not knowing that the high temperatures inside the coop and the presence of wet litter provide fertile ground for the coccidian organism that causes the disease. Signs and symptoms of coccidiosis disease include bloody diarrhea and a loss of appetite.

The disease can be controlled by maintaining good house hygiene and sanitation and avoiding overcrowding. Fortunately, this disease can be managed by using materials available locally. A farmer should mix blackjack in a litre of water, giving it to the bird for 3–5 days, and using pawpaw seeds by crushing the seeds and either mixing them with the poultry feed or water.

Brooder pneumonia

As we have seen, wet litter is the main factor that contributes to the majority of poultry diseases. Brooder pneumonia is not an exception. Poultry are infected by the inhalation of spores that are a result of dump litter or food. Symptoms include open mouth breathing, which is a sign that the chicken is having a hard time breathing; increased intake of water; and poor appetite. This deadly disease can be prevented by removing mouldy food and litter.

Worms

They mostly infect internal organs, such as the lungs and trachea. There are two groups of worms: round and flat worms. Common worms are tapeworms and flukes. Tapeworms invade the intestine, causing weakness and slow growth, and flukes attach themselves inside the body or beneath the skin. The worms can be treated by adding garlic, diatomite and vinegar in poultry's drinking water. Always remember the best way to manage poultry diseases is through proper feeding, good housing and maintaining proper hygiene.

Charles Kimani is the farmer feedback officer at Biovision Africa Trust. Email: ckimani@biovisionafrica.org

EARN FROM THE FARM

Garlic: A lucrative agribusiness venture with high demand

By Vincent Kipyegon

GARLIC IS A high-value crop and herb from the onion family used both for medicinal purposes and to spice food. A piece of garlic is a white or purple head the size of an egg that is made up of small cloves. When used as a food ingredient, garlic, locally referred to as *kitunguu saumu*, has a tantalizing aroma.

Garlic farming is a lucrative agribusiness activity that requires careful attention to detail, certified seed cloves, fertile soil, and water supply to produce the right quality and size of garlic bulb.

Health benefits of garlic

1. Boosts the immune system; strengthens the immune system's defense against bacterial, and viral infections. It is an effective prescription for the treatment of flu and common cold.
2. Promotes cardiovascular health; improves blood circulation and decreases blood pressure.
3. Rich in antioxidant elements that inhibit growth of cancer tumor.
4. Helps reduce the cholesterol levels in the body.

Garlic varieties

There are 2 broad categories of garlic in Africa,

1. Soft neck
2. Hard neck

Soft neck category is commonly grown in Kenya; varieties that fall within the category are the Africa giant, Arusha giant, and Rwanda giant. They come in a variety of colors, from white to purple.

Growing regions

Garlic thrives in areas with low humidity, low sunshine, moderate rainfall, and consistent temperatures through-

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Location	Frequency
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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!

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Garlic farming: lucrative agribusiness venture with high demand

out the year. In Kenya, the following regions are suitable for growing garlic: Nyeri, Murang'a, Kiambu, Kirinyaga, Machakos, Embu, Meru, Laikipia, Nakuru, Narok, Kajiado, and Bomet.

Ecological conditions

Garlic flourishes in a moderate climate with temperatures between 24°C and 30°C, low to moderate rainfall, and an altitude between 500 and 2000 meters above sea level. The crop grows best in well-drained, fertile loam or black cotton soil that is rich in organic matter and has a pH between 5.5 and 6.8. Soil testing is recommended to ensure high production of garlic bulbs and to eradicate soil-borne diseases.

Seed propagation

Garlic is planted by sowing garlic seed cloves directly into the soil. The cloves can be propagated from existing garlic or buying the garlic cloves. It is however highly advisable to purchase certified garlic seed cloves from the local agrovet stores as they are resistant to pests and diseases.

Field preparation and planting

Garlic planting is simple and straight forward.

1. Plough an open land twice, harrow it to break hard pans to achieve fine tilt and level surface.
2. Broadcast and mix the soil with manure few days to planting.
3. Create 25 cm ditches, each ditch should be separated by 15 cm from the other and 30 cm between rows. One garlic clove should be planted with its root end down and its tip facing up. Cover the clove with a shallow layer of soil.
4. The garlic germinates after 7-10 days, watering is key at this stage, add mulch if necessary.



Manure and fertilizers application

Compost or animal manure should be spread over the ground prior to planting. Organic manure has nitrogen that is used during the early stages of growth. After 4 weeks, apply organic foliar fertilizers to the plants on a 10-day interval. They supply the phosphate and potassium necessary for the growth of leaves and development of bulbs.

Irrigation, mulching and weeding

Weeds should be removed frequently by hand or hoe to remove competition for nutrients, light and water. Irrigation ensures the garlic plant receives adequate water for bulb development; drip irrigation is best suited for garlic. Mulching the plants with dry leaves or grass prevents moisture loss on the soil and prevents formation of weed.

Pests and diseases

Garlic is a pest repellent crop that produces strong pungent smell that deters pests and diseases. The common pests affecting garlic include red ants, thrips and aphids. The diseases include leaf rust, white rot, downy mildew and powdery mildew. Frequent weeding, regular field scouting and proper field sanitation practice deters attack from pests and diseases. There is a wide variety of organic pesticides and fungicides to apply to garlic crops in case of advanced pest infestation.

Harvesting and post harvesting

Garlic is ready to harvest after about 4 months, the leaves turn brown. Harvesting is done by digging the garlic plant and gently detaching the garlic bulb from the plant. The garlic is then cured in warm, dry place for 1 month. It is then graded and transported to market. Well cured garlic has a shelf life of up to 6 months.

Marketing opportunities

The prices of garlic vary depending on season and grading, ranging from ksh150-ksh250 per kilogram. A piece of garlic head goes for between ksh10 and ksh50.

The market demand of garlic in Kenya is high given that most of the garlic in the market is imported from China.

With a starting capital of ksh75,000 on a ¼ acre farm one can produce between 1.2-1.5 tonnes of garlic fetching around ksh120,000-ksh150,000. Garlic farming, if done well, is a lucrative agribusiness venture with big returns.

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